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Exploring Effectiveness of Hands-on Activities of Technical Students in Cambodia

Abstract

This study explored the effective hands-on activities of technical education students in Cambodia. Specifically, it investigated key hands-on activities and the level of effective hands-on activities of 205 technical education students. This study used a quantitative method employing a cross-sectional survey design and a factor analysis approach with Principal Component Analysis (PCA). Descriptive statistics were used to examine the data acquired using SPSS version 25, which provided the frequency count and percentage of responses. Moreover, the level of effective hands-on activities of technical education students revealed a high level of proficiency in procedures and steps, creativity, skill incorporation, immediate application, and a moderate level of skill in competition. The results revealed that the effective hands-on activities of technical education students are multidimensional and explore five factors: proficiency in procedures and steps, creativity, skill incorporation, being skilled in competition, and immediate application. They also demonstrated that national goals and missions were promoted while maintaining the quality of technically focused education to produce potential employees with better skill levels. Thus, the researchers recommend that important indicators are the elements that drive TVET teachers to not only work hard but also take pleasure in what they do.

Keywords: *hands-on activities, effectiveness, TVET students at high school level*

1 Introduction

The availability of basic resources is an important requirement for providing quality education. In addition, students have a modern approach to education, the methodology responsible for active learning, and their own learning. Students must be able to search for information, share knowledge with their peers, and discuss a variety of information and perspectives. They must continue investigating and examining what has changed into a debate to provide new understanding. To transform TVET skills into a weapon for poverty alleviation, individual lives must be transformed, which then develop hierarchically into community-level sustainable change. This is because it is through the transformation of individuals that families are transformed, and they, in turn, cooperatively transform communities. More recently, attention has focused on the provision of TVET as essential for developing human resources for socio-economic advancement, raising standards of living, and eliminating poverty. These crucial tasks have been completed by TVET thus far and have

produced outstanding outcomes (UNESCO-UNEVOC 2013). TVET must be high-quality and responsive to achieve this. The hands-on activity must integrate theories and practices that reflect work reality to respond effectively. In addition, there is a disconnect between theories and practices in Cambodia's TVET system as industry participation in practical training is lacking (ADB 2016).

1.1 Preamble

Hence, the impact of hands-on activities is not yet clear, which is a very new notion for Cambodia. Cambodia faces unique challenges in building the skill capacity of Cambodian people to participate in the twenty-first-century labor market. Since there was a short history of development, starting after the restoration of complete peace in 1998, a great deal of effort is needed to catch up with a fast-developing world. A review of the Royal Government of Cambodia's long-term social and economic policies revealed a dedication to skill development to support the framework for national economic development. The Royal Government of Cambodia (RGC) has laid out a comprehensive vision for the country's socioeconomic development through the National Strategic Development Plan (NSDP) 2014–2018 and Phase III of the Rectangular Strategy (RS). These plans outline a series of progressive milestones aimed at elevating Cambodia's economic status over the coming decades. The key objective is to transition from a Least Developed Country (LDC) to a lower-middle-income country by 2024, advance to an upper-middle-income country by 2030, and ultimately become a developed country by 2050. To meet the short- and long-term demands of economic growth and socioeconomic development, RGC is aware of the need to develop high-quality, competent, and capable human resources.

1.2 Research Objectives and Questions

In particular, this research paper will examine two main research questions:

Research question 1: What are the most effective hands-on activities for technical education students in Cambodia?

Research question 2: At what levels of effectiveness are there hands-on activities for technical education students in Cambodia?

1.3 Scope of the Study

This study was conducted only in Cambodia. The 205 participants are technical education students from different TVET schools.

2 Literature Review

The development of TVET in Cambodia's educational system is noticeable and consistent with the worldwide increase in TVET. The educational system formed and applied in TVET

can produce students who will become quality citizens, well-behaved, responsible, and able to adapt to real-life situations (Azid et al. 2019). Technical and Vocational Education and Training (TVET) is defined as a combination of education, training, and skill development related to a variety of professional fields (Dawe, Miller, & Diop 2020). It demands formal, non-formal, and informal learning mechanisms that offer knowledge and skills to the workforce (Khan, Siddiqui, & Abbasi, 2020). On the other hand, the term "TVET" is a relatively new term for technical and vocational education and training, also known as the "training supply" as people learn new skills (ADB 2009).

While a variety of definitions of the term "hands-on" have been suggested, this paper uses the definition first suggested by Holstermann, Grube, and Bögeholz (2010), who saw its general meaning in using experience to learn. Working hands-on is believed to provide students with a more interesting and authentic experience (Franklin & Peat 2005; Nott & Wellington 1996). The majority of empirical investigations support the notion that engaging in hands-on activities promotes favorable motivational outcomes. For instance, according to Bergin (1999), hands-on activities are frequently believed to arouse students' interest and inspire them to learn science with practical work, the so-called "hands-on experience."

2.1 TVET in Technical Education Students

The addition of skills to promote the existing TVET system promises to benefit both developed and developing countries, which would otherwise be challenging. These skills not only benefit students but also help teachers improve their professional skills (Sarastuen 2020). With the advent of the 21st century, the following new concepts have emerged: Particularly noteworthy is the phenomenon of knowledge-based economies in developing countries (Rijal 2020). The creation of respectable jobs and industrial growth has recently received much attention, specifically how the policy ensures high productivity and quality workforces to compete with other countries in the region. The construction of a labor force that can successfully meet market demand requires a framework known as technical vocational education and training (TVET) (Ministry of Labour and Vocational Training (MoLVT) 2017, 3). Additionally, the National Technical Vocational Education and Training Policy will be crucial in creating a TVET system that is adaptable to market demands, both inside and outside the nation, allowing people of all ages to acquire new skills throughout their lives.

A large and growing body of literature has investigated technical education, which is recognized as one of the most successful human resource development strategies that should be adopted for a country's rapid industrialization and long-term technological advancement. Because of its effects on productivity and economic growth, technical education has played a crucial role in the development of many societies (Odo et al. 2017). The current investigation aims to contribute to this important issue by exploring the effective hands-on activities of technical education students in Cambodia. To achieve this goal, two research questions were developed. The first study likely delves into the specific hands-on activities that technical education students in Cambodia engage in and examines their effectiveness. It may explore

the types of activities, how they are conducted, and their impact on learning outcomes or skill development.

2.2 The Role and Challenges of TVET in Cambodia's Socio-Economic Development

Technical and Vocational Education and Training (TVET) in Cambodia, emphasizing its role in equipping individuals with practical skills essential for the workforce. TVET programs are highlighted as critical tools for reducing unemployment rates by preparing individuals for employment opportunities and fostering innovation and entrepreneurship. The article also underscores TVET's potential to enhance productivity and contribute to economic growth in Cambodia. However, significant challenges remain, particularly in ensuring the quality and equitable access of TVET programs across the country. It discussed various ways forward, including policy reforms, improved infrastructure, and enhanced collaboration between educational institutions and industries. Addressing these challenges is crucial for leveraging TVET to address skill gaps effectively and promote inclusive development in Cambodia (Khorn 2023). Efforts to improve the quality and accessibility of TVET are essential to maximize its benefits for Cambodia's socio-economic development.

Previous studies have reported that TVET in Cambodia emphasizes its crucial role in equipping individuals with practical skills necessary for the workforce. It discussed how TVET programs aim to reduce unemployment rates by preparing individuals for employment opportunities, while also fostering innovation and entrepreneurship among participants. Additionally, the article highlights TVET's potential to enhance productivity and support economic growth in Cambodia. However, challenges persist in ensuring quality and equitable access to TVET programs across the country, which are crucial for addressing skill gaps and promoting inclusive development (Yok, Chrea & Pak 2019). Moreover, Song and Chea (2023) highlighted Vocational Education and Training (VET) in Cambodia, underlining its role in equipping individuals with practical skills essential for the workforce. It underscored the potential of VET in reducing unemployment, fostering innovation, enhancing productivity, and contributing to economic growth. However, it also addresses persistent challenges in ensuring quality and equitable access to VET programs across Cambodia. Efforts to strengthen TVET in Cambodia require collaborative initiatives focusing on curriculum development, teacher training, industry partnerships, and policy frameworks to maximize its socio-economic impact and contribute to sustainable development goals.

3 Research Methodology

3.1 Data Collection

After the pilot test had successfully concluded and the questionnaire had been officially changed, data collection for this research was coordinated among technical education students currently studying in years 1, 2, and 3 at General and Technical High Schools (GTHSs) in Cambodia. As part of self-reported assessments, the paper-based questionnaire was filled out

by the participants under direct instruction by a team of researchers. The participants were gathered to sit and listen to the researchers' instructions in one common hall at the schools before filling out the questionnaire. Furthermore, they were also told not to copy or cheat from each other while filling out the questionnaire because they were high school students.

Additionally, data was gathered from six General and Technical High Schools (GTHSs), specifically: Pouk General and Technical High School, Preah Reach Samphea General and Technical High School, Decho Sen Koh Kong General and Technical High School, Chea Sim Tbeng Meanchey General and Technical High School, Hun Sen Peam Chikang High School, and Heng Samrin Tbong Khmum General and Technical High School, located in six different provinces. The selection criteria for GTHSs are: (1) providing any trade service starting in year 2; (2) the participants may be evaluated by appointment; and (3) the curriculum guidelines for technical education at the upper secondary level are followed by GTHSs under the Ministry of Education, Youth, and Sport's (MoEYS) instructions.

As mentioned above in the reliability and quality process, the confirmation letter from SEAMEO TED and an authorization letter from the Ministry of Education, Youth, and Sports for the fundamental examination have just been finished in the meantime for the pilot test. Therefore, with the participation of the high school directors, one university rector, and the classroom teachers who were teaching in these high schools, the researcher visited each class for around 20 minutes to present themselves and the motivation behind the study to the students in Khmer and to request their collaboration. Additionally, the researcher clarified the students' participation in the study, the privacy and secrecy of students' answers, and the importance of the investigation. After that, the questionnaires were conveyed to the participants, relying on the sample size that the researcher had officially arranged, and they were gathered immediately after the survey finished.

3.2 Participant Selection

The target group is year 1, 2, and 3 students currently studying at GTHSs. The selection criteria for participants are: (1) study years 1, 2, and 3; (2) currently studying at any trade at GTHSs; (3) volunteering to participate in the study; and (4) being committed to graduate year 3. The participants are from diverse backgrounds, as described in the statistics revealing age, sex, years of studies, trade, names of schools, and school province. No incentives were provided for the participants after they filled out the questionnaire.

3.3 Research Method

Students from Cambodia's General and Technical Education are included in a sample of the research. The data was collected using a paper-based questionnaire, descriptive statistics, and Exploratory Factor Analysis (EFA). There were 205 General and Technical Education students from different TVET high schools in Cambodia, of whom 129 were male and 76 were female. The questionnaire was adopted from the reviews of three TVET experts. The consent letter was used for data collection. All the participants volunteered to join the

research and understood its purpose. All of the participants could withdraw from being participants at any time.

3.4 Research Instruments

Questionnaire items cover five trades consisting of mechanics, electricity, agronomy, computer science, and animal husbandry for years 1, 2, and 3 of the technical education curriculums for technical education at the upper secondary level (MoEYS 2015). The questionnaire was separated into two sections: Demographic Information and Content of Statements on the effectiveness of hands-on activities for technical education students in Cambodia were planned in view of the examination targets and the research questions as follows:

Section 1 tested the respondents for their statistical information, for example, age, sex, years of studies, trade, names of schools, and school provinces. The participants were asked to mark in the appropriate column.

Section 2 was the content of statements created on the effectiveness of hands-on activities of technical education students in Cambodia who were involved in their activities. This part comprised 22 items, focusing on the effectiveness of hands-on activities of technical education students in Cambodia. In this section, the respondents were asked to point out the frequency of completing each activity on a 5-point Likert scale as follows:

- 1 means Strongly disagree
- 2 means Disagree
- 3 means Neutral
- 4 means Agree
- 5 means Strongly agree

Since the participants were Cambodian high school students, the entire section of the questionnaire was translated into Khmer to avoid language barriers and misunderstandings, to provide respondents with a clear understanding of the questionnaire parts, and to ensure the accuracy and suitability of the interpretation. On the other hand, students from six GTHSs have been studying the curriculum contents of five trades at their respective schools. Therefore, construct validity was ensured because a measurement tool represents the thing to be measured. Each trade has different items/contents with the same Likert type and 5-point scale.

3.5 Data Analysis

A computer service program analyzed the survey data for the study. The data was analyzed for descriptive statistics Exploratory Factor Analysis (EFA). The analyzed data answered the following questions:

Research question 1: What are the most effective hands-on activities for technical education students in Cambodia?

To answer this question, descriptive statistics (means and standard deviations), and Factor Analysis (EFA) were used. The mean and standard deviations would be used to measure the categories of effective hands-on activities of technical education students in Cambodia. To determine the frequency levels, the questionnaire included 22 items rated on a 5-point Likert scale. The scale ranges from 1 (strongly disagreed) to 5 (strongly agreed).

Research question 2: At what levels of effectiveness are there hands-on activities for technical education students in Cambodia?

To answer this question, EFA (means and standard deviations) was used.

4 Research Findings

4.1 Exploratory Factor Analysis

Table 1 shows the factor structure of the effective hands-on activities of technical education students in Cambodia. Using main component analysis, the fundamental dimensions of 22 attitude-related items were identified, and the questions were grouped accordingly, resulting in the five factor groups retained. The factor pattern from the five retained factors was then transformed through varimax rotation. In analyzing the effectiveness of standardized factor loadings, according to Tapia (1996), the factor loadings must be 0.4 or higher for a sample size of exactly or more than 200 respondents in order to evaluate the item as significant. With these, items 18 (*I have ever done some hands-on activities behind the curriculum or textbook contents*) and 6 (*There are sufficient materials, equipment, or farms for hands-on activities)* were eliminated because their loads fell below 0.4 and thus failed to meet the minimum criteria.

The Cronbach's coefficient of reliability was used to assess the reliability of the five factor groups. Excellent internal reliability for the first four dimensions is demonstrated by very high Cronbach's alpha statistics, which confirm the great reliability of the groups participating in effective hands-on activities.

Table 1: **Tests of Data Normality**

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Incorporating hands-on activities into the classroom or into the home as practical reality	.402	205	.000	.666	205	.000

Actively innovate something relevant to the subject studies	.335	205	.000	.815	205	.000
Joining the school project team	.303	205	.000	.794	205	.000
Being exposed to hands-on activities in school regularly	.347	205	.000	.746	205	.000
Getting rigorous guidance and orientation from instructors in the period of hands-on activity implementation	.276	205	.000	.749	205	.000
There are sufficient materials/equipment/ farms for hands-on activities	.329	205	.000	.825	205	.000
The outcome of hands-on activities can be applied elsewhere	.364	205	.000	.768	205	.000
The achievement of hands-on activities is measured and evaluated objectively by subject instructors	343	205	.000	.748	205	.000
Having been taught about the procedure and steps in doing hands-on activities before	.365	205	.000	.715	205	.000
There is enough time to apply hands-on skills immediately after learning	.360	205	.000	.750	205	.000
There are supporting factors such as peer, parents, instructors, and school management in doing hands-on activities	.259	205	.000	.798	205	.000
I used to get financial and technical supports/contribution from the private sector in doing hands-on activities	.243	205	.000	.868	205	.000
I have ever tested/piloted the previous hands-on activities once before doing actual hands-on activities	.335	205	.000	.822	205	.000
I used to get strong help and guidance from the peer/team member in doing hands-on activities	.373	205	.000	.685	205	.000
Instructors allocate sufficient time for each hands-on activity	.272	205	.000	.675	205	.000
Some hands-on activities are created and initiated by my project team members	.361	205	.000	.769	205	.000
Each hands-on activity links with the theoretical perspectives/contents specified in the curriculum/textbook	.346	205	.000	.774	205	.000
I have ever done some hands-on activities behind the curriculum/textbook contents	.351	205	.000	.790	205	.000
I have ever joined the hands-on skill competition/contest as one of the contest candidates previously	.200	205	.000	.904	205	.000
I used to get a medal/award or appreciation letter resulted from my hands-on activities	.220	205	.000	.892	205	.000

I used to get benefits from my hands-on activities such as vegetables, fruits, fish, meat, …)	.263	205	.000	.883	205	.000
I have learnt a lot from my hands-on activities previously in terms of knowledge, experiences, and skills	.274	205	.000	.736	205	.000
[a] Lilliefors Significance Correction						

According to Table 1, there was a rotated component matrix with five components, each with a different category of scores.

Table 2: **Rotated Component Matrix**

Item No.	Items	Components					
		1	2	3	4	5	6
9	Having been taught about the procedure and steps in doing hands-on activities before	.612					
11	There are supporting factors such as peer, parents, instructors, and school management in doing hands-on activities	.710					
17	Each hands-on activity links with the theoretical perspectives/contents specified in the curriculum/textbook	757					
22	I have learnt a lot from my hands-on activities previously in terms of knowledge, experiences, and skills	.646					
2	Actively innovate something relevant to the subject studies		.614				
3	Joining the school project team		.597				
4	Being exposed to hands-on activities in school regularly		.559				
8	The achievement of hands-on activities is measured and evaluated objectively by subject instructors		.729				
1	Incorporating hands-on activities into the classroom or into the home as practical reality			.662			
5	Getting rigorous guidance and orientation from instructors in the period of hands-on activity implementation			.684			
10	There is enough time to apply hands-on skills immediately after learning			.572			

16	Some hands-on activities are created and initiated by my project team members			.520			
19	I have ever joined the hands-on skill competition/contest as one of the contest candidates previously				.630		
20	I used to get a medal/award or appreciation letter resulted from my hands-on activities				.813		
21	I used to get benefits from my hands-on activities such as vegetables, fruits, fish, meat, …)				.824		
7	The outcome of hands-on activities can be applied elsewhere					.607	
14	I used to get strong help and guidance from the peer/team member in doing hands-on activities					.752	
15	Instructors allocate sufficient time for each hands-on activity					.613	
Eigenvalue % Variance		26.389	11.542	7.961	7.024	5.818	-
Reliability by Cronbach α of N items 22							
Cronbach α = .804							
KMO = 0.796							
Bartlett's Test of Sphericity Chisquare = .000							

Meanwhile, the alphas for the next factors were considered to have good internal reliability, showing values above 0.7 (Cronbach 1951). It could be noted that Factor 6 did not indicate a reliability value since this factor only has 2 items and running a reliability test was estimated as not being possible. Furthermore, the eigenvalue and percentage of variance were also identified to guarantee the appropriateness of the items as indicators of the factors. The eigenvalues should be greater than one (eigenvalues > 1), as those less than one account for less variability and are thus not retained in the analysis (Girden 2001).

Upon reviewing the items and examining the result, the first factor has indicated four items: Item_9, Item_11, Item_17, and Item_22. It has a high internal consistency of 0.788 and a high degree of importance, as it revealed 19.76% of the total variances and has an eigenvalue of 26.389. This factor involves steps in the students' activities in terms of skills and knowledge. Thus, this dimension was named *Proficiency in procedures and steps.*

The second factor consisted of four items in the data set. It has a high reliability of 0.788, accounts for a total variance of 6.25% and has an eigenvalue of 11.542. Item_2, Item_3, Item_4, and Item_8 are included. This factor involves the feelings and attitudes of students regarding assessment, stating that the assessment is not tough and stressful and emphasizing

achievement evaluation and schoolwork regularly. This factor was named *Creativity*. Meanwhile, the third factor has a total variance of 2.28% and an eigenvalue of 7.961. Upon the examination of the items, four items were included, which displayed a reliability of 0.788. These items are Item_1, Item_5, Item_10, and Item_16. This factor involves active teacher instruction in order to obtain strict guidance and orientation. Thus, this dimension was named *Skill incorporation.*

The fourth factor indicated three items that displayed a high reliability of 0.788. These items include Item_19, Item_20, and Item_21. The total variance accounts for 1.71% and has an eigenvalue of 7.024. This factor participates in the competition as one of the contestants. Thus, this dimension was named *Being skilled in competition*.

Lastly, the fifth factor contained three data set items, namely Item_7, Item_14, and Item_15. It has an internal reliability of 0.788, a total variance of 0.83%, and an eigenvalue of 5.818. This factor discusses how students were able to perform tasks with the aid of various modes of instruction. Thus, this dimension was named *Immediate application.*

Table 3: **Effectiveness of Technical Education Students' Hands-on Activities**

Factor	Mean	SD
Proficiency in procedures and steps	4.00	0.50
Creativity	4.00	0.50
Skill incorporation	3.97	0.56
Being skilled in competition	2.75	0.87
Immediate application	4.08	0.55
Overall	**3.76**	**0.38**

Based on the results of the conducted factor analysis, it can be revealed that the grouping of the attitude items into various factors is statistically confirmed. Table 3 shows the level of effective hands-on activities of technical education students in the new normal. Through the effectiveness of hands-on activities in technical education, students discover five factors, namely: proficiency in procedures and steps, creativity, skill incorporation, being skilled in competition, and immediate application. The results showed that the level of effective hands-on activities obtained an overall mean of 3.76 (SD = 0.38), with a descriptive level of "high." This indicates the effectiveness of hands-on activities for technical education students in the context of effective learning. By changing their perspective, they are better able to anticipate and deal with difficulties or challenges.

- **A. Immediate application:** The immediate application dimension of effective hands-on activities of technical education students in Cambodia obtained the highest mean score of 4.08 (SD = 0.55) among all factors. As indicated in the data, the overall mean for the level of immediate application among students was high. The respondents

concluded from the findings that performance indicators converted the more comprehensive hands-on activities into measurable and teachable targets. Students focus on the practical application of knowledge gained from projects, tests, and homework from numerous classes studied throughout a student's high school career.

- **B. Creativity:** Among all factors, the creativity dimension of effective hands-on activities of technical education students in Cambodia obtained a mean score of 4.00 (SD = 0.50). As indicated in the data, the overall mean for students' creativity level was orally described as high. Based on their responses, the respondents assumed that they were able to overcome obstacles or find creative solutions to any issues. Respondents assumed that they regularly attended school or studied school subjects. For instance, it consists of obtaining knowledge and developing skills by exciting methods. They worked as a team to facilitate the instruction based on learning activities they had recently completed in their class.
- **C. Proficiency in procedures and steps:** The proficiency in procedures and steps dimension of effective hands-on activities of technical education students in Cambodia obtained a mean score of 4.00 (SD = 0.50) among all factors. As indicated in the data, the overall mean for the level of proficiency in procedures and steps of the student was high. Based on the results of the respondents' study, having a good connection with their classmates is better for doing their homework and having good communication with their friends. Students acquire the knowledge, skills, and competencies required in a field of study as well as those required for success in school, the workplace, and social life.
- **D. Skill incorporation:** Among all factors, the skill incorporation dimension of effective hands-on activities of technical education students in Cambodia obtained a mean score of 3.97 (SD = 0.56). As indicated in the data, the overall mean for the level of skill incorporation among students was high. Based on the result, respondents supposed that their learning allowed them to be independent in exploring new ideas, building new techniques, improving learning, and engaging in interactive exercises to assist in the learning process, particularly for complex topics that demand a great level of understanding. It can be concluded that they were able to monitor their progress as they received clear instructions.
- **E. Being skilled in competition:** Among all factors, the being skilled in competition dimension of effective hands-on activities of technical education students in Cambodia obtained a mean score of 2.75 (SD = 0.87). As indicated in the data, the overall mean for the level of being skilled in competition among students was moderate. Based on the findings, respondents hypothesized that skills would ensure they did not miss any important information or activities, provide them with insight into the true nature of competition, and account for working issues. As a result, we can see an increase in student engagement as they are more able to ask questions, debate course-related issues, and even compare their assessment scores. This encourages healthy competition among the students and helps them perform at their best every time.

Based on the results of the study, the finding was found to be significantly below the threshold. Moreover, the level of students' satisfaction with exploring effective hands-on activities with technical education students in Cambodia is moderate, obtaining the lowest mean score among all present factors.

5 Conclusion

Based on the findings of the study, the authors concluded that "the exploration of effective hands-on activities by technical education students in Cambodia is multidimensional." The factor structure revealed five factors, namely: proficiency in procedures and steps, creativity, skill incorporation, being skilled in competition, and immediate application. Moreover, the level of exploration of effective hands-on activities by technical education students in the Cambodia context is characterized by a high level of proficiency in procedures and steps, creativity, skill incorporation, and immediate application, and a moderate level of skill in competition.

6 Recommendations

The researchers acknowledged that the significance of their findings depended on how they interpreted the results, and they emphasized the need to address these interpretation limits. Thus, in the light of previous findings and conclusions, the following recommendations are offered:

a) The study found a moderate level of skill in competition among respondents from all academic departments. In order to address successful learning in the new normal, the researchers advise administrators to assess and boost the effectiveness of current policies and to take the appropriate steps.
b) An internship and apprenticeship program should be considered to expose students to more practical activities.
c) Students can complete their capstone projects under the guidance of instructors.
d) Policy on internship and apprentice program should be formulated.
e) Guidelines and directives on students' capstone projects should be developed to functionally guide students.
f) The researchers also recommend revising the study's findings to address its limitations. Future researchers can perform a confirmatory factor analysis to confirm the dimensionality of effective hands-on activities for technical education students. Factor analysis can also validate existing and new factors that have served as dimensions of effective hands-on activities for technical education students.

References

ADB (2009). Good practice in technical and vocational education and training. Manila: Asian Development Bank.

ADB (2016). Policy priorities for a more responsive technical and vocational education and training system in Cambodia (ADB briefs). Manila: Asian Development Bank.

Azid, N., Rawian, R., Shaik-Abdullah, S., & Tee, T. K. (2019). The development of interactive case-based smart thinking and industrial problem-solving stimulator to enhance TVET students' thinking skills. In: Journal of Engineering Science and Technology, 14(5), 2643-2656.

Bergin, D. A. (1999). Influences on classroom interest. Educational Psychologist, 34, 87–98.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. In: Psychometrika, 16, 297-334. Online: http://cda.psych.uiuc.edu/psychometrika_citation_classic_summaries/cronbach_citation_classic_alpha.pdf (retrieved 23.06.2024).

Dawe, M., Miller, T., & Diop, O. (2020). Policy brief: Using digital credentials to keep the promises of TVET. New Delhi: United Nations Educational, Scientific and Cultural Organization. Online: https://www.voced.edu.au/content/ngv:88623 (retrieved 23.06.2024).

Franklin, S. & Peat, M. (2005). Virtual versus real: an argument for maintaining diversity in the learning environment. In: International Journal of Continuing Engineering Education and Life Long Learning, 15(1-2), 67-78.

Girden, E. R. (2001). Evaluating research articles from start to finish. Thousand Oaks: Sage Publications. Online: https://openlibrary.org/books/OL6777401M/Evaluating_research_articles_from_start_to_finish (retrieved 23.06.2024).

Holstermann, N., Grube, D., & Bögeholz, S. (2010). Hands-on activities and their influence on students' interest. In: Research in Science Education, 40(5), 743-757.

Khan, A., Siddiqui, S. H., & Abbasi, M. I. (2020). Professional Development as a Determinant of Self-efficacy of TVET Teachers, under the Mediating and Moderating Effect of Technology Training and Work Culture. In: Pakistan Journal of Social Sciences (PJSS), 40(2), 745-757.

Khorn, S. (2023). Technical and Vocational Education and Training in Cambodia: Significance, Challenges, and Ways Forward. In: Innovations And Challenges In Cambodian Education, 193.

Ministry of Education, Youth, and Sport (MoEYS) (2015). The curriculum on technical education at upper secondary level. Phnom Penh: Ministry of Education, Youth, and Sport.

Ministry of Labour and Vocational Training (MoLVT). (2017). National technical vocational education and training policy 2017-2025. Phnom Penh: Ministry of Labour and Vocational Training.

No, F. & Sok, S. (2022) Primary education in Cambodia: in search of quality. In McNamara, V & Hayden, M. (eds.); Education in Cambodia. Singapore: Springer, 29–54.

Nott, M. & Wellington, J. (1996). When the black box springs open: practical work in schools and the nature of science. In: International Journal of Science Education, 18(7), 807-818.

Odo, J. U., Okafor, W. C., Odo, A. L., Ejikeugwu, L. N., & Ugwuoke, C. N. (2017). Technical Education - The Key to Sustainable Technological Development. In: Universal Journal of Educational Research, 5(11), 1878-1884.

Rijal, N. (2020). Desk Top Study: Challenges in Curriculum Development of TVET in preparation for the 21st century to Nepal. In: SSRN Electronic Journal.

Sarastuen, N. K. (2020). From vocational worker to vocational teacher: A study of identity transition and loss. In: Journal of Vocational Education & Training, 72(3), 333-349.

Song, S. & Chea, P. (2023). Vocational Education and Training in Cambodia. In: International Handbook on Education in South East Asia. Singapore: Springer Nature Singapore, 1-24.

Tapia, M. (1996). The attitudes toward mathematics instrument. Paper presented at the annual meeting of the Mid-South Educational Research Association, Tuscaloosa, AL (ERIC Reproduction Service No. ED 404165).

UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training (2013). Revisiting global trends in TVET: Reflections on theory and practice. UNESCO. Online: https://unevoc.unesco.org/fileadmin/up/2013_epub_revisiting_global_trends_in_tvet_book.pdf (retrieved 24.06.2024).

Yok, S., Chrea, S., & Pak, R. (2019). Technical and vocational education and training in Cambodia: Current status and future development. In: Vocational education and training in ASEAN member states: Current status and future development, 25-43.

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