

Integration of Green Skills in Sustainable Development in Technical And Vocational Education

Arasinah Kamis^a, Amarumi Alwi^a, Bushra Limuna Hj Ismail^a, Normah Zakaria^b, Faizal Amin Nur Yunus^b

^Afaculty Of Technical And Vocational Education, Universiti Pendidikan Sultan Idris, 35900 Tanjung Malim, Malaysia

^Bfaculty Of Technical And Vocational Education, University Tun Hussein Onn, 86400 Parit Raja, Malaysia

*Corresponding Author: amarumialwi@gmail.com

ABSTRACT

TVET or Technical and Vocational Education, *Pendidikan Teknikal dan Vokasional* in Malaysia (PTV) plays an important role in contributing to the source of skilled manpower. PTV transformation needs to emphasise sustainable development in producing competent students. Green skills that have a significant association with green technology will contribute to sustainable development in terms of the environment, economy and social activities. Indeed, green skills need to be incorporated in PTV as one of the measures to provide skilled labour and at the same time act as an agent of sustainable development in various aspects. This article explores the integration of green skills in the sustainable development of PTV in Education Sustainability Development (ESD) as a method of preserving and conserving the environment.

I. INTRODUCTION

The 11th Malaysia Plan contains the agenda of producing and developing human capital that can stimulate the national economic growth in the future, and cultivating awareness about the importance of preserving the environment. These efforts will not only achieve the goal of producing high-tech human capital but maintain sustainable economic growth and disseminate the knowledge of green technology (RMK 11, 2016-2020). The Ministry of Energy, Green Technology and Water, Malaysia or Kementerian Tenaga, Teknologi Hijau dan Air, Malaysia (KeTTHA) was established as a result of a cabinet restructuring of the Ministry, which was previously known as the Ministry of Energy, Water and Communications (KTAK). Therefore, a new function called green technology was included. Green technology encompasses a very wide range of environmental aspects, and one of them is green skills.

Green skills refer to the abilities, values and attitudes needed by humans to support the sustainable and effective utilisation of resources in the workplace (CEDEFOP, 2012; McDonald's, Condon and Riordan, 2012). The green education about sustainability focuses on skills that will help preserve and conserve the environment. In the year 2012, the International Centre for Technical and Vocational Education and Training (UNEVOC), set out the content of Green Technical Vocational Education and Training (TVET), which includes these elements: education that enhances problem-solving skills in the daily lives (skills manage life), education in

sustainable development in life and entrepreneurship education.

Through a greater sustainability-related curriculum, technical and vocational education or PTV, plays an important role in educating students to acquire awareness of the environment. The integration of green skills in the PTV curriculum is a must; it is very useful for realising our education philosophy in line with the goals of the national green technology policy (DTHN). Increasing education and awareness of green skills and encouraging the widespread use of green technology are a continuous effort; it helps expand the potential of individuals in a holistic and integrated manner that will produce a balanced and harmonious lifestyle in terms of intellectual, spiritual, emotional and physical qualities based on the belief in and adherence to God (Siti Nor Syazwani, MohdSafarin, & Muhammad Sukri, 2012)

The two components, sustainability Education Development, or ESD, and TVET or PTV in Malaysia are both needed in order to produce employees that have sustainability habits in life (UNEVOC, 2012: Ramlee, 2015). Sustainability practices are an essential element in the area of employment. For example, in the hospitality and food service industry, workers will carry out sustainable development through eco-tourism, using renewable energy and practising recycling of materials. Green TVET can add value to the field of education through these approaches: encouraging problem solving in life (life skills education); teaching the practices of

sustainable consumption and lifestyle; and imparting entrepreneurial skills (UNEVOC, 2012).

The practice of sustainability is an important factor in training students to be more responsible for preserving the Earth for the future generations. Studies by Siti Rohani (2013) indicate that the attitude of individuals is a factor that contributes to the environmental problems. Adverse impacts to the environment are closely related to the lifestyle-conscious community who carry out economic development and utilise materials without considering the importance of environmental care. An estimated 25,000 tons per day of solid waste are generated in the year 2012; the country's solid waste Department, "Jabatan Sisa Pepejal Negara" (JSPN) found that food waste accounted for 45 per cent of the total 29,000 tons of solid wastes produced in a day in Malaysia. Only 5% are recycled although many recycling campaigns had been launched and recycling bins are available in certain places. This is the effect of the lack of knowledge and skills in the solid waste management system, particularly in the separation of wastes (Festus and Ogoegbunam, 2012; Licy, Vivek, Saritha, Anies and Josphina, 2013).

II. GREEN SKILLS

As mentioned earlier, green skills refer to the abilities, values and attitudes needed by humans to support the sustainable and effective utilisation of resources in the workplace (CEDEFOP, 2012; McDonald's, Condon and Riordan, 2012). Organization for Economic Co-operation and Development, OECD (2014) defines Green Skills as skills of sustainability, also known as technical skills, values or attitudes required in work to develop or support the sustainability of the social activities, economy and revenue in business, industry and the community. However, teenagers nowadays see Green Job employment as unpopular, dirty and low-class; and hence the green-skill concepts are not given much attention (CEDEDOP, 2012).

Strietska-Illina, Hofman, Haro and Jeon (2011) state green skills as knowledge, abilities, values and attitudes needed in life for growth, and they support the formation of a community that has an efficient and sustainable management in utilisation available resources. Pavlova and Huang (2013) summarise in their review research that green-skill elements should be included in technical and vocational education, which will bring these benefits: adding value to life, not harming the environment, holding on to science and technology, working hard, and obeying the law and integrity in carrying out tasks in the daily lives. Consumers are advised to adopt green skills in everyday life by initiating steps to apply them as much as possible; they can start with

normal practices such as using own containers when they buy food to take home instead of using Styrofoam or plastic containers that are not environmentally friendly (Arasinah et al., 2016).

Diep And Hartmann (2016) In His Research State That Green Skills In The Field Of PTV Are A Thinking Process That Can Be Divided Into Four Categories:

1. Skills in taking up a responsibility to protect the environment such as managing energy and water resources, and solid waste disposal.
2. Social skills such as assuming a responsible role to prevent discrimination in the workplace.
3. Skills in taking up responsibilities in the areas of the economy such as financial accountability, innovation and entrepreneurship.
4. Skills at the local and international levels include those in the field of health, personal life, employment, the environment and the community.

The term green skills is still new compared with green practices or "amalan hijau"; the latter two terms are more often used in Malaysia which include practices related to measures in conserving the environment. The whole world, including Malaysia, has now caught on to providing education that contains green elements, such as Green economy, Green technology, Green education, and Green skills. Ruzian and Norizan (2014) underline the concept of green technology that is interconnected with Green Skills. Activities involving green energy are seen as a medium to help human conserve the environmental sustainability, which is realized through green-technology industries. Green technology will begin to develop and it will create a new dimension in green Skills, which will be in high demand in the future (Ghansyam, 2015; Ramlee, 2015; Arasinah et al., 2016).

III. ENVIRONMENTAL SUSTAINABLE DEVELOPMENT

Green TVET is a term used by UNIVEC (2012) to introduce the element of sustainability into the technical and vocational education. In achieving the success of Green TVET, three dimensions of sustainability requirements need to be addressed: the environment, the economic and social aspects; cultural elements have been added as a fourth dimension (UNESCO, 2009). Diep and Hartmann (2016) say that climate change is worrying as the problem of global warming requires urgent solutions, and they noted that today sustainable development plays a very important role in all areas of life including technical and vocational fields. Thus, the field of Technical and vocational education can be a tool to minimise the effects of global warming by

providing an environment-conscious culture. In the year 2012, the International Centre for Technical and Vocational Education and Training (UNEVOC) emphasized that Green TVET should play a crucial role in enhancing learners' creative, entrepreneurial and innovative skills. These skills need to be underpinned by critical reflections of attitudes and values that are at the heart of ESD. Although green practices are not part of our lifestyle today, we need to change our thinking so that we still will be able to enjoy the same quality of life we have today in the long run. We should also be aware that the choices made by us today will determine the quality of environment for our children in the future.

Ramlee (2015) stresses that education and training play an important role in the success of transitioning the economy to the development of green economy and clean environment conducive for the overall economic growth. Thus, elements of sustainability or green skills should be included in the curricula of schools, universities and skills training centres to provide human resources that are conscious of the environment. Sustainable development of the environment has many specific benefits, which are a positive process in solving the global problems, both individually and as a community (Bonnett, 2010). The PTV sustainable education involves two important elements: firstly, an equal opportunity for everyone to obtain education, formally or informally; secondly, availability of job-related training and opportunities of lifelong learning so that a person can acquire knowledge and skills in various related fields to foster professional development (Pavlova, 2015)

Majumdar (2010) classified green TVET into five key elements in order to achieve the objectives of sustainable development in an educational institution: green campus, green technology, green community, green research and green culture as shown in Figure 1 below.

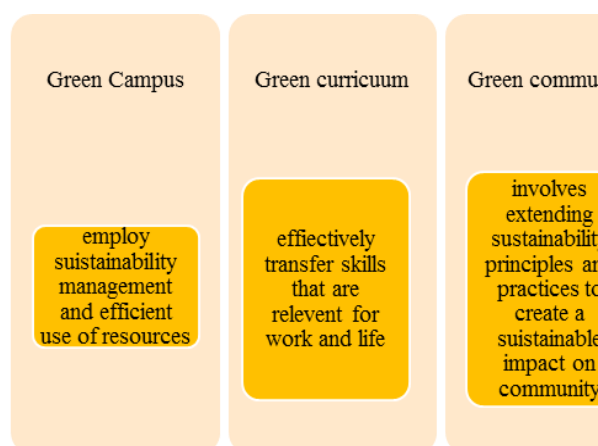


Figure 1. The Effectiveness Of Green Management In TVET (Source: Majumdar, 2010)

IV. INTEGRATION OF GREEN SKILLS IN THE SUSTAINABLE DEVELOPMENT OF PTV

Sustainable Development Education, or ESD, is generally a process to develop concerns, abilities, attitudes and values in students. Through this process, students will be involved in sustainable development more effectively at the local, national and international levels, which in turn will help them to work towards a more sustainable future. Thienemann (2014) indicates that the skills for sustainability, green skills, and skills learned via TVET for sustainability are different terms used in integrating sustainability education in TVET. ESD can help everyone to acquire the values, skills and knowledge needed to build a sustainable future.

PTV is an agent that facilitates the creation of a sustainable workforce. There is a need for a workforce equipped with sustainability values in order to overcome the globalisation issues involving climate change and other adverse effects. The technical and vocational education, through a greater sustainability-related curriculum, plays a crucial role in educating students to be aware of the environment. Hence, the integration of green skills in the PTV curriculum is a must. The education and training institutions in Malaysia have to figure out a method that will provide the younger generation with a thorough awareness about the importance of conserving the environment for the welfare of everyone. In this article, the integration of green skills is elaborated in the context of four elements: environmental sustainability, economic sustainability, social sustainability and culture.

PTV And Environmental Sustainability

Education could be instrumental in overcoming global environmental issues and help to preserve the earth for the future generations. Students need to be exposed to the knowledge of negative effects on the environment, which are brought by the inconsiderate acts of humans. Values of environmental sustainability should be taught in line with the skills learnt so that educational institutions can produce a workforce that is not only skilled, but has a concern for the good of the environment. The engagements of responsible personnel in the management of natural resources, waste reduction, and the reduction of the potential risk of damage to the atmosphere due to the business have been identified to contribute significantly towards the "carbon neutral" world (Majumdar, 2010). These efforts need to be reflected in all areas of education to address the environmental dimension of sustainability (Thienemann, 2014).

Therefore, the integration of green skills in PTV should emphasise sustainable environmental

development. Manitoba Education focuses on three important elements in diffusing the environmental sustainability: awareness, action and transformation (MacDiarmid 2015). In the aspect of awareness, integration of greens skills in the curricula of secondary and primary education is very important; green elements are incorporated into technical and vocational subjects such as Design and Technology (Arasinah et al, 2016). For example, these topics can be considered: solid waste management, activities that can lower the index of the carbon dioxide released by humans into the air, and other green efforts.

In addition, students in higher educational institutions must live their life as good models by practising green skills or “amalan hijau”; they should be seen as people who are committed to a variety of ongoing sustainability practices such as green campus, recycling, and participation in green campaigns. Several universities have successfully implemented the ‘greening’ of a university campus, whereby solid waste management programmes are carefully planned based on a key focus and waste characterisations. Paper and paper products constitute a huge volume of solid waste due to academic and research activities. A reduction of paper consumption is suggested and paper recycling is encouraged. PTV must inject eco-friendliness into the establishments of workshops or infrastructure facilities.

PTV And Economic Sustainability

The developments and applications of green skills will soon become a significant economic force in the world. Green skills include the tricks of the trade that will utilise green technology to generate the national income. This has been proven in many of the countries that have adapted to green culture and derived profits from natural resource and solid waste management. The country needs to implement these measures: transitioning to an economy of low carbon, adopting technologies that give priority to environment, and transforming people to think in terms of sustainability (Ramlee, 2015). Thus, PTV needs to introduce skills that are sought after in the world of globalisation; a good example is the expertise to harness utilisation of renewable energy from biomass and solar power, and change the usage of nature such as land and forestry (Jagannathan, 2013).

PTV and social sustainability

Social values also need to be integrated into the PTV curriculum to produce students that are not only competent technically but have the responsibility towards the environment. Development of social values, including the notion of eternity, will motivate a person to realize his or her potential in

using the talents and skills to attain a holistic happy life regardless of gender, ethnicity and geographical locations (Thienemann, 2014). To cultivate and develop habits of sustainability, it will not only involve changes of thinking and lifestyle but also a change of culture (Ramlee, 2015). Society should be cognisant that the way of life can have far-reaching implications for the environment.

PTV And Culture Sustainability

To cultivate sustainable development, it will only involve change in way of thinking and lifestyle but also changing culture (Ramlee, 2015). Majumdar (2010), listed some steps in promote ESD in the effective changes of TVET like Green values, Green attitude, Green ethics, Green practices. ESD is a process for applying the values to students in developing concern, ability and their attitude towards education. Even though parents should set a good example to children so that they will be compelled to adopt green lifestyle changes, but TVET has to play roles in creating a culture that embarks the sustainability practice in life. This step should start at school by the teacher and on campus by the lecturers. In reality culture and mindset change will be moving towards green technology and practice. Small changes we make today will have a major impact in the future (Arasinah, et al., 2016)

V. CONCLUSION

Green skills can bring many benefits to a country and consequently to the whole world. Integrating sustainability education into the PTV curriculum, particularly the green skill element, will benefit mankind and the environment. Educational institutions that adopt green skills and sustainable development elements in the courses will produce a workforce that is competent and able to contribute to the preservation of the environment in the long term. The policy makers should take the necessary actions such as promoting basic skills, and green skills so that well-equipped workers can meet the new challenges in their work place. At the same time, coherent policies must be introduced and there should be coordinated implementation of education and training for sustainable development.

REFERENCES

- [1]. CEDEFOP. (2012). Green skills and environmental awareness in vocational education and training. European Centre for the Development of Vocational Training, Luxembourg.
- [2]. Diep, P.C. & Hartmann, M, (2016). Green Skills in Vocational Teacher Education – a model of pedagogical competence for a world of sustainable development. In: TVET@Asia, issue 6, 1-19. Online access from:

- http://www.tvet-online.asia/issue6/diep_hartmann_tv6.pdf
- [3]. Majumdar, S. (2010). Greening TVET: Connecting the dots in TVET for sustainable development. Accessed from <http://iveta2010.cpsctech.org/downloads/materials/full%20papers/1.%20Greening%20TVET.pdf>
- [4]. Organisation for Economic Co-operation and Development, OECD. (2016). Diakses dari www.oecd.org/innovation/greenskillsforum2014.htm.
- [5]. Pavlova, M. (2012). Generic green skills: Can they be addressed through Technology Education?, Griffith University.
- [6]. Ramlee Mustapha (2015). Green and Sustainable Development for TVET in Asia. *The International Journal of Technical and Vocational Education*. Invotec XI:2 (2015)
- [7]. 133-142.
- [8]. Arasinah Kamis, Ramlee Mustapha, Waliza, & Bushra Lamuna, "Green Skills as an Added-Value Element in Producing Competent," *Int. Journal of Engineering Research and Application*, pp12-21, 2016
- [9]. UNEVOC, International Centre for Technical and Vocational Education and Training. <http://www.unevoc.unesco.org/>, 2012. [Assessed June 2016]
- [10]. Siti Nor Syazwani Saibani, Mohd Safarin Nordin & Muhammad Sukri Saud. (2012). Integrasi Teknologi Hijau Dalam Kurikulum Pendidikan Teknik Dan Vokasional (PTV). *Journal of Technical, Vocational & Engineering Education*, Volume 5. Page 11-19 / ISSN: 2231-7376.
- [11]. Suhaimi, N., Mahmud, S.M.Z., Mohamad Ariff, N.A., Hamzah, R., & Saud, M. S. (2010). Pelestarian kurikulum pendidikan teknik dan vokasional (PTV). Edupress 2010.
- [12]. Gabbasa, M., Sopian, K., Yaakob, Z., Faraji Zonooz, M. R., Fudholi, A., and Asim, N. 2013. Review of the Energy Supply Status for Sustainable Development in the Organization of Islamic Conference. *Renewable and Sustainable Energy Reviews*. 28(0): 18–28
- [13]. Pavlova, M., (2015). Green Skills: Defining and Reorienting Competencies for Environmentally friendly practices. Symposium on the Inclusion of Green Competences in the Recognition of Prior Learning (26 August 2015). Accessed from [Green%20Skills%20presentation%20Pavlova%20\(1\).pdf](http://www.greenskillsforum2015.org/pavlova%20(1).pdf)
- [14]. Bonnett, M. (2010). Environmental education. *International Encyclopedia of Education (Third Edition)*. Access from [http://dx.doi.org.libproxy.helsinki.fi/10.1016/B978-0-08-044894-7.00585-](http://dx.doi.org.libproxy.helsinki.fi/10.1016/B978-0-08-044894-7.00585-5)
- [15]. Thienemann, R.C.E (2014). Education for Sustainable Development in Technical and Vocational (Tesis Sarjana). Education and Training. Institute of International Education, Department of Education. Stockholm University.
- [16]. Asnul Dahar Minghat, Ruhizan M. Yasin, Kamalularifin Subari, Muhammad Khair Noordin, (2013). Strategi Kelesterian Pembangunan Pendidikan Teknikal dan Vokasional (PTV). 2nd International Seminar on Quality and Affordable Education (ISQAE 2013).
- [17]. Jagannathan, S. (2013). Education and skills in Asia: Responding to greening economies. In R. Maclean et al. (eds), *Skills Development for Inclusive and Sustainable Growth in Developing Asia-Pacific*. New York: Springer.

Arasinah Kamisa. "Integration of Green Skills in Sustainable Development in Technical And Vocational Education." *International Journal of Engineering Research and Applications (IJERA)*, vol. 07, no. 12, 2017, pp. 08-12.