
Employability Skills of Mechanical Engineering Graduates in the Era of Industrial Revolution 4.0

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Abstract

The Industrial Revolution 4.0 has transformed the ecosystem of life, where the rapid development of technology has impacted job opportunities, with the mechanical industry being no exception. This is a result of the skills that recent graduates possess not matching the skills that the industry currently requires. In order to ensure that the skills of their job candidates match, employers should prioritise employability skills as a crucial factor. Therefore, the purpose of this study is to determine the level of technical and generic skills that employers in the mechanical industry prioritise. The research employs a quantitative approach using questionnaires. The questionnaire consists of 46 items; each needs to be rated on a 5-point Likert scale. A total of 87 participants from the mechanical industry sector around Johor Bahru were involved in this study. The data collected are analyzed using the Statistical Package for The Social Science (SPSS) software to obtain frequency, percent, mean and standard deviation. The results of the study revealed that system and technology skills, with a mean value of 4.73, are the most sought-after skills by employers in the mechanical industry. Personal quality follows the second-highest skill with a mean score of 4.70. With a mean value of 4.63, information skills are the third highest level of skills, while tool and machine handling, basic, thinking, resource, and interpersonal skills are at the lowest level and have mean values between 4.50 and 4.60. Overall, the technical skills and generic skills of employees at the service centres around Johor Bahru are at a high level

Keywords : Mechanical industry, employability skills, technical skills, generic skills

I. INTRODUCTION

In this era of Industrial Revolution 4.0, the growing industrial sector requires skilled manpower who are skilled in the fields they are involved in. The industry prioritises hiring people with employability skills [1]. The previous findings support the notion that in the recruitment of skilled workers, the industry places a

high priority on graduates' skills and abilities [2]. According to Sarabatin, most industries prioritize graduates from technical and vocational education to be employed [3]. Therefore, it is evident that the industry chooses candidates for employment based on graduates' employability skills that are in line with the requirements of their industry. Employability skills are always emphasized by the industry as they

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can increase one's job productivity [2]. Thus, graduates need to master the elements of employability skills in order to improve the quality of their work. The element of employability skills is not only seen in terms of talent and techniques but also in relation to the ability of graduates to carry out the tasks given by the employer. Academic excellence is no longer the primary factor in hiring decisions; instead, marketability skills, such as technical and generic skills, are assessed [4]. This is supported by the Dzia-Uddin study which stated that generic skills and technical skills should be present in every graduate who is going to venture into employment [5]. The society often assumes that university graduates do not possess soft skills, and this leads to the failure of the graduates to secure jobs after their graduation [6]. Therefore, graduates must qualify themselves with employability skills that include technical skills and generic skills before going into the workforce.

The specific objectives of this study are as follows:

- i. To determine which technical skills are most important to employers in the automotive industry.
 - a) Tool and machine handling skills.
 - b) System and technology skills.
- ii. To identify generic skills that are the priority of employers in the automotive field
 - a) Basic skills.
 - b) Thinking skills.
 - c) Resource skills.
 - d) Information skills.
 - e) Interpersonal skills.
 - f) Personal Quality Skills

II. METHODS

This study employs a quantitative research design. Questionnaire survey is the instrument used to obtain necessary data from the respondents. The verified questionnaires were distributed to a total of 87 respondents. The sample was made up of mechanical industry sector job opportunities providers around Johor Bahru.

In this study, the overall Cronbach's alpha value was 0.95. Each item needs to be rated on a 5-point Likert scale; Strongly Agree (5), Agree (4), Uncertain (3), Disagree (2) And Strongly Disagree (1). The level is calculated using the mean, where the low level is between 1.00 and 2.33, the medium level is between 2.34 and 3.66, and the high level is between 3.67 and 5.00.

III. RESULT AND DISCUSSION

Findings on Technical Skills that are Prioritised by Industry 4.0 in the Mechanical Industry

Table 1 : Technical Skills that are Prioritised by Industry 4.0 in the Mechanical Industries in Johor Bahru area.

Skills	Mean	Standard Deviation
Tool and Machine Handling	4.58	0.55
System and Technology	4.73	0.45
Overall	4.65	0.50

Based on Table 1, system and technology skills obtained a mean score of 4.73, while tool and machine handling skills obtained a mean score of 4.58. Thus, this indicates that that employers prioritise system and technology skills over other technical skills. The mechanical industry in the Johor Bahru region has high-level technical skills overall, with a mean score of 4.65.

Findings on Generic Skills that are Prioritised by Industry 4.0 in the Mechanical Industry

Table 2 : Generic Skills that are Prioritised by Industry 4.0 in the Mechanical Industries in Johor Bahru area

Skills	Mean	Standard Deviation
Basic	4.55	0.56
Thinking	4.59	0.61
Resource	4.58	0.57
Information	4.63	0.54
Interpersonal	4.61	0.56
Personal Quality	4.70	0.47
Overall	4.61	0.55

According to Table 2, the personal quality of generic skills receives the highest mean value of 4.70, while the basic skill receives the lowest mean score of 4.55. All of these skills' average values, though, are at a high level. A high mean value of 4.61 is recorded for the mechanical industry's overall mean of generic skills in the Johor Bahru area.

Findings on the Aspects of Technical Skills that are Prioritised by Industry 4.0 In the Mechanical Field

Table 3 : Aspects of Technical Skills that are Prioritised by Industry 4.0 In the Mechanical Industries in Johor Bahru.

Skills	Skills Aspects	Mean
Tool and Machine Handling	Handling Installation Tools	4.67
	Handling Welding Technology	4.63
	Handling Tools	4.64
	Handling Logistic System	
	Basic Skill in Machine Operation	4.40
	High Skill in Machine Operation	4.66
	Basic Skill in Computer Operation	4.52
	High Skill in Computer Operation	4.66
	Computer Operation	4.49
System and Technology	Understanding System	
	Monitoring System	4.78
	System repair	4.74
	Selecting technology	4.74
	Applying the use of technology	4.69
	Solving tool malfunctions	4.76

Overall, the mean value of each item is at a high level. The skills of tools and machine handling and system and technology are seen as skills that are prioritised by employers in hiring employees in the mechanical field. The items in the technical skills that employers prefer by rating are (1) understanding the system, (2) applying the use of technology, (3) monitoring and repairing the system, (4) solving tool malfunctions, (5) selecting technology and (6) handling of installation tools.

Findings on the Aspects of Generic Skills that are Prioritised by Industry 4.0 In the Mechanical Field

Table 4 : Aspects of Generic Skills that are Prioritised by Industry 4.0 In the Mechanical Industries in Johor Bahru.

Skills	Skills Aspects	Mean
Basic	Reading	4.54
	Writing	4.54
	Mathematics	4.48
	Listening	4.59
	Speaking	4.59
Thinking	Creative	4.68
	Innovative	4.69
	Decision Making	4.59
	Problem Solving	4.57
	Observe	4.41
Resource	Time Management	4.68
	Financial Management	4.36
	Managing Mterials	4.70
	Facilities Management	4.68
	Resource Management	4.43
Information	Risk Management	4.61
	Obtain Information	4.63
	Evaluate Information	4.63
	Organise Information	4.67
	Preserve Information	4.68
Interpersonal	Translate Information	4.62
	Disseminate Information	4.51
	Processing Information	4.67
	Teaching Colleagues	4.60
	Customer Service	4.66
Personal Quality	Leadership Quality	4.60
	Negotiation	4.61
	Work with different culture	4.59
	Responsible	4.76
	Self-Esteem	4.71
	Social Abilities	4.56
	Self-management	4.68
	Integrity	4.80

Overall, the mean value of each item is at a high level. Basic skills, thinking, resources, information, interpersonal and personal qualities are seen as skills that are the priority of employers in hiring in the mechanical field. The items in the generic skills that employers prefer by rating are; (1) integrity, (2) responsible, (3) self-esteem, (4) managing materials and (5) innovative.

The findings of the study in terms of tools and machine handling are in line with the results of the study conducted by Azmanirah [7]. According to their research, the skill level of tool and machine handling is also at a high level because a worker's ability to handle operations in the industry depends

on having these skills. The tools and machines handling skills among employees can ease and smoothen the operation in the industry. According to them, the tool and machine handling skills is crucial as this skill is particularly important in the industrial sector. This is supported by a study by Fasihah [8], where tools and machine handling skills can also avoid the frequency of damage to tools and machines. She added that mastery in the handling skills of tools and machines is needed to prevent injury to workers. This demonstrates how being skilled at using tools and machinery is beneficial for both the industry and one's own personal safety.

The results of the study for system and technology skills are in line with the results of the study conducted by Sattar [9]. Based on their studies, system and technology skills are at a high level. They claim that this is because having the ability to use systems and technologies can raise the value of one's employees in the eyes of the industry. This is said to be because, expertise in the use of systems and technology can make a job run smoothly and easily. This is supported by [10]. in their study which asserts that system and technology skills are crucial for graduates who want to venture into the industry today to obtain a job with difficult and competitive conditions in this era of the Industrial Revolution 4.0.

The results of the study for basic skills are in line with the results of studies conducted by Sattar [9]. Based on their study, basic skills are at a high level. This is because, they claimed that basic skills are the most important skills considered when looking for potential employees. This is because, basic skills include skills in reading, writing, mathematics, listening and speaking. This is said to be important as it can make it easier for employees to receive instructions or give instructions as they can read, listen and speak well. Good basic skills can prevent mistakes when receiving instructions and giving instructions [11].

The findings of the study for thinking skills are in line with the results of the study conducted by Rasul [9]. They posited that thinking skills are an important set of skills and are at a high level. This is because employees equipped with thinking skills can create jobs in a creative and innovative way and be able to solve problems. This is corroborated by Rahman [7], which claims that thinking abilities are crucial for competing globally. This demonstrates the significance of thinking abilities in a job candidate to meet the requirements of the employability skills for the mechanical engineering industry.

Furthermore, the findings of the study for resource skills are similar to the results of studies conducted by Rasul et. al., [9]. Based on their study, resource skills are at a high level. In their research, they stated that resource skills are one of the important skills as the ability of prospective employees to manage materials and facilities can enhance the value of quality in them. This is supported by Yahya Buntat [12] in his study where he claimed that resource skills are a key aspect of self-skilling required by the industry.

However, the results of the study for information skills differed from the results of study conducted by Rasul et. al., [9]. According to their research, information skills are at a moderate level where in his research, he mentioned that information skills are a moderately important skill in the employment sector. Moreover, in their studies, the assessment of information is at a high level but the use of computers to process information is at a moderate level and considered unimportant. Nevertheless, the results of this study are in line with the results of Yahya et. al.,[13]. Based on their research, information skills are at a high level where they mentioned that in the era of Industrial Revolution 4.0, all information can be obtained at the fingertips, hence, it requires job candidates who are able to obtain diverse information with high information literacy.

Nevertheless, the findings of the study for interpersonal skills are not in line with the results of the study conducted by Norazean and Hasmaini [14]. In their study, interpersonal skills were found to be at a moderately high level. According to them, the presence of good interpersonal skills in a person can result in an excellent achievement. However, the results of this study were found to be in line with the results of a study conducted by Norlela and Suraini [14] where interpersonal skills are at a high level, above the mean value of 4.0. They claimed that having a strong grasp of interpersonal abilities is essential in the field and can enhance one's quality. This is supported by a study by Milner and Hill [15], which found that the presence of sensitivity in potential employees suggests that they have good interpersonal skills.

In addition, the findings of the study for personal quality items are in line with the results of studies conducted by Rasul [9]. Based on the results of their studies, personal qualities are at a high level. This is due to the fact that a prospective employee's personal qualities are one of the most crucial things for the industry to consider when making a hiring decision. They continued by claiming that employers of all sizes of companies in the industry place a high value on personal qualities. Hence, to

be competitive when applying for jobs, it is vital that all individuals put emphasis on their personal qualities and skills.

IV. CONCLUSION

In conclusion, the findings of the study revealed that the mechanical industry places a high value on both technical and generic skills, which are rated the highest. Consequently, it conveys the idea that these abilities are crucial and should be present in every mechanical engineering graduate who intends to work in the automotive sector. This will help to ensure that their skills align with the demands of the sector and lower the unemployment rate.

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