

## **Employers' perceptions of important employability skills required from Malaysian engineering and information and communication technology (ICT) graduates**

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**ABSTRACT:** This article presents the findings of a survey of 299 Malaysian employers from diverse types of agencies and organisations, which employ engineering and ICT graduates. The objective of the survey was to explore the employers' perceptions of the five most important employability skills they require graduates to possess for them to be considered as employable in the job market. A 13 item scale of *engineering employability skills* adopted from the Engineering Accreditation Council (EAC) manual and the Malaysian Future of Engineering Education Report 2007 was utilised as the instrument to examine the employers' perceptions. The findings revealed that problem-solving, tool handling competency, presentation skills and team working skills feature highly amongst the employers as important skills demanded from the students. Students are also required to be competent in their use of techniques, skills and modern tools in their area of expertise, as well as having the drive to acquire and apply knowledge in these areas. These findings are useful for improving Malaysian universities' understanding of the employability skills perceived as being the most important and allowing them to better equip their graduates according to industry requirements.

**Keywords:** Employers' perception, employability skills, engineering, information and communication technology (ICT), graduates

### **INTRODUCTION**

The shifting demand for skills has necessitated the availability of highly-skilled labour [1]. This is due to the dual challenges of competing in a world market and rapid technological advancements, which necessitate a redesign of the workplace and requires a behaviour and orientation toward work that go beyond step-by-step task performance [2]. Therefore, in this challenging environment, the role of higher education institutions is not only to produce graduates with specific areas of specialisation, but more importantly, to develop graduate employability skills that match the demands required by industry [3][4]. As such, universities are under intense pressure from their stakeholders, especially industry, to equip graduates with more than just academic skills [5]. The failure of universities to deal with this issue could create an unnecessary negative perception, which could lead industries becoming more selective in recruiting capable and competent graduates to work for them.

Whilst the majority of the employers in Malaysia are said to be satisfied with the knowledge and skills of the graduates that they employ [6], it is interesting to note that the Malaysia Economy in Brief 2013 Report [7] reported an increase of 0.1% in the unemployment rate in 2013 as compared with 2012. The report indicated that the number of unemployed persons, including university graduates, in Malaysia rose from 386,000 in 2012 to 426,000 in 2013. An arising concern is that these graduates do not possess the skills required by industry [4]. On the one hand, they are said to be well equipped with relevant technical skills while, on the other hand, they are deemed to lack important soft skills like communication, language, leadership, critical and creative thinking skills [8].

As a result, they struggle to find employment after graduating. This issue has been investigated by researchers in many countries, in which this phenomenon was attributed to the ineffectiveness of the current educational system to equip the graduates with relevant employability skills [8-11]. These findings may reflect negatively on how employers perceive local graduates, including graduates in engineering and ICT, and whether these graduates will be employed by them.

As such, this study is crucial in examining employers' perceptions of the important employability skills required when recruiting new graduates, especially in the Malaysian context. The study will also investigate the employers' perceptions of how they rank these employability skills according to importance, based on their types of organisation, e.g. government-linked companies (GLCs), multinational companies (MNCs), government agencies, and small and medium enterprises (SMEs). The findings of this study could assist local graduates, especially those in engineering and

information and technology (ICT), in knowing and understanding what employers required of them with regard to important employability skills.

## LITERATURE REVIEW

One of the most discussed topics concerning today's workforce is employability skills. There are various definitions of employability skills as defined by the scholars, such as the basic skills necessary for getting, keeping and doing well in a job, and which cut horizontally across all industries and vertically across all jobs [4][12]. It is also defined as skills required not only to gain employment, but also to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise strategic directions [13]. This is due to the rapid changes taking place in the economy, which create pressures on employers to identify and recruit graduates who possess critical employability skills relevant to current demands. As such, higher education needs to prepare future engineering and IT graduates with the skills and knowhow they will need to manage rapid change, uncertainty and complexity [14][15]. This is because *employability* skills are not limited to technical skills, but also include non-technical ability and occupational skills [16].

Employability skills focus on graduates' abilities to adapt and use their personal and academic skills to create more tangible educational outcomes that associate graduate employability with employment. It also refers the readiness of new graduates to contribute to their organisations in terms of skills, knowledge and attitude, as well as pragmatic industry understanding [5]. Subsequently, it also relates to the ability of the graduates to be competent in soft skills [17], which could contribute to the graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy [18]. Not only that, the graduates are also required to be adaptable and flexible where they can easily learn, relearn and unlearn current and new knowledge to be able to make changes as required by the economic and technological environment at the time [8]. Thus, the concept of employability can be observed in situations where new graduates are able to make themselves valuable to the organisations by possessing skills, knowledge and attitude relevant to the requirement of the organisations.

According to Mustapha, employers in industry said that technical graduates in Malaysia have adequate technical skills, but they are still not satisfied with the communication and interpersonal skills, critical thinking, problem-solving and entrepreneurial skills possessed by those graduates [19]. A range of empirical evidence exists indicating that employers are more inclined to hire graduates that possess both non-generic and technical skills. For example, Hagan when surveying 490 ICT firms in Australia found that 40% of these firms were not satisfied with the new graduates' business management skills and communication skills [20]. It was also reported that Japanese engineering graduates lack the initiative and problem-solving skills needed by the employers [21]. Similarly, Md Saad reported that whilst technical skills featured highly in the employability skills required from local engineering and ICT graduates, soft skills such problem-solving skills, communication skills, team working and leadership are also required from these graduates [8]. Therefore, it is interesting to note that this study provided an interesting avenue to gauge and understand the perception of employers towards Malaysian graduates' employability skills, specifically looking at engineering and ICT graduates.

## RESEARCH METHODOLOGY

### Sample of Population

The study identified and selected organisations that employ engineering and ICT graduates using a database provided by UTeM's Industry and Community Network Centre (ICNeT). Five hundred organisations were identified, consisting of government agencies, government-linked companies (GLCs), multinational companies (MNCs) and small and medium enterprises (SMEs). These organisations were also identified as organisations that accept universities' engineering and ICT student interns undergoing industrial training within their organisations. This was purposely done to ensure that the organisations are well equipped to provide an accurate assessment of the employability skills needed to be possessed by engineering and ICT graduates.

### Research Instrument

The study adopted a questionnaire of 13 items related to the employability skills of engineering graduates derived from the EAC manual and the Future of Engineering Education Report 2007, and acted as the core competency measured in this study. The questionnaire consisted of three parts, with the first part asking about the profile of the each employer's organisation. The second part asked the employers to rate on the scale of 1 to 5 employability skills they rate as important to be possessed by technical students, as well as their potential employees. Amongst the skills being assessed were combination of hard and soft skills like engineering and ICT skills, presentation skills, as well as other related skills. Finally, the third part asked the employers to reflect on their level of satisfaction with the level of employability skills possessed by UTeM's students.

### Research Procedure

The questionnaire was developed from a pilot study involving a few employers to elicit important and useful feedback regarding the items in the questionnaire in terms of its clarity and suitability. Once their feedback had been incorporated

in the refined questionnaire, the researchers, then, proceeded with the actual data gathering. Questionnaires were sent through UTeM's ICNeT who acted as the liaising office with the faculties' industrial training coordinator. A total of 299 organisations responded to the questionnaire and the results of the findings are discussed in the next section.

## FINDINGS

### Organisation's Profile

A total of 299 organisations responded to the questionnaire. They consist of 34 government agencies, 84 GLCs, 108 MNCs and 73 SMEs. The organisations can be grouped into two main areas of industries; engineering and non-engineering. The engineering industry consists of 107 organisations from manufacturing sectors, 64 from other engineering sectors, 55 from electronic and telecommunication sectors, 10 from automotive sectors and 9 from oil and gas sectors. The non-engineering industry consists of 34 organisations from the ICT sectors, 29 from service sectors and 52 from other sectors. In terms of the number of employees, 126 of these organisations employed more than 1,000 employees and the rest of the 239 organisations have fewer than 1,000 employees. Two hundred and thirty-nine organisations indicated that they have operations outside Malaysia, outnumbering the 159 organisations that only have local operations.

### Employers' Perception on the Five Most Important Employability Skills

This section discusses descriptive findings of the five most important employability skills as perceived by the different types of organisations. These findings are organised according to the types of agencies or organisations, and the rank of importance as indicated by those organisations.

Table 1 shows the five most important employability skills as perceived by GLCs. They indicated that the ability of the graduates to undertake problem identification, apply problem-solving, formulations and solutions ( $M = 4.33$ ,  $SD = 0.80$ ) as the most important employability skill, followed by the ability to use techniques, skills and modern engineering/ICT tools ( $M = 4.20$ ,  $SD = 0.80$ ). Next is the ability to present ideas with confidence and effectiveness ( $M = 4.18$ ,  $SD = 0.84$ ) and the ability to function effectively as an individual and in a group ( $M = 4.15$ ,  $SD = 0.770$ ), and the ability to acquire and apply knowledge of engineering/ICT fundamentals ( $M = 4.14$ ,  $SD = 0.78$ ), and so on. Finally, they require the graduates to have the ability to acquire and apply knowledge of engineering/ICT fundamentals ( $M = 4.06$ ,  $SD = 0.86$ ).

Table 1: GLCs' perception on the five most important employability skills.

Rank	Employability skills	Mean (M)	Standard deviation (SD)
1	The ability to undertake problem identification, apply problem-solving, formulations and solutions	4.35	0.80
2	The ability to use techniques, skills and modern engineering/ICT tools	4.20	0.80
3	The ability to present ideas with confidence and effectiveness	4.18	0.84
4	The ability to function effectively as an individual and in a group	4.14	0.78
5	The ability to acquire and apply knowledge of engineering/ICT fundamentals	4.06	0.86

Next, Table 2 describes the perception of MNCs of the five most important skills that they require from engineering and ICT graduates for these graduates to be considered as employable. The most important of the employability skills according to the MNCs is the ability to undertake problem identification, apply problem-solving, formulations and solutions ( $M = 4.36$ ,  $SD = 0.72$ ) followed by the ability to use techniques, skills and modern engineering/ICT tools ( $M = 4.29$ ,  $SD = 0.76$ ), the ability to present ideas with confidence and effectiveness ( $M = 4.28$ ,  $SD = 0.80$ ), the ability to continue learning independently in the acquisition of new knowledge, skills and technologies ( $M = 4.17$ ,  $SD = 0.68$ ), and the ability to function effectively as an individual and in a group ( $M = 4.09$ ,  $SD = 0.82$ ).

Table 2: MNCs' perception on the five most important of employability skills.

Rank	Employability skills	Mean (M)	Standard deviation (SD)
1	The ability to undertake problem identification, apply problem-solving, formulations and solutions	4.36	0.72
2	The ability to use techniques, skills and modern engineering/ICT tools	4.29	0.76
3	The ability to present ideas with confidence and effectiveness	4.28	0.80
4	The ability to continue learning independently in the acquisition of new knowledge, skills, and technologies	4.17	0.68
5	The ability to function effectively as an individual and in a group	4.09	0.82

Subsequently, Table 3 shows the perception of government agencies as to what they consider as the five most important employability skills required from graduates. The respondents from these agencies replied that they consider the graduates' ability to present ideas with confidence and effectiveness ( $M = 4.38$ ,  $SD = 0.70$ ) as the most important skills followed by the ability to acquire and apply knowledge of engineering/ICT fundamentals ( $M = 4.35$ ,  $SD = 0.65$ ), the ability to use techniques, skills and modern engineering/ICT tools ( $M = 4.35$ ,  $SD = 0.70$ ), the ability to continue learning independently in the acquisition of new knowledge, skills and technologies ( $M = 4.26$ ,  $SD = 0.75$ ), and the ability to undertake problem identification, apply problem-solving, formulations and solutions ( $M = 4.26$ ,  $SD = 0.80$ ).

Table 3: Government agencies' perception on the five most important employability skills.

Rank	Employability skills	Mean (M)	Standard deviation (SD)
1	The ability to present ideas with confident and effectiveness	4.38	0.70
2	The ability to acquire and apply knowledge of engineering/ICT fundamentals	4.35	0.65
3	The ability to use techniques, skills and modern engineering/ICT tools	4.35	0.70
4	The ability to continue learning independently in the acquisition of new knowledge, skills, and technologies	4.26	0.75
5	The ability to undertake problem identification, apply problem-solving, formulations and solutions	4.26	0.80

Finally, Table 4 shows the five most important employability skills as perceived by SMEs. The SMEs indicated that they require the graduates to have, firstly, the ability to undertake problem identification, apply problem-solving, formulations and solutions ( $M = 4.23$ ,  $SD = 0.76$ ) followed by the ability to use techniques, skills and modern engineering/ICT tools ( $M = 4.16$ ,  $SD = 0.67$ ), the ability to present ideas with confidence and effectiveness ( $M = 4.16$ ,  $SD = 0.76$ ), the ability to function effectively as an individual and in a group ( $M = 4.08$ ,  $SD = 0.78$ ), and the ability to acquire and apply knowledge of engineering/ICT fundamentals ( $M = 4.00$ ,  $SD = 0.74$ ).

Table 4: SMEs' perception on the five most important employability skills.

Rank	Employability skills	Mean (M)	Standard deviation (SD)
1	The ability to undertake problem identification, apply problem-solving, formulations and solutions	4.23	0.76
2	The ability to use techniques, skills and modern engineering/ICT tools	4.16	0.67
3	The ability to present ideas with confidence and effectiveness	4.16	0.76
4	The ability to function effectively as an individual and in a group	4.08	0.78
5	The ability to acquire and apply knowledge of engineering/ICT fundamentals	4.00	0.74

## CONCLUSIONS

The study has found that the ability to undertake problem identification, apply problem-solving, formulation and solutions, the ability to execute good and effective presentation, as well as leading and working as a team feature prominently amongst employers from the four type of categories; namely, the GLCs, MNCs, government agencies and SMEs. They deem that these employability skills are amongst the more important skills that they require their potential employees to possess before recruiting them. This is something that has been identified by previous studies when comparing the engineering employability skills required by employers in Asia.

These skills are listed as important because having the ability to think, reason and make sound decisions is crucial for all employees especially when they are professionals who are supposed to act as the trouble shooters and solution providers for their organisations. Therefore, it is crucial for organisations to be able to recruit graduates with problem-solving skills due to their impact of the organisations' performance. Thus, it is not surprising if an employee, who possesses the ability to think critically, act logically, and evaluate situations to make decisions and solve problems, is considered to be a valuable asset to the organisation.

At the same time, the ability of the graduates to present ideas with confidence and effectiveness is a skill that was also ranked as very important by the organisations. This is due to the fact that without proper and effective communication skills, no amount of information can be shared effectively within the organisation; hence, the probability of affecting productivity. Furthermore, due to the advancement of ICT, there is an increase amount of communication activities taking place in organisations, making it compulsory for graduates to equip themselves with the art and science of communication.

Similarly, it is crucial for graduates to be able to work in teams due to the fact that all individuals in an organisation are interconnected; thus, requiring sharing of ideas and expertise in pushing the organisation forward. One has to know

when to lead and leading well, and also when to follow and act as a good follower. This is because good synergy between the leaders and followers in any organisation will have a positive impact on the organisation.

At the same time, engineering and ICT graduates need to have a strong foundation in the ability to use techniques, skills and modern tools in their area of expertise, as well as having the drive to acquire and apply knowledge in these areas. These are core competencies that the graduates have to equip themselves with in order to be known as skilled and competent engineers or ICT technical workforce. As a result, the organisations that hire them will benefit tremendously with the expertise that they possess.

Universities, as well as the graduates themselves, must undertake the effort to equip graduates with the requirements identified by industry, especially, with regard to employability skills. On the one hand, universities must have consistent engagement with industries in understanding their evolving requirements with regard to what employability skills university graduates should possess. On the other hand, university graduates must also be proactive in identifying what is required by their potential employers. If this is happening, then, there is a bigger opportunity for the gap between universities, graduates and industries to be reduced in terms of what they can expect from one another.

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Associate Professor Dr Izaidin bin Abdul Majid currently holds the post of Deputy Vice-Chancellor (Student Affairs) of Universiti Teknikal Malaysia Melaka (UTeM) and at the same time is attached to the Faculty of Technology Management and Technopreneurship. He obtained his PhD in entrepreneurship from the Hunter Centre for Entrepreneurship, University of Strathclyde, Glasgow, Scotland, UK. He teaches a number of subjects relating to entrepreneurship at various levels from Diploma through to MBA at UTeM, as well as supervising postgraduate research students at the MSc and PhD levels. He is also conducting a number of research projects, and has assisted UniMap and KKTM in programmes relating to entrepreneurship.