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Skills Analysis of Technical Drafting Trainers Along Computer-Aided Drawing

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Abstract:
This study examines the proficiency levels of Technical Drafting trainers in Computer-Aided Drawing (CAD) at Libon Agro-Industrial High School. Employing a mixed-methods research approach, the study identifies key demographic characteristics, assesses CAD proficiency across various skills, and highlights perceived gaps in trainers' competencies. The findings reveal that trainers demonstrate intermediate proficiency in technical, design, and teaching skills, while software proficiency and soft skills require significant improvement. Key challenges include resource limitations, such as outdated hardware and software, lack of professional development opportunities, and minimal industry collaboration. Moreover, most trainers struggle with advanced CAD functionalities, particularly 3D modeling. The study underscores the importance of aligning training practices with modern industry demands to improve educational outcomes. Recommendations include organizing regular workshops, increasing resource allocation, fostering industry partnerships, and revising the curriculum to integrate advanced CAD tools and techniques. Addressing these gaps can enhance the effectiveness of CAD instruction and better prepare students for industry demands.

Keywords: Computer-Aided Drawing, Technical Drafting, CAD proficiency, Trainers' skills, Technical-Vocational Education, Skill Gaps, Industry Collaboration, Professional Development

INTRODUCTION

The rapid advancements in Information and Communication Technology (ICT) have revolutionized the way we live and work, impacting various sectors including education. As ICT continues to play an increasingly pivotal role in our daily lives, it is imperative for educators to keep up with the latest technological trends and tools to harness the full potential of these innovations. The MATATAG Curriculum of the Department of Education emphasizes the development of foundational skills and the integration of technology in education. Given the importance of technology in modern education, the curriculum likely includes provisions for integrating Information and Communication Technology (ICT) literacy to equip students with essential digital skills. The implementation of the MATATAG Curriculum involves challenges related to teacher readiness and support systems, which are crucial for effectively integrating ICT literacy into the curriculum.

Technical Drafting is one of the specializations being offered in the ICT strand- TVE and TVL Track in Libon Agro-Industrial High School utilizing competency-based training method which focuses on the demonstration of specific skills and knowledge. This approach ensures that trainers are assessed based on their ability to perform specific tasks and apply technical drafting skills effectively. According to the TESDA Technical Drafting NC2 training regulations (assessment and certification), the assessment

process guarantees that trainers are certified based on their demonstrated competencies, which includes proficiency in CAD operations.

The foundation of engineering and architectural design is technical drafting, which converts abstract concepts into exact, detailed blueprints. This sector has undergone a revolution with the introduction of Computer-Aided Drawing (CAD), necessitating a change in the skill sets needed for technical drawing trainers. Given the considerations, the researcher has decided to conduct a study titled: "Skills Analysis of Technical Drafting Trainers Along Computer-Aided Drawing" which explores the knowledge and abilities that trainers need in this evolving landscape since preparing computer-aided drawings is one of the core competencies in Technical Drafting NC II. The goal of this study is to ensure that Technical Drafting education stays relevant and effective in preparing students for the modern, digitally driven design industry by analyzing the current capacities of trainers, finding gaps, and recommending measures for skill growth.

OBJECTIVES OF THE STUDY

This study aimed to analyze the skills of Technical Drafting trainers in the context of Computer-Aided Drawing (CAD). Specifically, it seeks to answer the following questions:

1. What is the demographic profile of the respondents in terms of:
a. Age;
b. Educational Background;
c. Years of Experience; and
d. Employment Setting
2. What are the technical drafting trainers' current skills level of proficiency in Computer-Aided Drawing (CAD) in terms of:
a. Software Proficiency;
b. Technical Skills;
c. Design and Application Skills;
d. Teaching and Training Skills; and
e. Soft Skills
3. What are the perceived gaps in trainers' CAD skills?
4. What intervention may be recommended to address these gaps?

SCOPE AND DELIMITATION

This study aimed to analyze the CAD skills level of proficiency of Technical Drafting trainers in Libon Agro-Industrial High School, for which respondents will be purposely selected. An online survey questionnaire via Google Form was utilized to gather the respondents' responses. The researcher focused only on the computer-aided drafting skills of the trainers. The competencies in Technical Drafting like manual drawings of different layouts and different trainers from other schools are not included in this study.

SIGNIFICANCE OF THE STUDY

The skills analysis of Technical Drafting trainers along Computer-Aided Drafting holds substantial importance for various stakeholders, including educational institutions, trainers, students, and the industry. Specifically, it is beneficial to the following:

Technical Drafting Trainers. The intervention for the identified gaps will ensure that trainers are kept pace with the rapid evolution of CAD technologies which will lead to better certification and accreditation processes, enhancing the credibility of the educational institution and its programs.
Technical Drafting Trainees. Trainees gain a deeper understanding and hands-on experience with CAD since the trainers will be equipped with advance CAD skills, preparing them for the workforce.
School Learning and Development Team. The findings of the study will help the school learning and development team to offer targeted professional development programs for trainers.
Curriculum Developers. Identifying the strengths and weaknesses of Technical Drafting trainers' CAD skills can inform curriculum developers about the areas that need improvement. This ensures that the educational programs remain up-to-date with technological advancements and industry standards.
School Administrators. Administrators can ensure their school remains competitive, relevant, and effective in preparing students for successful careers in technical drafting and related industries as the study directly impacts curriculum development, resource allocation, educational quality, accreditation, student success, innovation, and faculty development.
Future Researchers. This study may serve as baseline for future related research.

REVIEW OF RELATED LITERATURE AND STUDIES

The review of the related literature and studies offers a thorough examination of pertinent scholarly works, which form the basis for the current study. These studies offer fundamental understanding into the competencies required, educational approaches, and challenges faced by professionals in this field. This study intends to build upon this existing research by conducting a comprehensive skills analysis of Technical Drafting trainers, focusing specifically on their proficiency in CAD.

According to Iyarubo et. al (2023) titled “Impact of Computer-Aided Design and Drafting on Students’ Attitude and Performance in Technical Drawing in Unity College in Port Harcourt”, it was found out that CADD had significant impact on students’ performance in technical drawing, and positively influenced the attitude of the students. Recommendations include among others; that the Nigerian Educational Research & Development Council (NERDC) should design a curriculum that will enforce the incorporation of modern technology software such as the CADD in the teaching and learning process in Secondary Schools in every subject area as this will help to promote the learning outcome and thus bringing about positive change towards students’ attitude in the different subject areas. This is directly relevant to the current study on the skills analysis of Technical Drafting trainers along Computer-Aided Drafting (CAD) as it emphasizes the importance of CADD proficiency and ensures that Technical Drafting trainers possesses the necessary skills to deliver high-quality CADD education.

According to Ugwu, Eunice Ifenyinwa et.al (2023) in the study titled “Application Of Computer Aided Design (CAD) And Flat Techniques In Teaching Pattern Drafting By Clothing Lecturers In Universities In South East, Nigeria” it revealed that some of the challenges in the application of CAD and Flat instructional techniques in teaching pattern drafting include lack of skills on the part of the teachers, insufficient numbers of computers and insufficient technical support for teachers, among others. Orientation of teachers on the importance of computer aided design instruction, using blended approach in teaching, and use of another pattern drafting technique among others are strategies to overcoming the challenges of CAD and Flat technique of pattern drafting instruction by Clothing Lecturers. Among the recommendations made was that curriculum planners and lecturers should make effort to adopt the use of CAD as one of the instructional techniques in teaching pattern drafting. This study is highly relevant to

the current study on the skills analysis of Technical Drafting trainers along CADD. By understanding and addressing skill deficiencies, resource limitations, and instructional challenges, the current study aims to enhance the effectiveness of CAD training in technical-vocational schools, thereby improving educational outcomes and aligning with modern industry practices.

On the other hand, the result in the study of Arslan et. al (2017) titled "Technical Drafting and Mental Visualize in Interior Architecture and Education" presents that the students' lack of skills in technical drawing and in creating 2D and 3D mental visualizations negatively influenced their design process. In the current study, the researcher will examine the CAD skills level of proficiency along computer-aided drawing to ensure that trainers can effectively teach students of the skills needed in technical drawing and in creating 2D and 3D mental visualizations and better improve their design process.

Moreover, according to Rabiu et.al (2020) in their study titled "Computer-Aided Design and Drafting Skills for Effective Programme in Tertiary Institutions Located in Kano State, Nigeria" CADD has great impact in TVET program. It serves as one of the tools that can be used to uplift the knowledge of the students in terms of industrial graphics, design and production, which enable them to meet up with the current challenges in the world of industrial design technology. It also provides technical education students with technical know-how on how to teach technical drawing effectively. Thus, identifying the skills needed for effective application of CADD in TVET program is crucial as it will help the students to learn easily, as well as improve the extent of CADD application in their career. By identifying the essential CADD skills required for effective teaching in TVET programs, Rabiu et al.'s study provides a foundation for understanding the gaps and areas for improvement among current trainers. The present study builds on this by conducting a detailed analysis of trainers' skills, aiming to improve the overall effectiveness of CADD instruction in Libon Agro-Industrial High School as a technical-vocational school implementing Strengthened Technical-Vocational Education Program (STVEP) Curriculum.

Furthermore, in the article titled "AutoCAD Technology Match in Academe and Industry" of Bañados, Helmer M. (2021) of the College of Technology and Engineering. Cebu Technological University, Argao, Campus, Philippines, it was found out that Auto Computer-Aided Design technology was the most utilized design software. Auto Computer-Aided Design skill was the favored skill by construction industries. There was a strong significant relationship between the company's Auto Computer-Aided Design skill requirements and the extent to which these requirements were taught. The most pressing problem met by the respondents in Auto Computer-Aided Design was the lack of facilities, lack of time, updated software, lack of space in the classroom, and lack of time for Auto Computer-Aided Design instruction. This article is highly pertinent to the current study on the skills analysis of Technical Drafting trainers along CAD. By emphasizing the alignment between educational outcomes and industry requirements, identifying existing challenges, and advocating for improved resources and professional development, the current study aims to enhance the effectiveness of CAD instruction.

DEFINITION OF TERMS

The following research words are defined theoretically and operationally to help readers better comprehend and provide clarification on the meaning of each term used in the problem statement and other sections of this paper.

Computer-Aided Drawing (CAD). Computer-aided drawing is a technique where engineering drawings are produced with the assistance of a computer. In the context of this study, this refers to the use of

specialized computer software to create, modify, analyze, and optimize engineering drawings and technical drafts.

Design and Application Skills. Refers to the comprehensive abilities required by technical drafting trainers to not only conceptualize and create detailed engineering drawings using CAD software but also to effectively apply these skills in an educational setting.

Soft Skills. Refers to a personal attribute that supports situational awareness and enhances an individual's ability to get a job done. In this study, this refers to the interpersonal and intrapersonal abilities that facilitate effective teaching, learning, and collaboration in a technical drafting educational environment.

Software Proficiency. Refers to a person's ability to effectively interact with computers and use specific software. It encompasses skills, attitude, knowledge, and experience related to computer usage. In this study, this refers to the level of proficiency of the Technical Drafting trainers in utilizing computer-aided drawing software.

Teaching and Training Skills. Teaching skills are the hard and soft skills that help a teacher keep students engaged. Operationally, this refers to the specific abilities and competencies required by technical drafting trainers to effectively impart knowledge and skills related to CAD to their students.

Technical Drafting NC II. Is a TESDA course designed to enhance the knowledge, skills and desirable work attitude of a draftsman or CAD operator. It covers the basic, common, core and elective competencies i.e. prepare architectural, structural, electrical and electronic, plumbing and sanitary, and mechanical layouts and details using both CAD system and manual drawing methods.

Technical Drafting Trainer. It refers to an educator or instructor who specializes in teaching students the principles and practices of technical drafting.

Technical Skills. These are the specialized knowledge and expertise required to perform specific tasks and use specific tools and programs in real world situations. In this study, this refers to the specific abilities and expertise required by technical drafting trainers to proficiently use CAD software for creating and instructing in engineering and technical drawings.

METHODOLOGY

Research Method

A mixed-methods approach was used for this study, mixing qualitative with quantitative surveys. This involved collecting and analyzing both numerical and non-numerical data and integrating the findings. Mixed-methods research is a valuable approach that enables the researcher to harness the advantages of both quantitative and qualitative methods, providing a deeper and more detailed understanding of the research problem.

Respondents/Participants of the Study

The school, as a Technical-Vocational School offers Technical Drafting from Grade 7 (exploratory) to Grade 10, as well as Technical Drawing as a mandated subject for Grade 7 and Grade 8 students in the Junior High School and Grade 11 to 12 (TVL-ICT-TD) in the Senior High School. Thus, the respondents are the trainers from these subjects.

Instrument

An online survey questionnaire via Google Form was sent to selected technical drafting/drawing trainers in Libon Agro-Industrial High School, to collect information on their demographic profile, level of CAD skills proficiency across the specified parameters, perceived gaps and suggestions for intervention. For analyzing the CAD skills level of proficiency of the trainers, a 4-Point Likert Scale was used with 5

parameters namely software proficiency, technical skills, design and application skills, teaching and training skills and soft skills. Each of them was composed of three to six indicators. The experts were to choose from the corresponding adjectival rating: 4- Advanced Proficiency/Excellent, 3- Intermediate Proficiency/Good, 2- Basic Proficiency/Fair, and 1- No proficiency/Poor. The interpretation of the weighted mean is shown on Table 1.

Table 1 Interpretation of the 4-point Likert-like Scale

Scale:		
Rating	**Range**	**Interpretation**
4	4.00-3.00	Advanced Proficiency/Excellent
3	2.99-2.00	Intermediate Proficiency/Good
2	1.99-1.00	Basic Proficiency/Fair
1	1.00-0.99	No proficiency/Poor

The survey questionnaire used in this study underwent a thorough validation process by a panel of technical experts to ensure its reliability and validity. The panel consisted of three (3) experts each selected for their extensive experience and expertise. These is composed of one (1) from Technical Drafting field, one (1) language expert and one (1) expert from the school's learning and development team.

Data Collection Procedure

The researcher sought the approval of the principal of the Libon Agro- Industrial High School for this present study to be conducted with its Technical Drafting/Drawing trainers. When such permission was granted, the researcher used electronic/digital platforms such as Google Forms in gathering data.

The participants received a thorough orientation outlining the purpose and significance of the study prior to the survey questionnaire being administered. In accordance with the Data Privacy Act, the researcher made sure their responses were handled with the highest respect and privacy. The respondents were encouraged to submit until the second week of June 2024 and were urged to provide honest answers based on their experiences.

After the participants or responders finished the questionnaire, the data was gathered. Every completed questionnaire was examined to make sure all the questions had been addressed. After tallying the data, the outcomes underwent analysis and interpretation.

Data Analysis

The data was analyzed using different statistical tools. The quantitative analysis included the presentation of the descriptive statistical data. The weighted mean was used to analyze the survey questionnaire results. Through the result, the trainers' perceptions were determined based on their answers from different parameters, and likewise, the factors affecting their CAD proficiency were formulated. To have a precise result, weighted mean was used to treat statistically the responses on the CAD skills' level of proficiency. The weighted mean is the ratio of the summation of the products of the individual weights and the individual values of the variable over the summation of weights. Mathematically written as:

$$\bar{x} = \frac{\sum fx}{n}$$

Where :

$\bar{x}$ = weighted mean n = total number of respondents $\sum$ = summation fx = frequency X weight f = frequency x = weight

Research Protocol

Attached to the survey questionnaire was the letter of request/consent letter for the respondents to participate in the study. The consent letter ensures agreement between the researcher and the respondents. Important provisions of the Data Privacy Act were included to safeguard the confidentiality of the data gathered among the respondents of this study.

RESULTS AND DISCUSSION

This part presents the analysis and interpretation of the gathered data from the respondents. Data were organized into tables with corresponding discussions. The data were presented as follows to facilitate data analysis and interpretation: 1) Demographic Profile 2) Current Skills Level of Proficiency in Computer-Aided Drawing (CAD) 3) Perceived gaps and 4) Proposed interventions.

1. Demographic Profile in terms of Age, Educational Background, Years of Experience and Employment Setting

This section presents the profile of the respondents in terms of age, educational background, years of experience and employment setting which highlight key features of this study that will help determine the respondents' profile as well as how it will influence their skills in Computer-Aided Drawing.

Table 2

a. Age

N= 6

Age Range	Frequency	Percentage
22-30	1	16.7%
31-40	4	66.7%
41-50	0	0%
51-60	1	16.7%
61+	0	0%

Table 2 presents that 1 or 16.7% of the respondents has an age range of 22-30 years, 4 or 66.7% has 31-40 years and 1 or 16.7% has 51-60 years. This implies that there are diverse skills set in the teaching workforce. Also, this indicates varying levels of exposure to CAD technologies. Recognizing and harnessing the unique contributions of each age group can lead to a more robust and effective training program in Computer-Aided Drafting, ultimately benefiting both trainers and students.

Table 3

b. 1. Educational Background (Highest Degree Obtained)

N= 6

Highest Level of Education	Frequency	Percentage
Bachelor's Degree	6	100%
Master's Degree	0	0%
Doctorate Degree	0	0%

It can be gleaned from the table 2 that all or 100% of the Technical Drafting trainers has a bachelor's degree and none of them has master's or doctorate degree. This suggests a foundational level of expertise with opportunities for significant enhancement. Encouraging and supporting trainers in pursuing advanced degrees can lead to improved instructional quality, better student outcomes, stronger industry collaboration, and overall growth and development of the technical drafting training programs.

Table 4

c. 2. Educational Background (Level of TESDA Certification)

N= 6

TESDA Certification	Frequency	Percentage
Technical Drafting NCII	3	50%
Trainers Methodology Level 1	1	16.7%
Others	2	33.4%

Based on the table presented, 3 or 50% of the Technical Drafting trainers has a national certification in Technical Drafting and 2 or 33.4% has a national certification for other qualification like Computer Systems Servicing and Electrical Installation and Maintenance. On the other hand, only 1 or 16.7% have undergone and passed the Trainers Methodology Level 1. The current certification levels among technical drafting trainers reveal a solid foundation in technical skills, with half of the trainers certified in technical drafting and a significant portion certified in other technical fields. However, the low percentage of trainers with the Trainers Methodology Level 1 certification highlights a critical area for improvement in teaching methodologies. Addressing this gap through targeted professional development can significantly enhance the quality of CAD training, leading to better student outcomes and a more robust training program overall.

C. Years of Experience

Table 5

c. 1. Years of Experience in Teaching Technical Drafting

N= 6

Years	Frequency	Percentage
Less than one year	2	33.3%
1-3	1	16.7%
4-6	0	0%
7-10	2	33.3%
More than 10 years	1	16.7%

Table 5 shows that 2 or 33.3% of the respondents have less than a year of experience in teaching Technical Drafting while 1 or 16.7% have 1-3 years, 2 or 33.3% have 7-10 years and 1 or 16.7% have more than 10 years of experience. This indicates that the teaching experience of technical drafting trainers varies widely, with a significant proportion of both new and highly experienced trainers. This diversity presents both challenges and opportunities. By implementing targeted training program, fostering mentorship, and encouraging continuous learning, the school can use the strengths of all trainers to enhance the overall quality of CAD education. This approach ensures that students receive a well-rounded education that prepares them effectively for the demands of the industry.

Table 6

c. 2. Years of Experience in Using CAD Applications

N= 6

Years	Frequency	Percentage
Less than one year	4	66.7%
1-3	0	16.7%
4-6	1	0%
7-10	0	0%
More than 10 years	1	16.7%

Table 6 shows the years of experience of the trainers in using CAD applications. It can be gleaned from the table that 4 or 66.7% of the respondents have less than one year of experience while 1 or 16.7% have one to three years and another 1 or 16.7% have more than 10 years of experience. With 66.7% of trainers having less than one year of experience, it indicates a substantial need for improved training and professional development in CAD applications among technical drafting trainers to ensure that all trainers can effectively teach CAD skills.

D. Employment Setting

Table 7

d. 1. Teaching Level

N= 6

Teaching Level	Frequency	Percentage
Junior High School	4	66.7%
Senior High School	2	33.3%

For the teaching level, table 4 shows that 4 or 66.7% of the trainers teaches in the Junior High School and 2 or 33.3% of the trainers teaches in the Senior High School. This data correlates with the years of experience of the trainers in teaching CAD since in the K-12 curriculum, more complex activities on CAD are given in the Senior High School because it focuses on the mastery of the core competencies.

Table 8
d.2. Availability of Resources
N= 6

Level of Availability of Resources	Frequency	Percentage
High (all necessary resources are available)	0	0%
Moderate (some resources are available)	2	33.3%
Low (limited resource available)	3	50%
Very Low (minimal to no resources available)	1	16.7%

Table 8 shows the availability of resources of the trainers in teaching computer-aided drawing. Based on the results of the survey, 2 or 33.3% of the respondents say that they have moderate availability of resources. Half or 50% of the respondents claimed that they have low or limited resources available and 1 or 16.7% says that they have minimal to no resource available. None of them says that they have all the necessary resources for teaching computer-aided drawing. With a significant proportion of trainers reporting low or minimal resources, there are alarming effects for the quality of education and student preparedness. This implies that there is a need to ensure that trainers have access to the necessary resources to enhance the quality of CAD education, leading to better learning outcomes and more proficient technical drafting trainees.

Table 9
d.3. Frequency of Professional Opportunities
N= 6

Frequency of Professional Opportunities	Frequency	Percentage
Regular (more than twice a year)	0	0%
Occasional (one or twice a year)	1	16.7%
Rare (less than once a year)	4	66.7%
Never	1	16.7%

Based on the table presented, it is shown that regarding on the professional opportunities related to computer-aided drawing, 1 or 16.7% says that they attend trainings/seminars occasionally and same percentage for those who never attended related trainings/seminars. None of them attends regularly or more than twice a year. The data reveals a significant gap in the professional development of technical drafting trainers related to Computer-Aided Drawing. With only a small percentage attending training occasionally and none attending regularly, there is a critical need for increased support and encouragement for continuous professional development.

Table 10
d.4. Access to Latest CAD Software
N= 6

Level of Accessibility	Frequency	Percentage
Always (up-to-date software)	0	0%
Often (mostly up-to-date software)	0	0%
Sometimes (occasionally updated software)	3	50%

Rarely (outdated software)	3	50%

The data presents the technical drafting trainers' accessibility to the latest CAD software. The result shows that 3 or 50% of the respondents update their software occasionally or sometimes and another 3 or 50% have outdated software. None of them answered that they have up to date to mostly up to date software. The data reveals significant limitations in the accessibility of the latest CAD software among technical drafting trainers, with none having access to up-to-date software. This implies that there is a need for the school to increase institutional support and funding to ensure that trainers have access to the latest CAD software. This includes purchasing software licenses, providing regular updates, and investing in the necessary hardware to run these applications efficiently.

Table 11
d.5. Collaboration with Industry
N= 6

Level of Collaboration with Industry	**Frequency**	**Percentage**
Frequent Collaboration	0	0%
Occasional Collaboration	2	33.3%
Rare Collaboration	1	16.7%
No collaboration	3	50%

The data shows the level of collaboration of trainers with industry which has significant implications in their CAD skills. It can be gleaned from the table that 2 or 33.3% collaborates with industry, 1 or 16.7%, rare collaboration and 3 or 50% of the trainers have no collaboration. Regular industry collaboration is crucial for maintaining skill relevance, accessing professional development opportunities, gaining practical knowledge, and staying proficient with the latest CAD technologies. To address the gaps identified, it is essential for the school to promote and facilitate stronger connections between trainers and the industry. This will ensure that trainers' skills remain current and aligned with industry standards, ultimately leading to more effective teaching and better-prepared students.

2. Current Skills Level of Proficiency in Computer-Aided Drawing (CAD)

Table 12
Software Proficiency
N= 6

Indicators	**Frequency**								∑fX	$\overline{X}$	Descriptive Interpretation
	4		**3**		**2**		**1**				
	f	fx	f	fx	f	fx	f	fx			
a. I can create precise 2D drawings and technical plans using AutoCAD.	2	**8**	0	**0**	1	**2**	3	**3**	**13**	**2.16**	Intermediate Proficiency/ Good
b. I can create detailed 3D models and visualizations using AutoCAD.	1	**4**	0	**0**	2	**4**	3	**3**	**11**	**1.83**	Basic Proficiency/ Fair

c. I can create 3D models and architectural designs using SketchUp	1	**4**	0	**0**	2	**4**	3	**3**	**11**	**1.83**	Basic Proficiency/ Fair
d. I can import 3D models from various CAD software into Lumion and optimize them for rendering	1	**4**	0	**0**	1	**2**	4	**4**	**10**	**1.66**	Intermediate Proficiency/ Good
e. I can edit and enhance images and graphics using Photoshop	1	**4**	1	**3**	3	**6**	1	**1**	**14**	**2.33**	Intermediate Proficiency/ Good
f. I can create 3D models and prototypes using TinkerCAD's intuitive interface.	0	**0**	0	**0**	2	**4**	4	**4**	**8**	**1.33**	Basic Proficiency/ Fair
								Average		**1.86**	**Basic Proficiency/ Fair**

The data in Table 12 provides insights into the proficiency levels of technical drafting trainers in using various CAD and graphic software tools. Results shows that along software proficiency, the trainers have basic proficiency/fair having an average weighted mean of 1.86. This suggests that while trainers have some foundational skills, there is a considerable need for improvement across most tools.

Table 13
Technical Skills
N= 6

Indicators	**Frequency**								∑fX	$\overline{X}$	Descriptive Interpretation
	4		**3**		**2**		**1**				
	f	fx	f	fx	f	fx	f	fx			
a. I can create 2D Drafting using AutoCAD	2	**8**	0	**0**	1	**2**	3	**3**	**13**	**2.16**	Intermediate Proficiency/ Good
b. I can create 3D Models using 3D CAD software.	1	**4**	0	**0**	2	**4**	1	**1**	**9**	**1.5**	Basic Proficiency/ Fair
c. I can edit photo using Photoshop and other editing tools	1	**4**	2	**6**	2	**4**	1	**1**	**15**	**2.5**	Intermediate Proficiency/ Good
									Average	**2.05**	**Intermediate Proficiency/ Good**

Table 13 shows the technical skills of the trainers in computer-aided drawing. Based on the table presented, it shows that they have an intermediate proficiency/good when it comes to creating 2D and 3D drawings as well as editing drawings using Photoshop and other editing tools having an average weighted mean of

2.05. The data indicates that while technical drafting trainers generally possess good proficiency in 2D drafting and photo editing, there is a significant need for improvement in 3D modeling skills.

Table 14
Design and Application Skills
N= 6

Indicators	Frequency								∑fX	$\overline{X}$	Descriptive Interpretation
	4		3		2		1				
	f	fx	f	fx	f	fx	f	fx			
a. I can create technical drawings	1	**4**	2	**6**	1	**2**	2	**2**	**14**	**2.33**	Intermediate Proficiency/ Good
b. I adhere to industry standards	1	**4**	1	**3**	2	**4**	2	**2**	**13**	**2.17**	Intermediate Proficiency/ Good
c. I can apply CAD in Specific Fields (e.g., architecture, mechanical engineering)	1	**4**	0	**0**	2	**4**	3	**3**	**11**	**1.83**	Basic Proficiency/ Fair
Average										**2.11**	**Intermediate Proficiency/ Good**

The data from Table 14 provides insight into the proficiency levels of technical drafting trainers in creating technical drawings, adhering to industry standards, and applying CAD in specific fields such as architecture and mechanical engineering. Along with this parameter, it was noted that the trainers have an average weighted mean of 2.11, interpreted as Intermediate Proficiency/Good. The data indicates that while technical drafting trainers possess good proficiency in creating technical drawings and adhering to industry standards, there is a significant need to improve their skills in applying CAD to specific fields.

Table 15
Teaching and Training Skills
N= 6

Indicators	Frequency								∑fX	$\overline{X}$	Descriptive Interpretation
	4		3		2		1				
	f	fx	f	fx	f	fx	f	fx			
a. I can develop instructional materials used in CAD	1	**4**	2	**6**	0	**0**	3	**3**	**13**	**2.16**	Intermediate Proficiency/ Good
b. I utilize available tutorial videos on the internet	1	**4**	4	**12**	0	**0**	1	**1**	**17**	**2.83**	Intermediate Proficiency/

											Good
c. I demonstrate steps in teaching CAD	1	**4**	2	**6**	0	**0**	3	**3**	**13**	**2.16**	Intermediate Proficiency/ Good
									Average	**2.38**	**Intermediate Proficiency/ Good**

Based on the data presented, the average weighted mean is 2.38, interpreted as intermediate proficiency/good. This implies that technical drafting trainers possess good proficiency in developing instructional materials, utilizing tutorial videos, and demonstrating CAD steps, however there are still areas for improvement since most trainers relies on available videos on the internet instead of demonstrating the steps by themselves.

Table 16
Soft Skills
N= 6

Indicators	**Frequency**								∑f X	$\overline{X}$	Descriptive Interpretation
	4		**3**		**2**		**1**				
	f	fx	f	fx	f	fx	f	fx			
a. I can effectively articulate ideas and information related to CAD, both verbally and in writing	0	**0**	2	**6**	2	**4**	2	**2**	**12**	**2.00**	Intermediate Proficiency/ Good
b. I can collaborate effectively with fellow trainers to accomplish shared objectives related to computer-aided drawing (CAD) training programs.	0	**0**	2	**6**	2	**4**	2	**2**	**12**	**2.00**	Intermediate Proficiency/ Good
c. I can develop structured project plans outlining tasks, milestones, and deadlines for completing CAD assignments, demonstrating my ability to manage time	0	**0**	1	**3**	3	**6**	2	**2**	**11**	**1.83**	Basic Proficiency/ Fair

and resources efficiently.											
Average										**1.94**	**Basic Proficiency/ Fair**

The data in Table 16 shows that the average weighted mean along soft skills is 1.94, interpreted as basic proficiency/fair. This suggests that technical drafting trainers possess intermediate proficiency in articulating ideas and collaborating with fellow trainers, but only basic proficiency in developing structured project plans. With this, continuous professional development is needed, focusing on enhancing communication, collaboration, and project management skills.

Table 17

Summary of the Current Skills Level of Proficiency in Computer-Aided Drawing (CAD)

N=6

Parameters	Weighted Mean	Descriptive Interpretation
1. Software Proficiency	1.86	Basic Proficiency/Fair
2. Technical Skills	2.05	Intermediate Proficiency/ Good
3. Design and Application Skills	2.11	Intermediate Proficiency/ Good
4. Teaching and Training Skills	2.38	Intermediate Proficiency/ Good
5. Soft Skills	1.94	Basic Proficiency/Fair
GRAND TOTAL	**2.068**	**Intermediate Proficiency/ Good**

The data from Table 17 summarizes the current skills level of proficiency in various aspects of CAD among technical drafting trainers. Having a grand total of 2.068, it shows that the trainers' level of CAD skills proficiency falls on intermediate proficiency or good. Among the five parameters, software proficiency got the lowest weighted mean of 1.86 which implies that trainers have a basic level of proficiency in using CAD software, which might limit their ability to teach more advanced features and functionalities of the software to students. On the other hand, trainers show the highest proficiency in teaching and training skills among the parameters but still fall short of advanced proficiency. This suggests they can effectively teach CAD but may not fully utilize advanced teaching methodologies and tools.

3. Perceived Gaps

a. *What specific challenges do you face when using CAD software in your teaching or professional work?*

Teaching CAD software in technical drafting faces several challenges based on the responses of the participants of this study. Teachers infrequently use CAD software due to a focus on mechanical drawings

for grades 7-8, leading to limited hands-on experience. CAD software also requires powerful hardware, which can be expensive and not always feasible for educators. Learning the various tools and commands of CAD software is essential but challenging without proper training. Additionally, the current curriculum limits exposure to AutoCAD, as it is not typically taught in grade 7. There is also a significant lack of resources, including high-performance computers and licensed software, which can impede effective teaching and learning. Using unlicensed software poses further challenges, such as missing features, updates, and potential legal issues. Addressing these challenges through better resource allocation and professional development is crucial for improving CAD instruction in technical drafting.

b. *In which areas of CAD do you believe you need further training or improvement?*

Some trainers do not personally use CAD software and feels they need more training on how to utilize the software to create computer-aided designs and impart knowledge and skills with their students. They have no idea about 3D CAD and 3D modeling and need to learn more about both 2D and 3D aspects of CAD.

4. Suggested Possible Interventions

a. What types of training or professional development opportunities would you find the most beneficial for improving your CAD skills?

According to the respondents, the most beneficial training or professional development opportunities for improving CAD skills include skills training and workshops, on-site training for interactive learning and personalized guidance, participation in internship and apprenticeship programs, and sessions involving lectures, demo teaching, and hands-on workshops. Actual training with a practical focus is also highly valued.

b. Can you recommend any specific tools, software, or technologies that should be included in CAD training to better equip trainers?

The trainers recommend including SketchUp for advanced modeling techniques and visualization skills, as well as SOLIDWORKS and Fusion 360. They also suggest providing PCs, desktops, or laptops, and incorporating Revit, updated CAD software, Lumion, Photoshop, Inkscape, CorelDRAW, TinkerCAD and SketchUp in the training to better equip trainers.

CONCLUSION

The researcher has drawn the following conclusions based on the cited findings:

With a total weighted mean of 2.068, the study indicates that technical drafting trainers have an intermediate level of CAD ability. The lowest proficiency in software usage competency points to the necessity for more training in advanced CAD functionalities. Trainers can fully employ advanced approaches and tools, but their competency in these areas is still lacking, despite their exceptional teaching and training abilities. Addressing these gaps through targeted training and resource allocation is essential to advance the proficiency of technical drafting trainers and improve CAD education.

Moreover, as highlighted by Bermundo (2024), continuous professional development programs, such as workshops and seminars, are crucial in equipping trainers with the necessary skills to navigate advanced technological tools effectively. This aligns with the need for technical support, active engagement strategies, and tailored resources, ensuring that trainers not only enhance their competencies but also contribute to more effective and dynamic CAD education.

RECOMMENDATIONS

Based on the findings and conclusions the following recommendations are proposed to improve the proficiency of technical drafting trainers in CAD:

1. Organize and implement regular workshops and on-site skills training for CAD for interactive learning.
2. Improve curriculum implementation. Computer-aided software may be introduced starting from Grade 7. In senior high school, emphasize learning 3D CAD and modelling techniques using AutoCAD 3D, Sketch-up and other 3D software.
3. Increase resource allocation to provide trainers with high-end computers and ensure availability of licensed CAD software.
4. Facilitate internships for practical experience.
5. Update training materials to include SketchUp, SOLIDWORKS, Fusion 360, Revit, Lumion, Photoshop, Inkscape, CorelDRAW, and TinkerCAD and encourage the use of online tutorials and videos for continuous learning.
6. Establish peer learning groups for knowledge sharing and foster partnerships with industry professionals for mentorship and insights.

REFERENCES

1. Arslan, Ali Riza; Dazkir, Sibel Seda. (2017). TECHNICAL DRAFTING AND MENTAL VISUALIZATION IN INTERIOR ARCHITECTURE EDUCATION. *International Journal for the Scholarship of Teaching and Learning*, v11 n2 Article Retrieved from https://files.eric.ed.gov/fulltext/EJ1150554.pdf on June 17, 2024
2. BAÑADOS, H. M. (2021). AUTOCAD TECHNOLOGY MATCH IN ACADEME AND INDUSTRY. *International Journal of Civil, Structural, Environmental and Infrastructure Engineering Research and Development (IJCSEIERD),* Vol. 11, Issue 2 Retrieved from https://d1wqtxts1xzle7.cloudfront.net/ on June 17, 2024
3. Dawadi, S., Shrestha, S., & Giri, R. A. (2021). Mixed-Methods Research: A Discussion on its Types, Challenges, and Criticisms. Journal of Practical Studies in Education, 2(2), 25-36,from: https://doi.org/10.46809/jpse.v2i2.20
4. Department of Education. (2023). Pilot Implementation of the MATATAG Curriculum. In *deped.gov.ph*. Retrieved June 21, 2024, from https://www.deped.gov.ph/wp-content/uploads/DM_s2023_054.pdf
5. Dr. Erdem (2002). INTRODUCTION TO COMPUTER AIDED-DRAWING In *https://transport.itu.edu.tr/*. Retrieved June 21, 2024, from https://transport.itu.edu.tr/docs/librariesprovider99/dersnotlari/dersnotlarires112e/not/cadd-1.pdf?sfvrsn=4
6. Glassdoor Team (2021). Teaching Skills: Definition and Examples ,In *https://www.glassdoor.com*. Retrieved June 21, 2024, from https://www.glassdoor.com/blog/guide/teaching-skills/
7. Kilag, O. K. ., Andrin, G., Abellanosa, C., Villaver, Jr., M., Uy, F., & Sasan, J. M. (2024). MATATAG Curriculum Rollout: Understanding Challenges for Effective Implementation. *International Multidisciplinary Journal of Research for Innovation, Sustainability, and Excellence (IMJRISE), 1*(5), 172-177. https://risejournals.org/index.php/imjrise/article/view/380

8. Pratt, M. K. (2023, January 23). *soft skills*. CIO. https://www.techtarget.com/searchcio/definition/soft-skills
9. Rabiu, Abdullahi & Ajelabi, Peter. (2020). COMPUTER AIDED DESIGN AND DRAFTING SKILLS FOR EFFECTIVE TVET PROGRAMME IN TERTIARY INSTITUTIONS LOCATED IN KANO STATE, NIGERIA. 8. 93. Retrieved from https://www.ieeesem.com/researchpaper on June 16, 2024
10. SIMINIALAYI, Leticia Iyarubo, FOMSI, Esther Fabiawari. (2023). IMPACT OF COMPUTER-AIDED DESIGN AND DRAFTING ON STUDENTS' ATTITUDE AND PERFORMANCE IN TECHNICAL DRAWING IN UNITY COLLEGES IN PORT HARCOURT. *EPRA International Journal of Multidisciplinary Research (IJMR)*, *9*(2), 318–325. Retrieved from http://www.eprajournals.net/index.php/IJMR/article/view/1590 on June 16, 2024
11. Staff, C. (2024, March 14). *What Are Technical Skills?* Coursera. https://www.coursera.org/articles/what-are-technical-skills
12. Training Regulation in Technical Drafting NC II. (2020). In *tesda.gov.ph*. Retrieved June 21, 2024, from https://www.tesda.gov.ph/Downloadables/TR%20-
13. Ugwu ,Eunice Ifenyinwa et.al (2023). APPLICATION OF COMPUTER AIDED DESIGN (CAD) AND FLAT TECHNIQUES IN TEACHING PATTERN DRAFTING BY CLOTHING LECTURERS IN UNIVERSITIES IN SOUTH EAST, NIGERIA. *International Journal of Home Economics, Hospitality and Allied Research v2 n1 p29-43 2023* Retrieved from https://files.eric.ed.gov/fulltext/ED638387.pdf on June 16, 2024
14. Bermundo, D. R. L. (2024). The case of distance learning modalities among technical vocational students in one state college in the Philippines. Research and Analysis Journal, 7(11), 18–25. https://doi.org/10.18535/raj.v7i11.480