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Exploring the Preparedness and Competence Level of Pre-service TVET Teachers Using Knowledge, Skills, and Attitude Model

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Abstract

The full implementation of the K-12 curricula and increasing enrolment in TVET institutions in the Philippines urges higher education institutions to provide quality pre-service teacher education continuously. This paper explored the preparedness level of pre-service TVET teachers in terms of specialized courses taken, training certifications attained, and length of course program-related training attended. This paper also determined the competence level of pre-service teachers in select TVET learning areas using the knowledge, skills, and attitude model. Using a descriptive survey design, the researchers administered a validated instrument among the 143 pre-service teachers enrolled in a Philippine university offering a TVET teacher training program. Findings revealed that most pre-service teachers specialized in cookery, cosmetology, carpentry and masonry, basic electricity, drafting, plumbing, and electronics. Only a few had attended course program-related training and attained TVET training certification levels. Findings revealed pre-service teachers perceived competence in knowledge, skills, and attitude in the select TVET learning areas. However, their level of competence varied from each TVET learning area, which calls for a pre-service teaching enhancement program to improve the competency levels of pre-service TVET teachers.

1. Introduction

Implementing the K to 12 curricula in the Philippines has significantly broadened the landscape of TVET learning areas. With the addition of extra years in primary education, there has been a noticeable augmentation in the range and diversity of TVET courses and educational opportunities (Budhrani et al., 2018). The K to 12 framework strives to equip students with a more comprehensive and practical skill set, aligning TVET programs with the evolving requirements of the workforce. This transition has included a more extensive array of technical and vocational subjects, catering to diverse industries and sectors. Consequently, there has been a notable rise in enrolment in TVET institutions (Wu et al., 2019; Francisco & Neri, 2023), driven by students recognizing the significance of acquiring specialized skills and knowledge to boost their employability (Vandenberg & Laranjo, 2021). The broadening of TVET learning areas reflects a proactive approach to address the evolving demands of the job market, cultivating a more adaptable workforce that possesses enhanced skills—aligned with the goals of the K to 12 educational reforms.

With these significant improvements in the TVET sector in the Philippines, higher education institutions that take charge of pre-service teacher education must continuously adapt and ensure that pre-service teachers can fulfill the changing demands of TVET in the country (Bongco & De Guzman, 2022). The country's educational system recognizes the significance of TVET teachers as they are central to instilling practical skills in students and preparing them for diverse careers in the global workforce (Diamonon, 2023). A meticulously crafted pre-service education program is necessary to give teachers essential pedagogical skills, subject expertise, and industry knowledge, ensuring their ability to engage and inspire students effectively (Alinea, 2021). This level of preparation is particularly crucial within the context of TVET, where the focus transcends mere theoretical understanding to the practical application of skills in real-world scenarios (Alamsyah et al., 2022). Ensuring the excellence of teacher education is crucial, enabling educators to adjust to the dynamic landscape of vocational fields and stay abreast of technological advancements and industry trends.

Given the expansion of TVET learning areas resulting from the implementation of the K to 12 curricula in the country, it is essential to reassess the readiness and competence of pre-service TVET teachers. A thorough understanding of the preparedness and competence levels among pre-service TVET teachers allows training providers to reevaluate their curricula and implement essential enhancements to meet the evolving demands of the TVET landscape in the Philippine education sector (Francisco & Neri, 2023).

Various research initiatives have thoroughly examined the preparedness and competence of pre-service TVET teachers, aiming to comprehend the effectiveness of their educational programs in meeting the demands of the TVET sector (Diao et al., 2023). This research trajectory typically entails evaluating the pedagogical skills, subject expertise, and industry knowledge acquired by pre-service TVET teachers, utilizing teaching demonstrations, examinations, and surveys. These studies provide valuable insights into strengths and areas requiring improvement within pre-service teacher education. These insights play a significant role in refining programs to better align with the dynamic requirements of the TVET sector (Alinea, 2021). Moreover, these research initiatives are instrumental in shaping policies and strategies to enhance the overall quality of TVET teacher preparation.

While various studies have delved into assessing pre-service TVET teachers, comprehensive investigations that systematically integrate knowledge, skills, and attitude (KSA) dimensions still need to be done. The KSA model offers a comprehensive framework for assessing the various dimensions of teacher preparedness, providing a nuanced perspective beyond conventional evaluations (Omar et al., 2020). This research, concentrating on knowledge, skills, and attitude, hopes to address a gap in the existing literature and contribute to a more in-depth comprehension of the factors impacting the effectiveness of pre-service TVET teachers. The outcomes of this study are intended to guide targeted interventions and enhancements in pre-service teacher education programs, ensuring a more precise alignment with the dynamic demands of the TVET sector.

With the identified gaps, this study investigates the preparedness and competence level of pre-service TVET teachers utilizing the KSA model. To achieve this aim, the researchers address the following specific objectives:

1. To describe the preparedness level of pre-service TVET teachers regarding specialized courses taken, TVET training certifications attained, and length of course program-related training attended; and
2. To determine the level of competence of pre-service TVET teachers on TVET standards for TLE learning areas using the knowledge, skills, and attitude model.

2. Literature Review

2.1 The TVET Education Landscape in the Philippines

The structure of TVET in the Philippines has recently experienced substantial changes, showcasing the nation's steadfast dedication to equipping its workforce with practical skills and expertise. The initiation of the K to 12 educational reforms in 2013, signified a fundamental shift that has left a profound and lasting impact on TVET (Gangoso, 2023; Ramos, 2021). This pioneering reform extended the duration of the basic education cycle and introduced innovative tracks meticulously tailored to address the specific demands of technical and vocational fields (Talento et al., 2022; Budhrani et al., 2018). Consequently, the amplification of TVET's influence has assumed a key role in augmenting its relevance, strategically aligning it with the dynamic and evolving requisites of the contemporary job market (Sumaya & Cruz, 2023).

The Technical Education and Skills Development Authority, also known as TESDA shapes the Philippines' technical and vocational education and training sector (Budhrani et al., 2018; Pallado et al., 2022). With its responsibility to regulate and supervise various technical education programs, TESDA is actively driving initiatives set to impact the future of TVET significantly (Tadle et al., 2021). The agency is proactive in championing carefully designed training initiatives to meet the needs and competencies of the industry (Francisco & Neri, 2023). Through collaborative efforts with diverse sectors, TESDA ensures that TVET programs stay aligned with the current demands of both local and global sectors, ready to anticipate and respond to changing requirements (Choi, 2021). This collective endeavor by TESDA significantly contributes to cultivating a responsive

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and dynamic TVET environment, ultimately contributing to the development of a well-prepared workforce that is highly adaptable to the challenges of the contemporary job market.

Despite making notable progress, the TVET in the Philippines grapples with ongoing challenges. It includes inadequate quality, challenges in student employment, a lack of coordinated management across multiple departments (Wu et al., 2019; Orbeta, 2021; Edralin & Pastrana, 2023; Widiastuti et al., 2021; Tadle et al., 2021) and a shortage in workshops, tools, and equipment (Declaro-Ruedas, 2022). A vital issue centers around the need for greater awareness and recognition of TVET as a practical career option, particularly when prevailing opinions favor traditional academic paths. Moreover, ensuring the quality and relevance of TVET programs, especially in rapidly changing industries, calls for targeted interventions. Effectively tackling these challenges is essential to unleash the full potential of TVET, significantly influencing the economic growth of the country and offering individuals the opportunity to acquire valuable skills for sustainable livelihoods. Diligent endeavors to surmount these challenges are positioned to play an important role in determining the future trajectory of TVET in the Philippines.

2.2 Approaches to Assessing the Preparedness and Competence Level of Pre-service TVET Teachers

The assessment of preparedness and competence levels among pre-service TVET teachers involves diverse approaches to gauging their readiness for the dynamic demands of the educational landscape. One approach evaluates the pedagogical skills acquired during pre-service training (Ramirez, 2020). It involves assessing their ability to effectively convey technical concepts, engage students in practical applications, and employ teaching methods tailored to the specialized nature of TVET subjects (Ramaligela, 2021). Classroom observations, teaching demonstrations, and feedback sessions are commonly used to measure the pedagogical preparedness of pre-service TVET teachers (Ogbuanya & Shodipe, 2022).

Another essential assessment aspect involves examining subject expertise (Masek et al., 2021; Omar et al., 2020). TVET teachers need a robust understanding of the technical subjects they are expected to teach (Ismail et al., 2018). TVET teachers must have a solid grasp of the technical subjects they teach (Jafar et al., 2020). This understanding is checked through various methods, such as subject-specific exams, hands-on demonstrations, and evaluations of their skill in explaining intricate technical concepts quickly for students to grasp. This procedure guarantees that pre-service TVET teachers possess in-depth knowledge of the subjects and the capability to communicate pertinent and precise information to their students that resonates with them. It ensures they are adequately prepared to transmit practical skills and knowledge to the upcoming generation adeptly.

Industry knowledge is also a critical dimension in assessing the preparedness of pre-service TVET teachers (Chrea & York, 2022). Given the practical orientation of TVET, understanding industry trends, technological advancements, and real-world applications is imperative (Tahir & Abdullah, 2023). To evaluate pre-service TVET teachers, we look at their understanding of current industry practices, whether they engaged in internships or industry collaborations during their training, and how well they can incorporate practical industry insights into their teaching methods. By amalgamating these elements in a thorough assessment, we comprehensively understand their readiness and proficiency. This holistic strategy aids in pinpointing particular areas for enhancement in teacher education programs, guaranteeing their customization to align with the changing requirements of the TVET sector. The goal is to ensure that our upcoming TVET educators are not only well-versed in theory but are also practical, with a solid connection to the real-world dynamics of the industries in which they will be guiding their students.

3. Methodology

This study applied a descriptive survey design to explore the preparedness and competence level of pre-service TVET teachers enrolled in two campuses of a Philippine university offering a TVET teacher training program. The researchers administered a validated instrument to the 143 pre-service teachers who participated in the study. This instrument has two parts. The first part describes the preparedness profile of the pre-service TVET teachers in terms of specialized courses taken, training certifications attained, and the length of course program-related training attended. The second part defines the competence level of the pre-service TVET teachers in specific TVET learning areas as to knowledge, skills, and attitudes. The researchers selected only three TVET learning areas among the existing TVET programs as they are commonly present in all secondary schools, thereby increasing the importance of assessing the competence and preparedness of the pre-service teachers in these learning areas. The competencies indicated in the instrument were adapted from the TESDA's TVET training regulation competency standards (TESDA, 2015). The instrument employed a 5-point Likert scale ranging from 1, labeled as not competent, to 5, as very competent. The instrument underwent validity and reliability testing with a Cronbach alpha that ranges from 0.90 to 0.98 above the acceptable level (Cristobal et al., 2007). The researchers used descriptive statistics in data analysis, which included frequencies, mean, standard deviation, and standard error.

The researchers also used Scott et al.'s (2014) guide in interpreting the competency levels of the pre-service TVET teachers (see Table 1). Moreover, the researchers ensured strict adherence to ethical protocols during the study.

Table 1 *Parameter scales and verbal descriptions for interpreting competency levels*

Scale	Range	Category	Verbal description
5	4.20-5.00	Very competent	Competency is fully carried out in all instances. The level of execution is between 81-100%.
4	3.40-4.19	Competent	Competency is fully carried out in most instances. The level of execution is between 61-80%.
3	2.60-3.39	Moderately competent	Competency is carried out to a moderately extensive degree in some instances. The level of execution is from 41-60%.
2	1.80-2.59	Slightly competent	Competency is carried out to a restricted degree in a few instances. The level of execution is from 21-40%.
1	1.00-1.79	Not competent	Competency is hardly carried out. The level of execution is from 1-20%.

4. Results

4.1 Characterizing the Preparedness Level of Pre-service TVET Teachers

The preparedness level of pre-service TVET teachers is critical to the success of vocational education. It ensures that students receive relevant and high-quality instruction, preparing them for successful workforce entry and promoting technical and vocational education advancement. This paper described the preparedness level of pre-service TVET teachers in terms of specialized courses taken, training certifications attained, and length of course program-related training attended.

The relevance of specialized courses taken by pre-service TVET teachers significantly contributes to their overall preparedness by ensuring alignment with industry needs, promoting practical application of knowledge, and enhancing teaching strategies (Omar et al., 2020). This alignment is necessary in preparing teachers to meet the demands of the ever-evolving technical and vocational education (Xinming, 2023). Table 2 provides valuable insights into the preferences and distribution of specialized courses among pre-service TVET teachers. The table presents a range of vocation and technical subjects in which foods/cookery, cosmetology, carpentry and masonry, basic electricity, and basic drafting are the top five most frequently taken courses. The high participation in courses like foods/cookery and cosmetology may indicate a strong interest or demand in these fields among pre-service TVET teachers. These courses fall in the home economics and industrial arts, where students mostly enroll as their technical-vocational-livelihood (TVL) track during senior high school (Sumaya & Cruz, 2023).

Table 2 *Distribution of the specialized courses taken among the pre-service TVET teachers*

Specialized courses	Frequency	Percentage (%)	Rank
Foods/cookery	141	98.60	1
Cosmetology	140	97.90	2
Carpentry and masonry	139	97.20	3.5
Basic electricity	139	97.20	3.5
Basic drafting	138	96.50	5.5
Plumbing	138	96.50	5.5
Welding	138	96.50	5.5
Basic electronics	136	95.10	8.5
Garments	136	95.10	8.5
Automotive	132	92.31	10
Handicrafts	69	48.25	11
Fishery	56	39.16	12
Computer assembly, maintenance, and troubleshooting	53	37.06	13

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Meanwhile, handicrafts, fishery, and computer assembly, maintenance, and troubleshooting are among the courses with lower participation percentages primarily because these were not fully integrated into the curriculum. The low enrolment in agri-fishery TVL tracks can be attributed to its common preference among the students (Kambat & Robles, 2023). However, the senior high school curriculum offered these courses as part of the TVL tracks. The ranking and percentage data can help educational institutions and policymakers understand the popularity and distribution of specialized courses, which can inform curriculum development and resource allocation.

TESDA training certification levels are crucial for enhancing the preparedness level of pre-service TVET teachers by validating their competence, aligning with industry standards, promoting quality assurance, and providing opportunities for career advancement (Alinea, 2021). These certifications contribute to the overall effectiveness of vocational education, ensuring that students receive high-quality and relevant training for successful entry into the workforce (Edralin & Pastrana, 2023). Table 3 offers a valuable understanding of the certification levels attained by pre-service TVET teachers across different courses, highlighting areas of strength and potential areas for improvement in preparing teachers for vocational education. The table provides that dressmaking, carpentry, beauty care, plumbing, computer system servicing, food and beverage services, housekeeping, and electrical installation and maintenance are among the courses with varying levels of certification achieved by pre-service TVET teachers. This result suggests a varied level of expertise among pre-service TVET teachers in different classes. Higher certification levels, especially in critical areas like electrical installation and maintenance, indicate a potentially advanced skill set among teachers. On the other hand, there are still areas in which the pre-service teachers need more certification levels (Alinea, 2021). These certifications prepare pre-service teachers to be skills-ready and competent in teaching TVET in the future (Tamayo, 2023).

Table 3 *Distribution of the TESDA certification level attained among the pre-service TVET teachers*

TESDA training courses	Certification level					
	COC	NC I	NC II	NC III	NC IV	TM
Dressmaking	1		1			
Technical drafting						
Carpentry	1		1			
Beauty care			3			
Plumbing			1			
Cookery						
Fishery						
Automotive servicing						
Computer system servicing			2			
Welding						
Bread and pastry production						
Food and beverage services	2		26			
Driving						
Housekeeping			1			
Bartending						
Electrical installation and maintenance			18			

Course program-related training is instrumental in enhancing the preparedness level of pre-service TVET teachers by aligning them with curriculum objectives, improving subject mastery, developing pedagogical skills, and ensuring relevance to industry standards (Eze et al., 2022). Consequently, this can positively impact the quality of vocational education and students' success in their future careers. Table 4 presents the distribution of course program-related training hours among pre-service TVET teachers, allowing for a better understanding of the preparation levels in different vocational fields. The table displays that different courses have varying lengths of program-related training, with some having concentrated hours in specific ranges. For example, courses like dressmaking, carpentry, plumbing, cookery, automotive servicing, welding, and electrical installation and maintenance have notable distributions across different training hour ranges. Beauty care and food and beverage services have longer trained hours, with significant representation in the 40+ hours category, suggesting comprehensive and in-depth training. Courses like fishery, driving, housekeeping, and bartending show a concentration in specific hour ranges, indicating a more focused but potentially shorter duration of training.

Teachers should continually undergo workshops and training sessions to keep abreast of the latest teaching trends in vocational education, particularly given these courses' practical and skill-based nature (Tamayo, 2023).

Table 4 *Distribution of length of course program-related training attended in hours among the pre-service TVET teachers*

Course program-related training	Length of training attended (hours)						
	0 to 8	9 to 16	17 to 24	25 to 32	33 to 40	40+	Total
Dressmaking	2				2	27	31
Technical drafting					1	25	26
Carpentry	2				2	26	30
Beauty care	3	4			1	29	37
Plumbing	2				2	26	30
Cookery	1		2		2	25	30
Fishery				3		3	6
Automotive servicing	2			9	2	13	26
Computer system servicing	1			1	1	11	14
Welding	2			1	1	21	25
Bread and pastry production						8	8
Food and beverage services						27	27
Driving					1	2	3
Housekeeping						2	2
Bartending						1	1
Electrical installation and maintenance						18	18

The table highlights the diversity in training hour distribution among courses, highlighting the tailored nature of program-related training based on each vocational field's specific demands and intricacies. The distribution of training hours reflects the varied nature of vocational courses, with some requiring more extensive training to cover a broader skill set or to address complex subject matter. Understanding the distribution of training hours is essential for program planning, resource allocation, and ensuring that teachers receive adequate preparation for effective vocational education delivery.

4.2 Determining the Competence Level of Pre-service TVET Teachers Using Knowledge, Skills, and Attitude Model

Competent teachers play a key role in advancing technical and vocational education goals, making them vital determinants of the overall success of TVET programs (Omar et al., 2020). Consequently, it is imperative to assess the competence level of pre-service TVET teachers, which is instrumental in shaping the quality of education, the practical skills development of students, and their preparedness for successful entry into the workforce. Table 5 portrays a comprehensive overview of the competence levels of pre-service TVET teachers in select TVET learning areas in terms of knowledge, skills, and attitude. The results suggest the competence of pre-service teachers, particularly in attitude, across the assessed learning areas. Attitude scores are consistently high across all learning areas, reflecting a very competent attitude among pre-service TVET teachers. There is some variation in mean scores across learning areas, with cookery having the highest mean scores in knowledge and attitude, while electricity shows the lowest mean in skills.

Although the overall skills assessment in electricity among the pre-service TVET teachers is positive (see Appendix A), there are specific skills, such as bending conduits, where performance levels vary significantly. While the pre-service teachers generally demonstrate strong safety attitudes, further emphasis is needed on handling electrical equipment in wet conditions. Meanwhile, pre-service TVET teachers also demonstrate overall competence in cookery (see Appendix B), but certain areas require further development. These include selecting primary protein cuts, packaging materials, and bread types. Skills related to sandwich preparation, appetizer and salad creation, and effective use of leftovers need improvement. Competencies in thawing ingredients, preparing sweet sauces, and plating desserts also require more attention.

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Conversely, there are specific areas in dressmaking competencies that also need enhancements. These comprise design planning, machine setup, garment adjustment, and product packaging (see Appendix C). Their pattern drafting, cutting, layout, tracing, sewing, finishing, and pressing skills must also be improved. Moreover, the pre-service teachers have a positive attitude in all TVET learning areas, which is beneficial in receiving specialized training to enhance those areas needing improvement.

Table 5 *The competence level of pre-service TVET teachers using the knowledge, skills, and attitude model*

TVET learning areas and competencies	Mean	SD	SE	Description
Electricity				
Knowledge	3.77	0.19	0.04	Competent
Skills	3.55	0.18	0.05	Competent
Attitude	4.37	0.17	0.07	Very competent
Cookery				
Knowledge	4.38	0.17	0.03	Very competent
Skills	4.16	0.12	0.03	Competent
Attitude	4.45	0.08	0.02	Very competent
Dressmaking				
Knowledge	4.11	0.16	0.06	Competent
Skills	4.09	0.07	0.02	Competent
Attitude	4.24	0.06	0.02	Very competent

5. Discussion and Implications

Building on the results of this paper, the researchers highlight critical areas that significantly contribute to the pre-service TVET teacher education delivery.

First, there is a noticeable variation in participation percentages across different courses. While some courses like foods/cookery and cosmetology have high participation, others like computer assembly, maintenance, and troubleshooting have relatively lower percentages. This variation may imply differences in interest, perceived relevance, or difficulty among pre-service teachers.

Second, pre-service teachers are encouraged to have more training certification levels in the following TESDA courses: technical drafting, cookery, fishery, automotive servicing, welding, bread and pastry production, driving, and bartending. Addressing the need for certification levels in these TESDA training courses requires a comprehensive strategy, including targeted professional development, collaboration with industry experts, and a review of certification processes (Alinea, 2021). Ensuring that pre-service TVET teachers receive appropriate certification is essential for upholding the quality and relevance of vocational education in these critical fields (Alamsyah et al., 2022).

Third, there needs to be more training hours for pre-service teachers in fishery, computer system servicing, bread and pastry production, driving, housekeeping, and bartending. The limited hours may indicate a need for more in-depth knowledge and skills for effective teaching in these fields, especially those requiring substantial practical exposure. Inadequate training hours could compromise overall preparedness and teaching effectiveness, impacting the delivery of comprehensive instruction, particularly in hands-on subjects. The lower hours suggest a potential misalignment with curriculum requirements, urging a review to ensure ample coverage of content and the necessary skills (Wahungu et al., 2023). Educational institutions must evaluate resource allocation to guarantee sufficient training hours, including time for practical sessions critical for competency development (Siena, 2024).

Lastly, pre-service teachers demonstrate competence in specific TVET learning areas, marking a positive accomplishment. However, it is imperative to recognize that this competence may not seamlessly translate to proficiency in other learning areas not subject to evaluation. The absence of integration among diverse learning domains within the curriculum poses a potential challenge, hindering the development of a more well-rounded and versatile cohort of educators (Chinedu et al., 2023). Furthermore, the need for more certification levels within particular TESDA courses raises concerns about the broader recognition and accreditation of the pre-service teachers' competencies (Padillo et al., 2021). This limitation could impact their credibility and acknowledgment within the educational community and the wider workforce. Moreover, the observed insufficiency in training hours attended in TESDA courses suggests a potential compromise in the overall preparedness of pre-service teachers, potentially affecting their adaptability to varying teaching demands and specialized areas.

Moreover, TVE teacher training programs should offer a wider range of courses to cater to diverse interests and preferences among pre-service teachers. Integrating real-world applications and local contexts into course content can make learning more engaging and relevant (Sibisi, 2024). Prioritizing certification in high-demand areas like TESDA courses is crucial (Mokher & Mella-Alcazar, 2024). Targeted professional development opportunities can help pre-service teachers acquire the necessary certifications and skills (Bamrungsin & Khampirat, 2022). The reassurance of industry collaboration ensures that certification processes align with current standards and requirements, instilling a sense of confidence in the quality of the program (Alamsyah et al., 2022). Allocating more training hours for courses that require in-depth knowledge and practical skills is essential. It is also important to review curriculum requirements to ensure they align with the necessary training hours (Olowoyo et al., 2020). Ensuring sufficient resources are available for practical sessions and hands-on learning experiences (Sephokgole & Ramaligela, 2021). To create a more holistic learning environment, integrating different learning domains within the curriculum can help pre-service teachers develop a broader range of competencies.

6. Conclusion

The study aimed to explore the preparedness and competence level of pre-service TVET teachers enrolled in a Philippine university offering a TVET teacher training program. Using the descriptive survey method, the researchers evaluated the preparedness level of pre-service TVET teachers in terms of specialized courses taken, training certifications attained, and length of course program-related training attended. On the other hand, the researchers applied the knowledge, skills, and attitude model in assessing the competence level of the pre-service TVET teachers. Results revealed that most pre-service teachers have taken specialized courses integrated into the curriculum. However, only a limited number of pre-service teachers have attended relevant training and consequently attained training certification levels. Results revealed that most pre-service teachers were generally competent in the selected TVET learning areas but on varying levels. With this, a pre-service teaching enhancement program can be devised to improve the competency levels of the pre-service teachers.

Moreover, the researchers acknowledge some limitations in this paper. The context of the study is limited only to a single case university in the Philippines, which might affect the applicability of the same results to another university in the country and even in the ASEAN region. The variables used in measuring the pre-service teachers' preparedness and competence level might result in different results if more relevant variables are integrated. On the other hand, future researchers may venture into the lived experiences of TVET teachers on delivering the different TVET learning areas in the country's public and private schools.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm their contribution to the paper as follows: ***study conception and design:*** *Estubio, Sarsale;* ***data collection:*** *Estubio;* ***analysis and interpretation of results:*** *Estubio, Sarsale;* ***draft manuscript preparation:*** *Estubio, Sarsale. All authors reviewed the results and approved the final version of the manuscript.*

Appendix A: The competence level of pre-service TVET teachers in electricity using the knowledge, skills, and attitude model

Knowledge competencies	Mean	SD	SE	Description
1. Identify and select electrical power and hydraulic tools in line with job specification.	3.52	0.97	0.08	Competent
2. Read and interpret drawings correctly based on job requirements.	3.70	0.99	0.08	Competent
3. Determine correct quantities of conduit and accessories per job requirements.	3.60	1.02	0.09	Competent
4. Perform correct procedures for installation of electrical protection system in line with job requirements and Philippine Electrical Code (PEC).	3.58	1.13	0.09	Competent

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5.	Perform correct procedures for installation of lighting fixtures in line with job requirements.	3.72	1.05	0.09	Competent
6.	Perform correct procedures for installation of wiring devices.	3.73	1.05	0.09	Competent
7.	Follow safety procedures in line with standard operating procedures (SOP).	4.10	0.89	0.07	Competent
8.	Make final check to ensure that work conform with instructions and job requirements.	3.88	0.96	0.08	Competent
9.	Clean, check and return tools, equipment and any surplus materials to storage in accordance with SOP.	4.15	0.91	0.08	Competent
10.	Follow plan to ensure work is completed with agreed time schedule of work to a quality standard and minimum waste of time.	3.95	0.90	0.08	Competent
11.	Undertake ongoing checks of quality of work in accordance with instructions and requirements.	3.70	1.01	0.08	Competent
12.	Identify correct rating, quantity, sizes and type of control components and wiring devices and other materials in line with job requirements.	3.52	0.94	0.08	Competent
13.	Check readings of electrical measuring instruments and identify defective instruments for calibration/replacement in accordance with enterprise procedure.	3.66	1.01	0.08	Competent
14.	Record details of fault, possible cause, corrective action and recommendation.	3.69	1.05	0.09	Competent
15.	Identify potential hazards for prevention and select control measures in accordance with the work plan and site procedures.	3.80	0.94	0.08	Competent
16.	Check and tighten connectors, bolts, nuts and screws according to sizes and torque requirements.	3.87	0.88	0.07	Competent
17.	Make final check to ensure that work conforms with instructions and to requirements.	3.93	0.98	0.08	Competent
18.	Notify immediate supervisor upon completion of work.	3.89	0.99	0.08	Competent
Skills competencies		Mean	SD	SE	Description
1.	Assemble conduits and ensure that fittings are fully inserted and tightened as per job requirements.	3.54	0.98	0.08	Competent
2.	Bend conduits not exceeding 90° as per job requirements.	3.32	0.99	0.08	Moderately competent
3.	Thread conduit in line with job requirements.	3.35	0.99	0.08	Moderately competent
4.	Install electrical metallic conduits.	3.28	0.97	0.08	Moderately competent
5.	Install wire ways and cable trays as per job requirements.	3.41	1.05	0.08	Competent
6.	Clean and make safe work area according to occupational health and safety (OHS) regulations.	3.78	1.02	0.08	Competent
7.	Layout, mount or install electrical components and wiring devices according to drawings, plans, specifications and PEC standards.	3.57	1.05	0.09	Competent
8.	Perform correct procedures for installation of electrical system and auxiliary in line with job requirements.	3.60	1.05	0.08	Competent
9.	Terminate/splice conductors/wires in accordance with the existing electrical standards.	3.55	1.03	0.09	Competent
10.	Wire electrical control components correctly in accordance with wiring diagrams and PEC standards.	3.52	1.04	0.08	Competent
11.	Make performance tests to ensure that work conforms to instructions and job requirements.	3.62	1.03	0.09	Competent
12.	Conduct preliminary checks/tests in line with job requirements.	3.70	1.07	0.09	Competent

13. Clean up and make work area safe in accordance with Occupational Safety and Health Act (OSHA) requirements.	3.89	1.06	0.09	Competent

Attitude competencies	Mean	SD	SE	Description
1. Eye protection such as a face shield, goggles, or safety glasses must be worn during activities. When operating or working near any power machine, when soldering or working with harmful chemicals and when using a hammer to shape or form metal.	4.41	0.75	0.06	Very competent
2. Never handle electrical equipment with wet hands or when standing on a wet or damp floor.	4.55	0.72	0.06	Very competent
3. Always remove the plug from the wall outlet before working or any electrical equipment.	4.54	0.66	0.06	Very competent
4. Always replace worn or damaged electrical cords.	4.35	0.76	0.06	Very competent
5. Check your work before connecting it to a power source.	4.49	0.72	0.06	Very competent
6. When you make adjustments on equipment while it is connected to a source of power, work with one hand in your pocket or behind your back. This reduces the chance of receiving a shock.	4.11	0.89	0.07	Competent
7. Never take an electric shock on purpose, no matter how small it is. Everyone's body is affected differently by electricity, and the effect can change from day to day.	4.17	0.89	0.08	Competent

Appendix B: The competence level of pre-service TVET teachers in cookery using the knowledge, skills, and attitude model

Knowledge competencies	Mean	SD	SE	Description
1. Gather, inspect tools and equipment needed.	4.61	0.61	0.05	Very competent
2. Store and stack cleaned equipment and utensils.	4.59	0.59	0.05	Very competent
3. Follow cleaning schedules.	4.67	0.57	0.05	Very competent
4. Use appropriate chemicals and equipment in cleaning and maintaining kitchen premises, tools and equipment.	4.52	0.65	0.05	Very competent
5. Gather, identify and select ingredients as per required menu items.	4.50	0.64	0.05	Very competent
6. Select and assemble ingredients to produce varieties of soup, stock and sauce.	4.34	0.70	0.06	Very competent
7. Select primary, secondary and portioned cuts of protein: pork, lamb, beef, veal and seafood.	4.20	0.81	0.07	Competent
8. Identify and use appropriate cooking methods.	4.44	0.70	0.06	Very competent
9. Arrange sauces and garnishes.	4.28	0.75	0.06	Very competent
10. Select packaging materials for foodstuffs.	4.18	0.77	0.06	Competent
11. Select suitable bases from a range of bread type.	4.16	0.82	0.07	Competent
12. Select and prepare variety of vegetables, fruits and starch food according to recipes.	4.36	0.77	0.06	Very competent
13. Select and prepare variety of cold dishes according to recipe requirements.	4.32	0.80	0.07	Very competent
14. Prepare reports.	4.29	0.79	0.07	Very competent
15. Coordinate end of service procedures.	4.34	0.69	0.06	Very competent
16. Sort and dispose waste according to sanitary regulations, enterprise practices and standard procedures.	4.52	0.64	0.05	Very competent
17. Identify ingredients according to standard recipes, recipe card or enterprise requirements.	4.41	0.69	0.06	Very competent
18. Prepare ingredients based on the required form and time frame.	4.43	0.63	0.05	Very competent

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19. Observe factors in plating dishes in presenting cold dessert.	4.25	0.76	0.06	Very competent
20. Select and use suitable packaging to preserve taste, appearance and tasting characteristics.	4.25	0.76	0.06	Very competent
21. Observe environmental requirements for food packaging.	4.34	0.68	0.06	Very competent
22. Label food according to industry standards.	4.31	0.77	0.06	Very competent
23. Check, record and label supplies.	4.43	0.72	0.06	Very competent
24. Adapt appropriate packaging procedures.	4.36	0.67	0.06	Very competent
25. Store food in appropriate condition.	4.49	0.60	0.05	Very competent
Skills competencies	Mean	SD	SE	Description
1. Cook menu items as required.	4.34	0.71	0.06	Very competent
2. Perform first aid procedure in the event of accident.	4.29	0.72	0.06	Very competent
3. Rotate and move supplies.	4.20	0.72	0.06	Very competent
4. Prepare variety of sandwich types.	4.00	0.89	0.07	Competent
5. Prepare appetizers and salads with suitable sauces and dressings.	4.07	0.92	0.08	Competent
6. Utilize quality trimmings or other left over.	4.01	0.84	0.07	Competent
7. Minimize wastage through purchases.	4.09	0.79	0.07	Competent
8. Assemble and disassemble cleaning equipment safely.	4.12	0.75	0.06	Competent
9. Dispose cleaning chemicals safely according to standard procedures.	4.34	0.73	0.06	Very competent
10. Assemble ingredients according to quantity, type, and quality required.	4.23	0.75	0.06	Very competent
11. Select, measure and weigh ingredients according to recipe requirements.	4.21	0.79	0.07	Very competent
12. Thaw frozen ingredients following enterprise procedures.	4.10	0.77	0.06	Competent
13. Produce a variety of hot, cold and frozen desserts, appropriate for a variety of menus.	4.11	0.83	0.07	Competent
14. Produce sweet sauces to a desired consistency and flavor.	4.01	0.87	0.07	Competent
15. Taste prepared desserts and sweets in accordance with the required taste.	4.14	0.84	0.07	Competent
16. Present dessert hygienically, logically and sequentially within the required timeframe, and decorated creatively.	4.31	0.74	0.06	Very competent
17. Plate and portion desserts according to enterprise standards.	4.09	0.76	0.06	Competent
Attitude competencies	Mean	SD	SE	Description
1. OHS procedures for controlling hazards/risks in workplace are followed.	4.50	0.69	0.06	Very competent
2. Practice personal grooming and hygiene.	4.52	0.60	0.05	Very competent
3. Clean and sanitized large and small equipment/utensils commonly found in a commercial/institutional kitchen.	4.54	0.65	0.05	Very competent
4. Safety and hygienic practices in handling food, tools and equipment are followed.	4.57	0.61	0.05	Very competent
5. Tools, utensils and equipment are cleaned, sanitized and prepared based on the required tasks.	4.54	0.66	0.06	Very competent
6. Safe and accurate cutting techniques are followed.	4.42	0.68	0.06	Very competent
7. Safety practices in handling tools and equipment are followed.	4.50	0.67	0.06	Very competent
8. Optimum quality is ensured using appropriate cooking methods.	4.38	0.69	0.06	Very competent

9.	Workplace interactions are conducted in a courteous manner.	4.37	0.72	0.06	Very competent
10.	Questions about simple routine workplace procedures and maters concerning working conditions of employment are asked and responded to.	4.36	0.73	0.06	Very competent
11.	Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives.	4.36	0.73	0.06	Very competent
12.	Observed protocols in reporting using standard operating procedures.	4.37	0.76	0.06	Very competent

Appendix C: The competence level of pre-service TVET teachers in dressmaking using the knowledge, skills, and attitude model

Knowledge competencies		Mean	SD	SE	Description
1.	Plan garment design of casual apparel.	4.08	0.81	0.07	Competent
2.	Select and prepares garment tools, accents and accessories.	4.22	0.71	0.06	Very competent
3.	Prepare sewing machine for operation.	4.04	0.95	0.08	Competent
4.	Alter/modify completed casual apparel.	3.92	0.92	0.08	Competent
5.	Pack the finished garment.	3.92	0.90	0.08	Competent
6.	Observe safe work procedures.	4.31	0.74	0.06	Very competent
7.	Perform housekeeping activities.	4.24	0.79	0.07	Very competent
Skills competencies		**Mean**	**SD**	**SE**	**Description**
1.	Take body measurements of client.	4.22	0.83	0.07	Very competent
2.	Draft and manipulates basic pattern.	4.06	0.85	0.07	Competent
3.	Cut final pattern of casual apparel.	4.13	0.87	0.07	Competent
4.	Lay-out and pins patterns according to the grain line of the fabric.	4.01	0.96	0.08	Competent
5.	Trace drafted pattern on the material/fabric.	4.08	0.93	0.08	Competent
6.	Cut the fabric.	4.15	0.80	0.07	Competent
7.	Sew and assembles garment parts of casual apparel.	4.05	0.83	0.07	Competent
8.	Apply finishing touches on the casual apparel	4.08	0.87	0.07	Competent
9.	Trim excess threads of casual apparel.	4.11	0.84	0.07	Competent
10.	Press finished casual apparel.	3.97	0.91	0.08	Competent
Attitude competencies		**Mean**	**SD**	**SE**	**Description**
1.	Workplace interactions are conducted in a courteous manner.	4.35	0.72	0.06	Very competent
2.	Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to.	4.24	0.77	0.06	Very competent
3.	Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives.	4.24	0.82	0.07	Very competent
4.	Observed protocols in reporting using standard operating procedures.	4.22	0.71	0.06	Very competent
5.	Personal growth and work plans are pursued towards improving the qualifications set for the profession.	4.20	0.84	0.07	Very competent
6.	Resources are utilized efficiently and effectively to manage work priorities and commitments	4.17	0.86	0.07	Competent

7.	Occupational health and safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed.	4.33	0.83	0.07	Very competent
8.	Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices.	4.27	0.87	0.07	Very competent
9.	Problems encountered and similar observations are documented and referred to the supervisor or appropriate personnel.	4.17	0.87	0.07	Competent
10.	Completed work is checked against workplace standards relevant to the operations being undertaken.	4.24	0.79	0.07	Very competent

References

Alamsyah, M. S. M., Widiaty, I., Wahyudin, D., Barliana, M. S., Rahmawati, Y., Meriawan, D., ... & Suryadi, E. (2022). Indonesia TVET teacher training: Policy and implementation to meet industry demands. In F. Bünning, G. Spöttl, & H. Stolte (Eds.), *Technical and vocational teacher education and training in international and development co-operation: Models, approaches and trends* (pp. 183-214). Springer Nature Singapore. https://doi.org/10.1007/978-981-16-6474-8_12

Alinea, J. M. L. (2021). Evaluation of technical-vocational teacher education program towards an academe-and industry-responsive curriculum. *Journal of Technical Education and Training*, *13*(4), 65-81. https://doi.org/10.30880/jtet. 2021.13.04.006

Bamrungsin, P., & Khampirat, B. (2022). Improving professional skills of pre-service teachers using online training: Applying work-integrated learning approaches through a quasi-experimental study. *Sustainability*, *14*(7), 4362. https://doi.org/10.3390/su14074362

Bongco, R. T., & De Guzman, D. M. (2022). Teachers adapting to curricular change: Basis for teacher education curriculum review. *Asia Pacific Journal of Advanced Education and Technology*, *1*(3), 1-11.

Budhrani, K. S., D'Amico, M. M., & Espiritu, J. D. (2018). Developing a skilled workforce through technical and vocational education and training in the Philippines. In R. L. Raby & E. J. Valeau (Eds.), *Handbook of comparative studies on community colleges and global counterparts* (pp. 693-718). Springer. https://doi.org/10.1007/978-3-319-50911-2_28

Chinedu, C. C., Saleem, A., & Wan Muda, W. H. N. (2023). Teaching and learning approaches: Curriculum framework for sustainability literacy for technical and vocational teacher training programmes in Malaysia. *Sustainability*, *15*(3), 2543. https://doi.org/10.3390/su15032543

Choi, S. (2021). Urban/rural disparities in the wage effect of additional vocational education after formal education: The case of the Philippines. *International Journal of Training Research*, *19*(3), 229-241. https://doi.org/10.1080/14480220.2021.1935296

Chrea, S., & Yok, S. (2022). Pre-service TVET teacher education in Cambodia. In F. Bünning, G. Spöttl, & H. Stolte (Eds.), *Technical and vocational teacher education and training in international and development co-operation: Models, approaches and trends* (pp. 231-241). Springer Nature Singapore. https://doi.org/10.1007/978-981-16-6474-8_14

Cristobal, E., Flavian, C., & Guinaliu, M. (2007). Perceived e-service quality (PeSQ) measurement validation and effects on consumer satisfaction and website loyalty. *Managing Service Quality: An International Journal*, *17*(3), 317-340. https://doi.org/10.1108/09604520710744326

Declaro-Ruedas, M. Y. (2022). Assessment of the joint delivery voucher program for senior high school technical-vocational livelihood in selected public schools in Occidental Mindoro, Philippines. *International Journal of Agricultural Extension*, *10*(3), 471-477. https://doi.org/10.33687/ijae.010.03.4133

Diamonon, R. S. (2023). Evaluation of competency-based TVET curriculum in SUNAS: Implication for program enhancement. *Central European Management Journal*, *31*(2), 1069-1078. https://doi.org/10.57030/23364890.cemj.31.2.108

Diao, J., Han, X., Zhou, Q., & Wang, Y. (2023). Professional competencies in TVET: Framework, indicators, and assessment instrument. In X. Han, Q. Zhou, M. Li, & Y. Wang (Eds.), *Handbook of technical and vocational teacher professional development in the digital age* (pp. 41-73). Springer Nature Singapore. https://doi.org/10.1007/978-981-99-5937-2_3

Edralin, D., & Pastrana, R. (2023). Technical and vocational education and training in the Philippines: In retrospect and its future directions. *Bedan Research Journal*, *8*(1), 138-172. https://doi.org/10.58870/berj.v8i1.50

Eze, N., Nwadi, C., Onodugo, I., Ozioko, E., Osondu, S., Nwosu, O., ... & Onyemachi, C. (2022). Occupational decision motives of potential TVET teachers: New standards of pre-service TVET teachers' recruitment and career development. *Frontiers in Education, 7,* 883340. https://doi.org/10.3389/feduc.2022.883340

Francisco, J. M., & Neri, J. (2023). Evaluating the Philippine TVET competency assessment and certification system using SERVQUAL model. *Journal of Technical Education and Training*, *15*(3), 46-54. https://doi.org/10.30880/jtet.2023.15.03.005

Gangoso, P. O. (2023). A framework for technical vocational education and training for indigenous peoples in the Philippines. *East Asian Journal of Multidisciplinary Research*, *2*(4), 1727-1748. https://doi.org/10.55927/eajmr.v2i4.3733

Ismail, K., Nopiah, Z. M., & Rasul, M. S. (2018). Challenges faced by vocational teachers in public skills training institutions: A reality in Malaysia. *Journal of Technical Education and Training*, *10*(2), 13-27. https://doi.org/10.30880/jtet.2018.10.02.002

Jafar, D. S. A., Saud, M. S., Hamid, M. Z. A., Suhairom, N., Hisham, M. H. M., & Zaid, Y. H. (2020). TVET teacher professional competency framework in industry 4.0 era. *Universal Journal of Educational Research*, *8*(5), 1969-1979. https://doi.org/10.13189/ujer.2020.080534

Kambat, A. K., & Robles, A. C. M. O. (2023). Feasibility study on the offering of technical, vocational, and livelihood (TVL) track for sustainable development of a community in Olandang National High School. *Psychology and Education: A Multidisciplinary Journal, 13*, 439-453. https://doi.org/10.5281/zenodo.8341531

Masek, A., Ismail, A., Nurtanto, M., & Hasim, S. (2021). Enhancing professional knowledge and self-concept through self and peer assessment using rubric: A case study for pre-services TVET teachers. *Journal of Engineering Education Transformations*, 110-115. https://doi.org/10.16920/jeet/2021/v35i1/155151

Mokher, C. G., & Mella-Alcazar, A. A. C. (2024). Identifying determinants in the context of a national education reform: The case of the Urdaneta City in the Philippines' adoption of secondary vocational pathways. *The Asia-Pacific Education Researcher*, 1-11. https://doi.org/10.1007/s40299-024-00845-2

Ogbuanya, T. C., & Shodipe, T. O. (2022). Workplace learning for pre–service teachers' practice and quality teaching and learning in technical vocational education and training: Key to professional development. *Journal of Workplace Learning*, *34*(4), 327-351. https://doi.org/10.1108/JWL-02-2021-0015

Olowoyo, M. M., Ramaila, S., & Mavuru, L. (2020). Levels of readiness and preparedness of selected South African TVET colleges in meeting the requirements of the hospitality industry. *International Journal of Learning, Teaching and Educational Research*, *19*(11), 53-70. https://doi.org/10.26803/ijlter.19.11.4

Omar, M. K., Zahar, F. N., & Rashid, A. M. (2020). Knowledge, skills, and attitudes as predictors in determining teachers' competency in Malaysian TVET institutions. *Universal Journal of Educational Research*, *8*(3), 95-104. https://doi.org/10.13189/ujer.2020.081612

Orbeta, A. C. (2021). Vocational education and training in the Philippines. In L. P. Symaco & M. Hayden (Eds.), *International handbook on education in South East Asia* (pp. 1-30). Springer. https://doi.org/10.1007/978-981-16-8136-3_9-1

Padillo, G. G., Manguilimotan, R. P., Capuno, R. G., & Espina, R. C. (2021). Professional development activities and teacher performance. *International Journal of Education and Practice*, *9*(3), 497-506. https://doi.org/10.18488/journal.61.2021.93.497.506

Pallado, C. R., Navarra, R., & Tenedero, C. (2022). The effectiveness of the technical vocational education and training's (TVET) flexible learning delivery in the selected TESDA technology institutions in National Capital Region. *Psychology and Education: A Multidisciplinary Journal*, *6*(4), 304-312. https://doi.org/10.5281/zenodo.7452045

Ramaligela, S. M. (2021). Exploring pre-service technology teachers' content and instructional knowledge to determine teaching readiness. *International Journal of Technology and Design Education*, *31*(3), 531-544. https://doi.org/10.1007/s10798-020-09570-5

Ramirez, I. A. L. (2020). Pre-service teachers' perceived level of teaching skills. *Journal of Education in Black Sea Region*, *6*(1), 97-109. https://doi.org/10.31578/jebs.v6i1.222

Ramos, F. G. (2021). An evaluation of the technical vocational livelihood track in public senior high schools in the Division of Batangas: Basis for an enhancement program. *International Journal of Academic Research in Progressive Education and Development, 10*(2), 877-900. https://doi.org/10.6007/IJARPED/v10-i2/10269

Scott, J., Boylan, J. C., & Jungers, C. M. (2014). *Practicum and internship: Textbook and resource guide for counseling and psychotherapy (5th ed.).* Routledge. https://doi.org/10.4324/9781315754895

Sephokgole, R. D. & Ramaligela, S. M. (2021). Challenges experienced by lecturers about instructional practices on agricultural programmes in TVET colleges. In M. Makgato & G. Afeti (Eds.), *New models for technical and vocational education and training* (pp. 49-73). IGI Global. https://doi.org/10.4018/978-1-7998-2607-1.ch004

Sibisi, P. N. (2024). Work-integrated learning: A TVET experience. In R. Dlamini, I. Moll, & V. Naiker (Eds.), *Technical and vocational teaching in South Africa: Practice, pedagogy and digitalisation* (pp. 143-162). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-58206-6_8

Siena, R. A. (2024). Implementation of TVET program: Input to action plan towards enhanced program implementation. *Ignatian International Journal for Multidisciplinary Research*, *2*(6), 735-756. https://doi.org/10.17613/5afd-6113

Sumaya, A. A., & Cruz, R. A. O. D. (2023). Evaluating the outcomes of technical-vocational education and training towards developing skills for the tourism sector. *Humanities, Arts and Social Sciences Studies*, *23*(2), 284-296. https://doi.org/10.14456/hasss.2023.26

Tadle, R. L., Valdez, L. P., Fernandez, R., Uy, C., & de Castro, B. (2021). Students' experience of service quality of technical vocational education and training (TVET) programs in Philippines's private higher educational institutions (HEIs). *Journal of Technical Education and Training*, *13*(3), 29-39. https://doi.org/10.30880/jtet.2021.13.03.004

Tahir, R., & Abdullah, Z. (2023). Revolutionising delivery in TVET for industry 4.0: Strategies from the field–NGT and ISM approach. *Journal of Current Science and Research Review*, *1*(5), 139-157.

Talento, M., Tandang, N., Rogelio, R., & Araña-Roldan, R. (2022). Factors influencing employment of female graduates of technical and vocational education and training program in the Philippines. *Philippine Journal of Science, 151*(3), 1171-1184. https://doi.org/10.56899/151.03.30

Tamayo, S. B. (2023). Status of technical-vocational and technology and livelihood education instruction in CSU: Input for a training program. *AIDE Interdisciplinary Research Journal*, *6*, 46-64. https://doi.org/10.56648/aide-irj.v6i1.93

TESDA. (2015). *Self-assessment guides.* Technical Education and Skills Development Authority.

Vandenberg, P., & Laranjo, J. (2021). Vocational training and labor market outcomes in the Philippines. *International Journal of Educational Development*, *87*, 102501. https://doi.org/10.1016/j.ijedudev.2021.102501

Wahungu, D. K., Wawire, V., & Kirimi, F. (2023). Strategies for aligning institutional engineering technical vocational education and training practices with industry skills requirements in Kenya. *Reviewed Journal International of Education Practice*, *4*(1), 96-116.

Widiastuti, I., Saputra, T. W., Noviansyah, W., & Trianingsih, L. (2021). TVET institutions' perspective on implementation of public-private partnerships model in the Southeast Asia countries. *Journal of Physics: Conference Series*, *1808*(1), 012007. https://doi.org/10.1088/1742-6596/1808/1/012007

Wu, Q., Bai, B., & Zhu, X. (2019). Technical and vocational education and training in the Philippines: Development and status quo. In B. Bai & Paryono (Eds.), *Vocational education and training in ASEAN member states: Current status and future development* (pp. 155-171). Springer. https://doi.org/10.1007/978-981-13-6617-8_7

Xinming, Z. (2023). Research on cultivating innovation and practical skills in higher vocational education. *Frontiers in Educational Research, 6*(26), 29-36. https://doi.org/10.25236/FER.2023.062606