JOURNAL OF TECHNICAL EDUCATION AND TRAINING
ISSN: 2229-8932 e-ISSN: 2600-7932

JTET

Vol. 17 No. 4 (2025) 178-194
https://publisher.uthm.edu.my/ojs/index.php/jtet

Exploring Domains and Elements for Students' Career Pathways in TVET Through an Asset-Based Approach

Khairol Anuar Kamri[1]*, Azman Hasan[2], Hairulnizam Mahdin[3], Yuslizar Kamaruddin[1], Amir Zal, W.A.[4]

[1] *Department of Social Science, Centre for General Studies and Co-curricular, Universiti Tun Hussein Onn Malaysia, Batu Pahat, Johor, 86400, MALAYSIA*
[2] *Department of Vocational Education, Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia, Batu Pahat, Johor, 86400, MALAYSIA*
[3] *Department of Information Security and Web Technology, Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia, Batu Pahat, Johor, 86400, MALAYSIA*
[4] *Faculty of Language Studies and Human Development, Universiti Malaysia Kelantan, Kota Bahru, Kelantan, 16100, MALAYSIA*

*Corresponding Author: khairol@uthm.edu.my
DOI: https://doi.org/10.30880/jtet.2025.17.04.014

Article Info

Received: 7th February 2025
Accepted: 23rd July 2025
Available online: 30th December 2025

Keywords

Asset-based, focus group discussion, nominal group technique, student potential, TVET career

Abstract

In the landscape of Technical and Vocational Education and Training (TVET), optimizing career development pathways for post-secondary school youth remains a critical issue. This research addresses the challenge by focusing on mapping the potential capital of youth. Youth capital mapping is an approach to systematically explore and document the realities of their potential and assets. The study employs the "Asset-Based Approach" theory, which emphasizes mapping the potential and resources possessed by youth. A combination of qualitative design through Focus Group Discussions (FGD) and semi-quantitative design using the Nominal Group Technique (NGT) was employed. A total of 10 informants from the TVET industry and field participated in both FGD and NGT sessions to achieve two primary objectives: to explore the domains and elements of the potential of post-secondary school youth for TVET career pathways, and to identify the domains and elements of their potential for TVET career pathways. The study identified two main assets influencing the potential of post-secondary school youth in building TVET career pathways: internal assets (interest, skills, values, and physical attributes) and external assets (environmental support and the workforce needs of local sectors). Special emphasis was placed on the role of digital assets, which have been underexplored in previous studies. Ownership of and proficiency in digital skills were found to be critical in enhancing youth employability and competitiveness in the era of the Fourth Industrial Revolution (IR 4.0). While other assets, such as social, economic, and physical support, are also important, digital assets require more focused attention in shaping future-ready skills and ensuring youth engagement in the rapidly growing TVET job sectors. Furthermore, a holistic approach to assessing student potential that encompassing interests, skills, and talents is needed to ensure more suitable and effective TVET career pathways.

1. Introduction

Careers in Technical and Vocational Education and Training (TVET) are increasingly recognized as crucial for meeting the dynamic workforce demands of the 21st century. TVET emphasizes the development of technical, practical, and professional skills aligned with industry needs, making it a key educational pathway that connects students directly to employment opportunities. Its role in reducing unemployment, enhancing national economic competitiveness, and fostering sustainable development has been widely acknowledged (World Economic Forum, 2022). In the context of the Fourth Industrial Revolution (IR 4.0), TVET becomes even more critical, preparing skilled labor for emerging sectors such as artificial intelligence, big data management, and green technology. Moreover, TVET contributes to social mobility by offering marginalized and low-income groups a pathway to higher-skilled and better-paying jobs, thus playing a vital role in reducing social inequality.

Internationally, countries such as Germany, Australia, and South Korea have demonstrated the effectiveness of integrating TVET into national development strategies. Germany's dual education system, which combines institutional learning with workplace training, serves as a model for enhancing youth employability and workforce readiness (Schwab, 2019). Organizations like UNESCO and the International Labour Organization (ILO) continue to emphasize the global importance of strengthening TVET systems to address automation, digitalization, and the changing nature of work. In Malaysia, TVET is identified as a key component in national policy documents such as the Malaysian Education Blueprint (2015–2025) and the Shared Prosperity Vision 2030. The government has initiated several efforts, including the expansion of polytechnics, community colleges, and skills training centers, to increase TVET participation.

However, despite its recognized importance, TVET continues to face significant challenges that hinder its growth and perception, particularly in Malaysia. One of the most persistent issues is the societal stigma that views TVET as a "second-class" educational track, often reserved for academically underperforming students (Yunos et al., 2017; Ismail & Hassan, 2019). This perception, compounded by a lack of prestige and misconceptions about lower earning potential, discourages many capable students from pursuing TVET pathways. Additionally, there is often a mismatch between the skills taught in TVET institutions and the actual needs of industry, which limits graduate employability (Ministry of Education Malaysia, 2020). Another pressing concern is the lack of effective career guidance in TVET institutions and at the school level, which limits students' awareness and informed decision-making regarding vocational careers (Zainudin et al., 2017; ILO, 2020). Most existing career counseling frameworks in Malaysian schools prioritize academic achievement and university pathways, providing limited exposure to vocational options during primary and secondary education.

While previous studies have highlighted issues such as stigma, curriculum mismatch, and lack of awareness regarding TVET (Yunos et al., 2017; Ismail & Hassan, 2019), there remains a gap in understanding how these perceptions and systemic barriers affect students' early career decision-making—particularly at the critical transition points from secondary education to post-secondary options. Existing literature has not sufficiently explored how early exposure to TVET opportunities, structured career guidance, and parental perceptions interact to influence student interest in TVET. Furthermore, there is limited empirical evidence on how Malaysian students perceive the relevance of TVET in the context of IR 4.0 and future job markets. Addressing this research gap is essential for developing more responsive education policies and strategies that can enhance the attractiveness, credibility, and impact of TVET in Malaysia.

1.1 Career Choice of Students

Career development is fundamental to the well-being of youth, providing meaning across various aspects of their lives, including psychological, social, and economic dimensions. Besides offering economic stability, careers provide identity and life satisfaction by allowing individuals to express their interests and refine their potential. Moreover, careers shape social status and help build essential networks that ensure a better quality of life (Blokker et al., 2019; Hoekestra, 2011). Thus, selecting and building an appropriate career path must be emphasized early, particularly during secondary school.

Existing career counseling services in secondary schools help students explore and understand their career tendencies and interests to align with academic qualifications. However, such counseling often focuses more on preparing students for higher education in academic pathways (Abdullah, 2019). School counselors frequently lack in-depth knowledge about TVET career pathways, and many schools fail to provide comprehensive information on technical and vocational careers (Yunos et al., 2017). Consequently, students do not receive sufficient guidance regarding alternative career paths such as TVET (Razali et al., 2019). This gap leaves students with limited interest in academic tracks unclear about their career options after completing their secondary school. The lack of information ultimately steers students toward temporary jobs in the gig economy.

Currently, many Malaysian schools use interest and tendency questionnaires to determine student streams in Form Four. However, relying solely on such methods is insufficient to guide students into suitable streams. Interests, especially in young students aged 15, can be highly variable. Moreover, questionnaires may fail to capture students' deep interests or hidden potential. Misplacement due to interest-based decisions alone can lead

to demotivation and poor performance in the future. Rahman et al. (2021) found that interest surveys alone are inadequate for educational decision-making, as students often lack exposure to diverse career options. Holland's Theory of Career Choice (1997) similarly emphasizes that interest must be combined with talent and exposure to opportunities to produce the best outcomes.

Determining student pathways, whether academic, TVET, or arts, requires a more holistic approach. This aligns with the Malaysia Education Blueprint (2013–2025), which emphasizes that educational assessments must consider multiple dimensions of student potential. The blueprint identifies four components in School-Based Assessment to ensure more comprehensive evaluations: school assessments, centralized assessments, psychometric assessments, and assessments of physical activities, sports, and co-curricular achievements (Ministry of Education Malaysia, 2013). Muhamad et al. (2022) advocate that academic evaluation alone is insufficient to identify students' potential, particularly in technical and vocational fields. UNESCO (2020) also highlights the need for education systems to integrate cognitive, affective, and psychomotor assessments to ensure equitable educational pathways. Additionally, Abdullah et al. (2023) suggest adopting more comprehensive evaluation approaches, including aptitude tests and teacher observations of student skills.

A holistic evaluation approach is needed, integrating students' interests, talents, and potential in technical and vocational fields. Interest questionnaires and academic results alone are inadequate for determining Form Four streams. Instead, a more comprehensive and evidence-based approach is required to ensure students are placed in streams that align with their true potential and interests (Rahim et al., 2023; UNESCO-UNEVOC, 2020; Abdullah et al., 2023). By adopting such a framework, schools can better prepare students for future careers that match their abilities and aspirations, ultimately fostering a skilled, motivated, and future-ready workforce.

1.2 Mapping the Potential of Youth

Mapping students' potential in the context of TVET can be approached using asset-based, deficit-based, and needs-based strategies. These approaches focus on students' strengths and potential while leveraging community resources to support their development. Broadly, the asset-based approach emphasizes students' strengths by utilizing their talents and interests to guide appropriate career pathways. This approach also considers community support involving families, schools, and industries to mentor students. Meanwhile, the needs-based approach tailors career pathways to local demands and key economic sectors.

The asset-based approach highlights individual strengths and existing community resources, leveraging skills, interests, experiences, and both internal and external assets to build educational and career pathways (Yosso, 2005). According to Ecological Systems Theory, the interaction between individuals and their environments such as families, communities, schools, and industries can shapes their potential development (Bronfenbrenner, 1979). In the context of TVET, this theory underscores the importance of family support and community opportunities in shaping career pathways. Additionally, Strength-Based Education Theory suggests that emphasizing students' strengths enhances their confidence and motivation (Lopez & Louis, 2009). Anderson (2004) found that this approach fosters more motivated and competitive students. Similarly, Holland's Career Development Theory stresses aligning career mapping with students' interests and work environments (Holland, 1959). Studies such as Rounds and Su (2014) have shown tools like Holland Codes (RIASEC) to be effective in identifying students' interests and matching them with TVET pathways. In Malaysia, programs like MyFutureJobs and TVET Profiling help map students' interests to vocational training opportunities. For instance, a rural student with agricultural experience could train in modern agricultural technology, transforming existing strengths into a career foundation.

Next is the deficit-based approach. This approach views students' weaknesses or deficiencies as the primary issues that need to be addressed. Through this approach, programs are designed to resolve problems such as a lack of basic skills, low performance, or the absence of work experience. This approach is considered effective for helping students who require additional support to meet minimum requirements. It also focuses on short-term outcomes, such as enabling students to enroll in more complex courses. For example, students who fail to meet the minimum standards in TVET entrance exams are given remedial mathematics courses before being allowed to proceed with mechanical engineering programs.

However, Freire (1970), in *Pedagogy of the Oppressed*, criticizes this approach for its tendency to perceive individuals as passive subjects reliant on external assistance. Similarly, Smith (2010) notes that deficit-based approaches often overlook critical yet invisible resources, such as intrinsic motivation or social networks. Additionally, a study by Zainudin et al. (2017) highlights that while remedial courses can enhance students' academic foundations, they may undermine their confidence if not implemented sensitively. Furthermore, this approach often fails to recognize students' hidden strengths or potential. Research by Wang and Eccles (2012) demonstrates that students labeled as "weak" are more likely to experience a loss of motivation.

Lastly, there is the needs-based approach. This approach assesses the needs of students or communities to achieve success. These needs are often externally determined by educators, industries, or policymakers. The approach aligns closely with Maslow's hierarchy of needs (1943), which emphasizes that basic needs, such as

safety and economic stability, must be met before focusing on potential development. This approach is particularly useful in the context of TVET training, as it helps align students with labor market demands (Johanson and Adams, 2004). Moreover, UNESCO-UNEVOC (2013) highlights that this approach is highly relevant in developing countries, where TVET is often used to address workforce shortages in specific sectors. However, this approach risks overlooking individual aspirations and interests. Ismail and Hassan (2019) point out that decisions stemming from this approach are often influenced by economic or political priorities rather than the actual needs of students. For instance, TVET institutions may train students in solar technology regardless of their strengths or interests, simply due to local industry demands for skilled labor in the green technology sector.

In conclusion, each of the three approaches which are asset-based, deficit-based, and needs-based has its advantages and limitations. The asset-based approach is most effective in fostering student confidence, delivering meaningful learning experiences, and aligning strengths with market needs. The deficit-based approach is beneficial in specific cases but must be applied cautiously to avoid negative labelling. The needs-based approach ensures graduates' employability but requires holistic integration with students' interests and potential. A summary comparison of these approaches is provided in Table 1.

Table 1 *Comparison based on literature*

Aspect	Asset-Based Approach	Deficit-Based Approach	Needs-Based Approach
Definition	Focuses on students' strengths and community assets	Focuses on students' weaknesses	Focuses on external needs (job market, economy)
Supporting Sources	Yosso (2005), Bronfenbrenner (1979)	Freire (1970), Smith (2010)	Maslow (1943), UNESCO (2013)
Goal	Holistic development	Bridging performance gaps	Based on external needs
Student Focus	Based on potential and interests	Based on weaknesses	Based on needs
Advantages	Enhances motivation and self-confidence	Provides support for foundational competencies	Helps students secure employment
Disadvantages	Requires in-depth analysis of strengths	May undermine students' motivation	Overlooks individual aspirations

1.3 Asset-Based Approach

The asset-based approach in mapping students' potential for TVET career pathways is one of the key approaches to ensure that students derive maximum benefit from education and training for their career paths. Asset mapping of student potential is the process of identifying the strengths, talents, interests, resources, and environments that students possess. In the context of TVET in Malaysia, this mapping is essential to ensure that students choose career paths that align with their abilities, meet industry needs, and adhere to the National TVET Policy. Asset mapping involves four processes: identifying assets, connecting assets to TVET pathways, designing TVET pathways, and, lastly, monitoring and evaluation.

The first process is identifying the student's assets. Students' assets are divided into internal and external assets. Internal assets refer to individual potential through skills, interests, aspirations, and existing experiences. This is supported by Shih et al. (2024), who found that internal assets such as skills, knowledge, experience, and interests positively impact students' competencies. Moreover, Sheppard & Benson (2024) and Dansu & Strong (2024) found that cultural aspects, values, self-identity, resilience, and personal experiences are among the internal assets that significantly contribute to students' career success. Aguirre et al. (2024) also added that students' identity, self-confidence, and ability to adapt to their surroundings are critical strategies for student development. External assets refer to the student's environment, including family and community support, school and teachers, as well as local resources such as training and job opportunities in the local area (Ocumpaugh et al., 2024). In this regard, Ocumpaugh et al. (2024) found that support assets, such as educators, researchers, and local industry services, play a significant role in developing student potential, particularly for students not interested in academic or mainstream education. Webb & Lawrence (2024) further emphasized that external assets include socio-economic factors, parental support, relationships with teachers, interactions with peers, and community support, such as from local religious institutions. Socioeconomic factors are also highlighted by Tan (2024), who found that students from low socio-economic backgrounds face greater challenges in educational achievement and future career development.

The second process is connecting assets to TVET pathways. The identified assets are linked to suitable fields within TVET. For example, if a student possesses mechanical skills, the relevant TVET field could be automotive

engineering, engineering, or construction. If the student has creativity, suitable fields would include graphic design, culinary arts, or fashion. The third process is designing the TVET career pathways. This involves goal-setting phases, including short-term and long-term goals. Short-term goals may include obtaining a Malaysian Skills Certificate (SKM), while long-term goals may involve advancing to diploma or degree levels, as well as providing apprenticeship and industrial training opportunities that allow students to work while learning, such as under the Human Resources Development Fund (HRDF) initiatives. Finally, the monitoring and evaluation process involves analyzing the student's development through a student portfolio to assess progress. Additionally, industry feedback is obtained to gather input from employers on students' job readiness. Simultaneously, graduate employability studies are conducted to determine the extent to which TVET graduates secure employment after completing training. Table 2 provides an example of asset mapping for TVET pathways in Malaysia.

Table 2 *Example of asset mapping in the malaysian context*

Asset Category	Example	TVET Pathway
Technical Skills	Skilled in motorcycle repair	Automotive (SKM Level 1-3)
Interest	Passionate about cooking	Culinary Arts
Community Resources	Family business in construction	Civil Engineering
Local Support	Training under a local GLC company	Green Technology (Solar Energy)

The asset-based approach focuses on identifying and leveraging the existing strengths, skills, and capacities of individuals and communities. Rather than seeing youth as passive recipients of help, this approach views them as capable contributors who possess unique talents and resources that can be cultivated. The asset-based approach supports the exploration of domains and elements of youth potential in TVET by encouraging participants to share their existing competencies, interests, and motivations. FGDs guided by this perspective aim to uncover positive attributes such as technical aptitudes, creativity, entrepreneurial spirit, and hands-on experience, factors that naturally align with TVET career pathways.

This approach informs the prioritization process by highlighting which strengths or talents should be further developed or emphasized within TVET programs. Through NGT, stakeholders can rank domains based on youth's actual capabilities and readiness, helping ensure that policies and interventions build upon what youth already possess. By integrating the asset-based, approaches, this study captures a holistic view of school-leaving youth's potential in TVET:

- Asset-based: What strengths and talents do youth already have?

2. Research Objective

The mapping of student potential assets for TVET career pathways in Malaysia is a strategic approach to ensure that students develop their talents in fields that are relevant to industry needs. By utilizing an asset-based approach, TVET can produce graduates who are better prepared to contribute to the nation's economic development. Therefore, this study is conducted to achieve the following objectives:

- To explore the domains and elements of potential for school-leaving youth in TVET career pathways through Focus Group Discussion (FGD) technique.
- To prioritise the domains and elements of potential for school-leaving youth in TVET career pathways through Nominal Group Technique (NGT) technique.

3. Methodology

This study employs a mixed-method approach, combining qualitative and semi-quantitative methods through Focus Group Discussion (FGD) and Nominal Group Technique (NGT). The qualitative method through FGD is used to explore the domains and elements of youth capital potential towards TVET career pathways, while the semi-quantitative method through NGT is utilized to determine the positioning of these domains and elements in relation to TVET career pathways. A total of 10 informants from both the academic and industrial sectors in Batu Pahat, Johor, Malaysia, participated in both the FGD and NGT sessions, which were conducted in November 2024 to achieve the objectives of this study. Table 3 shows the list of informants involved in this study.

Table 3 *List of informants*

Informant	Area of Expertise	Age	Experience (Years)	Institution
1	Technical and Vocational Education / Industrial TVET	51	26	Universiti Tun Hussein Onn Malaysia
2	Technical and Vocational Education / Industrial TVET	42	17	Universiti Tun Hussein Onn Malaysia
3	Engineering Technology / Industrial TVET	47	22	Kolej Kemahiran tinggi MARA, Sri Gading, Batu Pahat, Johor
4	Student Development and Secondary Education	45	20	Pejabat Pendidikan Daerah Batu Pahat, Johor
5	Education and Career Counseling	40	15	SMK Dato Sulaiman, Parit Sulong, Batu Pahat, Johor
6	Education and Career Counseling	43	18	SMK Tun Ismail, Parit Raja, Batu Pahat, Johor
7	Education and Career Counseling	35	10	Kolej Vokasional Batu Pahat
8	Vocational Education / Community TVET	40	15	GIATMARA Batu Pahat, Johor
9	Vocational Education / Community TVET	40	15	Kolej Kemahiran, Batu Pahat, Johor
10	Youth Development and industrial TVET	35	10	Unit Strategik Modal Insan Johor

3.1 Focus Group Discussion (FGD)

Focus Group Discussion (FGD) is a popular qualitative method used to gain in-depth insights into an issue through group interaction. This technique involves a small group of participants who share experiences, views, and perceptions on a particular topic, guided by a moderator (Smithson, 2018). In social research, FGD allows researchers to understand how meaning is collectively constructed and identify communication patterns between participants (Bryman, 2019). This discussion process is particularly useful in generating rich contextual data, especially when the issue being studied involves social relationships or group dynamics (Krueger & Casey, 2020).

FGD is also known for its ability to encourage participants to engage in open discussion, resulting in more in-depth information than individual interviews (Barbour, 2018). However, this method requires a skilled moderator to manage group dynamics and ensure that all participants are given the opportunity to voice their opinions (Morgan, 2019). The use of FGD as a research method is becoming increasingly relevant in contemporary studies, particularly for understanding social issues within specific contexts, such as multi-cultural or low-income communities (Vaughn et al., 2020). Therefore, FGD is an essential method that can provide a more holistic view in social research.

In the context of this study, FGD is the first session conducted to achieve the first research objective, which is to explore the domains and elements of potential post-secondary school youth for TVET career pathways. The instrument used in this FGD session is a semi-structured interview set consisting of two main questions. Semi-structured interviews are a flexible qualitative data collection method that combines guided questions with the freedom to explore issues that arise during the conversation (Adams, 2018). This method is often used to gain a deeper understanding of participants' experiences, opinions, and perspectives in a particular context (Kallio et al., 2018). The process involves using a pre-planned list of questions but does not restrict the researcher from asking additional questions to clarify or expand upon participants' responses (DeJonckheere & Vaughn, 2019). Semi-structured interviews are suitable for studies requiring rich data and flexibility to handle complex social dynamics, such as in studies of ethnic relations and community development (Major & Savin-Baden, 2020). However, it requires a high level of skill from the researcher to balance structure and flexibility and ensure trust between the researcher and participants (Jamshed, 2020). Table 4 shows two main questions in the semi-structures interview for the FGD session in this study.

Table 4 *Main questions in the semi-structured interview for the FGD session*

No.	Question
1	What internal assets do students possess for a career pathway in TVET?
2	What external assets do students possess for a career pathway in TVET?

After the FGD session, the recorded discussions were transcribed verbatim to ensure the accuracy of participants' expressions and preserve the richness of the data. The transcripts were then analyzed using thematic analysis, which is well-suited for identifying, analyzing, and reporting patterns or themes within qualitative data (Braun & Clarke, 2006). The analysis began with a phase of familiarization, during which the researcher read through the transcripts multiple times to become deeply immersed in the data. This was followed by an open coding process, where meaningful segments of text were systematically labeled to capture key ideas emerging from the discussions.

The next phase involved grouping similar codes into broader categories, which were further refined into preliminary themes. These themes were then carefully reviewed against the complete dataset to ensure they accurately reflected the participants' views and experiences. Once finalized, each theme was clearly defined and named to capture its essence, with representative quotes extracted from the transcripts to support and illustrate the findings. Throughout this process, interpretation was guided by the study's objectives and theoretical framework, ensuring the themes were contextually relevant and analytically meaningful.

To support the rigor of the analysis, NVivo software was used to organize and manage the qualitative data efficiently. This tool facilitated systematic coding and allowed the researcher to track and compare thematic patterns across participants. The outcome of this analytical process was a set of well-defined themes that provided deep insights into the internal and external assets students possess for pursuing TVET career pathways, thereby directly addressing the first research objective.

3.2 Nominal Group Technique (NGT)

The Nominal Group Technique (NGT) is a collaborative problem-solving and decision-making method that emphasizes equal participation of individuals in a group (McMillan et al., 2018). This method starts by asking each participant to generate ideas individually before sharing them with the group, which helps avoid the dominance of certain voices and ensures that all opinions are considered (Delbecq et al., 2019). The collected ideas are then discussed openly to ensure clear understanding among participants, followed by a voting or evaluation process to prioritize them (Ritchie et al., 2020). This approach is particularly suitable in situations that require systematic and inclusive decision-making, such as in social studies and community planning (van de Ven, 2019).

NGT has advantages in generating creative solutions and encouraging active participation from all group members, especially in diverse groups or when addressing complex issues (Harvey & Holmes, 2019). However, this technique requires careful planning, including ensuring the presence of a skilled facilitator to manage the process effectively and minimize potential biases (Boddy, 2020). In contemporary social research, NGT is widely used to gather data on community priorities and their perceptions of certain policies (Hughes et al., 2021). Therefore, NGT has become a significant qualitative approach for producing high-quality and inclusive decisions.

In the context of this study, NGT is the second session conducted after the FGD session to achieve the second objective, which is to determine the domain and elements of the potential of secondary school-leavers for TVET career pathways. The ideas collected during the FGD session are evaluated and voted on by the informants to determine the ranking of the domains and elements for the career pathways of secondary school-leavers in TVET. The instrument used in this NGT session is a questionnaire containing a list of domains and elements discussed during the FGD phase. The evaluation and voting process on the domains and elements are conducted using a Likert scale from 1 to 5, starting with scale 1 (Strongly Disagree), scale 2 (Disagree), scale 3 (Neutral), scale 4 (Agree), and scale 5 (Strongly Agree). The accepted and ranked domains and elements are based on the NGT acceptance range, with an agreement score of 70 percent and above (Dobbie et al., 2004).

To organize and prioritize the NGT data, each participant's responses were tabulated, and the percentage of agreement for each domain and element was calculated. The prioritization was based on the proportion of participants who selected "Agree" or "Strongly Agree" (Likert scores 4 and 5). A domain or element was considered accepted and prioritized if it reached or exceeded a 70% agreement threshold, in line with the acceptance criteria proposed by Dobbie et al. (2004). Those that met this threshold were ranked in descending order based on the highest percentage to lowest percentage of agreement, allowing the researcher to clearly identify the most strongly supported domains and elements. This prioritization process ensures transparency, replicability, and a democratic reflection of the group's collective judgment, thereby enhancing the validity of the findings.

4. Result

Objective 1: To explore the domains and elements of potential for school-leaving youth in TVET career pathways through Focus Group Discussion (FGD) technique.

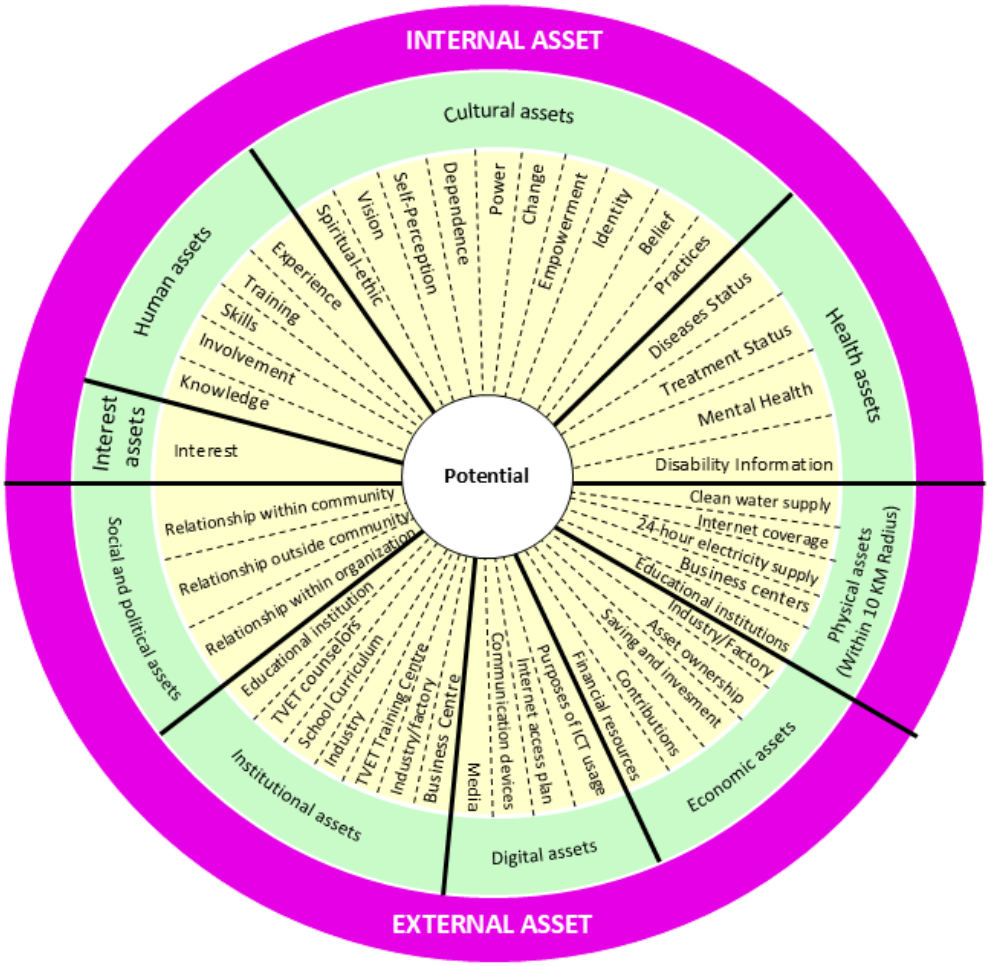

Fig. 1 *Domain and elements for the potential of school-leaving youth for TVET career pathways*

The first objective was achieved through the FGD session conducted with 10 informants. The exploration of domains and elements for the potential of school-leaving youth for TVET career pathways revealed that internal assets are divided into four sub-assets, each involving one domain for each sub-asset. The sub-assets of internal assets are interest, skills, values, and physical. The sub-asset of interest has the domain of interest assets. The domain of interest assets contains only one element, which is interest. The second sub-asset is skills, which involves the domain of human assets. Human assets contain five elements: knowledge, involvement, skills, training, and experience. The third sub-asset is values, which has the domain of cultural assets. The domain of cultural assets contains ten elements: spirituality, vision, self-perception, dependence, power, change, empowerment, identity, beliefs, and practice. The fourth sub-asset is physical, which involves health assets. Health assets contain six elements: disease status, treatment status, mental health, and disability information.

The second type of assets is external assets, which has two sub-assets: support from family, community, and industry networks, as well as labor market requirements in key local sectors. The sub-asset of support from family, community, and industry networks involves four domains: social and political assets, institutional assets, digital assets, and economic assets. Social and political assets contain three elements: individual community relationships, external individual community relationships, and community/organizational relationships. Institutional assets contain seven elements: educational institutions, TVET counselors, school curriculum, industries, TVET training centers, industrial factories, and business centers. Digital assets contain four elements: media, communication devices, internet access, and ICT usage purposes. Economic assets contain five elements: financial resources, contributions, savings and investments, asset ownership, and industrial or factory sectors. The second sub-asset is labor market requirements in key local sectors, which involves the domain of physical assets within a 10 km radius of the student's location. Physical assets contain five elements: educational institutions, business centers, 24-hour electricity supply, clean water supply, and internet network coverage. The exploration of the domains and elements for assets and sub-assets can also be observed in Figure 1.

Objective 2: To prioritise the domains and elements of potential for school-leaving youth in TVET career pathways through Nominal Group Technique (NGT) technique.

The second objective was achieved through the NGT session involving 10 informants. A domain and element determination questionnaire using a 5-point Likert scale was employed to assess the acceptance status of the domains and elements proposed by the informants during the FGD phase. Based on Table 5, all the domains and elements were accepted, with their evaluation percentages being 70 percent and above. While table 6 show the ranking element based on acceptance status of domain and element.

Table 5 *Acceptance status of domains and elements for post-secondary school youth career pathway in TVET*

Main Asset Exploration	Domain	Element	Score (N-10)	Percentage	Evaluation Status
Internal asset	Asset Interest	Interest	50	100	Accepted
	Human Asset	Knowledge	50	100	Accepted
		Experience	50	100	Accepted
		Skills	45	90	Accepted
		Training	40	80	Accepted
		Engagement	40	80	Accepted
	Cultural Asset	Spiritual-work meaning/ethics	50	100	Accepted
		Self-perception	50	100	Accepted
		Power	47	*94*	Accepted
		Empowerment	46	*92*	Accepted
		Change	43	*86*	Accepted
		Dependency	42	84	Accepted
		Identity	41	82	Accepted
		Beliefs	38	76	Accepted
		Vision-toward tvet goals	37	74	Accepted
		Practice	35	70	Accepted
	Health Asset	Disability information	50	100	Accepted
		Treatment status	39	78	Accepted
		Mental health	38	76	Accepted
		Disease status	37	74	Accepted
External asset	Social and Political Asset	Community relationships	50	100	Accepted
		External community relationship	50	100	Accepted
		Relationship in organization/institutional	45	90	Accepted
	Institutional Assets	Educational institutions	50	100	Accepted
		TVET counselors	50	100	Accepted
		School curriculum	50	100	Accepted
		Industry	50	100	Accepted
		Tvet training centers	43	86	Accepted
		Industry/factory	40	80	Accepted
		Business centers	40	80	Accepted
	Digital Assets	Media (social media, mass media, electronic media)	50	100	Accepted
		Communication devices	50	100	Accepted
		Internet access/plans	50	100	Accepted

Main Asset Exploration	Domain	Element	Score (N-10)	Percentage	Evaluation Status
		Ict usage purpose	50	100	Accepted
	Economic Assets	Financial sources	50	100	Accepted
		Contributions	46	92	Accepted
		Asset ownership	45	90	Accepted
		Savings and Investments	43	86	Accepted
		Industry/factory	38	76	Accepted
	Physical Asset (Within 10 KM Radius)	Educational institutions	50	100	Accepted
		24-hour Electricity Supply	50	100	Accepted
		Internet/wi-fi coverage	50	100	Accepted
		Business centers	40	80	Accepted
		Clean water supply	36	72	Accepted

Table 6 presents the ranking of domains and elements of internal assets that support post-secondary school youth in pursuing career pathways within the Technical and Vocational Education and Training (TVET) context. The internal assets are organized into four main domains: Interest Asset, Human Asset, Cultural Asset, and Health Asset. Each domain contains specific elements that have been systematically numbered to reflect their relevance and conceptual structure. The Interest Asset consists of a single, yet fundamental element which are the interest that serves as the driving force behind youth motivation and engagement in career exploration. The Human Asset domain encompasses five key elements: knowledge, experience, skills, training, and engagement. These components represent the individual's cognitive and practical capacities developed through education, life experience, and active participation in learning environments. The Cultural Asset domain is the most comprehensive, comprising nine elements: spiritual-work meaning or ethics, self-perception, power, empowerment, change, dependency, identity, beliefs, and vision toward TVET goals. This domain highlights the significance of internalized values, cultural identity, and future aspirations in shaping youth decisions and persistence in vocational pathways. Lastly, the Health Asset domain includes four elements: disability information, treatment status, mental health, and disease status. These health-related factors play a critical role in enabling or constraining youths' participation and continuity in TVET programmes. Altogether, this classification provides a holistic understanding of internal assets, serving as a conceptual foundation for the development of asset-based strategies to enhance youth career readiness and long-term success in TVET.

Table 6 also outlines the classification and ranking of external asset domains and elements that support the career pathways of post-secondary school youth in the context of Technical and Vocational Education and Training (TVET). The external assets are grouped into six key domains: Social and Political Asset, Institutional Asset, Digital Asset, Economic Asset, and Physical Asset (within a 10 km radius). Each domain includes several elements, numbered to indicate their position within the asset structure. The Social and Political Asset domain includes three elements that focus on the importance of individual and organizational relationships within the community. The Institutional Asset domain comprises seven elements, including the role of educational institutions, TVET counsellors, school curriculum, industry partnerships, training centres, and business hubs—highlighting the structural and programmatic supports essential to youth development. The Digital Asset domain consists of five elements, emphasizing the role of media platforms, communication devices, internet accessibility, and the purposeful use of ICT in enhancing digital readiness. The Economic Asset domain identifies five critical elements such as financial sources, contributions, asset ownership, savings and investments, and access to industry or factories—reflecting the economic environment's influence on youth career decisions. Lastly, the Physical Asset domain focuses on tangible resources located within a 10-kilometre radius, including educational institutions, 24-hour electricity supply, internet or Wi-Fi coverage, business centres, and clean water supply. Together, these external assets provide an ecosystem of support that directly and indirectly influences youths' access to opportunities, readiness for the workforce, and long-term career sustainability in TVET pathways.

J. of Technical Education and Training Vol. 17 No. 4 (2025) p. 178-194

Table 6 *Ranking of domains and elements for post-secondary school youth career pathway in TVET*

INTERNAL ASSET

Interest Asset	Human Asset	Cultural Asset	Health Asset
Interest	Knowledge Experience Skills Training Engagement	Spiritual work meaning/ethics Self-perception Power Empowerment Change Dependency Identity Beliefs Vision-toward TVET goals Practice	Disability information Treatment status Mental health Disease status

EXTERNAL ASSET

Social And Political Asset	Institutional Asset	Digital Asset	Economic Asset	Physical Asset (Within 10 Km Radius)
Community relationships	Educational institutions	Media (social media, mass media, electronic media)	Financial sources	Educational institutions
External community relationships	TVET counselors	Communication devices	Contributions	24-hour Electricity Supply
Relationship in organization/ institutional	School curriculum	Internet access/plans	Asset ownership	Internet/wi-fi coverage
	Industry	ICT usage purpose	Savings and Investments	Business centers
	Tvet training centers Industry/factory Business centers		Industry/factory	Clean water supply

5. Discussion

This study has identified and evaluated key domains and elements that shape the potential of post-secondary school youth in navigating career pathways through TVET. The findings highlight the importance of both internal and external assets, with particular emphasis on how these assets can inform and influence targeted TVET policies and interventions.

Among internal assets, the most foundational sub-asset is interest, which, although represented by a single element, received strong endorsement from respondents. High agreement on this element underscores the need for TVET policies to prioritize early and continuous interest exploration. Initiatives such as career counselling, exposure to multiple vocational fields, and interest-based assessments in secondary education could help align youth aspirations with appropriate TVET pathways. The intrinsic nature of interest as an internal motivator (Holland, 1997) suggests that TVET programs must not only be technically relevant but also resonate with youths' personal motivations to foster long-term engagement. As noted by Super (1990), identifying interests early helps in forming realistic career aspirations aligned with personal potential.

The skills sub-asset, under the human asset domain, encompasses knowledge, engagement, skills, training, and experience—elements essential to the formation of competent, work-ready individuals. These findings reinforce the importance of integrating practical experiences such as internships, apprenticeships, and project-based learning within TVET curricula. Early exposure to work environments and structured extracurricular participation can enhance key competencies linked to employability (Yorke, 2006). However, policy efforts must also consider that poorly managed training may negatively impact well-being (Maslach & Leiter, 1997), highlighting the importance of designing balanced, supportive training environments.

Values, as part of the cultural asset domain, include spirituality, vision, self-perception, dependency, power, change, empowerment, identity, beliefs, and practice. While these may appear abstract, their high acceptance suggests that values significantly influence career decisions. This implies a need for TVET policy to integrate components that foster soft skills, identity formation, and moral reasoning. Values such as empowerment and identity help build confidence (Schwartz, 1992; Razali et al., 2023), while spirituality and vision offer youth meaningful career direction. Interestingly, elements such as "dependency" and "power"—which are often perceived as sensitive or less emphasized in career literature—also received moderate to high acceptance, indicating a nuanced understanding among youth about the dynamics of agency and reliance in career progression. This unexpected outcome suggests that TVET frameworks should not overlook these dimensions, particularly in collectivist cultures where interdependence may shape decision-making.

The health asset domain, particularly regarding mental health, emerged as a critical enabler of youth participation in TVET. Physical and mental well-being affect students' capacity to engage fully in education and the workforce. The World Health Organization (2001) emphasizes that mental health is integral to achieving full individual potential—particularly relevant for youth in transitional stages. Therefore, TVET institutions should incorporate wellness programs, flexible learning structures, and counselling services to support holistic development.

On the external front, support from family, community, and industry networks plays a pivotal role. This is reflected in the high agreement for social and political, institutional, digital, and economic asset domains. For example, strong community relationships provide emotional and informational support necessary for career development (Putnam, 2000; Hamid et al., 2023). Relationships outside the immediate community expand job networks, while organizational-level ties help establish broader support ecosystems (Aziz et al., 2023). Policy should promote collaborative models where schools, families, and industries work closely to deliver mentoring, training, and job-matching services.

The institutional asset domain—which includes educational institutions, TVET counsellors, curricula, training centers, factories, and business hubs—serves as a bridge between education and employment. These institutions form the backbone of technical training (Rauner & Maclean, 2008), and policies must strengthen their capacity to deliver both theoretical and practical knowledge. Close partnerships with industries can provide youth with contextual learning and increase their employability. However, an interesting tension emerges between internal aspirations and external job market demands: while youth prioritize interests and personal values, some local labor markets may not offer opportunities that align with those aspirations. This mismatch requires TVET programs to strike a balance between nurturing individual passion and responding to regional economic needs—possibly through localized labor market analysis, career guidance, and flexible curriculum design that can adapt to evolving job trends.

Digital assets, such as access to the internet, ICT tools, and digital communication, were also highly endorsed. This finding signals a clear policy direction: to improve digital access and literacy. In today's digital economy, equitable access to online learning platforms, job portals, and communication tools is critical (van Deursen & van Dijk, 2019). Digital inclusivity initiatives must be prioritized, especially in underserved areas, to prevent the exclusion of disadvantaged youth from emerging career opportunities. It is also important to acknowledge that digital literacy skills have dual implications—while they can empower youth to access resources, communicate

effectively, and develop new competencies, they can also expose youth to misinformation, digital addiction, and online risks if not properly guided. Thus, efforts to integrate digital literacy into TVET must include not only technical training but also digital ethics, critical thinking, and responsible usage guidelines to ensure that these assets support rather than hinder youth development (UNESCO, 2020).

In the economic asset domain, financial stability—through savings, contributions, and access to industrial sectors—emerges as a key enabler. Consistent with Becker's (1993) theory of human capital, investment in education is often contingent on financial capacity. Thus, policies should explore mechanisms such as targeted subsidies, scholarships, or youth entrepreneurship funds to reduce financial barriers.

The second external sub-asset, labor market needs in local key sectors, is captured under the physical asset domain. This includes access to nearby educational institutions, business centers, electricity, water, and internet. The presence of such infrastructure within a 10 km radius can significantly impact youths' ability to participate in training and employment. As UNESCO (2020) notes, access to basic infrastructure is directly linked to better educational and employment outcomes, particularly in rural communities. Policymakers must therefore adopt a localized approach in TVET planning, ensuring infrastructure development aligns with youth needs and labor market demands.

In conclusion, this study moves beyond mere identification of domains—it reveals the interconnectedness between internal drivers and external supports in shaping youth career pathways. Strong endorsement across several domains reflects the urgency for TVET policies that are not only technically and economically responsive but also socially inclusive and youth-centered. The findings also suggest that while youth are eager to pursue careers aligned with their personal values and interests, the limited alignment with local labor market structures may pose constraints—underscoring the need for integrated planning between education providers, industries, and policymakers. Future strategies must therefore be multi-dimensional, integrating personal aspirations, community networks, infrastructure readiness, and labor market relevance to holistically support the career development of post-secondary school youth.

6. Conclusion

The study on internal and external assets for the potential of post-secondary school youth highlights the important role both asset types play in shaping career pathways. Internal assets such as interest, skills, values, and physical health contribute to developing the intrinsic capabilities of youth, enabling them to form goals, make informed decisions, and sustain motivation in their career trajectories. External assets—comprising family support, community engagement, industry networks, and alignment with local labor market needs—form a supportive ecosystem that enhances access to opportunities and resources required for career advancement.

Among these external assets, digital assets stand out as an increasingly vital, yet often underemphasized, component in youth development. Digital assets can be understood through three interconnected dimensions: access, literacy, and usage. Each of these plays a distinct role in enabling youth to fully leverage the benefits of digitalization.

Access refers to the availability of devices (e.g., computers, smartphones) and stable internet connectivity. Ownership of such tools provides a basic gateway to essential digital services, including online learning platforms, virtual career counselling, and job search engines (van Deursen & van Dijk, 2019). However, disparities in device availability and internet coverage—particularly in rural or low-income areas—continue to limit youth participation in digital learning and employment opportunities.

Digital literacy, on the other hand, refers to the ability to effectively and responsibly use digital technologies. UNESCO (2020) defines digital skills as encompassing a range of competencies—from basic functions such as browsing, typing, and accessing emails, to more advanced skills like using productivity software, evaluating online content, and collaborating in virtual environments. Without adequate digital literacy, mere access to technology does not translate into meaningful engagement or improved employability.

Usage focuses on how and for what purposes youth utilize their digital access and skills. Productive usage includes participating in MOOCs, pursuing certifications, building online portfolios, networking on professional platforms such as LinkedIn, and staying updated on labor market trends. Conversely, passive or non-constructive usage (e.g., excessive gaming, unregulated social media use) can reduce the developmental benefits of digital exposure. Thus, usage patterns must be actively shaped through guidance, curriculum integration, and positive digital role modeling.

In this regard, digital assets not only complement other internal and external assets but also serve as a cross-cutting enabler that amplifies their impact. For example, digital skills can enhance training effectiveness (skills), enable youth to access and maintain support networks (social assets), and increase awareness of education and employment opportunities (institutional and economic assets).

Given these findings, it is crucial that TVET institutions and policymakers develop strategies that address all three dimensions of digital assets. One practical approach is to institutionalize asset mapping at the school level, enabling schools to systematically assess students' access to devices and connectivity, levels of digital literacy, and

patterns of digital usage. This can be achieved through structured surveys, digital readiness diagnostics, and the use of school-level data analytics. The insights gained can then inform targeted interventions—such as providing hardware support, implementing tiered digital literacy programs, and guiding constructive usage habits.

Moreover, partnerships with tech companies and online learning providers can enrich digital training content and extend youth exposure to current digital tools and platforms. Schools can also establish dedicated digital resource centers and train educators to embed digital competencies across curricula, not just in ICT classes. By aligning asset mapping with individualized career planning and guidance, TVET institutions can ensure digital interventions are responsive, inclusive, and future-oriented. This comprehensive approach not only bridges the digital divide but also enhances the overall effectiveness of TVET in preparing youth for participation in a technology-driven global economy.

Acknowledgement

This research was supported by the Universiti Tun Hussein Onn Malaysia through Multi-Disciplinary Research Grant (MDR VOT Q750).

Conflict of Interest

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

Author Contribution

The authors confirm contribution to the paper as follows: ***study conception and design:*** *Khairol Anuar Kamri, Yuslizar Kamaruddin, Azman Hasan;* ***data collection:*** *Khairol Anuar Kamri, Yuslizar Kamaruddin;* ***analysis and interpretation of results:*** *Azman Hasan, Wan Ahmad Amir Zal Wan ismail, Hairulnizam Mahdin;* ***draft manuscript preparation:*** *Khairol Anuar Kamri, Yuslizar Kamaruddin. All authors reviewed the results and approved the final version of the manuscript*.

Reference

Abdullah, A. (2019). Kaunseling Kerjaya Di Abad Ke 21 Di Sekolah: Aplikasi Art Therapy Untuk Meneroka Minat Dan Kecenderungan Kerjaya Pelajar [Career Counseling in the 21st Century in Schools: Applying Art Therapy to Explore Students' Career Interests and Propensities]. *International Counselling Seminar*, 35-44

Abdullah, M. S. (2019). The effectiveness of career counseling in secondary schools: A Malaysian perspective. *Journal of Education and Counseling Studies, 12*(3), 45-57.

Abdullah, M. S., Hassan, R., & Yusof, N. H. (2023). Holistic assessment in determining student career pathways: A review. *International Journal of Technical Education and Training, 15*(1), 23-35. https://doi.org/xx.xxxx

Aguirre, H. C. C., Delgado, P. N., & Carrillo, L. R. G. (2024, June). Asset-Based Approaches to Transformative Learning: Community and Culture in an Undergraduate Engineering Research Program at a Hispanic Serving Institution. In *2024 ASEE Annual Conference & Exposition*.

Anderson, S. (2004). Strength-based education: A new paradigm for learning. *Journal of Educational Development, 18*(2), 85–92.

Aroff, N. (2018, Oktober 12). Lima Sebab Mengapa Belia Menganggur [Five Reasons Why Youth Are Unemployed]. *Astro Awani*. https://www.astroawani.com/berita-malaysia/5-sebab-mengapa-belia-menganggur-188084?

Aziz, M. Y. A., Hamid, A. H. A., Abdullah, M. H., Yunus, M. M., & Bukhari, N. A. M. (2023, June). Multi-group analysis by ethnicity in the governance impact toward youth ethnic tolerance behavior. In *AIP Conference Proceedings* (Vol. 2608, No. 1). AIP Publishing.

Barbour, R. (2018). *Doing focus groups*. SAGE.

Becker, G. S. (1993). *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education* (3rd ed.). University of Chicago Press.

Blokker, R., Akkermans, J., Tims, M., Jansen, P., & Khapova, S. (2019). Building a sustainable start: The role of career competencies, career success, and career shocks in young professionals' employability. *Journal of Vocational Behavior*, 112, 172-184.

Boddy, C. R. (2020). *The nominal group technique: A structured approach to brainstorming*. Journal of Qualitative Research, 21(3), 123-135.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Bryman, A. (2019). *Social research methods* (5th ed.). Oxford University Press.

Delbecq, A. L., Van de Ven, A. H., & Gustafson, D. H. (2019). *Group techniques for program planning: A guide to nominal group and Delphi processes*. Scott Foresman.

Freire, P. (1970). *Pedagogy of the oppressed*. New York: Herder and Herder.

Hamid, A. H. A., Aziz, M. Y. A., Abdullah, M. H., Yunus, M. M., & Bukhari, N. A. M. (2023, June). The bonding social capital among youth in conflict society of Pasir Gudang, Johor. In *AIP Conference Proceedings* (Vol. 2608, No. 1). AIP Publishing.

Harvey, N., & Holmes, C. A. (2019). Nominal group technique: Improving research through structured team collaboration. *Nurse Researcher, 26*(1), 15-19.

Hoekstra, H. A. (2011). A career roles model of career development. *Journal of Vocational Behavior*, 78(2), 159-173.

Holland, J. L. (1959). A theory of vocational choice. *Journal of Counseling Psychology, 6*(1), 35–45.

Holland, J. L. (1997). *Making Vocational Choices: A Theory of Vocational Personalities and Work Environments*. Psychological Assessment Resources.

Hughes, R., Schofield, L., & Collins, P. (2021). Using nominal group technique in social research: Lessons and applications. *Social Research Practice, 33*(2), 48-56.

International Labour Organization (ILO). (2020). *Skills for a greener future: A global view based on 32 country studies*. Geneva: International Labour Organization.

International Labour Organization. (2021). *Skills for a Greener Future*.

Ismail, M., & Hassan, R. (2019). Challenges in aligning TVET programs with industry needs in Malaysia. *Journal of Vocational Education and Training, 30*(2), 124–139.

Johanson, R. K., & Adams, A. V. (2004). *Skills development in sub-Saharan Africa*. Washington, DC: World Bank.

Kementerian Pendidikan Malaysia. (2013). *Pelan Pembangunan Pendidikan Malaysia 2013-2025 [Malaysian Education Development Plan 2013-2025]* . Putrajaya: Kementerian Pendidikan Malaysia.

Kori, G. (2023, Jun 8). Pastikan Lepasan SPM Bermotivasi belajar, lanjut pengajian [Ensure SPM Graduates Are Motivated to Study and Continue Their Studies]. *Berita Harian*. https://api.bharian.com.my/berita/nasional/2023/06/1111544/pastikan-lepasan-spmbermotivasi-belajar-lanjut-pengajian 7

Krueger, R. A., & Casey, M. A. (2020). *Focus groups: A practical guide for applied research* (6th ed.). SAGE.

Lopez, S. J., & Louis, M. C. (2009). The principles of strength-based education. *Journal of College and Character, 10*(4), 1–8. https://doi.org/10.xxxx

Maslach, C., & Leiter, M. P. (1997). *The Truth About Burnout: How Organizations Cause Personal Stress and What to Do About It*. Jossey-Bass.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370–396.

McMillan, S. S., King, M., & Tully, M. P. (2018). How to use the nominal group and Delphi techniques. *International Journal of Qualitative Methods, 17*(1), 1-13.

Ministry of Education Malaysia. (2020). *Annual report: Technical and Vocational Education and Training (TVET) initiatives 2020*. Putrajaya: Ministry of Education Malaysia

Morgan, D. L. (2019). *Focus groups as qualitative research*. SAGE.

Mud, N.N.N, Muhammad, M.Z, Hassan, A.A.M & Hussin, N.S.N (2023), Ekonomi Gig di Malaysia: Prospek dan Cabaran [Gig Economy in Malaysia: Prospects and Challenges], *Caknawan*, 2(1) Atas talian: https://caknawan.umk.edu.my/ekonomi-gig-di-malaysia-prospek-dancabaran#:~:text=Kira%2Dkira%202.2%20juta%20pekerja,Ekonomi%20Digital%20Malaysia%20(MDEC).

Muhamad, S., Ali, M. A., & Harun, M. H. (2022). Integrating psychometric assessment for TVET career placement: Challenges and opportunities. *Journal of Vocational Education, 19*(2), 105-120.

Ocumpaugh, J., Roscoe, R.D., Baker, R.S. *et al.* Toward Asset-based Instruction and Assessment in Artificial Intelligence in Education. *Int J Artif Intell Educ* **34**, 1559–1598 (2024). https://doi-org.ezproxy.uthm.edu.my/10.1007/s40593-023-00382-x

Omar, M. O. (2016). Perbandingan indeks kelestarian hidup dan kemudahancaman komuniti minoriti Orang Asli di Semenanjung Malaysia [Comparison of sustainability indices and amenities of Orang Asli minority communities in Peninsular Malaysia]. *Geografia*, 12(8).

Putnam, R. D. (2000). *Bowling Alone: The Collapse and Revival of American Community*. Simon & Schuster.

Rahim, A. H., Razak, M. S., & Aziz, N. (2023). Challenges in implementing holistic assessment in Malaysian schools. *Educational Measurement and Guidance, 5*(1), 32-46.

Rahman, N. A., Ismail, Z., & Yusuf, R. (2021). The limitations of interest-based questionnaires in career guidance: A qualitative study. *Asian Journal of Career Development, 7*(2), 112-128.

Rauner, F., & Maclean, R. (Eds.). (2008). *Handbook of Technical and Vocational Education and Training Research*. Springer.

Razali, M. S., Ali, S. R., & Yusof, F. (2019). Barriers to TVET career pathways among secondary school students in Malaysia. *Asia Pacific Journal of Education, 39*(3), 256-268. https://doi.org/xx.xxxx

Razali, N. A., Hamid, A. H. A., & Mejah, M. H. (2023, September). Emotional intelligence and work commitment among police officer in Malaysia. In *AIP Conference Proceedings* (Vol. 2827, No. 1). AIP Publishing.

Ritchie, J., Lewis, J., & McNaughton Nicholls, C. (2020). *Qualitative research practice: A guide for social science students and researchers*. SAGE.

Rounds, J., & Su, R. (2014). The nature and power of interests. *Current Directions in Psychological Science, 23*(2), 98–103. https://doi.org/10.xxxx

Sanusi, R.M. (2024, Januari 20). Sektor Ekonomi Gig Tidak Sesuai dijadikan Kerjaya Tetap. *Sinar Harian*. https://www.sinarharian.com.my/article/645326/berita/nasional/sektor-ekonomigig-tidak-sesuai-dijadikan-kerjaya-tetap

Schwab, K. (2019). *The Fourth Industrial Revolution*. Geneva: World Economic Forum.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology, 25*, 1–65.

Shahadan, M. A., Salleh, A., & Rahim, M. (2015). Matching TVET graduates' skills to labor market needs: A Malaysian perspective. *Journal of Technical Education, 22*(1), 45–58.

Sheppard, M., & Benson, L. (2024, June). Stories of Appalachian Engineers: A Phenomenographical Study of Appalachian Students' Quest for Success in Undergraduate Engineering Programs. In *2024 ASEE Annual Conference & Exposition*.

Shih, B. P. J., & Zappe, S. E. (2024, June). Board 121: Lessons Learned: Mapping and Mobilizing Faculty Assets for Creating Faculty-Development Programs in Engineering Ethics Education. In *2024 ASEE Annual Conference & Exposition*.

Smith, M. (2010). Strengths versus deficits: The impact of different pedagogical approaches on student outcomes. *Education Journal, 14*(3), 123–140.

Smithson, J. (2018). *Focus groups in social research*. Routledge.

Super, D. E. (1990). A life-span, life-space approach to career development. In D. Brown & L. Brooks (Eds.), *Career Choice and Development* (2nd ed., pp. 197–261). Jossey-Bass.

Tan, C.Y. Socioeconomic Status and Student Learning: Insights from an Umbrella Review. *Educ Psychol Rev* **36**, 100 (2024). https://doi-org.ezproxy.uthm.edu.my/10.1007/s10648-024-09929-3

Uchiyama, Y., Furuoka, F., Akhir, M. N. M., & MN, M. (2022). Gig Workers, Social Protection and Labour Market Inequality: Lessons from Malaysia. Jurnal Ekonomi Malaysia, 56(3), 165184.

UNESCO. (2020). *Beyond disruption: Technology and inclusive education*. Paris: UNESCO.

UNESCO. (2020). *Global Education Monitoring Report 2020: Inclusion and Education*. UNESCO Publishing.

UNESCO. (2020). *UNESCO Strategy for TVET (2020-2025)*.

UNESCO-UNEVOC. (2013). *Promoting learning for the world of work: A guide to TVET development*. Bonn: UNESCO-UNEVOC.

UNESCO-UNEVOC. (2020). *Holistic approaches to career guidance in technical and vocational education and training (TVET)*. Bonn: UNESCO-UNEVOC.

Van de Ven, A. H. (2019). Reflections on researching groups using NGT. *Organizational Research Methods, 22*(2), 245-258.

van Deursen, A. J. A. M., & van Dijk, J. A. G. M. (2019). The first-level digital divide shifts from inequalities in physical access to inequalities in material access. *New Media & Society, 21*(2), 354–375.

Vaughn, S., Schumm, J. S., & Sinagub, J. (2020). *Focus group interviews in education and psychology*. Routledge.

Wang, M. T., & Eccles, J. S. (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child Development, 83*(3), 877–895. https://doi.org/10.xxxx

Webb, B.J., Lawrence, S.C. Can We Talk for a Minute? Understanding Asset-Based Mechanisms for Academic Achievement from the Voices of High-Achieving Black Students. *Urban Rev* **56**, 566–583 (2024). https://doi-org.ezproxy.uthm.edu.my/10.1007/s11256-024-00690-z

WHO. (2001). *The World Health Report: Mental Health: New Understanding, New Hope*. World Health Organization.

World Economic Forum. (2022). *The future of jobs report 2022*. Geneva: World Economic Forum.

Yaakub, S., & Arshad, M.M (2022). Pembinaan kompetensi agropreneur muda di Malaysia [Building the competence of young agropreneurs in Malaysia]. *Asia Pacific Journal of Youth Studies* (APJYS) Vol, 1(1), 76-100.

Yorke, M. (2006). Employability in higher education: What it is - what it is not. *Higher Education Academy/ESECT*.

Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race Ethnicity and Education, 8*(1), 69–91. https://doi.org/10.xxxx

Yunos, J. M., Ismail, M., & Hassan, R. (2017). Challenges in enhancing the image of technical and vocational education and training (TVET) in Malaysia. *International Journal of Vocational Education and Training, 25*(1), 32-41.

Zainuddin, M.Z. (2024. Januari 14), Kadar Pengangguran Belia Turun, Kerja Tidak Formal Naik [Youth Unemployment Rate Drops, Informal Work Increases], *Berita Harian Online*. https://www.bharian.com.my/bisnes/lainlain/2024/01/1200114/kadar-pengangguran-belia-turun-kerja-tidak-formal-naik

Zainudin, Z., Yusof, R., & Rahman, N. (2017). Challenges and opportunities in remedial courses for TVET students. *Asian Journal of Technical Education, 12*(3), 55–67.