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EARLY EXPOSURE, FUTURE SKILLS: ACCEPTANCE OF TVET AMONG KAMPUNG SAHOM'S ORANG ASLI PRIMARY PUPILS

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ABSTRACT

This study investigates the acceptance and perception of Technical and Vocational Education and Training (TVET) among Orang Asli primary school students in Kampung Sahom, Perak, Malaysia—an underserved community with limited exposure to technical education pathways. As part of the PUO MechCare community outreach initiative by Department of Mechanical Engineering, a one-day experiential learning program was conducted at Sekolah Kebangsaan Sahom, featuring hands-on activities such as welding simulation, basic electromagnetism, and 3D printing demonstrations. The objective was to provide early exposure to TVET elements and assess students' interest, awareness, and engagement. A mixed-method approach was employed, incorporating pre- and post-program questionnaires and an observation checklist to evaluate both cognitive and behavioural responses. A total of 38 students participated in the program. Results indicated clear improvements, with awareness more than doubling and interest in technical skills and career aspirations increasing significantly. Observational data further confirmed high levels of engagement, though misconceptions persisted for instance, some students associated engineers with pilots. Overall, the findings highlight the value of early TVET exposure in rural and indigenous communities, showing how targeted outreach can inspire interest, clarify career pathways, and promote inclusive education opportunities from a young age.

1.0 Introduction

As the global economy continues to shift towards one that values skills and innovation, Technical and Vocational Education and Training (TVET) has become increasingly important. Internationally, studies have shown that early exposure to technical and vocational learning can improve student engagement, especially among underrepresented or indigenous groups, such as Native Americans in the United States (Flora, C. B., & Emery, M., 2011) and First Nations communities in Australia (Watson,S.,2013). These findings emphasize that marginalized populations often face systemic barriers to accessing technical education, making targeted outreach crucial.

In Malaysia, TVET plays a crucial role in preparing a workforce that is not only adaptable but also capable of meeting the diverse needs of modern industries. Research shows that when young learners are introduced early to hands-on and practical learning experiences, they are more likely to develop an interest in technical careers, especially in fields like science and engineering (Janius et al., 2024; Ali et al., 2024; Kirschner, P. A., & Hendrick, C., 2024). In Malaysia, the 12th Malaysia Plan (2021 - 2025) outlines several strategies to improve the country's TVET system. A key goal is to increase the participation of rural and marginalised groups, including the Orang Asli, Malaysia's Indigenous population. However, despite ongoing national efforts, students from these communities continue to face significant challenges. For many Orang Asli families, limited access to schools, scarce resources, and a lack of exposure to technical subjects make it difficult to see TVET as a real option (Sawalludin et al., 2020; Zamzuri et al., 2023; Rahim et al., 2022). This creates a critical research gap: while Malaysia has prioritised TVET inclusion at the policy level, little is known about how Orang Asli pupils especially at the primary school level perceive and respond to early exposure programs. Existing studies tend to focus on older students, leaving a lack of evidence on the potential of early interventions.

Despite being in a state with a notable Orang Asli population, Politeknik Ungku Omar (PUO) continues to record low enrolment numbers from this group. Over a span of five years (2020 - 2024), only 16 Orang Asli students enrolled at PUO. As outlined in Table 1, these students came from various states, including Pahang, Johor, Selangor, Perak, and the Federal Territory of Kuala Lumpur. However, the number of local Orang Asli students from Perak remains particularly small. This raises an important question: to what extent are these students even aware of the opportunities that TVET can offer, and how might early outreach make a difference?

Table 1 Enrolment data from Politeknik Ungku Omar over five years (2020-2024)

Year	Session	No. of Student	Department	Origin
2020	June 2020	1	Mechanical Engineering	Pahang
2021	I 2021/2022	1	Mechanical Engineering	Johor
2022	I 2022/2023	1	Civil Engineering	Perak
2023	II 2022/2023	3	Mechanical Engineering	Perak
	I 2023/2024	1	Mechanical Engineering	Perak
		2	Commerce	Perak
		1	Mechanical Engineering	Selangor
2024	II 2023/2024	1	Commerce	Selangor
	I 2024/2025	1	Commerce	Perak
		1	Mechanical Engineering	Selangor
		1	Mechanical Engineering	W.P. KL
		1	Mechanical Engineering	Perak
		1	Commerce	Selangor

To help address this educational gap, the Department of Mechanical Engineering at PUO introduced a community outreach program known as PUO MechCare as shown in Figure 1. One of its key efforts involved organising a one-day experiential learning activity at Sekolah

Kebangsaan Sahom, a rural primary school serving the Orang Asli community in Kampung Sahom, Perak. The goal was to spark curiosity and build early interest in TVET among young learners. The session introduced them to simple technical concepts using interactive activities like welding simulations, basic electromagnetism experiment, and 3D printing technology demonstration.

Beyond these activities, however, the program also recognised the importance of building trust with the local community. A recent study by Faezah (2024) highlights that social trust is key to encouraging participation in education among Orang Asli youth. Her findings show that when communities feel respected and included, they are more likely to support learning initiatives. In this way, PUO MechCare not only brought technical knowledge into the classroom but also helped build relationships that are essential for long-term educational engagement. Further supporting this approach, Omar (2020) found that how students receive information and from whom, matters deeply when it comes to choosing a vocational path. His study revealed that motivation and encouragement from teachers, parents, peers, and even digital media have a strong influence on students' decisions to pursue TVET. This shows that outreach programs must go beyond just presenting technical skills; they must also shape how vocational education is understood and valued by both students and their communities. As Omar suggests, it is time to rebrand TVET as a respected and forward-looking career option that contributes meaningfully to the country's development.

Figure 1 PUO MechCare program at Sekolah Kebangsaan Sahom

This study aims to explore how primary school students from the Orang Asli community respond to TVET after participating in such an outreach program. It focuses on their awareness, interest, and level of engagement, using surveys and observation to better understand their reactions. By doing so, the study hopes to provide insight into how early exposure to TVET can make a positive impact especially for learners from underserved backgrounds. This aligns not only with the goals of the Perak Sejahtera 2030 blueprint but also with Malaysia's broader

commitment to a more inclusive and equitable education system. The remainder of this paper is organized as follows: Section 2 outlines the methodology of this study. Section 3 and 4 presents and discusses the results obtained from pre- and post- analysis, respectively. Finally, Section 5 concludes the paper with key findings and directions for future research.

2.0 Methodology

This study used a mixed-method approach combining quantitative and qualitative methods to explore the acceptance and perception of Technical and Vocational Education and Training (TVET) among Orang Asli primary school students in Kampung Sahom, Kampar, Perak. The research is framed as a case study centered on a hands-on educational outreach program. The participants consisted of all Tahap 2 (Year 4 - Year 6) Orang Asli pupils from Sekolah Kebangsaan Sahom (n = 38). These grade levels were selected because students at this stage are developmentally prepared to engage with structured activities and reflect on learning experiences. Although modest in size, this sample is fully representative of the target population, as it encompassed the entire upper-primary Orang Asli cohort at the school. The study is embedded in the PUO MechCare: Empowering Sahom through TVET outreach program, which includes virtual welding simulation workshop, 3D printing demonstration and basic electromagnetic introduction. This program aims to introduce fundamental TVET concepts in an engaging and age-appropriate manner, utilising simulations and hands-on learning tools. The study received approval from the Perak State Education Department (Jabatan Pendidikan Negeri Perak), and all measures were taken to ensure the anonymity and confidentiality of participants throughout the research process.

2.1 Data collection instruments

A structured questionnaire with 6 questions was distributed to the students before and after the program to measure changes in awareness of TVET, interest in technical skills and perception of future career paths in technical fields. The questionnaire uses simple language, and a 3-point Likert scale was used to suit the comprehension level of primary students with the following interpretations:

3: Agree;
2: Uncertain;
1: Disagree;

The reliability of the research instrument was measured using the Cronbach's Alpha coefficient value which was analyzed using the Statistical Package for Social Science (SPSS) version 27. The interpretation of the Cronbach's Alpha reliability coefficient score is as in Table 2. Quantitative data were analysed using descriptive statistics to compare pre- and post-program responses. The analysis was conducted using the Statistical Package for the Social Sciences (IBM SPSS) Version 27. Interpretation of the mean scores was based on the scale shown in Table 3. Researchers and facilitators used a checklist to record student engagement, participation, and reactions during the activities. This qualitative data was analysed using thematic analysis to identify recurring patterns in student attitudes and engagement with TVET-related content.

Table 2 Cronbach's Alpha Score Interpretation

Reliability Coefficient	Interpretation of Reliability
0.90 – 1.0	Very good and effective
0.70 – 0.89	Good and acceptable
0.60 – 0.70	Acceptable
< 0.60	Items need to be fixed
< 0.50	Items should be dropped

Source: Yunusa et. al. (2014)

Table 3 Mean Score Interpretation

Mean Scale	Level
1.00 – 1.66	Disagree
1.67 – 2.33	Uncertain
2.34 – 3.00	Agree

Source: Pimentel (2019)

3.0 Results

This section presents the findings from both the pre- and post-program questionnaires and observation checklists carried out during the PUO MechCare outreach initiative with Orang Asli primary school pupils at SK Sahom. The analysis explores shifts in the pupils' acceptance, interest, and understanding of TVET concepts, as well as their behavioural engagement throughout the program. These insights offer a holistic view of the program's impact from both cognitive and observational perspectives.

3.1 Questionnaire Analysis

A total of 38 pupils participated in the questionnaire component of the study. Each respondent was asked to evaluate six statements designed to measure their awareness, interest, and perception of TVET, both before and after participating in the program. Responses were recorded using a three-point Likert scale: Agree = 3, Uncertain = 2, and Disagree = 1

a. Reliability Test

Table 4 presents the Cronbach's Alpha coefficients for the questionnaire administered pre- and post-program. The reliability analysis shows that the instrument demonstrated acceptable internal consistency prior to the program ($\alpha = 0.6988$), and a high level of reliability following the program ($\alpha = 0.8878$). These results suggest that the questionnaire is a reliable tool for assessing changes in pupils' attitudes toward TVET.

Table 4 Cronbach's Alpha Values

	Cronbach's Alpha, α	Number of Item, N
Pre-program	0.6988	6
Post-program	0.8878	6

b. Awareness of TVET

As shown in Table 5, the overall mean score for awareness of TVET before the program was 1.13, indicating a generally low level of awareness among participants. In contrast, the mean score after the program increased significantly to 2.66, reflecting a marked improvement and a high level of awareness.

Table 5 Mean and Standard Deviation for Awareness of TVET

Question	Before Program			After Program		
	Mean	Standard Deviation	Interpretation	Mean	Standard Deviation	Interpretation
1. I know what TVET means	1.05	0.2263	Disagree	2.68	0.4711	Agree
2. I think TVET is important for my future	1.21	0.4132	Disagree	2.63	0.5891	Agree
Awareness of TVET	1.13	0.3197	Disagree	2.66	0.5301	Agree

c. Interest in Technical Skills

As presented in Table 6, the overall mean score for interest in technical skills before the program was 1.90, suggesting a moderate to low level of interest. After participating in the program, this mean score rose significantly to 2.88, reflecting a strong interest in technical skills and hands-on learning.

Table 6 Mean and Standard Deviation for Interest in Technical Skills

Question	Before Program			After Program		
	Mean	Standard Deviation	Interpretation	Mean	Standard Deviation	Interpretation
3. I enjoy learning about hands-on skills	1.68	0.7391	Uncertain	2.89	0.3110	Agree
4. I enjoy learning through hands-on and interactive activities	2.11	0.6489	Uncertain	2.87	0.3426	Agree
Interest in Technical Skills	1.895	0.6940	Uncertain	2.88	0.3268	Agree

d. Perception of Future Career Paths in Technical Fields

As shown in Table 7, the overall mean score for participants' perception of future career paths in technical fields before the program was 1.79, reflecting a generally low level of aspiration. Following the program, the mean increased substantially to 2.83, indicating a marked improvement in the participants' understanding and interest in technical careers.

Table 7 Mean and Standard Deviation for Perception of Future Career Paths in Technical Fields

Question	Before Program			After Program		
	Mean	Standard Deviation	Interpretation	Mean	Standard Deviation	Interpretation
5. I have heard about jobs like engineer, mechanic, or 3D printer operator	1.55	0.6450	Disagree	2.87	0.3426	Agree
6. I want to learn how to use machines like a 3D printer	2.03	0.6773	Uncertain	2.79	0.5769	Agree
Perception of Future Career Paths in Technical Fields	1.79	0.6612	Uncertain	2.83	0.4598	Agree

3.2 Observation Checklist

During the program, observers assessed each pupil using a structured checklist comprising six behavioural indicators. These indicators were designed to measure student engagement, curiosity, collaboration, and overall response to the hands-on learning experience. Table 8 summarises the percentage of pupils who demonstrated each positive behaviour during the activities. The observation data supports the questionnaire findings. Most students were highly engaged, curious, and collaborative. All participants appeared to enjoy the activities as shown in Figure 2 until Figure 4, indicating that the practical nature of TVET was well-received.

Table 8 Observation during the activities

Observation Item	Yes
Showed interest during welding simulator activity	100%
Actively participated in 3D printing	84.2%
Asked questions related to TVET	65.8%
Collaborates well with peers during activities	100%
Showed positive attitude toward learning new skills	81.6%
Appeared to enjoy the program	100%

Figure 2 Pupils showing enthusiasm during an introductory session on electromagnetism

Figure 3 Student using a welding simulator during the hands-on activity

Figure 4 Students eagerly waiting to see the final products from the 3D printer

4.0 Discussion

The findings from this study suggest that even a short, hands-on exposure to TVET can significantly influence Orang Asli pupils' awareness, interest, and perception of technical education and career pathways. Before the program, most participants demonstrated low levels of awareness, with a mean score of 1.13. However, after participating in PUO MechCare's experiential activities, this mean rose dramatically to 2.66, indicating a high level of awareness. This outcome aligns with previous research (Janius et al., 2024; Ali et al., 2024), which has shown that early and interactive exposure to technical concepts helps young learners understand and appreciate the relevance of vocational education. These results resonate strongly with constructivist learning theory, which posits that knowledge is actively constructed through experience. By engaging in welding simulations and 3D printing demonstrations, students were not merely passive recipients of information but active participants in meaning-making processes.

Perceptions of future technical careers also showed significant improvement, with the mean score rising from 1.79 to 2.83. Several pupils admitted that they had never heard of professions such as engineer, mechanic, or 3D printing technician prior to participating in the program. Qualitative observations offered further insight into the underlying challenges. When asked, "Do you know what an engineer does?" a group of ten students responded, "An engineer is the one who flies the aeroplane." This response reflects a common misconception and highlights the need for age-appropriate and accurate career education. Such misunderstandings are likely the result of limited exposure to diverse occupational roles and the absence of structured career guidance within their communities.

Additionally, it was observed that some students were hesitant to ask questions directly. Instead, they preferred to seek clarification from their peers. This pattern suggests that while curiosity exists, social factors such as shyness or a lack of confidence may inhibit active participation especially in unfamiliar learning environments. These behaviours echo the findings of Faezah (2024), who emphasised the importance of building trust and adopting culturally sensitive approaches when working with Orang Asli learners.

Collectively, these results suggest that initiatives like PUO MechCare can play a meaningful role in not only raising awareness and interest but also in correcting misconceptions and fostering long-term educational engagement. For future research, it would be valuable to conduct longitudinal studies to assess whether early exposure to TVET translates into increased enrolment in vocational pathways. Moreover, incorporating culturally responsive teaching methods and establishing community-based mentorship models may further strengthen the long-term impact of such outreach efforts.

5.0 Conclusion

This study set out to explore the impact of an early exposure program PUO MechCare on Orang Asli pupils' awareness, interest, and perception of Technical and Vocational Education and Training (TVET). The results demonstrate that even a one-day, hands-on intervention can

significantly enhance pupils' understanding and enthusiasm toward technical education. Prior to the program, the pupils exhibited limited awareness of what TVET entails, showed only moderate interest in technical activities, and had a narrow understanding of potential careers in technical fields. Post-program data, however, revealed substantial improvements across all three dimensions. Quantitative findings showed marked increases in awareness (from a mean of 1.13 to 2.66), interest in technical skills (from 1.90 to 2.88), and perception of future technical careers (from 1.79 to 2.83). Observation data further confirmed high levels of engagement and positive behavioural indicators during the activities.

Moreover, the study uncovered deeper insights into the pupils' existing misconceptions and social behaviours. For instance, several students believed that engineers are people who fly airplanes, indicating a lack of exposure to accurate career information. Additionally, some students were hesitant to ask questions directly, preferring peer interaction for clarification. These findings suggest that building confidence and trust is as important as delivering technical content. Overall, the PUO MechCare initiative demonstrates promising potential as a model for bridging the TVET awareness gap among underserved and indigenous communities. By making technical education accessible, relatable, and engaging at an early stage, such programs can help realign perceptions, correct misinformation, and spark long-term interest in vocational pathways. This is in line with the goals of the 12th Malaysia Plan and Perak Sejahtera 2030, which emphasize inclusivity and equitable access to education.

Overall, the PUO MechCare initiative shows promising potential as a model for bridging the TVET awareness gap among underserved and indigenous communities. To build on these results, several recommendations emerge:

- For educators: integrate more experiential, activity-based learning and career guidance at the primary school level, ensuring materials are culturally relevant and age-appropriate.
- For policymakers: expand early TVET outreach programs in rural and indigenous areas, supported by sustained funding and collaboration between schools, polytechnics, and community leaders.
- For both stakeholders: establish mentorship models and community engagement strategies to strengthen trust, build confidence, and provide continuous exposure to diverse technical career pathways.

Future efforts should aim to expand the scope and frequency of such outreach programs, integrate culturally relevant content, and involve continuous community engagement to sustain impact and encourage participation from Orang Asli youth in the national TVET agenda.

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Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the author(s) used OpenAI's ChatGPT to assist in improving the readability and language of the text. All content generated by ChatGPT was subject to thorough review, editing, and revision by the author(s) to ensure its accuracy, completeness, and alignment with the research objectives. The author(s) take full responsibility for the integrity and content of the published work. This declaration complies with ICGESD 2025 guidelines on the use of generative AI in scientific writing.

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