Vol. 6, No. 4, 2025, pp. 22-28
DOI: https://doi.org/10.29210/810606000

Contents lists available at Journal IICET

Southeast Asian Journal of technology and Science
ISSN: 2723-1151(Print) ISSN 2723-116X (Electronic)

Journal homepage: https://jurnal.iicet.org/index.php/sajts

Suitability of excellent talent for TVET majoring in engineering

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Article Info

Article history:

Received May 18th, 2025
Revised Jun 22th, 2025
Accepted Jul 27th, 2025

Keywords:

Talent
TVET
Engineering graduates
MTUN
Talents domain

ABSTRACT

This study is to identify the suitability of the excellent talent components based on the industry's needs for more multitasking engineering graduates. Today's industry needs involve a workforce that is able to equip themselves with a wider range of skills and talents, especially in the world of digitalization. With that, there are several domains that have been identified in shaping the work talents of students. Among them are 1) relational talents; 2) the talent to influence, 3) the talent for self-improvement; 4) talent for thinking, 5) talent for digitalization technology and; 6) employability talent to ensure that TVET graduates are able to work in a high-tech environment in the future. The data of this study involved 741 respondents collected through a set of questionnaires at technical universities this study focuses on the guidelines in PPPM (PT) 2015-2025 to produce multitasking TVET graduates. The study used Win steps software and Statistical Packages for the Social Sciences. The results were to determine the usability of the items in the study, the mean score and the mean measure of domain is show that all components for each domain were appropriate. Where, 42 components for 6 domains were obtained suitable. That all 6 component is for; 1) relational talents; 2) the talent to influence, 3) the talent for self-improvement; 4) talent for thinking, 5) talent for digitalization technology and; 6) employability talent are suitable. This study prepare graduates with competent work styles to contribute the production of expert manpower in technologically advanced industrial world.

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Introduction

Suitability of excellent talent based on working talent is an individual's ability that is extracted from the potential and ability of oneself who wants to achieve a certain work (King, 2019; Sanusi, 2022). The development of this working talent can be seen when a person goes through intensive training and education in the field and works optimally (Dai, 2017; Sanusi, 2022). This work talent is successfully implemented if it is continuously developed (Pistrui & Kleinke, 2019; Sanusi, 2022). This working talent is introduced to achieve the Technical Vocational Education and Training (TVET) goal of creating productive and responsible students by applying knowledge, skills, and having high competence. The application of soft skills, generic skills, and retraining are also given so that students are committed and motivated to carry out work (Siddique, Anwer, & Zubair, 2022). The needs of the active job market are looking for a new workforce that is talented in jobs and skilled, not only in high-qualification value. Graduates with low qualifications but with work talent and career skills should be given

space and opportunities to get a job to reduce the unemployment rate (Ismail et al., 2018; Pistrui & Kleinke, 2019).

Literature Review

This working talent can be developed through intensive training and education. In addition, it can be developed if students have the opportunity to study in the field chosen according to the student's interests and abilities. So this excellent talent can indirectly make students able to develop their working talent optimally and dedicatedly (Dai, 2017). Self-knowledge and skills based on learning and experience can boost the excellence of working talent through self-performance (Sanusi, 2022). The importance of talent for work is not something new but something that needs to be present in students because the talent to establish relationships, the talent to influence, the talent of self-motivation, and the talent of thinking allow students to improve the quality of self-superiority (Teng et al., 2019). The seven components of talent are communication talent, empathy talent, harmonious talent, acceptance talent, individual talent, friendly talent, and responsible talent. From all these components, it was found that the industry wants to have critical thinking talent skills, and communication talent is very necessary to build students' relationships with the surrounding environment (Li Dai, Gao & Bu, 2020).

Today's industry wants engineering students not only to master technical skills but also to master communication skills, spiritual skills, teamwork, leadership skills, lifelong learning, critical thinking and problem-solving skills, ethical and moral skills, and the ability to use technology and social skills in meeting today's global job demands (Tuccio, 2019). This is also supported by Wan et al. (2015) and Pistrui & Kleinke (2019) which state that the industry needs a workforce that is skilled and talented in work as well as academic skills and soft skills in the professional process in future work. The continuation of demand from the industry regarding working talent makes the Malaysian Education Development Plan (Higher Education) 2015-2025 very important in the plan of talent formation in graduates (KPT, 2017; Boland et al., 2020; Deloitte, 2020). Outstanding talent is an important driver of excellence for serious HEIs, and this causes students to be classified as graduates who are not qualified to work (Benade, Mentz & Reitsmaet, 2016; UNESCO, 2017). It is clear that the importance of talent, working in skills, and possessing superior characteristics must be present in every graduate student. According to King (2019), the industry now places importance on employees who can help launch the productivity and quality of the company, so the selection of employees has become more difficult and careful to only choose graduates who are excellent and skilled in academics and who have additional skills in helping students explore the real world of work in the future industry.

In terms of restructuring global excellent talent components of engineering graduates. Digitalization of talents is one of the powerful trends to make sure graduates know how to use technology (Hassan, 2020). That helps to update their work, especially in editing video, audio, images and text, by using digitalization tools. The digitalization talents are very important to support their collaborations and engagement activities to enable digitalization to solve complex networks and transform something new in flexible ways (Vatousios & Happonen, 2021). Another important talent for graduates has been talent. That is not simply about getting a job but to help graduates with multitasking skills, by increasing their understanding, skills, efficacy belief and metacognition when to adapt and manage the constantly changing work environment (Sanusi, 2022). Employment talents give a chance for graduates to explore how to generate soft skills and are integrated with curriculum, thereby grooming them to be professional workers in managing their careers (Lu, 2023).

Method

This study was a research survey conducted by the Malaysian Technical University Network (MTUN); UTeM, UTHM, UMP and UniMAP by use stratified simple random sampling. Total respondents involved in this research were 741 students in the final years of students taking the TVET program Bachelor in Engineering. This study uses a questionnaire as an instrument to measure research questions. The questionnaire is self-development after a process of consensus by experts to identify domains of excellent talents. The instruments for the questionnaire have 106 items for 6 domains. This survey used a Likert scale of five options to state the degree of agreement with each item submitted. In this study, Rasch measurement model is used for measuring the validity and reliability of a questionnaire. The questionnaire refers to book of "The exploration and development of working talent for TVET students" by UTHM publication. Winsteps software is used to check the functionality of the item (Bond and Fox, 2007). Findings of this analysis are based on Rasch measurement model, value of mean score and mean measure, to gauge the level of consensus about the appropriateness of components based on the domains identified. Figure 1 shows the formula method to get the value of the mean scale interval value performed in this study.

Data Collection Method
The data analysis is gotten from a questionnaire survey, based on the mean scale intervals value of Levin and Rubin (2000) to analysis the result of respondent agreement according to components of excellence talents for each domain. From Table 1 shows the mean scale intervals value for level agreement.

Table 1 <Mean Scale Intervals Value>

Agreement level	Mean value
High	3.67 – 5.00
Medium	2.34 – 3.66
Low	1.00 – 2.33

The mean size value is based to Bond and Fox (2007) about apply Rasch Model states that when have the positive value means; individual is able to answer the difficult item and if get the negative value means; individual is able to answer the item given and the item is easy to answer.

Result and Discussion

Firstly, overall results of the analysis for suitability to this component are based on mean score and mean measure to see the level of respondent agreement to the components of talent according of 6 domain, that consist of a few items for the components. The domain of excellence talents is based on 1) Relation; 2) Influence, 3) Self-Improvement; 4) Thinking, 5) Digital Technology and; 6) Employability.

Domain 1: Relation
The analysis result for relation talents domain of mean score value and the mean value are as shown in Table 2. From result findings, the highest value agreed is Harmony (HR) component, mean score = 4.12; mean measurement = -0.17. This shows that HR is appropriate in helping to improve students' talents to better understand the surrounding situation. Meanwhile, the lowest consent value is Know Others (ML) component, mean score = 3.97; mean measurement = 0.29. This shows that ML is somewhat less mastered by students in building compatibility with other individuals and needs to be taken more seriously. The finding for relation talents domain level of agreement was high, mean score = 4.06; mean measurement = 0.00 and that mean all component in domain is approval.

Table 2 <Result of All Component for Relational Domains>

	Relational Domains	
Components	**Mean Score (M)**	**Mean Measurement**
Communication	4.07	-0.01
Empathy	4.09	-0.07
Harmony	4.12	-0.17
Acceptance	4.08	-0.05
Know Other	3.97	0.29
Friendship	4.11	-0.14
Responsibility	4.04	0.06
Total	4.06	0.00

First domains of relation are clearly show that important in highlight superior characteristics in students to produce quality graduates and meet the market (Li *et al.,* 2020; Sanusi, 2022). In the same time establish good relationships with employers, friends and people around to perform positive identity with good manners while working.

Domain 2: Influence
The results of the analysis for the overall mean score value and the mean value of the measure for the influence talent domain are as shown in Table 3. Based on the findings, the highest value agreed by the respondents was the question item for the Develop (MB) component, namely the mean score = 4.12, the mean measurement = -0.18. This shows that MB is suitable for building the spirit of camaraderie and always developing one's potential towards success together. Meanwhile, the question item with the lowest consensus value is the question item for the fighting component (BJ) which is the mean score = 3.95 and the mean measurement = 0.34. This shows that the BJ component is somewhat less mastered by students in their desire to work hard and needs to be improved to improve their self-quality. Overall, it was found that the level of agreement was at a high level, namely the mean score = 4.06 and the mean measurement = 0.00. The overall results of the analysis show a high level of approval for the influence talent domain.

Table 3 <Result of All Component for Influence Domains>

	Influence Domains	
Components	**Mean Score (M)**	**Mean Measurement**
Leads	4.07	-0.02
Match	4.04	0.05
Develop	4.12	-0.18
Maximize	4.00	0.17
Positive	4.10	-0.14
Fighting	3.95	0.34
Total	4.06	0.00

Second domain of influence is the one of needs from industry to employee is mastery of working talent is seen as important in leading towards competent and competitive graduates. The graduate highlighted talented self-strength in performing work and this shows the student's ability to work can advance the company with productivity good work (Gallup, 2017; Teng *et al.,* 2019).

Domain 3: self-improvement

The results of the analysis of the overall mean score value and the mean value of the measure for the self - improvement Talent domain are as shown in Table 4. Based on the results, the highest value agreed by the respondents was the question item for the Achievement (PC) component, namely the mean score = 4.11, the mean measurement = -0.13. This shows that PC is a component that is suitable to be improved to help students improve their talents in their goals while working. Meanwhile, the question item with the lowest agreement value is the question item for the Self-Confidence (KD) component, which is the mean score = 4.02 and the mean measurement = 0.14. This shows that the KD component is somewhat less mastered by students which needs to be emphasized to build self-courage. Overall, it was found that the level of agreement was at a high level, namely the mean score = 4.07 and the mean measurement = 0.00. The overall results of the analysis showed a high level of approval for the self- improvement Talent domain.

Table 4 <Result of All Component Self-improvement Domain>

	Self-Improvement Domain	
Components	**Mean Score (M)**	**Mean Measurement**
Achievement	4.11	-0.13
Action	4.11	-0.11
Adapt	4.10	-0.09
Belief	4.05	0.07
Discipline	4.05	0.05
Focus	4.09	-0.07
Rehabilitation	4.06	0.04
Self-Confidence	4.02	0.14
Total	4.07	0.00

Thirdly domain of self-improvement is to arising from internal, external awareness and self-regulation, but if students lack awareness of this motivation can make students weak and lack integrity in their efforts to achieve the country's desire to make students a skilled and talented workforce in the future (Ryan & Deci, 2020; Deloitte, 2020).

Domain 4: Thinking

The results of the analysis of the overall mean score value and mean value of the measure for the Thinking Talent domain are as shown in Table 5. Based on the results, the highest value agreed by the respondents was the question item for the Alert (WS) component, which was the mean score = 4.13, the mean measurement = -0.15. This shows that WS is an appropriate component for students to be more careful with every sharing and idea expressed. Meanwhile, the question item with the lowest consensus value is the question item for the Analysis (AN) component, which is the mean score = 4.02 and the mean measurement = 0.21. This shows that the AN component is relatively less used by students who need to be careful in finding the reasons and reasons for something happening in the job. Overall, it was found that the level of agreement was at a high level, namely the mean score = 4.08 and the mean measurement = 0.00. The overall results of the analysis showed a high level of agreement on the thinking talent domain.

Fourth domain of thinking is to create intelligent thinking and through discussion groups and how to solve problems in groups to generate thoughtful thinking in solving problems in any situation. This is important to be

a good thinker by using the mind to the maximum for think actively and respond sensibly in performing work (Bandura, 2019; Zamfirov, 2019).

Table 5 <Result of All Component for Thinking Domain>

Components	Thinking Domain	
	Mean Score (M)	Mean Measurement
Analysis	4.02	0.21
Coordinator	4.06	0.09
Trustee	4.07	0.04
Inspiration	4.09	-0.04
Alert	4.13	-0.15
Gain idea	4.09	-0.01
Learn	4.11	-0.10
Strategy	4.09	-0.04
Total	4.0	0.00

Domain 5: Digitalization Technology Domain

The results of the analysis for the overall mean score value and mean value of the measure for the digital technology talent domain are as shown in Table 6. Based on the findings, the highest value agreed by the respondents was the question item for the Teamwork (KB) component, namely the mean score = 4.13, the mean measurement = -0.23. This shows that KB is suitable to be practiced in helping students get used to working in a group organization. Meanwhile, the question item with the lowest consent value is the question item for the Programmer (PC) component, which is the mean score = 3.97 and the mean measurement = 0.27. This shows that the PC component is relatively less mastered by students who need more exposure to apply it. Overall, it was found that the level of agreement was at a high level, namely the mean score = 4.06 and the mean measurement = 0.00. The overall results of the analysis show a high level of approval for the digital technology talent domain.

Table 6 <Result of All Component for Digitalization Technology Domain>

Components	Digitalization Technology Domain	
	Mean Score (M)	Mean Measurement
Teamwork	4.13	-0.23
Problem solving	4.09	-0.10
Technical	4.07	-0.03
Knowledge	4.06	-0.01
Information Technology	4.06	0.02
Profession	4.11	-0.16
Leadership	4.05	0.03
Intelligent	4.09	-0.08
Programmer	3.97	0.27
Various Fields	4.00	0.20
Total	4.06	0.00

Fifth domain is about digitalization technology, where the industrial demand need a pioneer in the abilities of various fields of work, teamwork, problem solving, knowledge, ICT, profession, intelligence, programming, leadership and professional technical staff. That because to achieve vision 2020 goals and developed countries digital revolution 4.0 (Vatousios & Happonen, 2021)

Domain 6: Employability

The results of the analysis for the overall mean score value and the mean value of the measure for the employability talent domain are as shown in Table 7. Based on the findings, the highest value agreed by the respondents was the question item for the Creative and Critical (KK) component, namely the mean score = 4.07, the mean measurement = -0.07. This shows that KK is appropriate to help students work with intellectual abilities to assess from different perspectives. Meanwhile, the question item with the lowest agreement value is the question item for the Public Speaking (PA) component, which is the mean score = 4.02 and the mean measurement = 0.10. This shows that the PA component is relatively less mastered by students who need practice and courage to do delivery. Overall, it was found that the level of agreement was at a high level, namely

the mean score = 4.05 and the mean measurement = 0.00. The overall results of the analysis show a high level of approval for the employability talent domain.

Table 7 <Result of All Component for Employability Domain>

	Employability Domain	
Components	**Mean Score (M)**	**Mean Measurement**
Skilled	4.06	-0.03
Public Speaking	4.02	0.10
Creative and Critical	4.07	-0.07
Total	4.05	0.00

The last domain is about employability to create graduates who do the work according to the given task or skillful, critical and talent creative, public speaking in the process towards a professional employee at the time front (Shikweni *et al.,* 2019).

After the overall analysis was carried out, it was found that the six talent domains mentioned were agreed by the respondents to be high to help build students' talents in meeting the needs and demands of the industry. Based on Table 8, shows the order of the overall analysis results for each domain. The talent domain that recorded the highest value was thinking talent which was a mean score = 4.08 and a mean measurement = 0.00. For the next one is the self-improvement talent domain, which is the mean score value = 4.07 and the mean measurement value = 0.00. In fact, Talent establishes relation, Influence and digital technology, the mean score value = 4.06 and the mean size value = 0.00. For the latter domain is employability talent which is the mean score value = 4.05 and the mean measurement value = 0.00. This shows that the mean score and the mean value of the measure as a whole are high agreed by the respondents.

Table 8 <Ranking of Overall Analysis Results for Talents Domain>

Talents Domain	**Mean Score**	**Mean Size**	**Agreement Level**
Relational	4.08	0.00	High
Influence	4.07	0.00	High
Self-Improvement	4.06	0.00	High
Thinking	4.06	0.00	High
Digital Technology	4.06	0.00	High
Employability	4.05	0.00	High

Conclusion

Based on the findings of this quantitative phase, it was found that 42 components for 6 domains were suitable for use in this study. Where, the analysis using Winsteps software through the Rasch approach model in answering questions related to the usability of questionnaire items to be used in the study and the suitability of the components needed for each domain that has been identified in the work talent. Overall, all components of this job talent domain recorded a high level of approval. This clearly shows that the diversity or combination of components can help produce highly talented graduates in the workplace. These findings show that respondents gave a high level of agreement on the components for each domain to help produce engineering graduates in high-quality and employable technical universities. Where, the working culture in the industry requires individuals who work competently and responsibly to plan their own work in a team to handle technology (Sanusi, 2022; Lu, 2023). This study also focuses only on the context of occupational talents that can help prepare graduates with competent work styles to contribute to the production of expert manpower in the development of the engineering profession in bringing about reforms in the technologically advanced industrial world to compete with other developed countries.

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