

Technical-Vocational Education and Training in a Bubble Community through Open and Distance e-Learning: An Evaluative Study

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Abstract: Technical-Vocational Education and Training should continue for students to obtain a National Certification from Technical Education and Skills Development Authority (TESDA) amidst the disruptions brought by the pandemic. This study which was conducted in a bubble community in Cavite, Philippines, utilized an open and distance e-learning to educate and train fifty (50) students in Technical Drafting NCII course for one hundred forty-eight hours (148 hours). With the competency-based curriculum and training plan as the training reference, the students were expected to develop skills in drafting mechanical drawings using both manual drafting methods and computer-aided design (CAD) system to be competent in Technical Drafting NCII. The technical trainer subjected the students to institutional assessment prior to national competency assessment. Together with one TESDA representative, the assessors in Technical Drafting NCII conducted the national assessment for six hours. Results revealed that eighty-eight percent (88%) of the students are competent in Technical Drafting NCII. It is important to note that all students were competent in computer-aided design system. Students who failed in the national assessment shared that there is a need for more training in manual drafting methods and the need to be mentally prepared. Given the needed technology infrastructure, open and distance e-learning is effective in technical-vocational education and training. While the effect of the pandemic is recognized, this study recommends that schools and universities should continually take a proactive stance in anticipating and planning for various delivery conditions to help the equally diverse students to be equipped with the skills necessary for authentic work environments.

Keywords: *Technical-Vocational Education and Training, Bubble Community, Open and Distance e-Learning*

1. Introduction

Technical Education and Skills Development Authority (TESDA) is a government agency mandated to upskill and reskill the Filipinos for nation building and economic development. However, the pandemic posed a big challenge on how to move forward in the Fourth Industrial Revolution, especially in education and skills development. Administrators, teachers, instructional designers and practitioners alike across all year levels have come together to reconsider the design of the curriculum and course syllabi for learning to continue despite the pandemic.

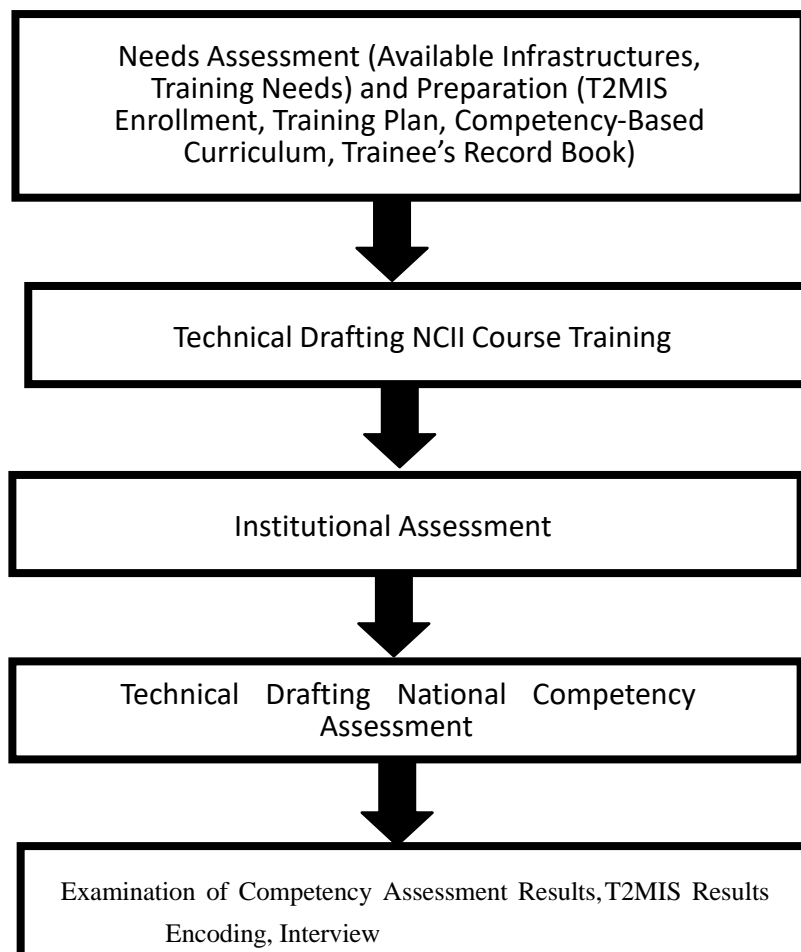
According to Ferri, Grifoni and Guzzo (2020), teaching and learning has technological, pedagogical and social challenges. In fact, Evseeva and Solozhenko (2015) posits three challenges faced by the teachers and learners when using technology in teaching such as extra workload in designing the content and activities, the integrity of the classroom and electronic components of the course, and students' orientation towards it. The use of technology results to extra workload because teachers have to design the learning activities, that is, the stages of teaching and learning process must be logically connected. On a positive note, digital technology can provide valuable support for

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improving interaction and learning (Mercer, Hennessy & Warwick, 2019). The utilization of different platforms and other related resources helps facilitate the continuity of learning process even in skills development. It also helps to ensure that the instructors and teachers are not exposed to the virus. In this pandemic and technological age, the teacher's instructional standpoint and understanding on how to effectively use technologies are crucial in teaching and learning process. It is important to continually produce learners with the necessary skills needed to adapt with a rapidly changing world. If not, there would still be an increasing unemployment rates, that is 17.7% in April 2020 versus 5.1% in 2019. However, this pedagogical shift is faced with issues such as availability of infrastructures, resource constraints and diverse set-up. With this, the role of open and distance e-learning plays a very crucial role in the continuity of skills development in the country and on the bigger picture, fight the increasing unemployment rates of the Filipino amidst the pandemic. This study sought to evaluate the effectiveness of open and distance e-learning in Technical Drafting skills training in a bubble community.

2. Method

This study which was conducted in a bubble community located in Cavite, Philippines has 50 learners enrolled in Technical Drafting NCII course from April-May 2022. The learners are senior high school students, male and has an age range of 17-21 years old. Being a bubble community, the learners stayed inside the community with buildings and amenities such as but is not limited to school, dormitory, clinic, farm, gymnasium, and recreational area. The research setting is also a TESDA accredited training and assessment center in Technical Drafting NCII. There are forty-eight working desktop computer units with complete unit peripherals and drafting application in the lecture area. Due to the sudden shift, there is only one smart television with camera and speakers in the lecture area for the synchronous session. There is also a manual drafting room, adjacent to the lecture area. On the other hand, the trainer in technical drafting NCII course has the necessary qualification to deliver the course via open and distance e-learning.



Technical Drafting NCII course is designed to enhance the knowledge, skills and desirable work attitude of a draftsman

or CAD operator. It covers the basic, common, core and elective competency on preparing architectural layouts and

details using both CAD system and manual drawing methods. Needs assessment was conducted before the start of the training (see figure 1). The trainer used a training plan designed for open and distance e-learning and a competency-based curriculum as a guide for the one hundred forty-eight hours (148 hrs) training. Following TESDA guidelines, there are only twenty-five learners from 8 am-12 noon and the remaining learners are scheduled from 1 pm-5 pm. It must be noted that all learners choose to enroll in Technical Drafting NCII course. After the training, all learners undergo an institutional assessment (five batches) to test their readiness in the national competency assessment. The institutional assessment includes written exam, practical exam, and interview. The learners who passed the institutional assessment are recommended for national competency assessment on a first-come first serve basis. During the national competency assessment, a representative from TESDA, the assessment manager and the assessor is present. The learners took a written and practical examination using computer and manual design system. Then, the assessor interviewed them on their performance and will inform them on the result of the assessment (competent or not yet competent). The said assessment lasted for six- seven hours. After the training and assessment, the researcher interview the learners on the challenges that they encounter in the skills development training.

3. Result

The learners undergo a skills development training in Technical Drafting NCII. The focus of the training is to draft architectural - site development plan, floor plan, ceiling, elevation, and section, and working drawing details using both manual drafting methods and computer-aided design (CAD) system. The learning outcomes in this course are to (LO1) plan and prepare for work; (LO2) prepare and set-up tools and materials for drawing; (LO3) draft site development plan ; (LO4) draft floor plan; (LO5) draft roof plans; (LO6) draft ceiling plans; (LO7) draft elevations and sections; and (LO8).submit complete drawings. Due to the sudden shift and lack of infrastructure, interaction between the trainer and trainees are limited during the training. Since there is only one smart television, one camera and the tv speaker was used, everyone is not given an equal chance to participate in the synchronous session. The trainer acknowledges that the provision of individual headset would be helpful to accelerate the training. The trainer reported that there are forty-six percent (46%) who did not submit course requirements during the training and some students arrived late especially during synchronous session (lecture).

| Practical | % | WRITTEN ASSESSMENT | | | | | LACKING OUTPUTS | | | | | |
|-----------|----|--------------------|----|----|----|----|-----------------|--------|-----------|-------------|----------|---------------------------------------|
| | | ST | Q1 | Q2 | Q3 | Q4 | CAD | Manual | Lettering | Elevation | Printout | Overall Assessment on their Exercises |
| 84.29 | 25 | | | | | | | Manual | Lettering | Incomplete | | Outputs are not completely Done |
| 84.29 | 31 | | | | | | | | Lettering | Incomplete | | Outputs are not completely Done |
| 77.14 | 22 | | | | | | CAD | | Lettering | Incomplete | | Outputs are not completely Done |
| 94.29 | 29 | 6 | | | | | | | | Almost Done | | Outputs are not completely Done |
| 77.62 | 28 | 5 | 9 | 7 | | | CAD | | | Incomplete | | Outputs are not completely Done |
| 97.14 | 29 | 6 | 9 | | | | | Manual | | | | Outputs are not completely Done |
| 72.38 | 23 | 4 | 6 | 7 | | | CAD | | | Incomplete | | Outputs are not completely Done |
| 67.14 | 17 | 4 | 8 | 7 | | | CAD | | | Incomplete | | Outputs are not completely Done |
| 74.29 | 26 | 6 | 9 | | | | | | | Incomplete | | Outputs are not completely Done |
| 76.19 | 26 | 6 | 8 | 7 | | | | | | NONE | | Outputs are not completely Done |
| 91.43 | 24 | | | | | | | Manual | | | NONE | Outputs are not completely Done |
| 86.67 | 28 | 8 | 5 | | | | | | Lettering | Incomplete | | Outputs are not completely Done |
| 97.14 | 35 | 5 | 10 | | | | | Manual | | | | Outputs are not completely Done |
| 50.00 | 33 | 5 | 8 | 7 | | | | Manual | | Incomplete | NONE | Outputs are not completely Done |
| 68.10 | 20 | 5 | 7 | 5 | | | | | Lettering | Incomplete | NONE | Outputs are not completely Done |
| 51.429 | 18 | | 8 | | | | | | | Incomplete | NONE | Outputs are not completely Done |
| 85.714 | 27 | 7 | | 9 | | | | | | Incomplete | | Outputs are not completely Done |
| 94.286 | 33 | | 8 | | | | | | | | | Outputs are not completely Done |
| 95.714 | 27 | | 9 | 9 | | | | | | | | Outputs are not completely Done |
| 84.286 | 32 | | | 9 | | | | | | Incomplete | NONE | Outputs are not completely Done |
| 75.714 | 23 | | | | | | CAD | Manual | | Incomplete | | Outputs are not completely Done |
| 94.286 | 26 | | 9 | 7 | | | | | | | | Outputs are not completely Done |
| 50 | 15 | | | | | | | | | | | Outputs are not completely Done |

Figure 2: Learners with lacking requirements

Prior to the institutional assessment, learners who have lacking requirements belongs to the last batch who took the national assessment. During the practical training, there

were no reported absences. Learners were particularly interested in using the computer-aided design system than manual design.

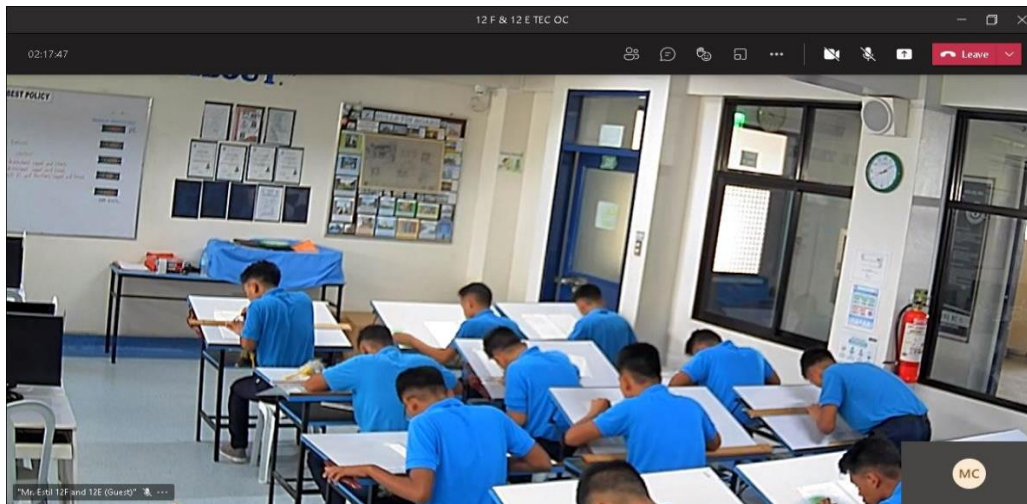
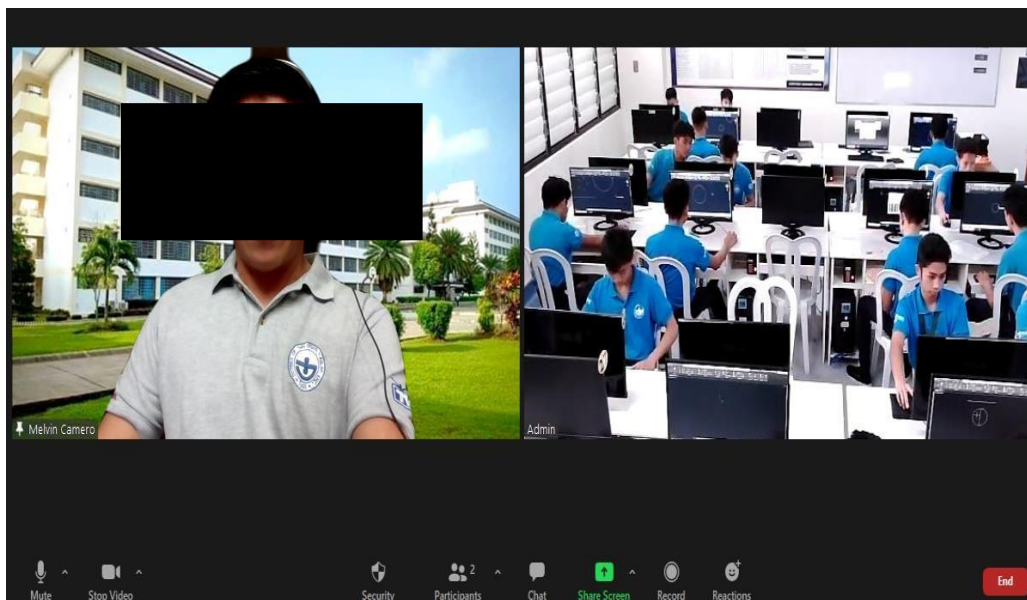


Figure 3: Training Using Manual Design System



All learners were recommended for national competency assessment. The Technical Drafting NCII assessment was scheduled last June 5 and 26, 2021. Results of the assessment showed that eighty-eight percent (88%) of the students are competent in Technical Drafting NCII course. This is higher compared to the sixty-three percent (63%) passing percentage in 2019. Being competent in the national assessment in Technical Drafting NCII means that the learners has necessary knowledge, skills and attitudes to gather interpret and convey information in response to workplace requirement; to identify role and responsibility as a member of a team; to promote career growth and advancement; to comply with regulatory and organizational requirements for occupational health and safety; on taking

measurements and calculations, identifying, interpreting, and analyzing and interpreting symbols in plans and drawings, analyzing quality of works and performing computer operations. Learners are all proficient in using the computer-aided design in drafting. It should also be noted that there are learners who have problems in printing their output. On the other hand, learners who are not yet competent in Technical Drafting NCII are those who did not finish the output using the manual drafting design system. Learners shared that they were not able to upskill in manual drafting because they needed more time and special assistance from their trainer. They admitted that they feel anxious, and time pressured during national assessment

| Learner's ID | Name | Result | Training Certificate | SO Number |
|----------------------|--|-----------|----------------------|--|
| ISA-03-307-13087-001 | STEPHEN KYLE ADRA INOCENCIO | Completed | | Assessment Result : Competent + Employment |
| PKD-03-372-14011-001 | KEVIN DUDAYAN PATANGDO | Completed | | Assessment Result : Not Yet Competent + Employment |
| PJP-04-188-05017-001 | JOEMEL PALES PALAYAR | Completed | | Assessment Result : Competent + Employment |
| NJM-03-258-05017-001 | JHODEL MACARANIG NABOR | Completed | | Assessment Result : Competent + Employment |
| MAD-02-335-14011-001 | ARCH ANGEL BEGAY MARCELO | Completed | | Assessment Result : Not Yet Competent + Employment |
| BGG-02-066-05017-001 | GHAN DONN GUEVARRA BARDIN | Completed | | Assessment Result : Competent + Employment |
| DJR-99-002-13039-001 | JEREMY RAMOS DELANTAN | Completed | | Assessment Result : Competent + Employment |
| FJB-03-456-05062-001 | JAYSON BRINCES FULGAR | Completed | | Assessment Result : Competent + Employment |
| IBL-04-048-13088-001 | BRAYVE ANGELO LACULIBARES | Completed | | Assessment Result : Competent + Employment |
| LRC-03-214-02031-001 | RUBY CATAOGATAN LAGAR | Completed | | Assessment Result : Competent + Employment |
| FJD-03-378-05062-001 | JUDE DEL ROSARIO FRANDO | Completed | | Assessment Result : Competent + Employment |
| RMA-04-211-17051-001 | MARK ALLEN AMOROS ROSELL | Completed | | Assessment Result : Competent + Employment |

Results gathered from the interview with the trainer revealed that learners who have difficulties must be given extra time to practice and assistance in any way. The trainer shared that giving of motivation and incentives also helped other students to perform well. Learners have the potential to be skilled in both CAD and manual drafting if they are given resources such as complete infrastructures during the training, opportunities to ask questions and to have individual feedbacking sessions and motivational support. The trainer acknowledges that each learner have different paces and they need to be considered in the planning and implementation of training. The not yet competent learners shared that they need special assistance from the trainer on how to draft manually in each time period. Learners also shared that they lack the motivation to go on with the training due to personal issues such as but is not limited to homesickness, anxieties, and boredom.

4. Discussion

Learners and trainer cited lack of infrastructure, design of the training plan and curriculum, and personal issues as hindrances in being competent in Technical Drafting NCII. Based on the result of the national competency assessment, using open and distance e-Learning in Technical Drafting NCII training is effective in developing the skills of the learners. It got an eighty-eight percent (88%) passing percentage and is twenty-five percent (25%) higher compared to face to face training. Learners were able to finished and submitted their output using the computer-design system while not yet competent learners were not able to complete the work using manual design system. The use of open and distance e-learning is effective in skills training, however, planning and delivery should put first diverse learners and situation. Learners acquire skills at different pace and they have different orientation towards learning. With this, it is important that the design of the

training plan and curriculum includes learners of all types. Activities which includes individual feedbacking and giving them opportunities to ask questions must also be considered for the institution and trainers to support them. While the effect of the pandemic is recognized, this study recommends that schools and universities should continually take a proactive stance in anticipating and planning for various delivery conditions to help the equally diverse students to be equipped with the skills necessary for authentic work environments. This study only focuses on Technical Drafting NCII, thus, the researcher recommends that open and distance e-learning should also be explored by TESDA training accredited institutions in different sector like automotive and land transportation, tourism, electrical and electronics, garments and metal and engineering. The COVID- 19 pandemic have challenged different agency on how to upskill and reskill the Filipinos, and more importantly, how to combat the increasing unemployment rates. TESDA training accredited institutions should consider open and distance e-learning to continue the skills development and training amidst the pandemic.

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