STUDENTS' PERCEPTION OF TVET EDUCATION IN THE PETROCHEMICAL FIELD

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ABSTRACT

Technical and Vocational Education and Training (TVET) has become increasingly important to the progress of a country due to its human capital needs in every field in the industrial sector. Therefore, students' exposure and understanding of the field of TVET is important to spark their interest in being involved in it so that it can contribute to the progress of the country. This study is to see the level of exposure in the field of Petrochemical TVET to Petrochemical TVET students before they become students in the field. Apart from that, this study is also to understand the students' perception of their interests and future prospects for a career in the petrochemical field. A total of 30 Petrochemical TVET students from the Tun Syed Nasir Syed Ismail Polytechnic (PTSN) were sampled in this study to answer all the questions in the form of a Google Form through the link given to them. The findings of the study showed that more than half of the samples had knowledge related to the field of petrochemical before they became Petrochemical TVET students, which was obtained through readings (53.3%) and their family members (60%). However, these students see that the knowledge they have gained is still at a low level. It was found that only 23.3% of these students felt that they had enough exposure to the field of petrochemical before they became Petrochemical TVET students. The findings of the study also show that the level of promotion to school students by the petrochemical education institute is very low where only 20% of these students get the promotion. In addition, the statistics of the findings of the study show that before becoming Petrochemical TVET students, these students already had a good interest in the field and this is evidenced by the fact that 86.6% of the students chose the field of Petrochemical TVET in their tertiary applications. After becoming a student in the field of TVET Petrochemical, it was found that the students also had a good interest in this field where 96.7% expressed their interest in continuing to study the courses in it and then 96.6% were confident to build a career in the field. Through this study, it can be concluded that the country's petrochemical field has a positive future.

Keywords: *Petrochemical, Tun Syed Nasir Syed Ismail Polytechnic (PTSN), TVET*

INTRODUCTION

TVET education regardless of field has been recognized as one of the important aspects that contribute a lot to the country's progress. Bakar (2011) said that nowadays TVET education has been recognized as the most important key to sustainable development and even more so TVET can enhance human capital development for the industrial sector. Lamichhane (2021) stated that TVET education is the main element for socio-economic development in a country. This is because this education can improve the efficiency of graduates in both programs, namely working as an employer or being self-employed. Ahmad et al. (2015) gave South Korea as an example of a country that prioritizes the strengthening of TVET education where the result of this has turned the country that was initially destroyed as a result of the war into an economic powerhouse. Awang Kechik (2011) argues that improving the skills of Malaysians is a foundation that needs to be given priority as it will be able to expand the marketability of the country's human capital. In this regard, Anafi and Mohd Noor (2024) emphasized that the implementation of broad and in-depth access to TVET education can be held to attract more students to venture into the field.

However, there is still an impression that TVET education is a second chance for students who do not excel in their academic achievements. Awang Kechik (2011) argues that it is necessary to eliminate the perception that people view TVET education negatively where it is often associated with students who drop out when the fact is that TVET education is the first choice for countries that have made progress. Bhatta (2021) mentioned that the negative perception and perception of the public towards TVET education is slowly disappearing as the awareness related to it increases and when TVET proves to be the best provider for knowledgeable and skilled workers in the 21st century.

The objective of this study was to see the level of exposure to education in the field of TVET Petrochemical to students in this field while they were still in secondary school. Apart from that, the objective of this study is also to understand the perception of these students towards their interests and future prospects to enter and pursue a career in the field of petrochemical after they become Petrochemical TVET students. The impact of this study is a snapshot of the country's future progress in the field of petrochemical.

LITERATURE REVIEW

Technical and Vocational Education and Training (TVET) plays a crucial role in developing education, training, and skills relevant to various sectors, including employment, production, services, and livelihoods. It encompasses work-based learning, continuous professional development, and training that contribute to formal qualifications (UNESCO, 2015). As industries evolve, TVET serves as a vital mechanism for equipping individuals with industry-relevant competencies, ensuring a skilled workforce that meets labor market demands.

One of the key industrial sectors that require specialized technical expertise is the petrochemical industry. The *Oxford Dictionary of English: Third Edition* (Oxford, 2010) defines petrochemicals as substances derived from the refining and processing of petroleum or natural gas resources. This industry is responsible for producing organic chemical products, including plastics, synthetic rubber, and various other essential materials derived from oil and gas (Sulaiman, 2016). Given its extensive application, the petrochemical industry is considered a highly complex sector that influences nearly all aspects of modern life (Tripathy et al., 2017). Prismecs (2024) further underscores the significance of this industry, noting its critical role in the global supply chain by providing raw materials for a wide range of manufacturing industries, from consumer goods to advanced industrial applications.

In Malaysia, the need for skilled professionals in the petrochemical industry has led to the establishment of TVET programmes specializing in this field. One of the higher education institutions offering such programmes is the Tun Syed Nasir Syed Ismail Polytechnic, located in Pagoh, Johor. However, despite the availability of these programmes, challenges persist in student engagement and retention. Nor Azman et al. (2024) found that a number of students pursuing petrochemical TVET programmes struggle to complete their studies within the stipulated time frame. A key factor contributing to this issue is a lack of interest in the field. Many students enrolled in petrochemical TVET programmes do so not out of personal preference but rather due to placement allocations or external influences.

This situation raises important concerns regarding students' perceptions of petrochemical TVET and their motivation to pursue careers in this industry. Understanding these perceptions is essential for improving programme design, enhancing student engagement, and ensuring that the workforce supply aligns with industry demands. Addressing these challenges could contribute to higher completion rates, better career preparedness, and a more sustainable pipeline of skilled professionals in the petrochemical sector.

METHODOLOGY

Sampling – The study conducted is in quantitative form where a set of questionnaire questions are prepared to be responded to and answered by a sample or respondent. The sample of respondents used in this study consisted of 30 students of the Petrochemical TVET programme from the Tun Syed Nasir bin Syed Ismail Polytechnic who were randomly selected.

Instruments and procedures for obtaining study data – This study uses a set of questionnaire questions built using *the Google Form* application. This application was chosen because it is easy to use to develop the questionnaire question set, it is also easy to distribute the questionnaire questions to respondents online and it also provides the facility to analyse the data obtained from the answers or responses by the selected respondents. By using this application, there will be no situation where there are any question questions left for the respondent to answer. This is because this application can be adjusted to not allow respondents to be on the next page if there are still items or questions on the current page that are still unanswered by the respondent, in addition to not allowing respondents to send feedback as long as there are items or questions that are still unanswered. The questionnaire question set used by Mohamad (2022) in his study has been used as the main reference to develop the questionnaire question set in this study. Furthermore, the set of questionnaire questions was modified to meet the objectives of the study. The researcher has divided the set of questioning questions into 3 parts as follows:

i. Part A: Demographic data where respondents are required to select only one from the given list with respect to gender, race or ancestry, age group and zone or residence from which the respondent originates.

ii. Part B: Placing a set of questions designed to measure students' exposure and knowledge in relation to the field of petrochemical before they become petrochemical TVET students. There are 12 questions that respondents need to answer in this section.

iii. Part C: It consists of a set of questions to gauge students' perceptions, interests and future prospects in the field of petrochemical TVET after they become petrochemical TVET students. In this section, the response needs to answer a total of 10 questions in total.

In parts B and C of the questionnaire question set, respondents were helped to give their respective levels of agreement with the listed statements using a five-level Likert scale where the score assignment for them was as shown in Table 1. According to Konting (2004), the five-level Likert scale will provide a lot of convenience to respondents to help them make the right choice on the statements in the questionnaire questions. Apart from that, this Likert scale also has a high reliability value which will result in more accurate measurements.

Table 1: Five-level Likert Scale

Score	Options
1	Strongly disagree (STS)
2	Disagree (TS)
3	Uncertain (TP)
4	Agree(s)
5	Strongly Agree (SS)

Source: Mahamod and Nor (2012)

To understand the level of exposure, knowledge and perception of students in the field of petrochemical TVET, the interpretation of the mean score of Likert scale five from Nunnally and Bernstein (1994) is used as a reference. The analysis of the mean score of the Likert scale of five is as shown in Table 2.

Table 2: Interpretation of mean score with Likert scale 5

Min Score	Min Score Interpretation
1.00 to 2.00	Low
2.01 to 3.00	Medium Low
3.01 to 4.00	Medium Height
4.01 to 5.00	High

Source: Nunnally and Bernstein (1994)

FINDINGS AND DISCUSSION

Table 3 shows the demographic data records for all respondents for this study. The respondents consisted of 23 or 76.7% male students while 7 female students or 23.3%. Of the 30 respondents, 23 or 76.7% were Malay students, while Indian and Bumiputera students from Sabah and Sarawak were the same number at 3 or 10% and one or 3.3% of the respondents stated that they were of a race or descent other than those listed in the questionnaire. Researchers believe these respondents are of Siamese ethnicity or descent. The age of the respondents was 19 years old and above 21 years old, 22 people or 73.3% were 20 years old and 6 students or 20% were 21 years old. Most of these respondents are from the southern part of Malaysia, either from the state of Melaka or Johor with a total of 12 people or 40%. The other respondents were from the east coast and the Federal Territories where there were 3 people each, 7 people (23.3% from Sabah and Sarawak), 4 people from the central states of the peninsula and one person from the north of the peninsula from either Kedah, Perlis or Penang.

Table 3: Demographic characteristics of respondents

No.	Demographic Characteristics		Frequency	Percentage (%)
1.	Gender	Men	23	76.70
		Female	7	23.30
2.	Race	Malay	23	76.70
		Chinese	–	–
		India	3	10.00
		Bumiputera of Sabah and Sarawak	3	10.00
		Bumiputera Peninsular Malaysia	–	–
		Others	1	3.30
3.	Age	Under 17 years old	–	–
		18 years	–	–
		19 years	1	3.35
		20 years	22	73.30
		21 years	6	20.00
		Over 21 years old	1	3.35
4.	Zone of origin or residence	North (Perlis, Kedah and Penang)	1	3.40
		Central (Perak, Selangor and Negeri Sembilan)	4	13.30
		Eastern (Pahang, Kelantan and Terengganu)	3	10.00
		South (Melaka and Johor)	12	40.00
		Borneo (Sabah and Sarawak)	7	23.30
		Federal Territories (Kuala Lumpur, Putrajaya and Labuan)	3	10.00
		Others	–	–

From Table 4, the study found that most of the respondents were not exposed to the field of petrochemical due to the location of their schools and residences close to educational institutions that offer studies in the field of petrochemical TVET. This is because most of the respondents' residences and schools are not close to these educational institutions. This can be seen from the moderately low mean score for the statement of residential and school locations close to the location of petrochemical TVET educational institutions, which are 2.63 and 2.23 respectively. Respondents' exposure or knowledge in relation to the field of

petrochemical was highest through their readings which was 53.3% of the total respondents and also through their family members which was 60% of the total respondents. The mean score for both of these things is 3.30. If you look further, school teachers are also still not playing a role in providing exposure to the field of petrochemical to their respective students where the average score is moderately high 3.07. Researchers see that teachers can still contribute a greater role to the effort. Another interesting thing is that it was found that the exposure or knowledge of the respondents regarding the field of petrochemical due to promotions from educational institutions that offer studies in the field of TVET is still at a low level where the average score is only 2.50 and only 20% of the total respondents have experienced the promotion. In this regard, the researcher sees that the educational institutions involved need to hold more promotions to provide more exposure regarding this field to school students where this is believed to produce more students who are interested and instil ambitions to be involved in the field of petrochemical.

Further research found that most of the respondents felt that they were not yet provided with sufficient exposure and knowledge regarding the field of petrochemical when they were still in school. Only 23.3% of the total respondents agreed that they had received sufficient exposure in this matter and the mean score was moderately low at 2.63. However, this modest exposure has sparked a good interest in the field of petrochemical among respondents when they were still in school. This can be seen from the statement of interest in the petrochemical field with a mean score of 3.63, the statement of wanting to continue his studies in the field of petrochemical TVET with a mean score of 3.83 and the statement of wanting to pursue a career in the petrochemical field with a high mean score of 4.00.

Table 4: Exposure and knowledge of respondents in the field of petrochemical TVET while still in school

No.	Statement	Frequency (Percentage, %)					Average
		STS	TS	TP	S	SS	
1.	My residence is close to petrochemical educational institutions.	5 (16.70)	10 (33.30)	6 (20.00)	9 (30.00)	–	2.63
2.	My school is close to petrochemical educational institutions.	10 (33.30)	8 (26.70)	5 (16.70)	6 (20.00)	1 (3.30)	2.23
3.	When I was still in school, I visited locations related to the petrochemical field.	11 (36.70)	9 (30.00)	6 (20.00)	2 (6.70)	2 (6.70)	2.17
4.	When I was still at the school level, I once received information regarding the field of petrochemical through reading.	3 (10.00)	7 (23.30)	4 (13.30)	10 (33.30)	6 (20.00)	3.30
5.	When I was still at the school level, I used to get information about the petrochemical field through announcements by teachers.	5 (16.70)	5 (16.70)	7 (23.30)	9 (30.00)	4 (13.30)	3.07
6.	When I was still in school, I had received information about the petrochemical field through information from my friends.	6 (20.00)	7 (23.30)	5 (16.70)	11 (36.70)	1 (3.30)	2.80
7.	When I was still at the school level, I was informed about the petrochemical field through an announcement by a family member.	5 (16.70)	6 (20.00)	1 (3.30)	11 (36.70)	7 (23.30)	3.30
8.	When I was still in school, I was informed about the field of petrochemical through a promotion by a petrochemical educational institution.	7 (23.30)	10 (33.30)	7 (23.30)	3 (10.00)	3 (10.00)	2.50
9.	When I was still in school, I gained enough exposure/knowledge regarding the field of petrochemical.	5 (16.70)	12 (40.00)	6 (20.00)	3 (10.00)	4 (13.30)	2.63
10.	When I was still in school, I was interested in the field of petrochemical.	–	3 (10.00)	12 (40.00)	8 (26.70)	7 (23.30)	3.63
11.	While I was still in school, I wanted to continue my studies in the field of petrochemical.	–	3 (10.00)	9 (30.00)	8 (26.70)	10 (33.30)	3.83
12.	While I was still in school, I wanted to pursue a career in petrochemical.	–	1 (3.30)	8 (26.70)	11 (36.70)	10 (33.30)	4.00

From Table 5, it was found that the interest sparked in the respondents when they were in school had contributed to the high application for the field of petrochemical TVET at the tertiary level. This can be seen with a high mean score of 4.20 and 86.6% of the total respondents who applied for the field at their higher education level. In addition, the interest among respondents in the field of petrochemical has increased after they were students in the field of petrochemical TVET compared to when they were still at the school level, from a medium-high mean score of 3.63 to a high of 4.13. The researcher thinks this is because the respondents have been exposed to the field of petrochemical more extensively after they have deepened their knowledge related to petrochemical in their institutions of higher learning. Table 5 also shows that the respondents as students in the field of

petrochemical TVET have a good and positive perception of the field. They have high confidence that this field will provide them with good career opportunities and experience in the future. This is due to the high mean score for their confidence in the career space and their desire to pursue a career in the field which is 4.50 each.

Table 5: Students' perception of the field of petrochemical TVET after becoming a petrochemical TVET student.

No.	Statement	Frequency (Percentage, %)					Average
		STS	TS	TP	S	SS	
1.	Petrochemical TVET is my top choice.	–	4 (13.30)	9 (30.00)	9 (30.00)	8 (26.70)	3.70
2.	I am applying to pursue my higher education in the field of petrochemical TVET.	–	–	4 (13.30)	16 (53.30)	10 (33.30)	4.20
3.	I am interested in studying the field of petrochemical TVET in an institute of higher learning.	–	1 (3.30)	5 (16.70)	13 (43.30)	11 (36.70)	4.13
4.	I enjoyed studying the courses in the petrochemical TVET programme at the institute of higher learning.	–	–	1 (3.30)	18 (80.00)	11 (36.70)	4.33
5.	I am confident that the field of petrochemical will promise a good career.	–	–	4 (13.30)	14 (46.70)	12 (40.00)	4.27
6.	I am confident that the field of petrochemical will provide a wide career space.	–	–	1 (3.30)	13 (43.30)	16 (53.30)	4.50
7.	I want to build a career in petrochemical.	–	–	1 (3.30)	13 (43.30)	16 (53.30)	4.50
8.	I want to gain experience in the field of petrochemical.	–	–	–	14 (46.70)	16 (53.30)	4.53
9.	I am proud to be a person in the field of petrochemical.	2 (6.70)	–	1 (3.30)	14 (46.70)	13 (43.30)	4.20
10.	I encourage the youth to get involved in petrochemical.	–	–	2 (6.70)	12 (40.00)	16 (53.30)	4.47

CONCLUSION

Overall, it was found that the exposure to the petrochemical field for students at the school level still needs to be actively increased to attract these students to the field. Petrochemical TVET teachers and educational institutions can play a greater role respectively to introduce and promote this field to students at the school level. It was also found that petrochemical TVET students indeed have a good perception and future prospects towards the field they are studying. There is no doubt that there will be students who will not be able to graduate in this field according to the proper study period as concluded in the study by Nor Azman et al. (2024), but the interest, perception and positive future prospects for this field in these students will give birth to continuous efforts by the students to eventually become graduates in the field of petrochemical. Researchers believe that this situation will provide a good picture for the country's petrochemical sector for the foreseeable future.

Recommendations for Study Improvement

Sample Size Increase – This study can be expanded by increasing the number of respondent samples to be more representative of the population of Petrochemical TVET students at Polytechnics. A larger sample size will provide more accurate and generalizable findings to the entire student population in this field.

Diversity of Data Collection Techniques – In addition to questionnaires, this study can be enriched with more diverse data collection methods such as interviews, case studies, and observations. This can provide a deeper understanding of the factors that influence students' interest and perception of the field of Petrochemical TVET.

Longitudinal Study – This study can be improved by conducting a longitudinal study to assess changes in students' interest and perception of the field of Petrochemical TVET from the early stages of study to graduation. This study can provide more comprehensive information on the effectiveness of Petrochemical TVET programmes in improving the employability of graduates.

Comparative Analysis between Polytechnics – This study can also be expanded by comparing the perceptions of Petrochemical TVET students at various polytechnics in Malaysia. This comparison can help in identifying the advantages and disadvantages of Petrochemical TVET programmes in different institutions as well as suggesting more effective improvements.

Evaluation of the Effectiveness of Petrochemical TVET Promotion – This study can include an evaluation of the effectiveness of Petrochemical TVET promotion programs that have been conducted by educational institutions. By assessing the impact of the promotion, the polytechnic was able to improve its promotional strategy to attract more students in this field.

Integration of Technology in Studies – The use of technologies such as data analytics, artificial intelligence (AI), and machine learning can help in analysing study data more efficiently. Studies can use analytics software to identify more in-depth patterns and trends.

Impact of Studies on Polytechnics

Increasing Awareness on Petrochemical TVET – This study can assist polytechnics in understanding the level of awareness and knowledge of secondary school students on the field of Petrochemical TVET. The results of this study can be used to formulate more effective strategies in increasing students' awareness of the importance and potential of this field.

More Effective Curriculum Planning – The findings of the study can be used as a basis for evaluating and improving the curriculum of the Petrochemical TVET programme at polytechnics. Curriculum adaptation based on industry needs and student wishes can improve the quality of TVET education as well as prepare students with more relevant skills.

Increased Participation Rate and Study Completion – By understanding the factors that influence students' interest in this field, polytechnics can take more effective steps to attract more students to participate in the program as well as reduce dropout rates.

Strengthening Links with Industry – The results of this study can be used by polytechnics to enhance collaboration with industry in the petrochemical sector. This can help in providing more effective industrial training as well as opening up a wider range of job opportunities for graduates.

Optimization of Promotion Strategy and Early Exposure – This study provides insight into the effectiveness of the promotion of the field of TVET Petrochemical to school students. With this, polytechnics can devise more interactive and engaging early exposure programs such as industry visits, talks by industry experts, and TVET-related motivational camps.

Increased Graduate Employability – This study can help polytechnics understand the skills gap between students and industry needs. With that, polytechnics can design additional programs such as short courses, skills certifications, and internships to increase the employability of graduates.

With the implementation of these improvement proposals, polytechnics can strengthen their role in providing skilled manpower in the field of petrochemical, thereby contributing to the overall economic development of the country.

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