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Instructional Strategies in Grade 10 Technology and Livelihood Education - Technical Drafting: Basis for Enhance Teaching Practices

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Abstract

The study aimed to determine the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting of secondary school teachers in Lingayen, Pangasinan during the school year 2026-2027. The study sought to answer the following sub-problems: the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting along the five (5) domains of Technical Drafting, use of tools and equipment, maintain hand tools, drawing instruments, equipment and paraphernalia, perform mensuration and calculation, Prepare and interpret technical drawing, and Practice occupational health and safety procedure (OHS). The study focused primarily on the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting in grade 10 in Lingayen District III, Division of Pangasinan I during the school year 2026-2027. Respondents of the study consisted of six (6) public secondary schools with sixty (60) public school teachers of Technology and Livelihood Education (TLE) teaching technical drafting and twelve (12) School Administrators in the complete enumeration. The variables that were investigated consisted of the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting along the five (5) domains of Technical Drafting, their strengths and weaknesses in the different information communication technology competencies domains and degree of seriousness of problems encountered by the teachers themselves.The overall Average Weighted Mean indicates that respondents are generally Somewhat Competent in the different domains of Technical Drafting. Among the five domains, Use of Tools and Equipment obtained the highest average mean with a descriptive rating of Competent, showing that learners are relatively more skilled in handling drafting tools and equipment. Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia received the lowest of average mean, indicating that respondents have limited competence in maintaining and caring for drafting materials and equipment. The domains Perform Mensuration and Calculation, Prepare and Interpret Technical Drawing, and Occupational Health and Safety Procedure, all fall under the Somewhat Competent level, suggesting that learners still require improvement in technical and safety-related skills. Therefore, a proposed action plan was made to enhance the level of instructional strategies of technical drafting teachers.

Keywords: *Technical Drafting Domains and Competencies for Grade 10, Instructional Technologies, Use of Tools and Equipment, Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia, Perform Mensuration and Calculation, Prepare and Interpret Technical Drawing, Occupational Health and Safety Procedure*

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Chapter 1
THE PROBLEM

Rationale

In the global perspective, Technical drafting is important for Technical Livelihood Education (TLE) and Technical-Vocational-Livelihood (TVL) students because it develops the knowledge, skills, and discipline needed in technical and industrial careers. It serves as a universal language used by engineers, architects, designers, and technicians to communicate ideas accurately through drawings and plans. By learning technical drafting, students improve their ability to visualize objects, interpret measurements, and create precise designs that meet industry standards.

In the global workforce, technical drafting plays a major role in fields such as construction, manufacturing, engineering, automotive technology, and information technology. TLE TVL students who study drafting gain practical competencies that prepare them for employment, entrepreneurship, and further technical education. The subject also strengthens critical thinking, creativity, problem-solving, and attention to detail, which are essential qualities in modern industries. Furthermore, technical drafting helps students become familiar with digital tools and computer-aided design (CAD) software widely used around the world. This exposure increases their competitiveness and adaptability in both local and international job markets. Through technical drafting, TLE TVL students are equipped with lifelong skills that support innovation, productivity, and professional growth in a technology-driven society.

Technical Drafting is considered an essential subject that develops students' creativity, precision, analytical thinking, and problem-solving abilities. In the context of the K to 12 curriculum, Technology and Livelihood Education (TLE) plays a vital role in equipping learners with practical knowledge, technical competencies, and lifelong skills necessary for employment, entrepreneurship, and higher education, further, Grade 10 TLE–Technical Drafting aims to prepare learners for industry-related opportunities by enhancing their technical skills and exposing them to real-world applications of drafting concepts and technologies. The effectiveness of teaching Technical Drafting, however, largely depends on the instructional strategies employed by teachers inside the classroom.

Instructional strategies serve as the foundation of meaningful learning experiences, influencing students' engagement, academic performance, skill acquisition, and overall interest in the subject. In today's rapidly changing educational landscape, teachers are expected to utilize innovative, learner-centered, and competency-based approaches that respond to the diverse needs and learning styles of students. Effective instructional strategies not only improve comprehension of technical concepts but also foster active participation, collaboration, and critical thinking among learners. Despite the importance of Technical Drafting in developing employable skills, many public secondary schools continue to encounter challenges related to teaching methodologies, availability of instructional materials, student motivation, and integration of technology in instruction. These challenges may affect the quality of teaching and learning outcomes in TLE classes. Consequently, there is a growing need to examine the instructional strategies currently used by teachers and determine their effectiveness in

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enhancing students' learning experiences and competencies in Technical Drafting. Information Communication Technology (ICT) Technical Drafting is one of somewhat neglected area in the Technology and Livelihood Education (TLE). Maybe because of its complication or dynamism, but the combination of both art and science makes technical drafting unique. The study of technical drafting is embedded in the ICT course for grade 7 and 8 in the secondary TLE. The course entails the accuracy and precision in drawing designs, fabrication and plans for infrastructure such as houses, buildings, machineries and equipment or even essential properties of individual. The measurements and curves cannot be discounted, it must be delicately calculated and every stroke of hand are measured accordingly.

While the Revised K-12 Curriculum introduce the rise of the Industrial Revolution like ICT supported introductory in blueprint reading software in some public schools like in the areas of Makati and San Juan, with steam-powered machines intensifying and expanding human productive power, the 20th century was characterized by the birth of machine-powered flight and the emergence of broadcasting and computer technologies that extended the reach of human creativity even more and made possible new ways by which humans could live and work together.

In the past few years, technology has made information, once a scarce resource was not that abundant. With computers and Internet technologies in particular, more people can now have access to move quickly than even before. Moreover, the exponential growth in access to information has led to a corresponding exponential growth in the production of new information, and this has forces us to rethink our nations of what we need to learn and how we should learn Tinio, (2022).

Educational institutions acknowledge that they must move apace with the technology-driven changes in society and economy. In today's knowledge society, schools must ensure that learners possess the competencies to wield these new information and communication tools productively, they must equip learners with the critical and analytic tools necessary to live and flourish in an information-saturated environment. Mastery of facts has become less important than the ability to contextualize these facts and derive their meaning within specific contexts. Thus, learners must develop three foundational skills: "a) hot to find information; b) how to determine if what is found is relevant to the task at hand: c) how to determine if what is found is relevant information is accurate Thornburg, (2023).

Further, according to him, acquisition of these three foundational skills sets the parameters for the use of ICT in schools. ICT is an acronym that stand for Information and Communication Technology. ICT is the integrated of information processing, computing and communication technologies. ICT is changing the way we learn, work and live in society and is often spoken of in a particular context, such as in education, health care, or liabilities. A good way to thinks about ICT is to consider all the uses of digital technology that already exist to help individuals, businesses and organizations use information. ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form and is concerned with these products. Importantly, it is also concerned with the way these different uses can work

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https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

with each other. The tools that in part created the demand for information literacy skills in the first place can, if used effectively, be the best tools to help learners meet these demands.

The integration of ICT in the teaching and learning process is, potentially, one of the most viable interventions towards educational reform. The models of effective ICT use, however, cannot be constructed overnight. A variety of technological, curricular, pedagogical, institutional, cultural and financial issues to be addressed, and the complex interaction among these various factors means that constructing the best practice models would involve much "though, experimentation, and a willingness to spend the time to develop and refine strategies until they are proven to be effective" Deped Order No. 76, series of 2019.

The Department of Education DepEd, (2019) began a process of curriculum restructuring aimed at improving the quality of Filipino learners and providing restructuring aimed at improving the quality of Filipino learners and providing them the necessary skills for lifelong learning. The resulting 2018 Basic Education Curriculum (BEC) is being implemented nationwide beginning June 2018. Among the new curriculum's notable features is the reorganization of subjects into five learning areas, namely: Filipino, English, Science, Mathematics and Makabayan. The latter integrated previously separate subjects such as Social Studies, Physical Education, Health and Music, and Technology and Home Economics. Values Education, on the other hand, will be integrated in all learning areas.

According to the Philippine Commission on Information and Communication Technology (2022), learners in junior high school have moderate computer skill literacy as the knowledge and ability to utilize computers and related technology was due to insufficiency of resource laboratory materials, with a range of skills covering levels. Computer literacy can be attributed to advancement of laboratory equipment, exposure to digital technology and applications of modern program for learners to get familiar with.

Computer drafting is considered to be a very important skill to possess in developed countries. Employers want their workers to have basic computer skills because their company becomes ever more dependent on computers. Many companies try to use computers to help run their company faster and cheaper.

Beichner (2022) technical drafting using the computer are just as common as pen and paper are for writing, especially among youth. There seems to be an inversely proportional relationship between computer literacy and compositional literacy among first world computer users. For many applications-especially communicating-computers are preferred over pen, paper, and typewriters because of their ability to duplicate and retain information and ease of editing. As personal computers become common-place and they become more powerful, the concepts of drafting using the computer are moving beyond basic functionality to more powerful applications under the heading of multimedia literacy.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

It is frequently assumed that as autocad drafting access become common-place in the first world, everyone in those countries must have equal and ready access to this technology, and to skills in how to effectively use it. There is, however, a significant digital divide in even the most technologically advanced and enabled countries, with digital advancements. Older workers who do not use the internet at home and are computer illiterate may be frozen out of the job market even for relatively unskilled jobs such as clerking in an auto parts store.

J.O Neil (2022) Troubleshooting is the process of diagnosing the source of a problem. It is used to fix problems with hardware, software, and many other products. The basic theory of troubleshooting is that you star with the most general (and often most obvious) possible problems, and then narrow it down to more specific issues.

Typically, each of these questions will be followed by specific advice, whether the answer is Yes or No. Sometimes, this advice is presented as a flowchart diagram. This means each question is followed by a series of other questions, depending on the answer. However, in many cases, only single solutions are provided for each question.

According to Kevin (2020) Troubleshooting is something we all have to do at some point, though of use have to troubleshoot product problems more often than others. The good news is that, the more you do it, the more you learn and the better you get at fixing problems. Since many products have similar troubleshooting steps, you may find that after lapse of time, you don't need the manual to find solutions to the problems you are facing in the Technical Drafting under Information and Communication Technology (ICT).

Andrea (2021) using a computer aided technical drafting to create, edit, and print plans and 3d dimensions. Of all computer applications, word processing is the most common. To perform word processing, you need a computer a special program called a word processor, and a printer. A word processor enables you to create a document, store it electronically on a disk, display it on a screen, modify it by entering command and characters form the keyboard, and print of on printer. The great advantage of word processing over using a typewriter is that you can make changes without retyping the entire document. If you make a typing mistake, you simplied back up the cursor and correct your mistake. If you want to delete a paragraph, you simplied remove it, without leaving a trace. It is equally easy to insert a word, sentence, or paragraph in the middle of a document. Autocad and Sketchup also make it easy to more sections of text from one place to another within a document, or between documents, when you have made all the changes you want, you can send the file to a printer to get a hard copy. Autocad and Sketchup is drawing, editing, and production of technical plan, as materials and specifications, reports, and aesthetics, through the use of computer program or a complete computer system designed to facilitate rapid and efficient manipulation of text. It is the composition of document using a computer system to input, edit, store, and print them.

Cuban, (2021), powerpoint for presenting drafting techniques is an interactive computer application program for organization and analysis of data in tabular form.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Spreadsheets developed as computerized simulations of drawing by demonstrating step by step solutions. The programs operate on data represented as cells of an array, organized in rows and columns. Each slide of the array is a model-view-controller element that can contain either moving motion or clip from the lectures downloaded from the curriculum guide for technical drafting.

Solid Works and Fusion 360 can make changes in any stored value and observe the effects on technical drafting procedures. This makes the 3d dimensions and planning for setup of fixtures, rooms and other vital parts of the house or office easier. Useful for "what-if" analysis since many cases can be rapidly investigated without tedious manual recalculation. Modern technical drafting software and applications can have multiple interacting computer aided drawings, and sketches display data either as graphical form or floor plan with perspective. Computer Aided Drawing (CAD) have now replaced paper-based systems throughout the business world. Although they were first developed for planning and material costing tasks, they now are used extensively in any context where student can learn how to design particular perspective.

A modern spreadsheet file consists of multiple worksheets (usually called by the shorter name sheet) that make up one workbook, with each file being one workbook. A cell on one sheet is capable of referencing cells on other, different sheets, whether within the same workbook or even, in some cases, in different workbooks.

Lee, (2023) technical drafting program is one of the main components of an office productivity suite, which usually also contains a word processor, a presentation program, and a database management system. Computer aided drafting within a suite use similar commands for similar functions. Usually sharing data between the components is easier than with a non-integrated collection of functionally equivalent programs. This was particularly an advantage at a time when many personal computer systems used text-mode displays and commands, instead of a graphical user interface.

Levine, (2022) drawing by aide of computer devise is indistinguishable from a batch compiler with added input data, producing an output report or conventional, non-interactive, batch computer-aided drafting program. However, this concept of an electronic spreadsheet was outlined in the 1961 paper "Budgeting Models and System Simulation" by Richard Mattessich. The subsequent work by Mattessich (2020) reiterated its companion volume, Mattessich applied computerized drafting systems (on mainframe computer programmed in Cloud Storage Software).

In 2020 this concept of the Microsoft Edge, called Chromium Computer Application, was implemented on an online basis with the downloadable applications in apple store and google store. This program was introduced mainly to cause easy, available and convenience of the end users to utilized these soft wares in the modern methods of teaching. It was used to assist in the teaching of finance to business students, to be able to take information prepared by the professor and manipulate it to represent it and show ratios etc. It is an application in just a click and sweep on a finger so that effective delivery of lessons shall be aided with corresponding visuals in the form of pictures, short videos for education purposes and animation if needed.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Database

Morvison, (2020) A database is an organized collection of fata. The data are typically organized to model relevant aspects of reality in a way that supports processes requiring this information. For example, modeling the availability of rooms in hotels in a way that supports findings a hotel with vacancies.

According to Keirns (2022), database application software for technical drafting are specially designed software applications that interact with the user, other applications, and the database itself to capture and analyze data. A general-purpose this is a software system designed to allow the definition, querying, update, and administration of databases for computer aided designs for technical drafting. Well-known systems include LibreCAD, Tinkercad, DraftSight, Sketchup, Solidworks, Fusion 360, Revit, Blender, and Canva Pro. A database is not generally portable across different systems can interoperate by using standards such as technical drafting to allow a single application to work with more than one database.

Formally, “database” in technical drafting refers to the data themselves and supporting data structures after designing plans. Databases are created to operate large quantities of information by inputting, storing, retrieving, and managing that information. Databases are set up so that one set of software programs provides all users with access to all the data after the learner created plans based on their curriculum guide and output will be stored accordingly for checking or printing to be attached in their portfolios.

The interactions catered for by most existing DBMS fall into four main groups:

- Data definition – Defining new data structures for a database, removing data structures form the database, modifying the structure of existing data.
- Update – Inserting, modifying, and deleting data.
- Retrieval – Obtaining information either for end-user queries and report or for processing by applications.
- Administration – Registering and monitoring user5s, enforcing data security, monitoring performance, maintaining data integrity, dealing with concurrency control, and recovering information if the system fails.

Tanembaun, (2023), teaching strategies play an important role in improving students’ performance and skills in technical drafting. According to Technical and Vocational Education and Training, effective instruction combines theory and hands-on activities to help learners understand technical concepts and apply them in practical situations. Studies emphasize that demonstration, project-based learning, computer-assisted instruction, and collaborative learning are among the most effective approaches in technical-vocational subjects.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

A study by Springer Nature (2022), explained that inquiry-based and collaborative teaching strategies help students develop techno-mathematical literacy and technical problem-solving skills. The researchers highlighted the importance of contextualized learning and feedback sessions in improving technical competencies. Technical drafting with the use of computer support applications such as access to the World Wide Web, shared use of application and storage servers, printers, and fax machines, and use of email and instant messaging applications. Computer networks differ in the physical media used to transmit their signals, the communications protocols to organize network traffic, the network's size, topology and organizational intent.

Williams, (2022) Similarly, research on TVL education found that teachers frequently use lecture-demonstration methods, peer tutoring, computer-assisted instruction, and group activities. These strategies were found to increase students' satisfaction and improve learning quality in technical-vocational subjects. Modeling and teaching demonstrations were identified as highly effective in skill development. Another study about contextualized teaching in Technical-Vocational Livelihood Education emphasized that practical and real-life activities improve learners' understanding and engagement. The use of contextualized modules and project-based tasks helps students connect technical drafting concepts to actual workplace situations.

Research on 21st-century teaching strategies in TVL education also highlighted the value of project-based learning, discovery learning, inquiry-based learning, and problem-solving approaches. These strategies help students develop creativity, critical thinking, collaboration, and digital literacy, which are essential in technical drafting and computer-aided design (CAD).

Furthermore, according to Andrada (2021), technical drafting education revealed that students improve their visualization and drafting skills through the use of computer-generated models and digital drafting applications. The integration of CAD software and visual learning tools supports better understanding of two-dimensional and three-dimensional designs.

According to Valdez (2021), teleconferencing is communication at a distance by technological means, particularly through electrical signals or electromagnetic waves to convey conversations and messages in a virtual and continuous manner. Due to the many different technologies involved, the word is often used in a plural form, as teleconferencing may be recorded to be able to review when something or someone would want to repeat the lessons covered.

According to Macatangay (2022), investigated the teaching strategies of technical-vocational teachers and students' satisfaction. The findings showed that lecture with laboratory activities, modeling, teaching demonstrations, and computer-assisted lessons were frequently used and positively influenced student learning and satisfaction. The world's effective capacity to exchange information through two-way telecommunication networks grew from the informational equivalent of two newspaper pages per person per day in six entire newspapers per person per day by 2017. Given

this growth, telecommunications play an increasingly important role in the world economy and the global telecommunications industry was about a trillion sector in 2020. The service revenue of the global telecommunications industry was estimated.

Social Advertising

Gobbo, (2021) assessed the teaching strategies and techniques used by TVL teachers. The study revealed that teachers commonly use demonstration methods, experiential learning, and collaborative activities to improve students' technical skills. The researchers recommended pedagogical training programs to further strengthen teaching effectiveness. Internet media provides many mass media services, such as email, websites, blogs, and internet-based radio and television. Many other mass media outlets have a presence on the web, by such things as having TV ads that link to a website, or distributing a QR Code in print or outdoor media to direct a mobile user to a website. In this way, they can utilize the easy accessibility that the Internet has, and the outreach that Internet affords, as information can easily be broadcast to many different regions of the world simultaneously and cost-efficiently. The organizations that control these technologies, such as television stations or publishing companies, are also known as the mass media.

Carison (2020), examined the relationship between specialized teaching strategies and TVL students' technical skills. The study concluded that competency-based instruction, workplace simulation, project-based activities, and experiential learning significantly improve students' practical and technical competencies.

Technical drafting may also be evolving into online series of applications such as Canva Pro and other programs Romano (2023). Online technical drafting conveys the same messages and ideologies to all their users. Users sometimes share the experience with each other by playing online. Excluding the internet however, it is questionable whether learners as drawer and planner are sharing a common experience when they drawing procedures separately. It is possible to discuss in great detail the event of drawing and planning technical details as guided by the curriculum in technical drafting.

A study conducted by Robinson and Amadi (2023), investigated the effects of Computer-Aided Design (CAD) in teaching electrical drafting in technical colleges in Nigeria. Using a quasi-experimental design, the researchers found that students taught through CAD performed significantly better than those taught using conventional methods. The study concluded that CAD-based instruction improves drafting performance and technical understanding.

Wittich and Schuller (3023) conducted a comparative study between manual drafting and computer-assisted drafting among secondary students. The findings showed that both approaches are effective in teaching technical drawing techniques. However, integrating manual and computer-assisted drafting provides students with broader technical competencies and adaptability.

In a study by Veronica Gracia-Ibáñez and Margarita Vergara (2023), action research was applied in CAD teaching to improve students' learning experiences. The

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https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

results showed that innovative teaching strategies, guided instruction, and coordinated learning activities increased students' academic performance and technical drawing skills.

A recent Philippine study by Morrison (2023), focused on contextualizing technical drafting with AutoCAD. The study revealed that students who frequently practiced CAD activities achieved better learning outcomes in drafting accuracy, system usability, and design competencies. The researcher developed a contextualized learning guide to bridge classroom learning and industry practices.

Further, the study of Rodrigo (2024), on TVL teaching strategies found that lecture-demonstration methods, peer tutoring, group work, and computer-assisted lessons were frequently used by technical-vocational teachers. Students reported high satisfaction with these teaching methods, especially modeling and demonstration activities that enhanced practical skill development.

According to Masagca (2023), his conducted research on vocational schools in Batangas also emphasized that modernized laboratories, updated drafting equipment, and technology-supported instruction improve student engagement and technical competencies in technical drafting subjects.

It can easily be observed that technological innovation in the multifarious fields of commerce, science and education, is fast developing such that it is difficult to foresee the technological revolution in the millennium, inclusive of educational changes. For certain, however, technological changes in education will make its impact on the delivery of more effective, efficient and humanizing teaching-and-learning.

But presently, we can identify three current trends that could carry on to the nature of education in the future. The first trend is the paradigm shift from teacher-centered to student-centered approach to learning. The second is the broadening realization that education is not simplied a delivery of facts and information, but an educative process of cultivating the cognitive, affective, psychomotor, and much more the contemplative intelligence of the learners of a new age. But the third and possibly the more explosive trend is the increase in the use of new information and communication technology or ICT.

According to Trinidad (2023) 21st-century teaching strategies in TVL education highlighted that inquiry-based learning, project-based learning, discovery learning, and problem-solving activities positively affect students' technical skills, creativity, and critical thinking abilities. These strategies are highly applicable in technical drafting because they encourage students to apply concepts in real-world design tasks and collaborative projects.

De Vera (2022), pointed out that is the teachers' responsibility to choose the most appropriate devise according to the objective of the lesson, hence to do this, the teacher must be acquainted with the characteristics and use of different instructional technologies.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

It is a reality that technologies must be seen in their relationship to teaching as a whole and to the learning process in particular. Until this relationship is understood, intelligent or fruitful use of techniques cannot be expected. If these instructional technologies for inspiring and improving learning because they offer a variety of ways to adjust to learning tasks and objectives to students' capacities and levels of maturity.

That educators are nor more keenly aware of their responsibility to deliver the highest quality of education to learners, while also recognizing the need to use and integrate technology in the curriculum and the teaching-learning process of classroom instruction is a very good development. There is no doubt, however, that the concept of educational technology is a very complex one, made more sophisticated with the advent of what is called hypermedia or multimedia packages that include: text, audio, graphic image (still picture), animation and video clip.

According to Salandanan (2022), hypermedia finds an application in what is known as Information and Communication Technology or ICT that includes tutorial software packages, webpages, simulation games, project management packages, and others. To cite an example, the hypermedia package in Economics which can be accessed through the Internet site *WinEcon*. In contains one hundred (100) hour of tutorial material including self-assessment questions and examinations, an economic databased, an economic glossary, references to learning economic texts and lecture-suited features.

In realizing the aforementioned status and national policies, the Philippine Department of Education (DepEd) stresses that Technical Drafting must be an integral part of all learning areas under Technology and Livelihood Education. Hence, according to the education department of the country, drafting through e-learning and the use and laboratory process must be employed discipline because it entails accuracy and precision. Subsequently, when used appropriately, ICT are powerful tools than can improve technical drafting teaching strategies. This further motivate and engage learners in the the process of developing multiple intelligences through multimedia presentation of materials; facilitate comprehension of abstract concepts by making them more concrete; develop basic skills (sketching, doodle, drawing and designing) by giving learners opportunities for practice; promote inquiry and exploration through the use of interactive learning resources; enhance information literacy, critical thinking, problem-solving and other higher order thinking skills; facilitate collaborative and cooperative learning by providing tools for learners to communicate and work with other learners and develop lifelong learning skills, including learning how to draw their future and design their pathways.

Technical Drafting under Technology and Livelihood Education (TLE) advances by leaps and bound, but as it advances we can be certain that educational technology will continue to play an important role in education. On the other hand, it is also necessary that teachers should be exposed to the technology competencies in the different domains of technical drafting in order that they will become more effective as

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https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

implementers of curriculum particularly teaching of the core competencies for the 21st century learners.

In the municipality of Lingayen, Pangasinan, public secondary schools strive to deliver quality TLE education aligned with national standards and workforce demands. However, limited studies have been conducted focusing specifically on the instructional practices utilized in Grade 10 TLE–Technical Drafting classes within the locality. Understanding these practices is essential in identifying strengths, addressing gaps, and developing improved teaching approaches that can contribute to better educational outcomes. Hence, this study seeks to assess the instructional strategies employed in Grade 10 TLE–Technical Drafting in public secondary schools in Lingayen, Pangasinan. Specifically, it aims to determine the effectiveness of these strategies as a basis for enhanced teaching practices. The findings of this study may provide valuable insights for teachers, school administrators, curriculum planners, and future researchers in promoting innovative and effective instructional methods that will improve students' technical skills, academic performance, and readiness for future careers.

Theoretical Framework

The study was premised on the theory of Symbolic Interactionism. According to Reynolds (2017), this anchored on the major premises, namely; (a) individuals act toward things and people on the basis of the meanings that have for them; (b) the meaning of such things are derived from, or arise out of the social interaction that individuals have with one another, and (c) these meanings are handled in, modified through, an interpretive process used by individual to deal with the things and other people they encounter. The symbolic interactionism perspective views the individual as a social product who is influenced by others but also maintains distance from other and is able to initiate individual action. Thus, these competencies are the basis of social interaction.

On the other hand, this theory of constructivist learning can be used to support the technology competencies of teachers.

Powell and Kalina (2018) believed that the need to construct one's own knowledge would immediately understand materials being taught to them thereby attaining high level of analysis and in-depth understanding in every aspect of learning endeavor. In other words, it is a manner of discovering and transforming complex information, checking against old rules or methods and revising rules/methods when they no longer work. There should be an active monitoring and consequent regulation and orchestration of one's cognitive process. Thus, it allows teachers to look at material from different perspectives and obtain complete understanding. By using technology, teachers can see materials from different angels and create their own knowledge and understanding of the material. Likewise, Hension (2018) claimed that, "For educational systems to serve the needs of every learner, it is essential that every instructional decision focuses on the individual learner with an understanding of the learning process".

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Each teacher and each learner are conceived as person within his psychological environment. The teacher's function is to help the learners develop insights toward the attainment of adequate and harmonious personalities removing the barriers to communication, thus learning is facilitated. The learning situation to be of maximum value therefore must be realistic and meaningful to the learner and value therefore must be realistic and meaningful to the learner and should take place within the rich and satisfying environment. Thus, the technology competencies of teachers can greatly help students in the attainment of quality, meaningful and workable learning.

Conceptual Framework

This study adopted the Input–Process–Output (IPO) Model as its conceptual framework. The input consists of the instructional strategies employed in teaching Grade 10 Technology and Livelihood Education–Technical Drafting, which are evaluated across the five domains of Technical Drafting: use of tools and equipment; maintenance of hand tools, drawing instruments, equipment, and paraphernalia; performance of mensuration and calculation; preparation and interpretation of technical drawings; and practice of occupational health and safety procedures. The input also includes the respondents' assessment of the level of instructional strategies, identification of their strengths and weaknesses in each domain, and the degree of seriousness of the problems encountered in teaching Technical Drafting.

The process involves the systematic conduct of the research through the preparation and validation of the research instrument, administration of the survey questionnaire, collection and organization of data, application of appropriate statistical tools for data analysis, interpretation of the findings, and identification of the strengths, weaknesses, and challenges related to the instructional strategies employed by the teachers.

The output of the study is a proposed action plan for enhancing the instructional strategies in teaching Grade 10 Technology and Livelihood Education–Technical Drafting. The proposed action plan is expected to provide appropriate interventions and professional development activities that will strengthen teachers' instructional practices, address the identified concerns and challenges, and improve the overall quality of Technical Drafting instruction.

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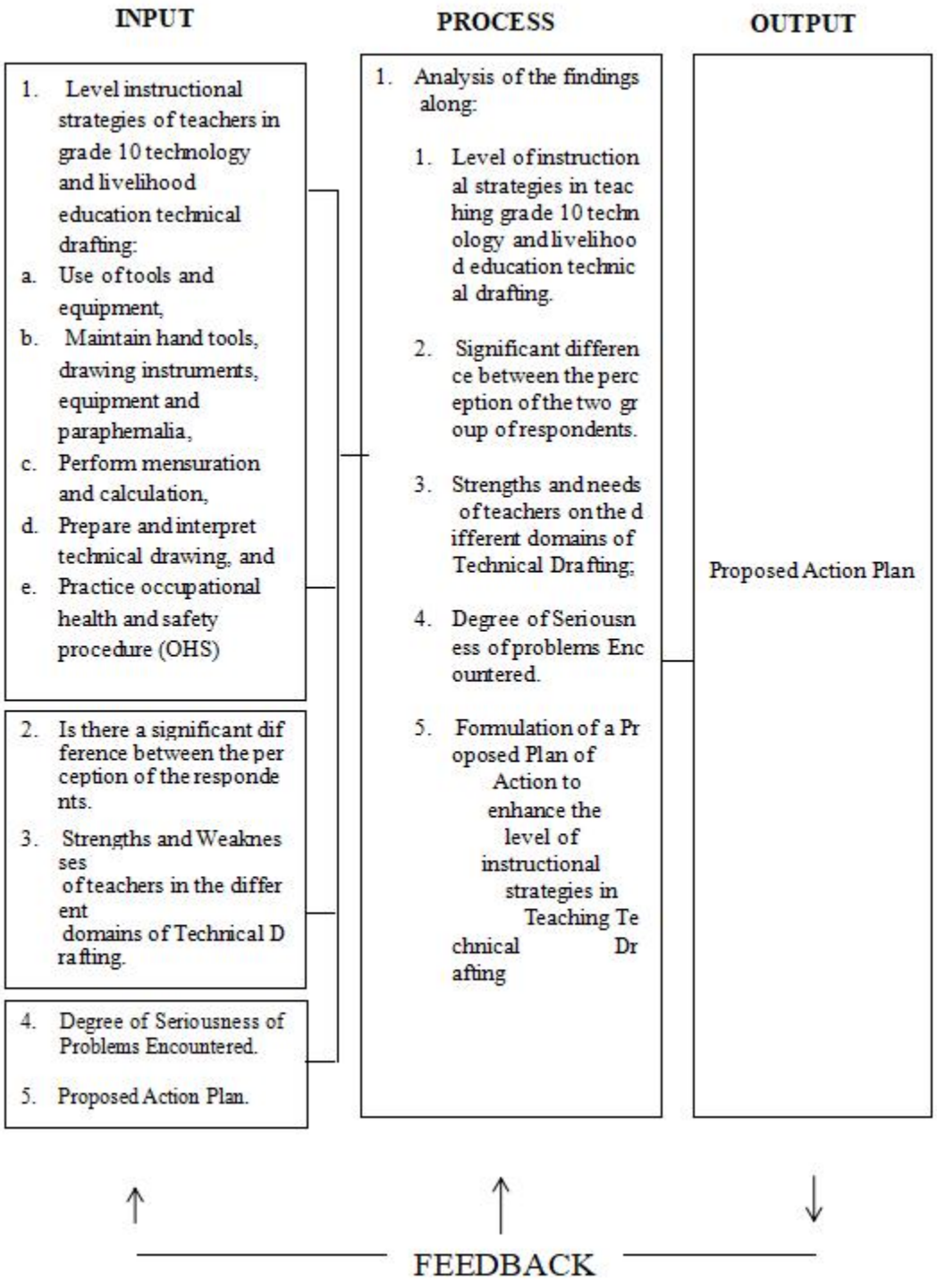

Figure 1. Paradigm of the Study

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Volume 2 Issue 7 (2026)

Statement of the Problem

This study aimed to determine the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting of secondary school teachers in Lingayen, Pangasinan during the school year 2025-2026.

Specifically, this study sought to answer the following sub-problems:

1. What is the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting along the five (5) domains of Technical Drafting?
   a. Use of tools and equipment,
   b. Maintain hand tools, drawing instruments, equipment and paraphernalia,
   c. Perform mensuration and calculation,
   d. Prepare and interpret technical drawing, and
   e. Practice occupational health and safety procedure (OHS)?
2. Is there a significant difference in the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting?
3. What are the strengths and weaknesses of the respondent Technology and Livelihood Education – Technical Drafting teachers in the different domains?
4. What is the degree of seriousness of problems encountered by the respondent teachers in teaching Technology and Livelihood Education – Technical Drafting?
5. What plan of action can be proposed to enhance the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting?

Research Hypothesis

This study tested the null hypothesis at the .05 level of significance.

1. There is no significant difference in the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting as perceived by themselves and their school administrators.
2.

Scope and Delimitation of the Study

The study focused primarily on the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting in grade 10 in Lingayen District III, Division of Pangasinan I during the school year 2025-2026. Respondents of the study consisted of six (6) public secondary schools with sixty (60) public school teachers of Technology and Livelihood Education (TLE) teaching technical drafting and twelve (12) School Administrators in the complete enumeration.

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

The variables that were investigated consisted of the level of instructional strategies in teaching grade 10 technology and livelihood education technical drafting along the five (5) domains of Technical Drafting, their strengths and weaknesses in the different information communication technology competencies domains and degree of seriousness of problems encountered by the teachers themselves.

Significance of the Study

The study is envisioned to benefit the following clientele groups:

Curriculum and Instruction Planners. The findings of this study would provide information as to the kinds of instructional technologies extensively used by the public-school teachers as a part of their planning.

School Administrators. The findings of this study would provide insights on the research-based information of in-service trainings to be provided likewise, the real estimates of how the schools have been provided to enhance the Technical Drafting competencies and skills of their teachers for instruction purposes.

Technology and Livelihood Education (TLE) Teachers. The findings of this study would provide research-based information that enhances their level of competencies in the different technical drafting domains.

Learners. They would benefit from all the improvements which would be initiated and implemented by the school administrators and the public-school teachers as a result of their awareness on ICT instruction.

Researcher. The findings of this study would provide meaningful experiences and insights in the gathering and organizing of data as well as for the improvement of teaching-learning manifestations.

Other Researchers. They could use the findings of this study for the conduct and interpretation of related researches.

Definition of Terms

In order to present a more thorough and comprehensive insight into this study, the following terms and phrases are lexically and operationally defined.

Basic Computer Operation Skill. It refers to the knowledge and ability to utilize computers and related technology efficiently; Navarro (2022).

Competence. It refers to the quality or state of being functionally adequate or of having sufficient knowledge, judgment, skill or strength for a particular discipline Niederhauser (2021).

Computer Aided Drafting (CAD). In this study, it refers to the technology competencies of teachers in the five (5) domains of Technical Drafting which by utilizing computer applications and software programs may enhance the results of students' drawing design and quality of their output, Reynolds (2023).

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Manual Technical Drafting. It refers to the traditional designing and sketching using paper, pencil, technical drawing materials, French curves drawing table and T-square, Creighton (2023).

Drawing Design. In this study refer to the specifications based on the intended output for grade 10 learners using the available resources and guided by the teacher's curriculum guide.

Technical Drafting Laboratory. This refers to the place where learners process and apply their theoretical knowledge. It is also storing the equipment for technical drafting such as drawing tables, drawing tools and computer for online drawing sessions, Lucido (2023).

Information and Communication Technology Instruction. It refers to the practice of teaching or profession as to manner or technique of doing someday.

Technical Drafting. It refers to any device in planning, sketching, measuring, and devising technique to relay strokes and symbols to the facts, knowledge, understanding and appreciation. In this study, it refers to the print and non-print materials including the importance of drawing techniques and skills.

Social Media Communication. It refers to the ways of interchanging or transmitting and receiving information through an online platform and other similar application in the internet (Collins, 2018).

Social Media Advertising and Networking. It refers in this study as the construction, design and use of a network, including the virtual selection and use of telecommunication protocol and computer software including establishment of operation policies and procedures related to the network in order to appreciate such online concepts and introduce products and services to the user of the online platform (Tanenbaum, 2016).

Online Drafting Learning Materials. These refer to supplementary devices other than print materials such as online tutorials, youtube, tiktok, facebook reels, and chatbots for inquiries, that aid in the teaching and/or learning of certain concepts and skills in technical drafting, Morrison, (2023).

Software Application. In this study, refers to the utilization, maintenance and troubleshooting of the available means in the internet using the wifi or other devises in the web whether free or with subscription payment. It refers to the process of diagnosing the source of a problem on software and many other online products such as downloadable forms, worksheets, modules, games, animation etc, Collins, (2024).

Social, Legal and Ethical Issues. They refer to issues concerning how computers have affected the way society is organized and how people react and behave towards each other. Further, they refer to issued which have something to do with right or wrong, Abad, (2024).

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Software Application. In this study, refers to programs or corresponding materials for a computer, Beichner, (2023)

Online Technical Drafting Consultations. It refers to communication at a distance by technological means particularly through electrical signals or electromagnetic waves and sending messages particularly the design output of learners to the database of the school for real-time assessment of the technical drafting teacher or the TESDA assessor in case of National Competency Assessment, Dela Cruz, (2023).

Chapter 2
RESEARCH METHODOLOGY

This chapter presented the methods and procedures adopted by the researcher in conducting the study.

Research Design

The research method used in this study is the descriptive research method. This method is used to establish the prevailing status or conditions to situations which call for the analysis of difference without variable manipulation. The use of the descriptive method is appropriate since, to determine the level instructional strategies of grade 10 teachers teaching technical drafting under technology and livelihood education, strength and weaknesses of public secondary school teachers in the technical drafting, and the seriousness of problem encountered by the technical drafting teachers.

Locale and Population of the Study

The study will be conducted in six (6) Public Secondary Schools of Lingayen District III, Division of Pangasinan I with thirty-seven (60) Technology and Livelihood Teachers and twelve (12) School Administrators.

Table 1 presented the distribution of public secondary school teachers and the name of schools where these teachers represented in the Municipality of Lingayen, Pangasinan and the number of respondents.

Table 1

Distribution of Respondents by School

Name of Schools	Number of TLE Teachers Respondents/Population	School Administrators
1. Lasip National High	19	2
2. Malawa Integrated School	12	2
3. Pangasinan National High School	9	2

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https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

4. Pangasinan School of Arts and Trades	9	2
5. Domalandan Integrated School	11	2
6. Estanza National High School	10	2
Total	**60**	**12**

Data Gathering Instrument

The data required to answer the problems of the study will be gathered using a questionnaire for the teachers.

Part I deals with the level of efficacy teaching strategies of teachers along the five (5) domains. The five (5) domains and the corresponding competencies were taken from the MATATAG Curriculum and K-12 Curriculum.

Part II deals significant differences of the perceptions of public secondary school teachers teaching technical drafting and their school administrators.

Part III deals with the strengths and weaknesses of the public secondary school teachers teaching technical drafting.

Part IV consisted of the problems encountered by the public secondary school teachers teaching technical drafting in the municipality of Lingayen District III, Division of Pangasinan I.

Lastly, the proposed action plan to enhanced the teaching by the public secondary school teachers on the subject Technical Drafting.

Data Gathering Procedures

The researcher first seek permission from the Schools Division Superintendent to conduct the study in the 6 Public Secondary Schools of Lingayen, Pangasinan.

Once granted, the questionnaire was personally administered by the researcher to the teachers in the six (6) public secondary schools. The distribution, administration and retrieval of the instrument lasted for three weeks. The researcher was able to retrieve all the questionnaires from the respondent teachers.

Statistical Treatment of Data

Problem 1 on the level of efficacy of teaching strategies in grade 10 technology and livelihood education technical drafting will be answered by using the 4-value Likert Scale and was subjected to average weighted mean (AWM) with descriptive equivalent as in balance.

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Score	Scale	Descriptive Equivalent
4	3.26 – 4.00	Very Competent (VC)
3	2.51 – 3.25	Competent(C)
2	1.76 – 2.50	Somewhat Competent (SC)
1	1.00 – 1.75	Not Competent (NC)

Problem 2 on the significant differences in the level of efficacy of teaching strategies in grade 10 technology and livelihood education technical drafting as perceived by teacher themselves and their school administrators will be answered by using t-test for comparison of variables. For the analysis of comparison, t-test will be applied.

Formula:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{SD\bar{x}}$$

where:

$\overline{X}_1$ = First Mean

$\overline{X}_2$ = Second Mean

$SD\bar{x}$ = Standard error of difference between the two means

Problem 3 on the determining the strengths and weaknesses of the respondent-teachers in the different domains in technical drafting will be answered by using the 4-value Likert Scale. An average weighted mean of 2.51 and Above are classified as “Strength” while an average weighted mean of 2.50 and Below are classified as “Weakness”.

Problem 4 on determining the degree of seriousness of problems encountered by the respondent teachers will be answered by using the 3-value Likert Scales.

The average weighted mean and verbal descriptions are as follows:

3 (2.34 – 3.00) Serious (S)

2 (1.67 – 2.33) Moderately Serious (MS)

1 (1.00 – 1.66) Not Serious (NS)

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

The formula of average weighted mean is:

$$Xw = \frac{fxw}{N}$$

Where:

Xw	=	weighted mean
f	=	frequency of responses of respondents
w	=	weighted of the category responses
N	=	total number of respondents

Problem 5 on the proposed plan of action was formulated based on the findings of the study, strengths and weaknesses including seriousness of problems encountered by the teachers themselves.

Chapter 3
RESULTS AND DISCUSSION

This chapter presented the data gathered and are analyzed and interpreted in the light of the problems presented.

The level of Technology Competencies of Teacher Respondents Along the Five (5) Different Domains of Technical Drafting are presented and described in the succeeding tables.

Use of Tools and Equipment

Table 2 presented the level of technology competencies of teacher respondents along the domain of use of tools and equipment.

It could be gleaned in the table that the level of competence of respondents in the use of tools and equipment in technical drafting, with an overall average weighted mean with average mean of 2.47, interpreted as “Competent.” This indicates that, in general, the respondents demonstrate a satisfactory level of ability in handling drafting tools and equipment, though some areas still require improvement to achieve higher proficiency.

Among the indicators, the highest mean is observed in the proper use of appropriate drafting tools and equipment during activities with average mean of 2.73, followed by the distinction between manual drafting tools and digital CAD tools with average mean of 2.70), and the identification of appropriate hand tools and equipment used in technical drafting with average mean of 2.61. These results suggest that

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

respondents are relatively strong in the actual use and basic recognition of drafting tools, as well as in distinguishing traditional and digital drafting resources.

Further, several indicators fall under the "Somewhat Competent" level, including classification of tools and equipment (2.41), listing required tools based on job requirements (2.38), operation of basic computer or gadget tools (2.33), installation of drafting software (2.34), ensuring completeness and readiness of tools (2.29), and application of safety procedures (2.37). These findings indicated weaknesses in organizational skills, ICT-related competencies, preparation practices, and safety application.

Finally, the results implied that while respondents demonstrate competence in basic identification and utilization of drafting tools, they still need improvement in digital skills, preparation procedures, safety practices, and systematic organization of tools and equipment. Strengthening training in CAD-related applications and hands-on laboratory activities may further enhance their competency in technical drafting.

Table 2

Level of Technology Competencies of Teacher Respondents Along the Domain of Use of Tools and Equipment

Indicators	Average Weighed Mean	Descriptive Equivalent
1. Proper preparation of hand tools and equipment before starting a drafting task.	2.55	Competent
2. Identification of appropriate hand tools and equipment used in technical drafting.	2.61	Competent
3. Classification of drafting tools and equipment according to function and use.	2.41	Somewhat Competent
4. Listing of required tools and equipment based on job or project requirements.	2.38	Somewhat Competent
5. Proper use of appropriate drafting tools and equipment	2.73	Competent

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https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

during activities.		
6. Distinction between manual drafting tools and digital CAD tools.	2.70	Competent
7. Operation of basic computer or gadget tools used in technical drafting.	2.33	Somewhat Competent
8. Installation of basic drafting software applications with minimal assistance.	2.34	Somewhat Competent
9. Ensuring completeness and readiness of tools and equipment before use.	2.29	Somewhat Competent
10. Application of safety procedures when using drafting tools and equipment.	2.37	Somewhat Competent
Overall Average Weighted Mean	**2.47**	**Competent**

Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia

Table 3 presented the level of competencies of the teachers along the domain of computer setup, maintenance and troubleshooting of equipment.

Table 3

Level of Technology Competencies of Teacher Respondents Along the Domain of Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia

Indicators	Average Weighed Mean	Descriptive Equivalent
1. Following safety procedures in maintaining drafting tools and equipment.	2.10	Somewhat Competent
2. Inspection of hand tools and drawing instruments before and	2.25	Somewhat Competent

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https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

after use.		
3. Identification of damaged or defective drafting tools and equipment.	2.05	Somewhat Competent
4. Proper cleaning and storage of drafting tools after use.	2.39	Somewhat Competent
5. Checking completeness of tools and equipment received from the custodian.	2.25	Somewhat Competent
6. Preparation of accurate inspection reports for drafting tools and equipment.	2.17	Somewhat Competent
7. Documentation of the condition of tools and equipment.	2.31	Somewhat Competent
8. Submission of inspection reports to the property custodian.	2.20	Somewhat Competent
9. Maintenance of proper organization of drafting tools and materials.	2.19	Somewhat Competent
10. Ensuring that drafting equipment is in good working condition at all times.	2.33	Somewhat Competent
Overall Average Weighted Mean	**2.22**	**Somewhat Competent**

The table presented the level of competence of respondents in maintaining hand tools, drawing instruments, equipment, and paraphernalia in technical drafting, with an overall average weighted mean of 2.22, interpreted as “Somewhat Competent.” This indicates that, in general, the respondents have a moderate level of competence, but their skills in proper maintenance and inspection procedures are still limited and need further improvement.

Moreover, the highest mean score is 2.39, interpreted as “Somewhat Competent,” which refers to the proper cleaning and storage of drafting tools after use. This suggests that respondents are relatively more familiar with basic post-use care of tools compared to other maintenance practices. Another relatively higher indicator is ensuring that drafting equipment is in good working condition at all times (2.33), which reflects some awareness of equipment usability and functionality.

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Furthermore, most of the indicators fall within the lower range of the "Somewhat Competent" level. These include documentation of tool condition (2.31), inspection of tools before and after use (2.25), checking completeness of tools received (2.25), submission of inspection reports (2.20), and maintenance of proper organization of tools and materials (2.19). These results suggest weaknesses in systematic maintenance procedures, documentation, and organizational practices.

Notably, the lowest mean score is 2.05, which pertains to the identification of damaged or defective drafting tools and equipment. This indicates a particular difficulty in recognizing faulty tools, which may affect the quality and safety of drafting activities. Similarly, following safety procedures in maintaining tools (2.10) and preparation of accurate inspection reports (2.17) also reflect limited competence in formal maintenance processes.

Finally, the findings implied that respondents demonstrate only a basic level of competence in maintaining drafting tools and equipment, with strengths mainly in simple tasks such as cleaning and storage. However, they show weaknesses in inspection, documentation, defect identification, and systematic maintenance procedures. This suggests a need for enhanced training focused on proper maintenance protocols, tool inspection skills, and laboratory management practices to improve efficiency and safety in technical drafting activities.

Perform Mensuration and Calculation (MC)

Table 4 presented the level of competencies of the teachers along the domain of word processing.

Table 4

Level of Technology Competencies of Teacher Respondents Along the Domain of Perform Mensuration and Calculation (MC)

Indicators	Average Weighed Mean	Descriptive Equivalent
1. Selection of appropriate measuring instruments for drafting tasks.	2.40	Somewhat Competent
2. Identification of geometric shapes used in technical drawing measurements.	2.50	Somewhat Competent
3. Interpretation of object dimensions based on drawings.	2.45	Somewhat Competent
4. Conversion of measurements from one unit to another.	1.75	Not competent

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

5. Use of alternative measuring tools when necessary.	2.30	Somewhat Competent
6. Performance of accurate mensuration and calculation in drafting tasks.	2.33	Somewhat Competent
7. Application of formulas in solving measurement problems.	2.28	Somewhat Competent
8. Checking accuracy of computations.	1.75	Not competent
9. Use of techniques to reduce errors in measurement.	2.31	Somewhat Competent
10. Application of measurement results in technical drawing outputs.	2.29	Somewhat Competent
Overall Average Weighted Mean	**2.34**	**Somewhat Competent**

The table shows the level of competence of respondents in performing mensuration and calculation in technical drafting, with an overall average weighted mean (AWM) of 2.34, interpreted as "Somewhat Competent." This indicates that, in general, the respondents demonstrate a moderate level of competence, but still lack full mastery of essential measurement and computation skills required in technical drafting.

This only showed that the highest mean score is 2.50, interpreted as "Somewhat Competent," which refers to the identification of geometric shapes used in technical drawing measurements. This suggests that respondents have a relatively better understanding of basic geometric concepts. Other moderately rated indicators include interpretation of object dimensions (2.45) and selection of appropriate measuring instruments (2.40), indicating that respondents have basic skills in understanding and applying measurement concepts in drafting tasks.

However, several indicators reveal notable weaknesses. The lowest mean scores are 1.75, both interpreted as "Not Competent," which refer to the conversion of measurements from one unit to another and checking the accuracy of computations. These results indicate a serious difficulty in performing accurate mathematical operations, which are essential in technical drafting for ensuring precision and correctness of outputs.

Further, other indicators such as use of alternative measuring tools (2.30), application of formulas (2.28), performance of accurate mensuration and calculation (2.33), use of techniques to reduce errors (2.31), and application of measurement results in outputs (2.29) are all interpreted as "Somewhat Competent." This suggests that respondents have basic procedural knowledge but lack consistency and accuracy in applying mathematical and measurement skills.

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Finally, the findings implied that respondents possess limited to moderate competence in mensuration and calculation skills, with strengths in basic conceptual understanding but significant weaknesses in unit conversion and computational accuracy. This highlights the need for strengthened instruction in mathematical applications, problem-solving techniques, and accuracy-building exercises in technical drafting.

Prepare and Interpret Technical Drawing (TD)

Table 5 presented the level of competencies of the teachers along the domain of spreadsheets.

Table 5

Level of Technology Competencies of Teacher Respondents Along the Domain of Prepare and Interpret Technical Drawing (TD)

Indicators	Average Weighed Mean	Descriptive Equivalent
1. Identification of symbols and signs used in technical drawings.	2.19	Somewhat Competent
2. Interpretation of information shown in technical drawings.	2.32	Somewhat Competent
3. Analysis of data found in blueprints and technical plans.	2.73	Competent
4. Identification of materials needed based on technical drawings.	2.66	Competent
5. Recognition of components and parts of objects in drawings.	2.60	Competent
6. Determination of correct dimensions from technical drawings.	2.18	Somewhat Competent
7. Following specifications indicated in drawings.	2.27	Somewhat Competent
8. Reading and understanding of blueprint layouts.	2.63	Competent
9. Relating technical drawings to actual objects or projects.	2.23	Somewhat Competent
10. Application of interpretation skills in drafting tasks.	2.31	Somewhat Competent
Overall Average Weighted Mean	**2.41**	**Somewhat Competent**

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

The table presented the level of competence of respondents in preparing and interpreting technical drawings, with an overall average weighted mean of 2.41, interpreted as "Competent." This indicates that, in general, the respondents demonstrate a satisfactory level of competence in understanding and working with technical drawings, although some specific areas still need improvement to achieve higher proficiency.

Among the indicators, the highest mean score was 2.73, interpreted as "Competent," which refers to the analysis of data found in blueprints and technical plans. This suggests that respondents are relatively strong in examining and understanding structured technical information. Other indicators that also fall under the "Competent" level include identification of materials needed based on drawings (2.66), reading and understanding blueprint layouts (2.63), and recognition of components and parts of objects in drawings (2.60). These results indicate that respondents have a good grasp of practical interpretation skills and visual understanding of technical drawings.

However, several indicators are interpreted as "Somewhat Competent," including identification of symbols and signs (2.19), interpretation of information in technical drawings (2.32), determination of correct dimensions (2.18), following specifications (2.27), relating drawings to actual objects (2.23), and application of interpretation skills (2.31). These findings suggest weaknesses in symbol recognition, dimensional accuracy, and deeper application of drawing interpretation skills.

Finally, the results implied that respondents possess a generally competent level of ability in interpreting technical drawings, particularly in analyzing blueprints and identifying materials and components. However, their performance is weaker in more detailed and precise tasks such as interpreting symbols, determining exact dimensions, and applying drawings to real-world contexts. This suggests the need for further enhancement in analytical accuracy, symbol literacy, and applied interpretation skills in technical drafting instruction.

Occupational Health and Safety (OHS) Procedure

Table 6 presented the level of competencies of the teachers along the domain of database.

Data revealed that the respondents have an overall weighted mean of 2.30**,** which is interpreted as "Somewhat Competent" in Occupational Health and Safety (OHS) practices in technical drafting. This indicates that the respondents possess a moderate level of competence**,** meaning they have basic knowledge and limited practical application of safety procedures in the drafting workplace. Among the indicators, the highest mean score is 2.75, interpreted as "Competent," which is reflected in the respondents' ability to explain different types of workplace hazards. This suggests that they have a relatively better understanding of OHS concepts at the theoretical level. However, this strength is not consistently observed in other areas of practice.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Table 6

Level of Technology Competencies of Teacher Respondents Along the Occupational Health and Safety (OHS) Procedure

Indicators	Average Weighed Mean	Descriptive Equivalent
1. Identification of hazards and risks in the drafting workplace.	2.25	Somewhat Competent
2. Following of OHS policies and procedures during drafting activities.	2.29	Somewhat Competent
3. Explanation of different types of workplace hazards.	2.75	Competent
4. Application of safety procedures to prevent accidents in drafting work.	2.16	Somewhat Competent
5. Proper use of personal protective equipment (PPE).	2.16	Somewhat Competent
6. Appropriate response to emergencies in the workplace.	2.23	Somewhat Competent
7. Evaluation of risks before starting drafting tasks.	2.30	Somewhat Competent
8. Application of methods to control or reduce workplace hazards.	2.25	Somewhat Competent
9. Maintenance of cleanliness and order in the drafting area.	2.30	Somewhat Competent
10. Practice of continuous safety awareness during drafting activities.	2.31	Somewhat Competent
Overall Average Weighted Mean	**2.30**	**Somewhat Competent**

All other indicators fall under the “Somewhat Competent” level, with mean scores ranging from 2.16 to 2.31. These include identification of hazards and risks, following OHS policies and procedures, application of safety measures, proper use of personal protective equipment (PPE), emergency response, risk evaluation, application

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

of hazard control methods, maintenance of cleanliness and order, and continuous safety awareness. Notably, the lowest ratings are found in the application of safety procedures and proper use of PPE, both with a mean of 2.16, indicating weaker performance in hands-on safety practices.

Finally, the findings implied that while the respondents demonstrate basic awareness and understanding of occupational health and safety, their ability to consistently apply safety practices in actual technical drafting activities is still developing. This gap between knowledge and practice suggests the need for strengthened training, more hands-on demonstrations, and increased reinforcement of safety protocols to improve their competency in real workplace situations.

Summary on the Level of Technology Competencies of Teacher Respondents in the Different Domains of Technical Drafting.

Data in table 7 revealed that the overall average weighted means of five (5) dimensions of ICT Drafting ranges from 2.20 to 3.12. Data on the same table also show that the top (3) dimensions of ICT drafting were: Use of Tools and Equipment (2.59), Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia (2.20) and Prepare and Interpret Technical Drawing TD (2.77). These are described as "Competent". Perform Mensuration and Calculation MC and Occupational Health and Safety Procedure are noted as somewhat competent 2.28 and 2.34 respective.

Table 7
Summary on the Level of Technology Competencies of Teacher Respondents in the Different Domains of Technical Drafting

Domains of Technical Drafting	Overall AWM	Descriptive Rating
1. Use of Tools and Equipment	2.47	Competent
2. Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia	2.22	Somewhat Competent
3. Perform Mensuration and Calculation	2.34	Somewhat Competent
4. Prepare and Interpret Technical Drawing	2.41	Somewhat Competent
5. Occupational Health and Safety Procedure	2.30	Somewhat Competent
Overall Average Weighted Mean	**2.35**	**Somewhat Competent**

However, the lowest four among the five dimensions which were: maintain hand tools, drawing instrument, equipment and paraphernalia (2.22), perform mensuration and calculation (2.34) prepare and interpret technical drawing (2.41) and occupational

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

health and safety (2.30) with a common descriptive rating of "Somewhat Competent". The grand mean is 2.35 described as "Somewhat Competent".

Findings revealed that the technical drafting teachers were generally less competent than expected in providing quality instructional strategies to enhance the different domains in technical drafting. However, it must be mentioned that these were domains where they still lack the needed skills and competencies to be able to teach efficiently and effectively the Technical Drafting.

Table 8 presented the significant difference in the level of instructional strategies of technical drafting teachers across the five domains.

Table 8

Difference in the Level of Instructional Strategies of Teachers in Technical Drafting as Perceived by Themselves and the School Administrators

Domains	Teacher of Technical Drafting		School Administrators		Total Average Weighted Mean	DE
	N = 60		N = 12			
	AWM	DE	AWM	DE		
1. Content Knowledge and Pedagogy	2.48	MI	2.46	MI	2.47	C
2. Learner's Safety and Pedagogy Security	2.20	MI	2.23	MI	2.22	SC
3. Diversity of Learners	2.35	MI	2.36	MI	2.34	SC
4. Curriculum and Planning	2.42	MI	2.40	SI	2.41	SC
5. Assessment and Reporting	2.29	MI	2.31	MI	2.30	SC
Overall AWM	**2.35**	**MI**	**2.35**	**MI**	**2.35**	**SC**

Computed t – value: 0.9506, df 4

Critical value: 2.3060, alpha: .05

Decision: Accept the null hypothesis

Interpretation: There is no significant difference

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

The computed t – value is 0.9506 it is lower than the critical – value of 2.3060 at 0.05 level of significance. The result was not significance; therefore, the decision was to accept the null hypothesis. It meant that the teaching strategies in technical drafting was not affected by the position / rank of the teachers. It only implied that both groups of respondents agreed that there is a need to enhance the instructional strategies in teaching technical drafting in grade 10 by the public-school teachers.

Strengths and Weaknesses of Teachers in the Different Domains of Technical Drafting.

Table 9 showed the strengths and weaknesses of teachers along the different domains of technical drafting.

The problems surmised the actual scenarios that a typical teacher of Technical Drafting is experiencing, notwithstanding the difficulty in adjusting to the situation where these five (5) domains could be harmonized to attain the very essence of the course of information and communication technology.

Table 9
Strengths and Weaknesses of Respondent Teachers in the Different Domains of Technical Drafting

Domains of Technical Drafting	Strengths	Weaknesses
1. Use of Tools and Equipment	2.59	
2. Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia		2.20
3. Perform Mensuration and Calculation		2.28
4. Prepare and Interpret Technical Drawing	2.77	
5. Occupational Health and Safety Procedure		2.34

The data depicted the true scenario in the field that there are more weaknesses than the strengths that needed to be address to the administration. This only implies that the teacher's delivery of lessons is being hindered by the lack of resources, lack of quality skills, lack of machineries and time constraints. The learners are expose to more sophisticated gadgets now a day, no learner was not oriented in using smartphones, software applications, online gaming, downloading peripherals, video editing, uploading pictures and other analogous to the foregoing.

Hence, problems like the priority needs focus group discussions in the division level with the expert in the field of information and communication technology in order to provide technical assistance to the field particularly in technology and livelihood education.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Problems Encountered by the Teachers in the Different Domains of Technical Drafting

Table 10 presented the problems encountered by the teachers along the different domains of technical drafting.

It could be noted that the degree of seriousness of problems encountered by technical drafting teachers, with an overall average weighted mean of 2.38, interpreted as "Serious." This indicates that, in general, the respondents experience notable challenges in the teaching and delivery of technical drafting instruction, particularly in terms of resources, training, and institutional support.

Indicators showed, the most serious problem was insufficient funding for the procurement, upgrading, and maintenance of drafting tools, equipment, and technologies with weighted mean of 2.49, Rank 1. This only suggest that financial limitations significantly affect the availability and quality of instructional materials used in technical drafting. Closely following are inadequate knowledge and technical skills in the effective use of modern drafting tools and technologies with weighted average mean of 2.45, Rank 2 and insufficient training in the preparation, maintenance, and troubleshooting of equipment and tools with weighted average mean of 2.45, Rank 3. These findings implied that both resource constraints and professional competency gaps are major concerns affecting effective instruction.

Table 10
Seriousness of Problems Encountered by the Teacher Respondents in Teaching Technical Drafting

Indicators	Degree of Seriousness of Problems		
	Average Weighted Mean (AWM)	Descriptive Equivalent (DE)	Rank
1. Insufficient training in the preparation, maintenance, and troubleshooting of technical drafting equipment and tools.	2.45	Serious	3
2. Limited access to high-quality instructional technologies and drafting equipment for teaching and learning.	2.40	Serious	5
3. Lack of qualified resource persons or experts to conduct training and professional development on technical drafting technologies.	2.18	Moderately Serious	10
4. Availability of outdated, defective, or non-functional instructional technologies and drafting equipment.	2.41	Serious	8

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

5. Inadequate knowledge and technical skills in the effective use of modern drafting tools and technologies.	2.45	Serious	2
6. Limited opportunities for teachers to participate in seminars, workshops, and training programs related to technical drafting technologies.	2.39	Serious	6.5
7. Insufficient funding for the procurement, upgrading, and maintenance of drafting tools, equipment, and technologies.	2.49	Serious	1
8. Unequal distribution of instructional technologies and resources among schools or learning institutions.	2.35	Serious	6.5
9. Lack of institutional support and external partnerships for the provision and improvement of technical drafting technologies.	2.38	Serious	4
10. Low level of awareness and implementation of occupational health and safety (OHS) practices in technical drafting laboratories.	2.33	Moderately serious	9
Overall Average Weighted Mean	**2.38**	**Serious**	**-**

Other indicators also fall under the "Serious" category, including lack of institutional support and external linkages with weighted average mean of 2.38, Rank 4, limited access to high-quality instructional technologies with average weighted mean of 2.40, Rank 5, limited opportunities for training and professional development with weighted average mean of 2.39, Rank 6.5, unequal distribution of instructional resources with average weighted mean of 2.35, Rank 6.5, and availability of outdated or defective equipment with average weighted mean of 2.41, Rank 8. These results reflect systemic issues in resource allocation, technology availability, and professional development opportunities.

Meanwhile, two indicators were interpreted as "Moderately Serious," namely lack of qualified resource persons for training with weighted average mean of 2.18, Rank 10 and low level of awareness and implementation of occupational health and safety (OHS) practices with weighted average mean of 2.33, Rank 9. Although still considered problems, these are perceived as slightly less severe compared to the other concerns.

Finally, the findings indicated that technical drafting teachers face multiple interconnected challenges, with the most critical issues centered on insufficient funding,

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

limited training, and inadequate technical skills development. These constraints highlight the need for stronger institutional support, increased budget allocation, improved training programs, and better access to modern drafting technologies to enhance the quality of technical drafting education.

Proposed Action Plan

Based on the identified strengths and weaknesses including the degree of seriousness of problems encountered, the proposed plan of action along training program is designed.

In designing said plan, special focus was given to areas that require immediate attention because of their significance in enhancing teachers' level of technology competencies along the different domains of Technical Drafting.

The proposed action plan has the following components:

1. Areas of Concern,
2. Targets,
3. Activities / Strategies,
4. Time Frame,
5. Person / Agencies Involved, and
6. Success Indicators.

The proposed action plan is presented in tabular form in the pages that follow.

General Objective:

Based on the results, the sub-problem on information and communication technology technical drafting widen the gap along the quality instructions for the learners. The five domains in instructional delivery of technical drafting under technology and livelihood education and the factors affecting the actualization of the indicators therein makes sense that the problems are already existing from the beginning that needs to be address. Hence, this action plan will close the gaps found out based on the results of this study.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

PROPOSED ACTION PLAN TO ENHANCED TEACHING PRACTICES IN TECHNICAL DRAFTING IN THE PUBLIC SECONDARY SCHOOLS IN THE MUNICIPALITY OF LINGAYEN, PANGASINAN

Areas of Concern	Targets/Objectives	Activities / Strategies	Time Frame	Persons/Agencies Involve	Success Indicator
1. Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia	To equip teachers about protection of hard disk drive, virus protection and scanning, connecting peripheral cables, managing memory including ability to set-up, maintain and troubleshoot equipment.	Attend division training on the areas / indicators along the identified domain.	Semesterly Break	Division Personnel Principal Teachers	90% of the teachers shall have equipped with the aforementioned areas / indicators including ability to setup, maintain and troubleshoot equipment.
2. Perform Mensuration and Calculation (MC)	To gain teachers "know-how" of word processing which also includes setting of margins, cutting, copying and pasting in and between documents and changing font size and type.	Conduct training and lecture on word processing	During Saturday and Sunday	Principal Teachers Resource Person	90% of the teacher shall have gained "know-how| word processing including the identified areas.

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

3. Occupational Health and Safety Procedure	To improve teachers' competency relative to enter data in cells, move data within spreadsheets, use formulas, create charts including spreadsheets management ability.	Initiate training and forum concerning spreadsheets management.	Semesterly break (3 day training)	Division Supervisor Principal Teachers LGU	90% of the teachers shall have improved their competencies along the domain of spreadsheets.
4. Use of Tools and Equipment	To equip teacher's, enter data, sort and search and produce a report in database.	Conduct training and lecture on the proper use of database	Summer Break (2 days training of database)	Principal Teachers Resource Person	90% of the teacher shall have equipped with the proper use of database.
5. Prepare and Interpret Technical Drawing (TD)	To gain teachers meaningful insight understanding, and skills concerning networking including logging on a network environment, electronic file sharing and knowledge of advantages of server.	Attend LAC session on networking management and Festival of Talents	Saturday and Sunday	Principal Teachers Resource Persons	90% of the teachers shall have gained insight, understanding and skills concerning networking.
Seriousness of Problems Encountered					

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

1. Lack of funds in the provision of technologies both hardware and software.	To provide funds in the provision of technologies	To engage in the different activities. a. solicitation b. school fund raising campaign c. asking donations from the successful alumni and other civic-spirited citizens	Year round	Teachers Internal and External Stakeholders	90% of the amount for the budget estimate shall be provided by the teachers.
2. Lack of "know-how" in the use of the different technologies	Teachers should be equipped with the "know-how" in the use of the different hardware and software technologies	Thru holding of seminars – workshops	Year Round	Principal Teachers Resource Persons	90% of the teachers shall equipped with the "know-how" in the use of different technologies.
3. Lack of training in the preparation, maintenance and troubleshooting of equipment.	Teachers should undergo training in the preparation, maintenance and troubleshooting of equipment.	Conducting seminars – workshops	April – May	Division Personnel Principal Teachers	95% of the teachers shall have trained in the preparation, maintenance and troubleshooting of equipment

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Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

4. Recruitment of teacher with ICT background	To recruit teachers with ICT background	Conducting Information Disseminatio n Campaign on needs of school / institution preferably with ICT background. Submit specialized skills related to ICT. Skills are to be validated through practicum.	April – May	Division Personnel Principal Ranking Committee Teacher – Applicants	90% teachers with ICT background shall have been employed with manifested trainings in handling the subject.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

Chapter 4

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presented the re-statement of the research problems which was the focus of this study, summary of salient findings, conclusion and recommendations which are primarily based on the findings.

The study sought to determine the status of instructional strategies in grade 10 technology and livelihood education (TLE) – technical drafting of the Public Secondary School Teachers in Lingayen, Pangasinan during the school year 2025-2026. In terms of level of technology competencies in five (5) domains of technical drafting along strengths and weaknesses of teachers and the problems encountered.

The respondents consisted of 60 public secondary teachers teaching technical drafting in the six (6) Public Secondary Schools in the Municipality of Lingayen III, Division of Pangasinan I.

Findings

The salient findings of the study were as follows:

1. The overall Average Weighted Mean of 2.35 indicates that respondents are generally Somewhat Competent in the different domains of Technical Drafting.

2. Among the five domains, Use of Tools and Equipment obtained the highest average mean of 2.47 with a descriptive rating of Competent, showing that learners are relatively more skilled in handling drafting tools and equipment.

3. Maintain Hand Tools, Drawing Instruments, Equipment and Paraphernalia received the lowest of average mean of 2.22, indicating that respondents have limited competence in maintaining and caring for drafting materials and equipment.

4. The domains Perform Mensuration and Calculation (2.34), Prepare and Interpret Technical Drawing (2.41), and Occupational Health and Safety Procedure (2.30) all fall under the Somewhat Competent level, suggesting that learners still require improvement in technical and safety-related skills.

5. The results revealed that only one domain reached the Competent level, while four domains remained at the Somewhat Competent level, indicating inconsistency in learners' mastery of Technical Drafting competencies.

Conclusions

Based on the findings, the following conclusions, were drawn.

1. Learners possessed basic technical drafting skills but have not yet achieved a high level of competency across all domains.

2. The strongest competency of the respondents was in the use of drafting tools and equipment, implied adequate exposure to practical tool operation.

3. Respondents demonstrated insufficient competence in maintaining tools and equipment, which may affect the longevity and proper usage of drafting materials.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

4. Skills related to mensuration, calculation, technical drawing interpretation, and occupational safety needed further enhancement to meet competency standards.
5. The need for strengthened instructional strategies, practical activities, and skills training in Technical Drafting for teachers in the secondary schools.

Recommendations

Based on the findings and conclusions of the study, the following recommendation is forwarded.

1. Teachers should provide more hands-on activities and demonstrations to improve learners' competencies in all Technical Drafting domains.
2. Additional training and workshops on the proper maintenance of drafting tools and equipment should be conducted to address the lowest-rated domain.
3. Schools should enhance instructional support in mensuration, calculation, and technical drawing interpretation through remedial classes and practice exercises.
4. Occupational health and safety procedures should be emphasized regularly through simulations, orientations, and monitoring of safety practices in drafting laboratories.
5. School administrators may provide updated drafting tools, equipment, and learning resources to further develop learners' technical drafting competencies.

Online ISSN: 3082-5121
Aloysian Interdisciplinary Journal of Social Sciences, Education, and Allied Fields
https://journals.aloysianpublications.com
Volume 2 Issue 7 (2026)

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