

Hamid Zolkifli, Yusri Kamin, Azlan Bin Abdul Latib, Yahya Buntat, & Zubaidah Awang (Universiti Teknologi Malaysia)

Generic Green Skills: Industry and perspectives on technical education and vocational training (TVET)

Abstract

The development of green technology has intensified in the early 21st century as evident by the increasing attention given to it by governments and industries. This development requires more employees who possess generic green skills. Questions on what generic green skills are, is still unclear and needs further investigation. This qualitative study explored the perspective of employers and academicians about the meaning of generic green skills. Interviews with ten personnel (three from industries currently involved in green practices and seven academicians from the Department of Technical and Engineering Education, Faculty of Education, Universiti Teknologi Malaysia) were conducted from January to May 2015. Results indicate that employers and academicians are fully aware of the importance of environmental sustainability. Although some were found to be ignorant about the term generic green skills, they showed an inclination towards referring to generic green skills as green practices. To achieve change, emphasis should be placed on the role of technical education and vocational training (TVET) in developing generic green skills which can eventually lead to environmental sustainability. Therefore, TVET could serve as an effective platform in promoting generic green skills. Findings of this study are just the initial step in exploring what generic green skills are. More studies should be conducted to better understand and stimulate the inclusion of generic green skills in all industries, including green technology-oriented industry to further improve awareness and implementation practices among the parties concerned.

Keywords: *Generic Green Skills, Technical Education and Vocational Training, Environmental Sustainability*

1 Introduction

In any education system, the three domains of learning, cognitive, psychomotor, and affective are essential to produce not only holistic students but also prospective workers with good manners. In the Malaysian context, all educational processes at the national level are envisioned by the National Education Philosophy (Shafeeq Hussain et al. 2014). The three domains complement each other and would produce the best human capital. This is the essence of the National Education Philosophy of Malaysia that focuses on the creation of human capital with a balance of intellectual, spiritual, emotional and physical elements (Wan Mohd Zahid 1993). Hazril Azmin & Abdullah (2013) claimed that education and the development of human resources constitute an essential relationship for most developing countries including Malaysia. In addition, technical education and vocational training (TVET) which focus on the psychomotor domain can equip students with the skills needed by an entry level worker. Hanafi & Ma'sumit (2014) stated that TVET education has special characteristics

oriented towards preparing students to work in particular fields. They argued that TVET cannot be separated from the world of work.

Different countries have their own definition of TVET. According to Ivan et al. (2008), vocational educational specializes on training students and youngsters for immediate employment upon completion of their study or training. Gray & Herr (1998), on the other hand viewed vocational education as a workforce education while Pavlova (2009) referred to it as technology education which is seen as a means for developing knowledge, skills, attitudes and values that allow students to maximize their flexibility and adaptability to their future employment. In the Malaysian context, vocational education is defined as an education, which aims at enabling a person to perform specific jobs (Robiah Sidin 1994). More specifically,

“In a simple definition, technical and vocational education refers to all educational activities offered by formal institutions and its implementation is in stages to provide an individual with knowledge of academic, technical and specialized job skills. However, in an era of globalization and rapid technological change, a student in the field of technical education and vocational training must be complemented with a variety of workability skills and generic skills” (Abdullah Mat Rashid et al. 2008).

To enhance the definition above, the Malaysian Technical and Vocational Education has its own policy, which is to strengthen and streamline the technical and vocational education system towards preparing students with technical education orientation to meet the manpower needs of the country (Mohamad Hussin et al. 2001). This is done through the deliberate inclusion of generic skills which shows its importance in terms of producing human capital in line with the aims of the national education philosophy.

Therefore, TVET focuses on the pre baccalaureate level. Technical education encompasses more on skills, enabling students to either enter directly the job market or pursue their study to a higher level. It also covers courses on retraining and upskilling of workers. On a broader spectrum it involves any education activities or advanced professional practices which lead to conferment of a professional license.

Despite the differences in definitions, the thrust of TVET is on skill development and the world of work. Ivan et al. (2008) asserted that even though there are different varieties of TVET systems in each country, the direction and strategy of the development of TVET system is almost the same that is on how to provide students with skills to prepare them to work in specific areas in accordance with the development and economic growth of a country. In Malaysia, students have the option of either going through academic pathways to pursue their study or technical education and vocational training. Generally, students with high achievement after completing their PT3 (national assessment at the 3rd year of secondary school), are more prone to continue their study in the academic stream. While students, who are keen and have the potential to embark on their career as skilled or semi-skilled entry level workers, can pursue their study either at Vocational Colleges (CV) or Technical Schools. The existence of vocational colleges (upgrading of vocational schools) is the outcome of the transformation of the vocational education program in an effort to restore the image of TVET that has been

underestimated but has now been raised to a higher level and is no longer regarded as second-class education. Vocational Colleges offer various programs towards conferment of a diploma after four years of study which include a 12-week on-the-job training.

In addition to technical skills, future workers must also have non-technical skills such as leadership, team working, problem solving, creative and critical thinking, which would enable them to be better individuals at their workplace and for job sustainability. Woods et al. (2000) described soft skills as process skills used in the application of knowledge and are considered critical skills for prospective workers to have. Nik Safiah (2010) highlights the function of these skills in increasing the competitiveness of organisations.

In every developing country, there are contradictory views on the environment and development. Challenges of development have a significant impact on the environment. Discourse and debate on the link between economic development and environmental degradation are well presented in the literature e.g. Pavlova (2009), Adams (2001) and Kahn & Peter (1999). Most of the conclusions made were on the issue of awareness of development in tandem with environmental sustainability. In relation to that, Kamarudin et al. (2011) emphasized the importance of meeting present needs without compromising the ability of the future generations to meet their own needs. As the green concept gets serious attention from many parties in Malaysia and has become a 'revolution'; in April 2009, Malaysia set up the Ministry of Energy, Green Technology and Water (KeTTHA) specifically to deal with problems of environmental pollution and maintain quality of life. Prior to this, it was known as the Ministry of Energy, Water and Communications, established in March 27, 2004, through the restructuring of the Ministry of Energy, Communications and Multimedia.

KeTTHA is responsible for planning and formulating policies and programs in green technology. This shows the Malaysian government's determination to lead the initiative to deal with current global issues such as environmental pollution, depletion of the ozone layer, 'global warming' and issues related to it. Under this ministry, there are four main sectors; one which is directly related to green technology is the Green Technology sector. This sector has two sections, that is the Regulatory and Development of Green Technology and the other one is Green Technology Policy.

The Malaysian Green Technology Corporation (GreenTech Malaysia) is another organisation under the purview of the Ministry of Energy, Green Technology and Water (KeTTHA), entrusted with catalyzing green technology deployment as a strategic engine for socio-economic growth in Malaysia in line with the National Green Technology Policy 2009. The goal of Green Tech Malaysia is to position Malaysia as a global hub for green technology by 2020 and subsequently develop the country into a green community by 2030.

Green Tech Malaysia also conducts various courses under Green Technology Academy to promote green technology through a wide range of training programs. This initiative is in tandem with Strategic Thrust 3 of the National Green Technology Policy, which focuses on intensifying human capital development in the green technology sector. To encourage industries to practice green technology, Green Tech Malaysia offers incentives via Green Technol-

ogy Financing Scheme (GTFS) to industries which use renewable energy and are energy efficient. Green Tech Malaysia also organizes a special MyHIJAU (@ MyGREEN) Training as a key initiative to promote green technology adoption and understanding by offering a wide range of training programs. In addition, Green Industry Virtual Center under the Department of Environment also encourages small and medium enterprises to adopt cleaner production methods as a means to reduce carbon footprint. This department is under the auspices of the Ministry of Natural Resources and Environment.

It is undeniable that green technology has become a cliché in the process of sustainable development. According to Ramlee and Siti Shuhada (2014), green technology is an emerging concept with the ultimate goal to achieve sustainable development by reducing environmental risks and ecological scarcities, carbon emissions and pollution as well as enhancing energy and resource efficiency and preventing loss of biodiversity. Something to keep in mind is, that the basic requirements for the realization of green technologies, is the existence of employees and prospective employees with generic green skills. Green technology and green generic skills are interdependent and complement each other.

Although a myriad of studies has been conducted on generic skills, reference materials and research on generic green skills are still insufficient (Mohd Zolkifli et al. 2014) and inadequate for us to fully understand what is meant by generic green skills. A few early studies e.g. Yahya et al. (2013) and Suziana & Johari (2013) concluded that generic green skills are not clearly understood. What remains unmeasured is the number of employees using these skills effectively in the workplace, the number of employees likely to use these skills in the future, and the effect that these skills will have on promoting sustainable outcomes in the workplace (Rafferty & Yu 2010). This study contributes towards this gap in research and focused on academicians and employers perspectives on generic green skills. Specifically for academicians, it deals with teaching and learning, while for employers, it focuses on the tasks of frontline workers at green technology industries.

2 Research Design: Methodology, Research Process and Findings

A qualitative approach, using exploratory and explanatory case study (Yin 1994), was adopted to collect data for this study. Exploratory case study was used to answer ‘what is meant by generic green skills?’ and explanatory case study to answer ‘how do you implement green practices at the work place?’. The population of this study involved employers and lecturers cum academicians. Employers were represented by human resource officers at companies which were awarded with ISO 14000 (Environmental Management Standards) certificate and employed green practices while lecturers cum academicians were represented by lecturers teaching technical courses at the Faculty of Education, Universiti Teknologi Malaysia (UTM). Purposive sampling (Merriam 2002) was carried out and data were gathered through semi-structured interviews. An open-ended semi-structured interview protocol was developed and used to collect the data. A team of researchers were divided into two groups. One group interviewed academic staff at the Faculty of Education, UTM while another group collected data at designated industries. The duration of data collection was 5 months, from January to

May 2015 which was concurrent with semester II of the 2014/2015 academic session. Raw data collected from interviews were then transcribed and analyzed inductively (Maykut & Morehouse 1994) using content analysis technique (Merriam 2009).

A total of ten participants, three personnel from the industries and seven lecturers from the Technical and Engineering Education Department, Faculty of Education, UTM were involved in the study. Two of the industries were multinational companies manufacturing electrical and electronic components and one in chemical engineering. One of the industries was awarded with the Prime Minister's Hibiscus Award, the premier private sector environmental award for business and industry in Malaysia.

3 Results: Industry perspective

Some typical responses are stated in the section below.

Understanding of generic green skills

When asked on what is meant by generic green skills, participants provided the following responses:

"frankly speaking, I've never heard of that word before. What's it all about? I do have heard about generic skills, but not generic green skills. "

"ehmm...not sure...hahaha...don't know. "

Further probing on the same question, produced feedback below:

"maybe it's more on awareness towards clean environment, avoid pollution etc. "

"practicing 3R: Re-used, Reduce and Re-cycled"

"it concerns about environment?"

Implementation of generic green skills

One of the participants at the industry which received the Prime Minister's Hibiscus Award, revealed,

"we actually...100% recycled, reused our waste, whether it is schedule or non-schedule waste."

She added,

"... even, every month we will display the usage of printer's ink and papers for each departments. We are not trying to identify which departments is using the materials lavishly, but to share! ...and be responsible towards using materials wisely."

An officer at the industry which produce relays for vehicles, commented:

"here ... soldering jobs are done using solder without plumbum"

“I think ... it is more towards dicipline. Workers have to obey safety and green instruction’. For instance, please do not litter!”

4 Discussion and Conclusion

One of the initiatives to transform Malaysia into a developed country and sustainable high income nation is by mainstreaming and expanding access to quality technical education and vocational training (TVET). This will contribute to the improvement of workforce skills. According to the Prime Minister’s Department (2011), the strategy is to develop quality workforce and reduce dependency on foreign workers. By 2015, the percentage of skilled jobs is expected to increase to 33% i.e. approaching the standard of developed countries (Prime Minister’s Department 2011). These job opportunities are expected to come from the Twelve National Key Economic Areas (NKEA) with the following breakdown for workforce requirements: 61% professional, 20% semi-skilled and 19% unskilled. The NKEA, defined as a driver of economic activity that has the potential to contribute directly to the growth of the Malaysian economy, is under the auspices of the Economic Transformation Programme (ETP) which was formulated as a part of Malaysia's National Transformation Programme. One of the twelve NKEA is education. The goal and aspiration of education in NKEA is to create 536,000 additional job opportunities with the majority in professional and technical fields. This shows Malaysia’s commitment towards ensuring the success of the national agenda by 2020.

The increasing concern towards environmental quality has sparked the green phenomenon. Indirectly, more employment opportunities will be created especially in the fields which adopt and implement green technology practices. The rapid establishment of multi-agencies under various ministries in Malaysia together with increasing awareness of the importance of protecting the environment among industry players seems to reflect the emergence of a green- ing phenomenon in various aspects of life ranging from transportation system, infrastructure and industry. This is evident in the green technology policy which is based on the following four main pillars, namely energy, environment, economic and social. The explosion of green initiatives can be considered as a green revolution, almost similar to the explosion of information technology.

Based on the 10th Malaysia Plan, an estimated 2143 jobs would be generated by the year 2020 (Prime Minister’s Department 2011). These jobs require skilled and semi-skilled workers to be equipped with generic green skills. The data shows that there will be an increase in sector demand for a competent workforce with the required skills in key sectors of Malaysia’s economy, particularly in Green Technology (Ministry of Human Resource Malaysia 2011). In the Malaysian context, green technology refers to any human activities involving the use of technology that does not damage the environment. It also covers the development and application of products, equipment and systems to preserve the environment and minimize or mitigate the negative effects of human activities. This definition also refers to any product, equipment or system that can minimize degradation of the environment, save energy and natural resources, encourage the use of renewable sources and clean production practices

(Ministry of Energy, Green Technology and Water, Malaysia 2009). It clearly outlines the need and the ways to ensure development that does not compromise quality of the environment; thus the need to train skilled workers equipped with generic green skills.

Understanding about Generic Green Skills

The data demonstrates that both employers and academics share a similar perspective on generic green skills. Both claimed that they know about green practices, but were not familiar with the terminology generic green skills. For instance, while employers adopted and implemented the 3R concept of reduce, recycle and reuse to save on operational cost and minimize wastage in their organizations; when asked about activities which deal with generic green skills, they did not seem to be familiar with the matter.

One participant said, *“frankly speaking, I’ve never heard of that word before. What’s it all about? I do have heard about generic skills, but not generic green skills.”*

While another participant responded, *“hmm ... not sure ... hahaha (laughing)... don’t know.”*

In our quest to uncover the participants’ knowledge and understanding of what generic green skills are, one of the participants said that, *“maybe it’s more on awareness towards clean environment, avoid pollution etc.”* One participant added, *it is about “practicing 3R: Re-used, Reduce and Re-cycled”.*

Implementing Generic Green Skills: Employers’ Perspective

Employers are now more selective and in favour of hiring new workers with generic skills compared to those with only technical skills. A Production Manager at one chemical industry in Senai, Johor, who is also in charge of hiring new production operators, said that he gives priority to candidates who demonstrate strong commitment in work discipline. He even said, *“Frankly speaking, I don’t look at their certificates (qualification), but rather on their keenness to commit strong working discipline.”* For example, willingness to work extra time after working hours. He added that the company is willing to invest in training new workers with technical skills in the plant, but not on developing generic skills. This shows that generic skills are pivotal, as claimed by Wasimudin (2012), that a worker’s success is not solely determined by knowledge and technical skills (hard skills), but also by the ability to manage oneself and others (employability or generic skills).

Among other reasons employers are focusing on generic skills, is because the technical skills of new employees are sometimes less suitable and obsolete to be used with new technologies in the plant. If this happens, the industries have to allocate greater expenses for retraining and skills upgrading. However, when asked how they select new workers with generic green skills, one of the Human Resource Managers said,

“I will pick workers with strong awareness on maintaining good quality of environment ... on how they manage their activities so that they will contribute to a minimal impact to the environment”

The manager's response to "how do you identify this attitude?" was,

"During an interview, of course we could not assess directly their attitude towards environment, but during induction course, we (the company) will expose and train them on how to exercise green practices in the plant and also relevant areas such as in the canteen and restroom."

In order to comply with the Occupational Safety and Health Act (OSHA) 1994 (The Commissioner of Law Revision, Malaysia 2006), industries are now paying serious attention to green practices or cleaner production in the workplace. Cleaner production is a concept that encompasses any activity that includes specific, general techniques or processes that seek to avoid, prevent or reduce any waste from being generated at the source of its generation (Nik Merriam et al. 2002).

Employers said that they worked hard in practicing green practices in the workplace, and this can be seen when one production manager stated that, "... even when the workers take their meals at the canteen, the supervisor will ensure that all leftover foods be disposed into a right container". It shows that green practices are implemented everywhere in the industry, from the activities of loading and unloading materials at the delivery bay required drivers have switch off the engine of their vehicles to prevent carbon dioxide emission, to community self-help activities such as tree planting. These activities indicate that generic green skills focus on humanity-nature relationship (Pavlova 2009). Discourse on above matter shown that academicians and employers were ignorant about the term 'generic green skills'. They did, however, practice generic green skills unnoticed, through cleaner production activities.

In their effort to reduce the use of paper, industries were found to implement e-pay slip to enable workers to monitor their monthly wage payments. A visit to one industry, situated in the Parit Raja Industrial Estate, shows that the employer provided workers with the facility to check their salary by setting up a special station equipped with a set of computer. To execute this task, workers are expected to have a minimum ability in using the computer. This indicates that generic skills are also directly related to literacy and numeracy of information technology which is considered as one of the generic green skills. The finding concurs with the profiles of generic green skills listed by Pavlova (2012) on the understanding and application of Science, Technology, Engineering and Mathematics (STEM) at the workplace.

On the component of engineering and mathematics, the statement by a Human Resources Officer brought implicit meaning in the context of generic green skills. He said,

"To apply for a post in our plant is not easy. Our screening here is very rigorous. Even, if they applied for post as Production Operator, they have to sit for two tests. One is Kraepelin Test, a test that is often used in recruiting employees, and the other one is TOWES (Test of Workplace Essential Skills) which measures some of the essential skills people use at work. These skills include reading text, document use and numeracy."

It shows that competency in mathematics is indeed a necessary skill in order to be accepted as an employee in industries which deal with green practices.

5 Implementing Generic Green Skills: Academician Perspective

According to CEDEFOP (2010), a deep understanding of the impact of development on the environment should be applied in mainstream education and training systems. In line with that, to educate and inculcate awareness towards environmental sustainability, most academicians proposed paperless communication for academic assignments. For instance, e-learning has been widely used and virtual interaction between students and lecturers or among students themselves has been widely utilized. This has also resulted in interaction through medium such as WhatsApp Group becoming popular. One lecturer commented,

“I will insist that my students to submit their assignment through email and if hard copy is needed, I will encourage them to print on recycled A4 paper.”

“... as I said just now, through short message service (SMS), email, telephone, loudspeaker announcement may contribute towards environmentally friendly user.”

What the academicians were actually doing were efforts in reducing carbon footprint activities in order to create awareness to their students. Indirectly this exercise will provide students a skill on how to practice green practices (generic green skills) once they enter the job market. Further inculcation towards environmental sustainability awareness among students are when they undergo industrial training. This practicum is compulsory for all Technical and Vocational Education undergraduates during the third semester of Year Three of their study. This work-based learning provides them with the opportunity to practice generic green skills to complement their technical skills. With these skills, graduates become more employable and this can expedite Malaysia to achieve developed nation status by the Year 2020. They form what we call ‘a reservoir of prospective green-collar workers for green jobs’, ready to embark into the job market. The growth of green technology, not only means creating new green jobs but also the greening of established jobs.

An established job for academicians refers to their core task of teaching and learning at the faculties. This mainly occurs in the classrooms, workshops, studios and laboratories. Greening activities in this context is towards the lowering of carbon-print. For instance, students may submit a digital version of their assignments instead of a hard copy. At UTM, e-learning is a compulsory medium of interaction between lecturers and students. This provides an avenue for tests or quizzes to be held online, thus it may reduce the use of printers and lead towards reducing carbon-print. In order for this to be properly done, students must have skills in computing i.e. the ability to use computer and information technology which are essential in green technology. The same skill is needed industry where employees must know how to use the computer to access their e-pay slip. Therefore, e-learning and industry placement were identified by academics as two main ways to raise awareness of environmental issues.

6 Conclusion

Both personnel from industries and academicians claimed that they practise green activities. However, personnel at the industries admitted that they have never heard of the term ‘Generic

Green Skills'. Based on this, it can be concluded that knowing the terminology is not really crucial. The implementation and green practices in industry exemplifies that knowing how to implement and practice generic green skills are more important and critical. These results closely relate to the findings of other studies that claim that industry has difficulties in formulating their requirements in terms of skills. An emphasis on know-how is congruent with the fundamental principles of TVET which emphasized the concept of know-how compared to know-why. The know-how context refers to the ability of employees to perform activities which could lead to a clean(er) environment and minimize pollution. They are required to perform the green practices, including recycling, reusing and reducing.

TVET plays a crucial role in educating and developing generic green skills of future employees. Awareness of environmental sustainability and green practices are key to successful industry and manpower enhancement. Amalgamation of knowledge, technical skills, generic green skills and attitudes towards environment may act as a catalyst to survive in a prolonged conducive environment and contribute to a developed country which not only focuses on infrastructure development but also its citizens. Trained workers with generic green skills have a greater opportunity to be employed in the future and are a valuable asset who should be given serious attention by any country. This research demonstrates that additional opportunities should be searched for (that are going beyond e-learning and industry placement) to ensure that TVET engage students in learning green practices, and for that a set of skills based on analysis of environmental friendly practices in industry should be performed.

References

- Adams, W. M. (2001). *Green Development: Environment and Sustainability in the Third World*. 2nd edition, NY: Routledge.
- CEDEFOP - European Centre for the Development of Vocational Training (2010). *Skills for Green Job: Developing a Low-Carbon Economy Depends on Improving Existing Skills Rather Than Specialised Green Skills*. Briefing Note – 9024 EN. Thessaloniki.
- Gray, K. C. & Herr, E. L. (1998). *Workforce Education: The Basics*. Needham Heights, MA: Allyn and Bacon.
- Hanafi, I. & Ma'sum, M. (2014). Integration of the Employability Skills into TVET Curricula: Proposed by Demand Perspectives. In Proc. of 10th Int. Conf. of AASVET (Asian Academic Society for Vocational Education and Training). Tokyo, Japan, 31-38.
- Hazril Azmin, S. & Abdullah, M. R. (2013) "Competency Level of Employability Skills Among the Apprentices of the National Dual Training System: A Comparative Analysis of Industry Perception by Company Status." In: *International Journal of Education and Research*. Vol. 1, (11), 1-12.
- Ivan, H., Rahim, B.A., Ramlah, H., & Rosini, A. (2008). "A Model of Technical-Vocational Education and Training System." In Abdullah, M.R., Mohd Ibrahim, N., & Ramlah, H. (eds.). *Technical and Vocational Education: A General Perspective*. Serdang, Selangor: University Putra Malaysia Publisher, 3-22.

Kahn, Jr. & Peter, H. (1999). *The Human Relationship with Nature: Development and Culture*. Cambridge, MA: The MIT Press.

Kamarudin, A.B., Mohd Fazli, M.S., Md Nor, H.T., Ismi, R., & Norhana, M. (2011). "Green Technology Readiness in Malaysia: Sustainability for Business Development." In 2nd Int. Conf. on Business and Economic Research Proc., Langkawi, Malaysia, 1120-1129.

Maykut, P. & Morehouse, R., (1994). *Beginning Qualitative Research: A Philosophical and Practical Guide*. London: Falmer Press.

Merriam, S. B. & Associates (2002). *Qualitative Research in Practice: Examples for Discussion and Analysis*. San Francisco, CA: Jossey-Bass Publishers.

Merriam, S. B. (2009). *Qualitative Research: A Guide to Design and Implementation*. San Francisco, CA: Jossey-Bass Publishers.

Ministry of Energy, Green Technology and Water, Malaysia, (2009). *National Green Technology Policy*. Kuala Lumpur: Dewan Bahasa dan Pustaka (Translation).

Ministry of Human Resource Malaysia, (2011). *Occupational Structure: Green Technology Industry*, Putrajaya, Malaysia: Department of Skill Development.

Nik Merriam, S., Abdul Rahim, R., & Liew, A. (2002). *Module of Cleaner Technology*, Kuala Lumpur: MUCED-I and UA, University of Malaya.

Nik Safiah, N. I. (2010). *Soft Skills. The What, The Why, The How*. Bangi, Selangor: the National University Malaysia Publisher.

Pavlova, M. (2009). *Technology and Vocational Education for Sustainable Development: Empowering Individuals for the Future*. Bonn: UNEVOC – Springer.

Pavlova, M. (2012). *Generic Green Skills: Can They be Addressed Through Technology Education?*. In Proc. of the 7th Biennial Int. Conf. on Tech. Educ. Queensland, Australia, 49-57.

Prime Minister's Department (2010). *Tenth Malaysia Plan: 2011-2015*. Putrajaya, Malaysia: The Economic Planning Unit.

Prime Minister's Department (2011). *Manpower Needs in the Field of Technical Skills*, Putrajaya, Malaysia: The Economic Planning Unit.

Rafferty, M. & Yu, S. (2010). *Skills for Green Jobs in Australia: Unedited Background Country Study*, Geneva: Workplace Research Centre, School of Economics and Business, University of Sydney and International Labour Office, Skills and Employability Department.

Ramlee, M. & Siti Shuhada, M. A. (2014). *Perspective of Technical Students on Green Technology: A Case Study in a Malaysian Public University*. In Proceedings of 10th International Conference of AASVET (Asian Academic Society for Vocational Education and Training). Tokyo, Japan, 194-205.

Shafeeq Hussain, V. A., Fong, L. S. R., Mohammed, B. M., & Lokman, M. T. (2014). *The Actualization of the Malaysian National Education Philosophy in Secondary Schools: Student and Teacher Perspectives*. In: *International Education Studies*; Vol. 7, No. 4. 57-68.

Sidin, R. (1994). *Education in Malaysia: Challenges for the Future*. (translation) Kuala Lumpur: Penerbit Fajar Bakti Sdn. Bhd.

Suziana, Y. & Johari, S. (2013). Students Knowledge and Attitude Towards Low Carbon Society in Secondary School Science Curriculum. In: *Bulletin of the Johore Association of Science and Mathematics Education*, vol. 23 (1), 9-21.

The Commissioner of Law Revision, Malaysia (2006). *Laws of Malaysia: Act 514 Occupational Safety and Health Act 1994*. Online: <http://www.agc.gov.my/Akta/Vol.11/Act 514.pdf>.

Wasimudin, S. S. (2012). Vocational Technology Education Students' Perception on Employability Skills. In: *Proceedings of the 2nd UPI International Conference on Technical and Vocational Education and Training*. Bandung, Indonesia.

Woods, D. R., Welder, R. M., Rugarcia, A., & Stice, J. E. (2000). The Future of Engineering Education III. Developing Critical Skills. In: *Chem. Engr. Education*, vol. 34, (2), 108-117.

Yahya, B., Mustafa, O., Sukri, S. Md., Sharif, M. Md., & Shafeq, S. M., (2013). Integration of Green Soft Skills in Malaysian Technical Education. In: *Advanced Science Letters*, vol. 19 (12), 3718-3720.

Yin, R. K. (1994). *Case Study Research: Design and Methods*. 2nd ed., vol.5. Thousand Oaks, CA: SAGE Publications, Inc.

Yusuf, M. H. M., Ramlee, M., & Noriah, Md. I. (2001). Pendidikan Teknikal dan Vokasional di Malaysia: Perkembangan dan Halatuju. In *Proceedings of the International Conference on Technology and Vocational-Technical Education: Globalization and Future Trends*. Residence Hotel, UNITEN, Malaysia. (12-13 Nov. 2001), 591-597.

Zolkifli, A. H., Yusri, K., Dayana Farzeeha, A., & Mohd Azlan, L. (2014). Generic Green Skills: An Exploratory Literature Review. In: *Int. Seminar on Global Education*. Bangi, Selangor, Malaysia, DOI.

TVET@*sia* The Online Journal for Technical and Vocational Education and Training in Asia

CITATION:

Zolkifli, A.H., Kamin, Y., Azlan, B.A.L., Yahya, B., & Awang Z. (2016). Generic Green Skills: Industry and perspectives on technical education and vocational training (TVET) In: *TVET@Asia*, issue 6, 1-13. Online: http://www.tvet-online.asia/issue6/zolkifli_et_al_tv6.pdf (retrieved 30.01.2016).

This document is published under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License.



The Authors



Dr. HAMID ZOLKIFLI

Technical and Engineering Education Department
Universiti Teknologi Malaysia

E-mail: p-zolkifli@utm.my

WWW: <http://educ.utm.my/mohdzol>



Dr. YUSRI KAMIN

Technical and Engineering Education Department
Universiti Teknologi Malaysia

E-mail: p-yusri@utm.my

WWW: <http://educ.utm.my/yusri>



Dr. AZLAN BIN ABDUL LATIB

Technical and Engineering Education Department
Universiti Teknologi Malaysia

E-mail: p-azlan@utm.my

WWW: <http://educ.utm.my/azlan>



Assoc. Prof. Dr. YAHYA BUNTAT

Technical and Engineering Education Department
Universiti Teknologi Malaysia

E-mail: p-yahya@utm.my

WWW: <http://educ.utm.my/yahya>



Assoc. Prof. Dr. ZUBAIDAH AWANG

Technical and Engineering Education Department
Universiti Teknologi Malaysia

E-mail: m-zu@utm.my

WWW: <http://educ.utm.my/zubaidahawang>