

Technical skills and non-technical skills: predefinition concept

Ahmad Nabil Bin MD NASIR

Universiti Teknologi Malaysia
Skudai, Johor, Malaysia
ahmadnabil@utm.my

Dayana Farzeeha ALI

Universiti Teknologi Malaysia
Skudai, Johor, Malaysia
dayanafarzeeha@utm.my

Muhammad Khair Bin NOORDIN

Universiti Teknologi Malaysia
Skudai, Johor, Malaysia
mdkhair@utm.my

Mohd Safarin Bin NORDIN

Universiti Teknologi Malaysia
Skudai, Johor, Malaysia
p-safarin@utm.my

ABSTRACT

The rapid increase of technology has contributed to increased demands on skilled workers that are not only focusing on technical skills, but also on non-technical skills. However, the lack of non-technical skills and the high dependence on technical skills is the problem that should be overcome by skilled workers in Malaysia. Employers always give negative feedback about skilled workers when the non-technical skills are raised. The purpose of this paper is to explain the concept of non-technical skills that are neglected compared to technical skills. This is seriously highlighted by their definition and the elements in them when compared to technical skills definitions. The difference names that reflect the non-technical skills such as generic skills and employability skills are also explained and the study is more focused on the names used.

Keywords: *technical skills, non-technical skills, generic skills, employability skills*

INTRODUCTION

Malaysia's aspiration to become a developed nation by 2020 is something that can be realized. The full integration of all parties should be focused on achieving the goal. Among the biggest factors required of a developed country, which is often

based on the higher gross domestic product (GDP) is having rapid tertiary and quaternary industries. The high pace of the industry results in increased foreign investment and will increase the country's economy.

The increase in investments from industrial areas has resulted in increased demand for skilled workers in the country (Julie, 2008). High demand for skilled workers is not only dependent on the quantity of skilled workers and even industry has emphasized that the quality of their own skilled workers in the industry is essential to enhance productivity and develop the economy. According to *Third Industrial Masterplan* (IMP3), industrial sectors in Malaysia require a skilled worker who satisfies required criteria to achieve quality targets that are targeted by the sector (MITI, 2005). The emphasis on technical skills as a whole, as the criteria to be observed by the industry for skilled workers, is something that has become obsolete.

Quality of skilled workers is evaluated by industry through the two aspects, their technical skills and non-technical skills. This is because with just leveraging the technical skills, it is not enough to qualify a skilled worker facing the needs of a global industry that is advanced, powerful and moving forward. This has not only become a guide in Malaysia but all over the world as examples from China, that is popularly known as '*sleeping dragon*' in the world economy also needs skilled workers with the quality criteria are not only technical, but also non-technical (Thomas, 2008). Skilled workers are recognized as quality workers when they have a unity between technical and non technical skills.

However, 'skill mismatch' phenomena happens to skilled workers in Malaysia nowadays. This problem can be observed when many employers provide different and negative responses to the performance of skilled workers in Malaysia. Lack of mastery of non-technical skills and overall dependence on technical skills as their working style is viewed as a phenomenon that is difficult to change.

Hence, this concept paper will focus on non-technical skill and technical skill elements that should be mastered by skilled workers in Malaysia. Explanations of the concept of non-technical skills, technical skills, skilled workers and high demands on these skills in the workplace also are detailed.

NON-TECHNICAL SKILLS

Non-technical skills refer to general skills (Zubaidah et, al, 2006), generic skills or life skills (Munce, 1981) that are outside the formal education syllabus. These skills are not specific to any particular job position or workplace environment (Zubaidah et, al, 2006) but can be used widely in all jobs and tasks assigned (Kruger, 2006). These skills cannot be obtained in a short time, but can be controlled with extensive use and experience (Mohd.Sahandri and Saifuddin Kumar, 2009).

According to Straub (1990), he explained that non-technical skills represent aspects common to all jobs and tasks, such as following instructions, communicating effectively, and cooperating with others in teamwork. In the working environment, Noor Azizi Ismail et al. (2001) claimed that non-technical skills comprise the ability to carry out specific tasks. In addition, non-technical skills play an important role in supporting technical skills (Roger, 1996).

Non-technical skills can be divided into two categories: functional and adaptive (Munce, 1981). Functional skills are basic skills used to apply to tasks and to solve new problems and these can go beyond one's training and past experience by the workers in all fields; and are communicating, questioning, analyzing and decision-making. While, adaptive skills are skills that describe the manner in which employees conduct themselves and interact with the working environment, which are group effectiveness and teamwork skills and leadership and organizational skills (Lange, 2000).

According to Kruger (2006), functional skills are included within communication skills and information skills. However in adaptive skills, he proposed organizational effectiveness and teamwork as additional skills.

According to Zubaidah *et al.* (2006), functional skills are communication, creative thinking and problem solving, information management, and leadership and organizational skills. While group effectiveness and teamwork skills, work related dispositions and attitudes, personal traits and self-management skills are included in adaptive skills.

However, non-technical skills, also called by some other names are “*generic skills*” (Wiggill, 1991; Sharifah Kamaliah 2009; Kamaruddin, Ruhizan and Ramlee 2009), “*soft skills*” (Davis and Woodward, 2006), “*employability skills*” (Conference board of Canada, 1992; Cotton, 1995), “*key skills*”, “*core skills*”, “*essential skills*”, “*key competencies*” (Australian Education Council Review Committee, 1991; Conference board of Canada, 1992), “*necessary skills*”, “*transferable skill*” (Wiggill, 1991; Statsz et al, 1994), “*functional*” and “*adaptive*” skills (Murphy and Jenks, 1982), “*foundation*” and “*basic skill*” (SCANS Report, 1992)

Researchers used various names to carry out research in respect of non-technical skills. This resulted in the definition of the name used often being different and various. In Malaysia, researchers prefer to use generic skills, employability skills, and soft skills as a substitute for non-technical skills. Besides that, there are researchers who are still using the name ‘non-technical skills’ in their study. Following is the definition of each name and elements of each skills used.

GENERIC SKILLS

Generic skills identified as skills, qualities and trait that a person has to master in order to be successful in their studies (Mohd.Sahandri and Saifuddin Kumar,

2009) and attributes that harmonize with the field of specialization of employees for work performance (Quah Chun Hoo et.al, 2009). Generic skills can be identified as the skills can be useful across a diversity of jobs (Kearns, 2001) and life contexts (National Centre for Vocational Education Research, 2003). Pumphery (2001) explains that generic skills are skills that can boost individual productivity in all fields.

These skills are not specific but are skills which cut horizontally across all industries and vertically across all job from entry level to chief executive officer. Generic skills have become a catalyst for job marketability in the global arena (Sharifah Kamaliah 2009; Kamaruddin, Ruhizan dan Ramlee 2009). Generic skills are seen as relevant, useful and durable. They underpin education and provide a basic support to lifelong learning.

TYPES OF GENERIC SKILLS

Various studies refer to the generic skills all over the world. Elements contained in the generic skills are also seen as various depending on the initial researchers. Key competencies model that has been issued by Mayer (1992) which is the model most often used as a basis for the formation of the elements of generic skills. The elements are:

- (1) Collect, analyze and organize information
- (2) Communicate ideas and information
- (3) Plan and organize activities
- (4) Work with others and in teams
- (5) Use mathematical ideas and techniques
- (6) Solve problems
- (7) Use technology

However, the Centre for Vocational Education Research (NCVER) in Australia issued a list of generic skills in a more detailed form in 2003. There are six main sections and specific details given to list the elements of generic skills. Table 1 shows a list of generic skills produced by NCVER (2003).

EMPLOYABILITY SKILLS

Employability skills, also known as skills, attitudes and behaviors that employers look for in their employees (Buck and Barrick, 1987; Conference Board of Canada, 1992). By the way, these are not similar to technical skill. These skills derive naturally compared to job specifications and consists in all types of industries, business sizes and phases of occupation (Robinson, 2000).

Conceptual definition of an employability skill was provided by Fugate et. al, (2004), they claimed that an employability skill was a form of active adjustment of individuals towards certain occupations until they could identify and recognize existing career opportunities in the work place. Lankard (1990) identified

employability skills which include personality, interpersonal skills, and attitudes and good behavior. Saterfiel et. al (1995) describe employability skills as skills that are required to meet and equip the work requirements.

Table 1: List of generic skills from NCVER (2003).

Skills	Elements
Basic/fundamental skills	Literacy Using numbers Using technology
People-related skills	Communication Interpersonal Teamwork Customer-service skills
Conceptual/thinking skills	Collecting and organizing information Problem-solving Planning and organizing Learning-to-learn skills Thinking innovatively and creatively Systems thinking
Personal skills and attributes	Being responsible Resourceful Flexible Able to manage own time Having self-esteem
Skills related to the business world	Innovation skills Enterprise skills
Skills related to the community	Civic or citizenship knowledge and skills

Other definitions state that employability skills are a group of important skills instilled in each individual in order to produce a productive workforce (Kazilan, et al., 2009). It is supported by Yahya (2002) who identified employability skills as an important aspect that needed to be known by all parties, because it can increase the efficiency and quality of the individual to become more competent in the workforce.

Employers in manufacturing industries in Australia also found that the employability skills are skills that are needed not only to gain employment, but for the development of the industry and enhance the ability to achieve success and contribute to industry (Department of Education, Science and Training, 2004). Employability skills could also assist employees to adjust themselves towards various changes and to increase their working abilities, which better suit the working environmental needs.

TYPES OF EMPLOYABILITY SKILLS

When discussing the research related to employability skills, many researchers have expressed the elements produced by Secretary's Commission on Achieving Necessary Skills (SCANS, 2001), United States Department of Labor Secretary on employability skills as the most complete of all the research, both before and after. This can be supported through extensive research by Rasul et, al (2009) in their comparison table.

Elements for employability skills that are contained in the SCANS (2001) look like they completely fulfill any criteria because of their collection of the elements of non-technical skills, which is careful and complex. To obtain these elements, the commission has been doing research by having interviews with the owners of business owners, public employers, association officials, and employees to complete the elements of employability skills to achieve the best result.

The report of SCANS (2001) has identified seven key competencies essential for employment. Seven core competencies are divided into two main groups, foundation and workplace competencies. Table 2 explained in more detail the content and elements contained in SCANS (2001).

Specialization is a term for representing the non-technical skills such as generic skills, employability skills and soft skills and is the way researchers sort out the elements of the non-technical skills. As we can seen, the elements contained in these skills have almost the same purpose, although they use a different sentence. Through a number of researchers use the term non-technical skills for their study, the list of elements that are used are also similar.

Basically, the employability skills terminology is exclusively and directly dedicated to the research that is focusing on the non-technical skills required by the students to get employed. So that, many researchers (Ab Bakar Rahim et, al., 2007; Fitriehara et, al., 2009 and Mohamed Sattar Rasul et, al., 2009) in Malaysia that use the employability skills terminology are selecting students as their research's respondents, especially students in higher institutions.

However, research that used generic skills and non-technical skills terminology looks more general and open in their research's objectives. We can see that many of the respondents used are from various types of people such as students, workers and lecturers.

MALAYSIA'S PHENOMENA ON NON-TECHNICAL SKILLS

Ramlee (2002) in his research found that the employer's in manufacturing industry in Malaysia find technical graduates in Malaysia have more than enough technical skills, however, employers feel less satisfied in terms of non-technical skills such as motivational skills, communication, interpersonal, critical thinking, problem

solving and entrepreneurial skills. Besides that, according to Syed Hussain (2005), he found that most graduates of technical field (62.3%) are still jobless because of two factors, lack of non-technical skills rather than technical skills and the second is the lack of practical training and experience.

Table 2: List of employability skills from SCANS (2001).

Group	Skills and Competencies	Elements
Foundation	Basic Skills	Reading Writing Arithmetic/Mathematics Listening Speaking
	Thinking Skills	Creative thinking Decision making Problem solving Seeing things in the mind's eye Learning skills Reasoning
	Personal Qualities	Responsibility Self-esteem Sociability Self-management Integrity Honesty
Workplace Competencies	Resources Skills	Time management Money management Material and facilities Human resources
	Interpersonal Skills	Participates as a team member Teaches others new skills Serves clients/customers Exercises leadership Negotiates Works with diversity
	Informational Skills	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information
	System and Technology Skills	Understands systems Monitors and corrects performance Improves or designs systems Selects technology Applies technology to task Maintains and troubleshoots equipment

More than half of the technical graduates of polytechnics (50.5%) are jobless for nearly nine months each year after their graduation due to the problem of lacking non-technical skills (Rashid, 2005). The results also found that graduates were still weak in communication skills, writing and computer skills. According to research by Kathleen (2005) on technical graduates in the U.S, she found that employers are not satisfied with the job applications for technical graduates, not because they do not have the sufficient skills or technical knowledge, but the dissatisfaction is caused by a lack of non-technical skills.

According to research by Fauzi (2000), skilled workers in Malaysia are still moderate in non-technical skills. He claimed that skilled workers are still weak in terms of ability to work together successfully in a team and co-operate with others at all levels, friendly, courteous and show proper respect to superiors and subordinates and seldom recognized hazardous working situations and lacked observance of the general safety requirement.

Expectation and perceptions employers have about engineers in Malaysia is that they are still low in non-technical skills. According to Zaharim (2008), he claimed that employers expect that all of the engineers in Malaysia have the ability to improve their non-technical skills after graduating from university or in the workplace, but the situation is not so. The results in Table 3 and Figure 1, show that a higher mean gap value indicates a bigger discrepancy between what is expected of the work force and their performance as perceived by the employers. The attributes which exhibit the worst mean gap was the ability to undertake problem identification, formulation and solution (0.94), followed by the ability to communicate effectively (0.92). On the other hand, the best score (lowest mean gap) was displayed by attribute L (0.60) on knowledge of contemporary issues (Zaharim, 2008).

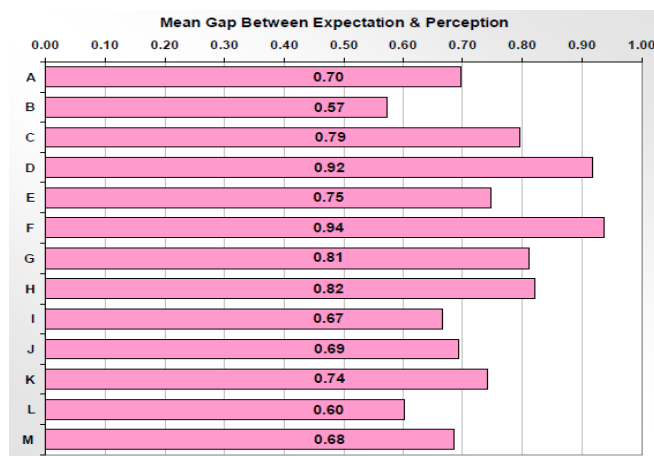


Figure 1: Adopted from Azami Zaharim (2008).

Table 3: List of attributes.

A	Ability to acquire and apply knowledge of engineering fundamentals.
B	Having the competency in theoretical and research engineering.
C	Having competency in application and practical oriented engineering.
D	Ability to communicate effectively, not only with engineers but also with the community at large.
E	Having in-depth technical competence in a specific engineering discipline.
F	Ability to undertake problem identification, formulation and solution.
G	Ability to utilise a systems approach to design and evaluate operational performance.
H	Ability to function effectively as an individual and in a group with the capacity to be a leader or manager as well as an effective team member.
I	Having the understanding of the social, cultural, global and environmental responsibilities and ethics of a professional engineer and the need for sustainable development.
J	Recognising the need to undertake lifelong learning, and possessing/acquiring the capacity to do so.
K	Ability to design and conduct experiments, as well as to analyse and interpret data.
L	Having the knowledge of contemporary issues.
M	Having the basic entrepreneurial skills

TECHNICAL SKILLS

Technical skills are a skill, expertise or technical competence related to the field of the workers, whether engineering or technical (Medina, 2010). Technical skills or '*hard skills*' is often associated with the use of tools, equipment related to work properly and efficiently, as well as all technical matters. It can be known and understood more easily as can be seen clearly with the naked eye (Yahya and Muhammad Rashid, 2001).

Technical skills are a skills that require a combination of specific knowledge and skills of the work done using the body to achieve the target (Damooei, Maxey and Watkins, 2008). In the working environment, technical skills normally refer to technical procedures or practical tasks that are typically easy to observe, quantify, and measure. The skills are tangible, specific, and usually teachable such as typing

50 words per minute or changing tires (Roselina, 2009). In other view, technical skills are the ability to perform work in a technically competent manner and also to monitor it in an independent and critical manner (Mohd Fauzi, 2000).

Technical skills can be acquired in formal and non formal way. In formal way, Medina (2010) explained that the common way is through academic channels, namely through the institutions of higher learning. In addition, attending courses and seminars organized by world bodies such as *International Electrical and Electronic Engineers* (IEEE) and obtaining certification through this channel, is one of the ways to obtain technical skills. The non formal method is through a progressive tutorial written, electronic, and practical way that can be done to obtain the technical skills (Medina, 2010). Consistent involvement is needed to improve the technical knowledge in the field of endeavor so that skills are constantly improved.

TYPES OF TECHNICAL SKILLS

In 2009, Board of Engineer Malaysia (BEM) signed an agreement to the Washington Accord when the International Engineering Alliance (IEA) meeting in Kyoto, Japan. The Washington Accord is an international accreditation agreement for professional engineering academic degrees, between the bodies responsible for accreditation in its signatory countries. This causes the contents of engineering education to be dependent and consistent with what is agreed in the Washington Accord. Technical skills required for an engineering graduate when she/he becomes an engineer are also itemized in Washington Accord. Table 4 shows the technical skills essential for an engineering graduate working as an engineer.

On the other hand, Jabatan Pembangunan Kemahiran (JPK) under Kementerian Sumber Manusia Malaysia has released the details of job profiles of workers by the qualification of Sijil Kemahiran Malaysia (SKM). Level three and above for SKM is selected on the appropriate qualifications for skilled workers in Malaysia. Detailed job profile is based on the type of jobs available in Malaysia. Table 5 shows the details of technical skills in audio visual electronic job profile issued by the Jabatan Pembangunan Kemahiran (JPK) in general as an example (Jabatan Pembangunan Kemahiran, 2010).

MALAYSIA'S PHENOMENA ON TECHNICAL SKILLS

Industries which invest in Malaysia have the equipment, machinery, and sophisticated technology in line with their ability as an expert in a particular field. Sophisticated equipment that must be utilized by skilled workers with high technical skills so that they can be used with maximum possible efficiency (Handler and Healy, 2009). However, the sophistication of technology in the industry is not in line with the content of teaching in institutions. This is a problem for the industry, as happened at the Politeknik Shah Alam (POLISAS) which shows that students think that there is a lack of exposure to new

technologies from the existing curriculum (Yahya, Muhammad Sukri and Hairul Annuar, 2006).

Table 4: Technical skills elements.

Technical Skills	Characteristic	Details
Engineering knowledge	Breadth and depth of education and type of knowledge, both theoretical and practical	Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
Design/ development of solutions	Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified	Design solutions for <i>complex</i> engineering problems and <i>design</i> systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
Modern Tool Usage	Level of understanding of the appropriateness of the tool	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to <i>complex</i> engineering activities, with an understanding of the limitations.
Environment And Sustainability	Type of solutions	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

The problem occurred because of the lack of tools and equipments for practical work and should be noted, that by maintaining the existing equipment and not upgrading with new high-tech equipment. With the exposure of new technologies, students can use their experience while studying as a basis for the actual working environment as skilled workers (Yahya, Muhammad Sukri and Hairul Annuar, 2006).

Based on Chek Mat (1996), new technologies must be mastered quickly by the entire skilled workers in Malaysia's industries to avoid "Sunset Technology" phenomena. This is parallel to the industries' needs for the skilled workers. This matter should be maintained or further enhanced, so that the skilled workers are

more prepared for the changes of the technology and can handle all types of devices or machines with a maximum proficiency.

Table 5: List of technical skills in audio visual electronic job profile.

SKM level 3	SKM level 4	SKM level 5
Repair Faulty Handy Cam	Construct Complex Audio Visual Printed Circuit Board (PCB)	Demonstrate Audio Visual Complex Circuit
Carry Out Handy Cam Preventive Maintenance	Assemble Components On Printed Circuit Board (PCB)	Plan Audio Visual Product Testing
Carry Out Dvd Player Preventive Maintenance	Carry Out Functionality Test	Ensure Audio Visual Product Testing
Maintain Equipment, Tools And Spare Parts Inventory	Create Diagnosis Flow Chart	Produce Audio Visual Test Results
Perform Preventive Maintenance	Implement Audio Visual Product Testing	Verify Preventive Maintenance Schedule
Perform Audio Visual Equipment Repair Work	Carry Out Audio Visual Product Testing Equipment Identification	Ensure Maintenance Activities Compliance
Verify Part List Requisition	Troubleshoot Audio Visual Equipment	Verify Material Requisition
Maintain Quality Control (Qc) Of Serviced Product	Design Maintenance Procedure	Monitor Production Performances
	Establish Calibration Activities	
	Control Spare Part Inventory	
	Perform Maintenance Activities	

According to Mohd Fauzi (2000), skilled workers have a moderate capability in technical skills. The problems are still persistent in the worker who handles and operates equipment and machines according to standard operating procedures without an ability to translate learned knowledge into assigned tasks. Weakness of technical skills among workers is due to a low understanding all the technical aspects of assigned jobs and no clear understanding of subject areas (Mohd Fauzi, 2000).

Consistent involvement is needed to improve the technical knowledge in the field of endeavor so that skills are constantly improved (Medina, 2010). Albrecht (2001) claimed that skilled workers are able to apply and connect ideas, concepts, information and technology to productive work and quality.

Table 6: Adopted from MERIC (2008).

Workers Qualification	Skills lack
<p><u>Long-Term On-the-Job Training/Work Experience in a Related Occupation</u> Occupations requiring long-term on-the-job training are those for which more than one year of training is needed. Jobs that generally require work experience in a work-related occupation are assumed to require a level of skills and experience higher than that of jobs requiring long-term on-the-job training.</p>	<p>Skill gaps exist for both non-technical skills and technical skills</p>
<p><u>Associate's Degree/Vocational Education</u> Occupations requiring vocational education are those for which at least a few weeks or more than a year of vocational education is needed. Occupations that generally require the completion of an associate's degree program usually require at least 2 years of full-time academic study.</p>	
<p><u>Bachelor's Degree/Work Experience</u> Occupations that require completion of a bachelor's degree program usually require 4 or 5 years of full-time academic work. Jobs may also require work experience in addition to a bachelor's degree or higher.</p>	<p>Technical skills gaps are most predominant than non-technical skills</p>
<p><u>Master's/Doctoral/Professional Degree</u> Occupations that require the completion of a master's degree program usually need 1 to 2 years of full-time equivalent study beyond a bachelor's degree whereas a doctoral degree program usually requires at least 3 years of academic work beyond a bachelor's degree. A professional degree usually requires at least 6 years of academic study.</p>	

According to research by MERIC (2008), even though many of the employers are satisfied with technical skills from their employees, they are still having concerns about the lack of competencies and shortcomings in specific technical skills and

the acquiring and use of information. Therefore all of employees should have their good technical and generic skills to contribute effectively to positive productivity.

Based on the problems dealt with before, it can now be understood that there is a lack of available skilled workers not only in non-technical skills but also technical skills. This should be seen as a serious problem if Malaysia wants to move quickly as a developed nation by 2020.

CONCLUSION

Based on these details the definition of the terms of the research it is quite clear. From the previous observations, skilled workers lack non-technical skills more than technical skills. Non-technical skills are necessary to balance the technical skills of a skilled worker. Industries now are focusing more on skilled workers that have excellent integration between technical skills and non-technical skills.

Technical skills are basic knowledge to any work in any industry. The ability of a skilled worker to apply the technical skills acquired in higher education institutions to the real working environment was highly regarded. However, the lack of non-technical skills has retarded the development of skilled worker's productivity in industry sector. Thus it can be noted that good abilities in non-technical skills such as communications skills, problem solving skills and decision making skills will be used as a medium to enhance the ability for skilled workers in industry.

Technical skills are easy to use and also easy to learn. This is different from the non-technical skills that are difficult to implement excellently. This is because non-technical skills can only be mastered by experience and frequent use in the workplace. This paper therefore concludes that technical skills and non-technical skills are important to all skilled workers in any industry to enhance their productivity in the workplace; hence it also will increase Malaysia's economy through a variety of industry sectors.

Although technical skills are basic to a job, we cannot forget that non-technical skills are a perfect complement to skilled workers in the industry. Through research, some method is needed to ensure that skilled workers have their non-technical skills that are equivalent to their competencies in their technical skills. In conclusion, skilled workers are under equipped if they are only concentrating on technical skills without non-technical skill competencies in industry.

REFERENCES

Azami Zaharim (2008). A Gap Study between Employers' Perception and Expectation of Engineering Graduates in Malaysia. *Internatinal Conference on Engineering Education*. 22-24 July 2008. Heraklion, Greece, 404-407.

Borjas, G.J. (2003). The Labor Demand Curve Is Downward Sloping: Reexamining The Impact of Immigration on the Labor Market .*The Quarterly Journal of Economics*, November 2003, 1335-1374

Chek Mat (1996). Masalah Pendidikan Teknik dan Vokasional. Dewan Masyarakat, Februari. pp. 15-16.

Conference Board of Canada. (1992) Employability skills profile: the critical skills required of the Canadian workforce. *Ministry News*, (6):1-10, June 4.

Cotton K. (1995) *Developing employability skills*. Portland, OR: North West Regional Educational Laboratory

Damooei, J., Maxey, C. and Watkins, W. (2008). *A Survey of Skill Gaps and Related Workforce Issues in Selected Manufacturing Sectors: Report and Recommendations*. Workforce Investment Board of Ventura County, USA.

Department of Education, Science and Training (2004). Final Report: Development of a Strategy to Support the Universal Recognition and Recording of Employability Skills. A Skills Portfolio Approach. Australian Government.

Fitrisihara Kazilan, Ramlah Hamzah and Ab. Rahim Bakar (2009). Employability Skills Among the Students of Technical and Vocational Training Centers in Malaysia. *European Journal of Social Sciences*. 9(1), 147-160

Fugate, M., A.J., Kinicki, and B.E., Ashforth, (2004). "Employability: A Psychosocial Construct, Its Dimension, and Applications", *Journal of Vocational Behavior* 65, pp. 14-38.

Handler, C.A. dan Healy, M.C (2009).Hiring Manufacturing Staff in the 21st Century: *A Fundamental Shift in Skills*. Pearson Education, Inc

Jabatan Pembangunan Kemahiran (2010). <http://www.dsd.gov.my>. Dilayari pada 14 Jun 2010.

Julie, A.S. (2008). International Trade and the Changing Demand for Skilled Workers in High-Tech Manufacturing. *Growth and Change*. Vol. 39 (2), 225-251.

Kathleen, C. (2005). *Developing Employability Skills*. Regional Educational Laboratory. School Improvement Research Series (SIRS).

Kearns, P (2001), *Generic Skills For The new Economy* – review of research, NCVER Adelaide.

Kruger, S. (2006). "Developing non-technical skills through co-operative education" *The Third V.T. Vittachi International Conference*, July.

Lange, G. D. (2000), The Identification of The Most Important Non-Technical Skills Required By Entry-Level Engineering Students When They Assume Employment, *Journal of Cooperative Education*.

Lowell, L. and Batalova, J. (2005). *International Migration of Highly Skilled Workers: Methodological And Public Policy Issues*. Population Association of America 2005 Annual Meeting Program.

MASCO (2010). Kementerian Sumber Manusia Malaysia.

Mayer, E. (1992). *Key Competencies. Report of the Committee to advise The ACE and MOVET on Employment Related Key Competencies for Post Compulsory Education and Training*. Canberra: Australian Government Publishing Service.

Medina,R.(2010). Upgrading yourself—technical and nontechnical competencies. *IEEE Potentials*,29,10.

MERIC (2008). MISSOURI SKILLS GAP. Missouri Economic Research & Information Center, USA.

MITI (2005). Kementerian Perdagangan Antarabangsa dan Industri, Malaysia.

Mohd Fauzi Abdul Rahman (2000). *Perception of industry towards competencies of German-Malaysian Institute graduate in relation to their qualification for highly skilled technician*. Master thesis, Universiti Teknologi Malaysia, Skudai.

Mohd.Sahandri and Saifuddin Kumar (2009). Generic Skills in Personnel Development *European Journal of Social Sciences*. 11(4), 684-489

Mohamad Sattar Rasul et, al (2009). Peranan Institusi Pendidikan Teknikal Dalam Pemupukan Kemahiran 'Employability' Pelajar. *Jurnal Teknologi*. 50(E) : 113–127

Munce, J.W. (1981). Toward a Comprehensive Model of Clustering Skills. Washington DC: NSIEE Occasional Pape.

National Centre for Vocational Education Research (2003). Defining generic skills, At a glance. From <http://www.ncver.edu.au>. Last accessed on 14th June 2010.

Noor Azizi Ismail, Faisol Haron, Kamarulbahrain Abd Manaf and Rosmawati Mamat (2001). "The Importance of Non-Technical Skills In Accounting Graduates." *Akauntan Nasional*. 22-27

Quah Chun Hoo et,al (2009). Employers' Preference for Foreign Trained Graduates – Myth or Reality?. *European Journal of Scientific Research*. 34(3), 372-383

Ramlee B. Mustapha (2002). The Role of Vocational and Technical Education in the Industrialization of Malaysia as Perceived by Educators and Employers. Doctoral Dissertation. Purdue University.

Robinson, J.P., (2000). "What are Employability Skills?" Alabama Cooperative Extension System.

Roger, M. (1996). Non-Technical Essential Skills Handbook For Apparel Industry Supervisors- Interpersonal Communications. <http://www.wem.mb.ca/ES17.htm>

Roselina Shakir (2009). Soft skills at the Malaysian institutes of higher learning. *Asia Pacific Education Review*. 2009. Volume 10(3):309-315.

SCANS (2001). "About SCANS", Baltimore, Maryland: SCANS2000 Center, Johns HopkinsUniversity.

Statsz, C. (1994) Classrooms that work: teaching and learning generic skills. *Centre Focus*, (4):37-39.

Straub, R. (1990) Engineering Students Perceptions of Non-Technical Employment Qualities. *Journal of Cooperative Education*. Vol. 27, 1, 39-43

Syed Hussain Syed Husman (2005). Meeting The Needs of Employers. Proceedings of National Seminar “The development of Technology and Technical-Vocational Education and Training in an Era of Globalization: Trend and Issues.” Kuala Lumpur.

The Directorate of Immigration (2010). <http://www.udi.no>. Accessed on 6 Jun 2010.

Thomas, C. (2008). *China 2nd High Skills Development Forum*. Unpublished. International Labour Organization.

Yahya Buntat (2002). Intergrasi Kemahiran “*Employability*” dalam Program Pendidikan Vokasional Pertanian dan Industri di Malaysia. Universiti Teknologi Malaysia.

Yahya Buntat, Muhammad Sukri Saud Dan Hairul Anuar Hussain (2008). Cabaran Politeknik Sultan Ahmad Shah (Polisas) Membangunkan Modal Insan Seajar Dengan Keperluan Sektor Industri.

Zubaidah Awang et al. (2006). Non-Technical Skills For Engineers In The 21st Century: A Basis For Developing A Guideline. Project Report. Universiti Teknologi Malaysia.

Copyright © 2011 IETEC11, MD NASIR, et al.: The authors assign to IETEC11 a non-exclusive license to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive license to IETEC11 to publish this document in full on the World Wide Web (prime sites and mirrors) on CD-ROM and in printed form within the IETEC 2011 conference proceedings. Any other usage is prohibited without the express permission of the authors.