JTET

http://penerbit.uthm.edu.my/ojs/index.php/jtet
ISSN 2229-8932 e-ISSN 2600-7932

Journal of Technical Education and Training

The Relationship between Engineer Skill Ability towards Manufacturing Employer's Satisfaction: A Fundamental Study

Hasan Saleh[1*]

[1]Faculty of Technology Management and Technopreneurship,
Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, Durian Tunggal, Melaka, 76100, MALAYSIA

*Corresponding Author

DOI: https://doi.org/10.30880/jtet.2020.12.03.007
Received 25th February 2019; Accepted 18th April 2020; Available online 30th September 2020

Abstract: The purpose of this study is to investigate the employers' satisfaction with the skill of engineering graduates in Malaysia. This study attempt to investigate the relationship between engineering skill ability towards manufacturing employer's satisfaction. Implicitly, we do not know the most demanded and essential skill that needed toward employer satisfaction nowadays. The method used in this study is quantitative method where questionnaire forms distribute to the company representatives. This study uses 195 survey questionnaires distributed to manufacturing senior managers in Melaka, Negeri Sembilan and Pulau Pinang. Statistical Package for Social Science (SPSS) software version 22.0 has been used to extract the data needed from the survey. Findings indicate that employers are satisfied with the skill equipped with the engineering graduates and show that fundamental general skill (FGS) and engineering skills (EgS) are the most essential element to ensure employer's satisfaction followed closely by other skills. The results offer important practical implication for engineering graduates to succeed in employability. Proper skills are important in the race to gain employer's satisfaction in terms of necessary skills needed in engineering graduates. It is hoped that these data can be an essential reference for engineering graduates to prepare themselves to enter the working environment especially in this challenging economic situation.

Keywords: Graduate employability, engineering skill, graduate skill, employer satisfaction

1. Introduction

Industries today are demanding that all new workers be equipped with certain skills to be successful in their job and career (Yuzainee et al., 2012). Employers today are not only looking for good workers with basic academic skills such as reading, writing, listening, oral communication skills together with basic knowledge of science and mathematics, but they are also looking for employees who have higher order thinking ability such as creativity, learning, reasoning, problem solving and decision-making skills (Latisha & Surina, 2010). Notwithstanding, since the 1980s, employers have been seeking employees who can adapt to changes, especially in terms of service, product, a process in which they have been a meta characteristic requirement by employers (Grip, Loo & Sanders, 2004).

Recently, with the rapid growth of technology and continuous innovations, the competition for employability has become a significant challenge whereby sustaining both parties appear to be difficult, given the current scenario, without adequate and proper learning process (Rao et al. 2011). With the rapid technology evolvement, it is important to innovate and align oneself into the current situation (Saleh, 2018). For this reason, leaders in the industry and government sectors have been calling on fresh graduates to master the employability skills, especially problem solving, communication skills, decision making and teamwork (Yuzainee et al., 2012). The skill demand by manufacturing industry must be aligned with the nature of the company. Having the required skill is seen as the ticket for engineers to get promotion in their career. It has been proven in previous study that skill is important in helping people to adapt with changes and improve

*Corresponding author: hasansaleh@utem.edu.my

career opportunities in the workplaces (Satar, 2013). Employers today require accurate assessment indicator to recruit the engineers they need (Jackson, 2009).

This is very important because engineers who have different skills which are not in accordance to the demand of the industry, as well as the need in the manufacturing sector, will not be hired because of the unsuitability in the skills' requirement. The consequence of this situation is that there will be quite a few numbers of engineers who remain jobless as they cannot be hired because of the lack of skills required by the manufacturing sector. This is also due to the fact that the Employer's expectation and perception play an important role in determining which are the essential skills needed in the industry (Zaharim et al., 2009). This situation proves that the skills are considered important (Jackson, 2009) to be equipped to engineers in order for them to be hired by the employers.

In addition to the discussion above, functional skill or discipline are also considered important (Jackson, 2009) to certain manufacturing companies. Therefore, having the required skills that are accurate with the need of the manufacturing company in today's world is important to determine job opportunity for engineers. In previous research by Ramlee (1999), it was found that the industry indicated that engineering graduates in Malaysia had adequate skills, but employers were still not satisfied with the graduates' skills. In addition to that, a more recent study by Zaini (2005) found that engineering graduates largely depend on academic qualifications to get a job, but they care less about the engineering skills which are actually required by most of the employers.

Bianca and Peter (2004) defined engineering as a profession directed towards the skilled application of a distinctive body of knowledge based on mathematics, science and technology, integrated with business and management, which is acquired through education and professional formation in a particular engineering discipline. Zaharim et al. (2009) defined engineering as an area which is directed in developing, providing and maintaining infrastructure, goods and service for the industry as well as the community. Therefore, being an engineer means someone who has certain skills and knowledge to be applied and practised effectively in the workplace. Furthermore, Zaharim et al. (2010) also defined engineering employability skill as the ability to perform engineering related skill, knowledge and personal attributes to gain employment, maintain employment and succeed in the engineering field. Sheppard (2006) mentioned that engineering work is focused on resolving an undesirable condition through the application of technologies where the technologies involved may be well-established, nascent or as yet unimagined. Engineering work is about problem-solving in which its effect changes the world, for example; modifying process or procedure or introducing new products, technologies or knowledge. However, unlike the scientist, engineers' tasks are associated with being changes agents (Sheppard, 2006). Skills have been categorized under the following competencies; problem-solving, personal values, decision-making skills, relationship with others, maturity, communications skills, task-related skills, job commitment, as well as health habits and safety. Usually, students need to equip themselves with employability skills to meet the demands of various jobs upon graduation (Latisha & Surina, 2010).

From researcher's view, engineering is in-depth ability and skill in a specific engineering discipline, ability to utilize a system to design, operate with the use of technology such as computer technologies, machine, software and engineering tools. It also includes the ability to learn, gain new knowledge in the engineering field and willingness to upgrade themselves with the evolving changes in technology. This study attempts to investigate the answer to these specific research questions; the first research question is **"**What is the relationship between employer**'**s satisfaction towards engineer**'**s skills?**"**. Meanwhile, the second research question is **"**What is the relationship between engineers**'** skill and employer**'**s satisfaction?**"**. The objective of this study is to determine the skill factors that are most needed for engineering graduates**'** employability by determining employers**'** satisfaction level towards engineers**'** skills. The main objective is to determine the **E**mployer**'**s satisfaction toward engineers**'** skill and at the same time to identify the relationship between engineers**'** skill and **E**mployer**'**s satisfaction. This study aims to provide empirical data about the satisfaction among the manufacturing employers towards engineering graduates**'** employability.

2. Methodology

The unit of analysis in this study is at the individual level (senior manager of the company) and the primary data for this study are collected through the distribution of the questionnaire. Respondents' satisfaction with the variable (Fundamental General Skill, Engineering Skill, Interpersonal Skill, Behavior Skill, Adaptive Skill, and Self-emotional Intelligence Skill) becomes the basis for understanding the Employer's Satisfaction.

2.1 Population and Sampling

This study uses simple random sampling to select senior managers from manufacturing companies around Malaysia. The samples are chosen out of a total population of 2457 manufacturing companies listed in the Federation of Malaysian Manufacturers (FMM) book published in 2015. The questionnaires were distributed among senior managers, where the researcher managed to collect data from 195 respondents.

2.2 Instrument

The questionnaire is designed using a Likert-scale rating where respondents are asked how strongly they agree or disagree with the statements. The first part of the questionnaire is Section A which is the respondent's characteristics that include

sex, age, marital status, working experience and education. The second part is Section B, that includes the independent variables, which are the Fundamental General Skills, Engineering Skills, Interpersonal Skills, Behavioral Skills, and Adaptive Skills. The last part of the questionnaire is the dependent variable, which is the Employers' Satisfaction. Both Section B and C are rated using Likert-scale rating point from 1 to 5 (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree). The source of instruments a collection from the literature such as Bloom and Saeki, (2012) and some of the instrument have been adapt and adopt to suitable with this study. 80 items have been used for measurement of this study. Example of items that have been used to measure the independent variable of Fundamental General Skill a "Demonstrate high communications skills (English)". Furthermore, the reliability test for Cronbach's alpha value is more than .80; hence this variable is accepted and preferable for investigation.

2.3 Location of Research

This study was conducted in Melaka, Negeri Sembilan and Pulau Pinang. The reason for choosing employers from these three (3) states is because these states have the highest output of manufacturing product according to the Department of Statistic Malaysia (DOSM) (2015). Because of that, it becomes an ideal setting for this research. Apart from that reason, it is not practical to conduct a survey on all manufacturing companies all around Malaysia based on the time limitation. Hence there are only three (3) states chosen in this study.

2.4 Data Analysis

The Statistical Package for the Social Sciences (SPSS) Version 22 was used for statistical analyses of this study. All related categories were coded before the data were entered into the computer. Continuous variables were entered into the computer as what the respondents mentioned in the questionnaire. After that, the researcher conducted several tests to get the minimum, maximum, mean and standard deviation (SD). These tests were conducted via descriptive analysis.

3. Finding and Discussion

Multiple regression analysis in Table 1 shows that skills factors have a significant relationship with skills of graduate employability with R = 0.509. The adjusted R2 of the model was 0.235, which indicates 23.5 per cent of the variation in skills of graduate employability among manufacturing employer was explained by the graduate's skills. To determine the running factor analysis suitability, the KMO and Bartlett's test of sphericity were conducted. All the results suggest that the matrix is factorable with KMO test value of .70 and Bartlett's test of sphericity at $\chi 2$ ($df = 10$, $n = 195$) = 247.33, $p <$ .000. This study used multiple regressions analysis to predict the values of the dependent variable. These analyses to determine the strongest determinants of skills and each variable was tested to determine the extent that the skills enhance employers' satisfaction in the organization.

Table 1 - Multiple regression analysis for determining the relationships between the skills factors and the employer's satisfaction.

Variables (Skills Factors)	Regression Models (Employer satisfaction)		
	Unstandardized Coefficients	Standardized Coefficients	Sig
	B	B	
Constant	1.380		
(H1) Fundamental general skill	0.318	0.330	0.000
(H2) Engineering skill	0.278	0.286	0.000
(H3) Interpersonal skill	0.176	0.166	0.027
(H4) Behavioral skill	0.417	0.271	0.002
(H5) Adaptive skill	0.091	0.093	0.157
(H6) Self-emotional intelligence skill	0.175	0.138	0.048
R		0.509	
Adjusted R2		0.235	

Fundamental General Skill (B=0.330, p=0.000) shows a significant relationship with the Employer's satisfaction. Thus, H1 is supported. While Engineering Skill (B=0.286, p=0.000) shows a significant relationship with the Employer's satisfaction. Thus, H2 is also supported. Skill factors found two (2) positive relationships with the Employer's satisfaction, which are Fundamental General Skill (FGS) and Engineering Skill (EgS). These two skills are essential in organizations in order to achieve successful engineering practice as well as technical skills to achieve career expectations. From the

result, it also shows that manufacturing employers in Malaysia are satisfied with the FGS and the EgS of engineering graduates. Interpersonal Skill factor (B=-0.166, p=0.027), Behavioural skill (B=0.271, p=0.002) and Self-emotional Intelligence Skill (B=0.138, p=0.048) show a significant relationship with Employer's Satisfaction. So, H3, H4 and H6 are supported. While, Adaptive Skill (B=0.093, p=0.157) indicates insignificant relationship with the Employer's satisfaction. Thus, H5 is not supported.

Interpersonal Skill, Behavioural Skill and Self-emotional Intelligence Skill are significant towards Employer's Satisfaction. The results explain that graduates do not only need to acquire good academic results but at the same time, they need to have a positive attitude towards the job. Without proper skills, employers will face problems in dealing with work and the workers in the company. Table 2 shows ANOVA test to determine the relationship between the skill factors and Employer's Satisfaction where (F=10.954, p=0.000) indicates that the results of the regression model could occur by chance. However, the significance of ANOVA and p-value of coefficients must indicate $p<0.05$. Hence, the model is significant, with 0.000 significant value.

Table 2 - Anova[b] for determining the relationships between the skill factors and employer's satisfaction.

	Model	Sum of Squares	df	Mean Square	F	Sig.
1.	Regression	16.257	6	2.709	10.954	.000[a]
	Residual	46.502	188	0.247		
	Total	62.759	194			

a. Predictors: (Constant) Self-Emotional Intelligence Skill, Fundamental General Skill, Adaptive Skill, Engineering Skill, Interpersonal Skill, Behavioral Skill

b. Dependent Variable: Employer's Satisfaction

H1: There is positive significant relationship between Fundamental General Skill and Employer's Satisfaction

A positive relationship between fundamental general skill and employer satisfaction is known as H1. The results have shown that FGS (B=0.330, p=0.000) has a significant relationship with Employer's Satisfaction. In essence, this result is consistent with past studies by Sattar et. al. (2013), which proved that graduates need to be skilful in communicating with people from varieties of ethnic backgrounds. Apart from that, graduates should also place different emphasis on the different forms of communication. Employers need employees who are not only able to read and write but also able to explain complex concepts to be easily understood by all.

H2: There is positive significant relationship between Engineering Skill and Employer's Satisfaction

A positive relationship between Engineering Skill and Employer's Satisfaction is hypothesized as H2. The findings in this study showed that the relationship of EgS with Employer's Satisfaction is significant with B=0.286 and p=0.000. However, this result is inconsistent with other studies on the importance of Engineering Skill in the employment in industries such as Becker (2010) and Noailly et al. (2011) which argued that engineering careers do not seem to be attractive especially with the emergence of other disciplines which cause greater confusion and affect students' expectancy as well as their plans about engineering skills. Lindberg (2007) reported that 77% of manufacturers thought that the lack of skilled engineers is the biggest barrier to future growth.

H3: There is positive significant relationship between Interpersonal Skill and Employer's Satisfaction

A positive relationship between Interpersonal Skill and Employer's Satisfaction is suggested as H3. Based on the findings, interpersonal skill appeared as a mean of providing sufficient information with the significant value of B=0.166 and p=0.027. This result is inconsistent with Robles (2012) and Sisodia and Agarwal (2017), which indicated that the importance of interpersonal skill is not sufficient to influence Employer's satisfaction. In particular, Beenen and Pichler (2018) mentioned that an individual must possess a certain personal and interpersonal competency so they can determine and be responsive to the view of their constituents while conveying the impression that they are self-confident and sure of their own agendas to achieve reputations' effectiveness.

Sattar et al., (2013) indicated that planning and organizing skills are important to which employees need to be independent, good at time management and able to manage priorities in order to survive. Employees need to know when to work alone and when to ask for support. However, these previous researchers' results differ from other published studies such as Robles (2012). In that study, hiring applicants who have personal and interpersonal skills is found to be the key factor for an organization to gain or maintain a competitive advantage. Some other researchers noted that interpersonal skill, i.e. the attributes that characterize a person's relationship with others, are the most important skills at all levels of job.

H4: There is positive significant relationship between Behavioral Skill and Employer's Satisfaction

The positive relationship between Behavioural Skill and Employer's Satisfaction is presented as H4 where B=0.271 and p=0.002. The findings signify that behavioural skill will lead to positive Employer's satisfaction. In the case where behaviour skill is not practised among engineering graduates as part of their strategy to develop their employability skills

apart from their knowledge in engineering subjects, the employees will not meet the local requirement as much as global criteria to secure a job (Sisodia & Agarwal, 2017). These skills are very important for new engineers as well as for engineers to succeed in their profession and being promoted to higher positions in their own career path and future.

H5: There is positive significant relationship between Adaptive Skill and Employer's Satisfaction
A positive relationship between adaptive skill and Employer's satisfaction is hypothesized as H5. The result of this study indicates insignificant relationship between adaptive skill and Employer's satisfaction where B=0.093 and p=0.157. Due to that, H5 is rejected. The results are similar with other studies (Koen, Klehe & Van Vianen, 2013; Gonza'lez-Roma, Gamboa & Peiro, 2016; Ramli et al., 2010). The result explains that graduates who perceive themselves as highly efficacious have higher expectations about their jobs, so they tend to negatively assess the quality of their current jobs because these jobs do not meet their expectations.

H6: There is positive significant relationship between Self-emotional Intelligence Skill and Employer's Satisfaction.
A positive relationship between Self-emotional Intelligence Skill with Employer's Satisfaction is hypothesized as H6. The result shows the relationship with the Employer's satisfaction with B=0.138 and p=0.048. In essence, this result is consistent with past studies conducted by Slaski (2003) and Parker et al. (2008) which collectively recognized that the graduate's ability to perceive, understand and regulate their emotions, and in their ability to integrate these with their own thoughts and actions. George (2000) 's findings indicated that the ability to understand and manage emotions in self and others enhances a graduate's ability to solve problems and influence their juniors' emotions, thus enabling the graduate to grasp opportunities, address issues, introduce change and promote effectiveness in an organization. Kaufhold and Johnson (2003) indicated that the emotional intelligence skill can be developed but it needs to be built and reinforced. This attribute reflects the graduate's personality and their commitment towards employability which will assist them in building their good work history. Yilmaz (2009) also found that emotional intelligence skills is effective in increasing graduate's empathic skills.

4. Conclusion

In the first and second research questions which queried about the evaluation of manufacturing employers' satisfaction of graduates' capability in the key skill factors that emerged from this study, the results indicated that employers are satisfied with the engineering graduate's skills. In other word, employers are satisfied with the skills mentioned in this study except for adaptive skill. Descriptive statistics revealed that although skills' ability in the survey distributed to the respondents assessed high scores in all of the emerging skill factors, manufacturing employers evaluated higher scores in fundamental general skill and engineering skill. In contrast, behavioural skill and interpersonal skills followed closely. This concluded that Malaysian manufacturing employers gave higher evaluation in all employability skills gathered through the Employer's satisfaction. Most importantly, there is general agreement between graduates and employers on the importance of the specific skills used in the survey. However, there is less agreement on the possession of these skills. In general, this research confirmed that manufacturing employers assessed a wide range of skills and competencies as important to seek and retain their employees.

The main contribution of this study is validating the evaluation of Employer's satisfaction of skills from engineering graduates that influences employability skills needed by manufacturing firms in Malaysia. Subsequently, the factors that are important in graduate employability skills are identified as fundamental general skills and engineering skills. Nonetheless, this research has successfully addressed the factors leading to employability skills and Employer's satisfaction. It is imperative for Malaysian organizations, especially those in the manufacturing industry, to apprehend the importance of graduates' employability skills. This study also highlights employers' demand in technology to meet the growing need for higher-level skills in order to survive in the challenging economic as well as the industry's competitive situation.

Acknowledgement

Special thanks to all personals and individual who involves in the research especially to Universiti Teknikal Malaysia Melaka.

References

Becker, F. S. (2010). Why don't young people want to become engineers? Rational reasons for disappointing decisions, *European Journal of Engineering Education,* 35, 4. 349–366.

Beenen, G., & Pichler, S. (2018). Interpersonal Skills in MBA Admissions: How Are They Conceptualized and Assessed? *Journal of Management Education*, *42,* 1. 34–54.

Bianca, K. & Peter, F. (2004). Student Employability profiles engineering, *enhance student employability coordination Team (ESECT)*, The Higher Education Academy.

George J. M. (2000). Emotions and leadership: the role of emotional intelligence. *Human Relations,* 53, 10. 27–41.

Gonza'lez-Roma', V., Gamboa, J. P., & Peiro, M. (2016). University Graduates' Employability, Employment Status, and Job Quality, *Journal of Career Development, 45,* 2. 132–149.

Grip, A. D., Loo, J. V., & Sanders, J. (2004). The Industry Employability Index: taking account of supply and demand characteristics. *International Labor Review,* 143, 3. 211-233.

Jackson, D. (2009). An International Profile of Industry-Relevant Competencies and Skill Gaps in Modern Graduates, *International Journal of Management Education,* 8, 3. 29-58.

Kaufhold, J. A., & Johnson, L. R. (2003). The analysis of the emotional intelligence skills and potential problem areas of elementary educators. *Education*, *125*, 4. 615–626.

Koen, J., Klehe, U. C., &Van Vianen, A. E. M. (2013). Employability among the long-term unemployed: A futile quest or worth the effort? *Journal of Vocational Behavior*, 82, 37–48.

Lindberg, M. (2007). At the Frontier of Graduate Surveys: assessing participation and employability of graduates with master's degree in nine European countries, *Higher Education,* 53, 623-644.

Noailly, J., Webbink, D., & Jacobs, B. (2011). Should the government stimulate enrolment in science and engineering studies? *Applied Economics Letters*, 18, 4. 371–375.

Parker, P. A., Manager, D., Care, M., & Trust, N. H. S. (2008). Emotional intelligence and leadership skills among NHS managers: an empirical investigation. *International journal of Clinical Leadership,* 16, 3. 137 – 142.

Robles, M. M. (2012). Executive perceptions of the top 10 soft skills needed in today's work- place, *Business Communication Quarterly*, 75, 453-465.

Ramli, A., Nawawi, R., Poh, M., & Chun, P. (2010). Employees' Perception of Employability Skills Needed in Todays Workforce among Physiotherapy Graduates, *Procedia- Social and Behaviour Sciences,* 7, 455–463.

Saleh, H. (2018). Relationship of technology impact on manufacturing employees' performance: A case study at Kedah, Malaysia. *Advanced Science Letters,* 24, 7. 694-697.

Sattar, M., Amnah, R., Rauf, A., & Norhaini, A. (2013). Graduate Employability for Manufacturing Industry. *Procedia - Social and Behavioral Sciences*, *102,* 242–250.

Sheppard, S., Colby, A., Macatangay, K., & Sullivan, W. (2006). What is Engineering Practice? *International Journal Engineering Education*, 22, 3. 429-438.

Sisodia, S., & Agarwal, N. (2017). Employability Skills Essential for Healthcare Industry, *Procedia- Computer Science,* 122, 431-438.

Slaski, M., & Cartwright, S. (2003). Emotional intelligence training and its implications for stress, health and performance. *Stress and Health*, 19, 4. 223-239.

Ramlee, M. (1999). The role of vocational and technical education in the industrialization of Malaysia as perceived by educator and Employer. PhD Thesis, University Purdue, Indiana.

Rao, A. A., Shah, S. S. H., Aziz, J., Jaffari, A. R., Ul-Haq, W. E. I., & Raza, S. N. (2011). Employability in MNCs: Challenge for Graduates. *Interdisciplinary Journal of Contemporary Research in Business,* 3, 4. 189-200.

Yilmaz, M. (2009). The effects of an emotional intelligence skills training program on the consistent anger levels of Turkish university students, *Social Behaviour and Personality*, *37*, 4. 565–576.

Yuzainee, M. D, Mohd Zaidi Omar, M. Z., Zaharim, A., Mohamed, A., & Muhamad, N. (2012). Employability Skills Performance Score for Fresh Engineering Graduates in Malaysian Country. *Asian Social Science,* 8, 16. 140-145.

Zaharim, A., Yuzainee, M. Y., Omar, M. Z., Mohamed, A., Muhamad, N. & Mustapha, R. (2009). Employers' perception towards engineering employability skills in Asia, *WSEAS transaction on advances in engineering education,* 9, 6. 306-215.

Zaharim, A. et al (2010). Practical framework of Employability Skills for Engineering Graduate in Malaysia. *IEEE EDUCON Education Engineering 2010 – The Future of Global Learning Engineering Education, (*921-927). Madrid, SPAIN: IEEE.

Zaini, A. (2005). Students and Employer as customers of multimedia college. Proceeding of National seminar "the development of technology and Technical-Vocational Education and Training in Era of Globalization: Trends and issues". Kuala Lumpur.