

GREEN SKILLS FRAMEWORK FOR TVET STUDENTS IN THE CONSTRUCTION SECTOR

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ABSTRACT: *Environmental issues are social issues that are constantly affecting the society starting with environmental pollution, global climate change and the lack of natural resources that threatens the lives of individuals, communities, and other living organisms. The solution for the problem is to expose the public to green skills. Green skills are skills that need to be there for all ages and they underlie all areas. Individuals who enter the industry must be equipped with enough skills and knowledge related to green skills. But in Malaysia, green skills are still relatively new and need to be explored in terms of the types and forms of skills. Nowadays, individuals entering the industry do not have relevant qualifications. In this regard, this study was conducted to explore and develop the green skills framework for technical students in the construction sector. This study used qualitative approach, which data were collected through interviews conducted by three (3) experts who have served for over 5 years in the construction industry. Results from the interviews found 20 elements of green skills.*

Keywords: Environment; Framework; Green skills.

I. INTRODUCTION

Environmental issues are a social problem that is constantly affecting the society due to environmental pollution, global climate change and the lack of natural resources that threatens the lives of individuals, communities and other living organisms (Bruni, Chance & Wesley, 2012). These cause serious social and economic consequences if pragmatic action is not taken. Environmental regulations lead to technical advancement and increasing demands for technical and scientific skills (Vona, Marin, Consoli and Popp, 2015). One of the agreed methods that can address this problem is awareness of green technology. The development of green technology in education is the most influential agent in society to convey information in minimizing the negative impact of the environment (Hanifah, Shaharudin, Mohmadisa, Nasir and Yazid, 2015). Green technology

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encompasses a wide range of environmental aspects and one of them is green skills. Buntat and Othman (2012) state that the term green skills has emerged since the advent of green technology. Green technology requires a specific skill set to operate on the green technology itself called green skills (Rebecca, 2010). Green skills are defined as a skill that underpins all fields of work and a must skill for everyone.

The two main types of skills that employers often require are technical skills and generic skills. In general, technical skills are considered work-related skills, such as programming, car repairing, woodcutting, barn construction and so on (Laker and Powel, 2011). Generic skills are the ability to control jobs and people such as communication skills, teamwork skills, problem solving and critical thinking (Zhang, 2012). However, this scenario has changed as it is still not enough for a person with both technical and generic skills to get a job (Abdullah, Mohamed, Sabran, Muthusamy and Amin, 2009). In addition to the skills mentioned above, employers are beginning to find workforce with green skills to promote a sustainable social, economic, and environmental development.

Some countries, especially developed countries, are taking precautions and measures to solve environmental issues by moving the current economic model to a green economy (CEDEFOP, 2010). CEDEFOP (2010) also states that the shift to green economy has increased the rate of change in the labour market and the skills required by the green industry. The green industry that supports the green economy requires workers with green skills to perform their tasks. The green industry has led to changes in employers' demands for jobs and workers' skills. In other words, significant skill gaps exist in the labour market due to the need in the green industry. The consequences of ignoring and not filling these skill gaps can hinder economic growth and employment, and can also hinder efforts to fight climate change.

The current major issue is the lack of emphasis on green skills in education in Malaysia. If the concept of development based on environmental sustainability is not practiced, the country will be at risk by producing skilled workers but neglecting the responsibility to conserve nature and the need for energy conservation and natural resources. Therefore, green skills need to be included in the school curriculum (Arasinah, Amarumi, Haryati, Faizal Amin and Ridzwan, 2016).

II. OBJECTIVE

This study aims to develop a green skills framework for technical and vocational students in the construction sector.

III. LITERATURE REVIEW

Green skills

Green skills are skills that include the confidence, initiative, and interpersonal skills that must be present in every human being (Strachan and Laing, 2010). Green skills are a skill that everyone must have in order to produce individuals who are always working towards sustainable life and economy. Green skills refer to the skills, values, and attitudes needed by humans to support sustainability and effective use of resources at workplace

(CEDEFOP, 2012). In general, green skills are considered as sustainability skills related to technical skills, knowledge, values, and attitudes needed in the workforce to develop sustainable social, economic, and environmental outcomes in business, industries, and communities (McDonald, Condon and Riordan, 2012). Therefore, green skills are an important skill for self-competitiveness and improving quality.

Sustainable Development

There are various opinions on the definition of sustainable development. However, it is still unacceptable and it is agreed that there are many areas in the community. This is because the concept is considered to be inaccurate based on the perspective of the business community. According to Pierantoni (2004), economic, social, and environmental concepts are important variables in a sustainable development.

Ciegis and Zeleniute (2008) propose definitions related to sustainable development such as: (i) social and sustainable development encompassing a range of social relationships that exist in communities that are closely related to emotional-social; (ii) in the areas of environment related to development processes that maintain, manage, and conserve ecosystem life, environmental, and biological diversity; (iii) focus on economic and sustainable development in the development process with emphasis on the per capita income of the inhabitant to be better, and the welfare of the community is guaranteed.

IV. METHODOLOGY

Qualitative method in research can facilitate the search for clearer information about a problem. The main advantage of using qualitative method in a study is that the data obtained are conclusive and have high validity. Interview is a face-to-face method of collecting data between researchers and respondents. Among the methods that have high validity in the qualitative data collection process is the interview method (Yin, 2014). Interviews in qualitative studies have been recognized to have advantages in terms of depth of study (Silverman, 2013).

Therefore, in this study, researchers used the interview method to obtain data. Interview sessions were conducted with three (3) experts. Experts are experienced engineers for more than five (5) years. Researchers chose these criteria because those who are experienced on site know what is needed better. The method of analysis used in this research was thematic analysis. The thematic analysis method aims to find common patterns across the data sets. Thematic analysis is an analytical approach based on or characterized by certain themes (Abdul Halim, 2016). The researchers collected data from the interviews and developed the transcripts based on the interview findings. Completed transcripts were then divided into specific themes.

V. FINDINGS

Based on the findings of the study, respondents provided some important elements that can serve as a guide for developing a green skills framework for technical students in the construction sector.

There are five (5) main themes that have been found in the analysis of interviews which are environmental awareness, increasing the courses or trainings related to the environment before entering the career, mastering leadership skills, practice recycling activities, and minimize the use of electricity and water. Therefore, green skills framework for technical and vocational students is needed by the green jobs for the future of construction and should be implemented in schools.

i. Environmental awareness

"If I want to find a new employee on site, the first thing I'm looking for is an environmentalist." (R1)

"Workers who have a high awareness of the environment are among the workers I need here." (R2)

"If I need a new employee here, I want a worker who is committed to work and has high environmental awareness." (R3)

ii. Increasing the courses or trainings related to the environment before entering the career

"I recommend that all institutions increase environmental courses or trainings because such knowledge is very helpful in our industry today." (R1)

"I have attended courses or trainings related to the environment and they have been a great experience and worth it to attend and I recommend them to all technical and vocational students." (R2)

"I have attended environmental courses and for me this kind of course is quite important in construction work." (R3)

iii. Mastering leadership skills

"I think leadership skills should be mastered by all employees so that all employees can work in one team." (R1)

"For me, to be in this green industry, leadership skills are essential but not for all employees. It is enough for individuals with position because the decisions are difficult to make if everyone feels themselves as a leader." (R2)

"Leadership skills are important to employees so that they will be more positive and confident in speaking or communicating with subordinates." (R3)

iv. Practice recycling activities

"We often do recycling here where our site cabin will be used repeatedly for some projects as long as it is not damaged. So, indirectly, the workers who engage in such activities are indeed the workers we seek." (R1)

"When it comes to recycling, here we use aluminum formwork that can be used many times because they are difficult to break. So we can save money on new formwork. I also encourage technical students to make this recycling practice as one of their daily practices." (R2)

"We use the barrel of water repeatedly here. For example if in this project the container or the barrel can be used, we will use it again in the coming project. Students need to make this recycling activity their daily routine." (R3)

v. Minimize electricity and water consumption

"We always ask employees to turn off the switch if they do not use the equipment or the machine and constantly saving on water." (R1)

"At the site cabin, we install timer and sensors for some electrical appliances so that they are not wasted if no one use it. For the water, we will use the water here carefully and that's what we always tell the workers." (R2)

"In this project we use LED lights because as we know LED lights are more economical than regular lamps. We also keep reminding all workers to save water. We also use rain water that we store in barrel to wash our equipment after usage." (R3)

Table 1: Research findings

Themes	Interview results			Findings of the literature review
	R1	R2	R3	
Environmental awareness	<i>"If I want to find a new employee on site, the first thing I'm looking for is an environmentalist."</i>	<i>"Workers who have a high awareness of the environment are among the workers I need here."</i>	<i>"If I need a new employee here, I want a worker who is committed to work and has high environmental awareness."</i>	<ul style="list-style-type: none"> • Pavlova (2017) notes that environmental awareness and willingness to learn about sustainable development is one of the green skills competencies. • Irresponsible societal attitudes have led to negative impacts

				on the environment and consequently affected the quality of human life (Jamilah, Hasrina, Hamidah and Juliana, 2011).
Increasing the courses or trainings related to the environment before entering the career	<i>"I recommend that all institutions increase environmental courses or trainings because such knowledge is very helpful in our industry today."</i>	<i>"I have attended courses or trainings related to the environment and they are a great experience and worth it to attend and I recommend them to all technical and vocational students."</i>	<i>"I have attended environmental courses and for me this kind of course is quite important in construction work."</i>	<ul style="list-style-type: none"> • Pavlova (2016) states that green-related programs and trainings play an important role in enabling workers to participate in the green economy. • The issue of green skills can be solved by increasing programs and training as it will help to provide green skills trainings to workers in the construction sector effectively (McCoy, Patrick, O'Brien, Novak and Cavell, 2012).
Mastering leadership skills	<i>"I think leadership skills should be mastered by all employees so that all employees can work in one team."</i>	<i>"For me, to be in this green industry, leadership skills are essential but not for all employees. It is enough for individuals with positions because the decisions are difficult to make if</i>	<i>"Leadership skills are important to employees so that they will be more positive and confident in speaking or with subordinates."</i>	<ul style="list-style-type: none"> • State leaders should take the issue seriously in producing students with high leadership skill to participate in the development of the country (Supaat, 2012). • In addition to technical skills in the green industry, workers should also have non-

		<i>everyone feels themselves as a leader.”</i>		technical skills such as leadership, teamwork, problem solving, creative and critical thinking skills to enable them to become better individuals at workplace and for a sustainable development (Zolkifli, Kamin, Azlan, John and Awang, 2016).
Practice recycling activities	<i>“We often do recycling here where our site cabin will be used repeatedly for some projects as long as it is not damaged. So, indirectly, the workers who engage in such activities are indeed the workers we seek.”</i>	<i>“When it comes to recycling, here we use aluminum formwork that can be used many times because they are difficult to break. So we can save money on new formwork. I also encourage technical students to make this recycling practice as one of their daily practices.”</i>	<i>“We use the barrel of water repeatedly here. For example if in this project the container or the barrel can be used, we will use it again in the coming project. Students need to make this recycling activity their daily routine.”</i>	<ul style="list-style-type: none"> • Students are encouraged to use recycled materials such as rattan, bamboo, boxes, plastic bottles, shells, wooden castings and plastic pipes regularly while carrying out educational activities in order to save cost and learn about the resources available around them (KPM, 2015).
Minimize electricity and water consumption	<i>“We always ask employees to turn off the switch if they do not use the equipment or the machine and constantly saving on water.”</i>	<i>“At the site cabin, we install timer and sensors for some electrical appliances so that they are not wasted if no one use it. For the</i>	<i>“In this project we use LED lights because as we know LED lights are more economical than regular lamps. We also keep</i>	<ul style="list-style-type: none"> • The public is still unaware of this problem by wasting domestic water especially through wastage of clean water sources in their daily practice (Che Ngah,

		<p><i>water, we will use the water here carefully and that's what we always tell the workers."</i></p>	<p><i>reminding all workers to save water. We also use rain water that we store in barrel to wash our equipment after usage."</i></p>	<p>Saleh, Hashim, Nayan and Ibrahim, 2013).</p> <ul style="list-style-type: none"> • The jobs that are gaining attention in the industry are related to efficient use of renewable energy, energy saving, sustainable water systems, green development and recycling (Brown, 2013). • Energy saving can be best interpreted as any activity that can reduce electricity costs (Mustapha, 2015).
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Table 2: Summary of research findings

Theme	Element
Environmental awareness	<ul style="list-style-type: none"> • High awareness of the environment • Willingness to learn about sustainable development • Committed to work • Irresponsible societal attitudes have had a negative impact towards the environment
Enhance environment related courses or training before entering the work environment	<ul style="list-style-type: none"> • Knowledge from environment related courses and trainings can be used in the work environment • Allow workers to participate in the green economy • Assist in providing green skills training to workers in the construction sector
Mastering leadership skills	<ul style="list-style-type: none"> • All employees can work in one team

	<ul style="list-style-type: none"> • Employees will be more positive and confident in communicating with their subordinates • Assist in the development of the country • Non-technical skills such as leadership, teamwork, problem solving, creative and critical thinking skills make employees better and assist in sustainable development
Practice recycling activities	<ul style="list-style-type: none"> • Make recycling as a daily practice • Save costs • Recycling practice makes people know about the use of resources around them
Minimize electricity and water consumption	<ul style="list-style-type: none"> • Switch off equipment or machine if not used • Always conserve water • Install timer and sensor at electrical equipment to save electricity • Always remind employees to save on water usage • The public is still unaware and does not care about the problem with domestic wastage • Jobs that are gaining attention in the industry are efficient in using renewable energy, energy saving, sustainable water systems, green development and recycling

VI. DISCUSSION

The results of the study showed that there are some elements of green skills that need to be provided to technical students so that they are well prepared to work. This is because the industry in our country is now slowly changing into green industry. Students with technical skills alone are not enough to earn their place in the green industry (Abdullah, Mohamed, Sabran, Muthusamy and Amin, 2009). The green industry demands not only for technical skills but also workers with green skills (Buntat and Othman, 2012). Strieska-Illina, Haro and Jeon (2011) point out that green skills are in high demand in green economic development.

These green skills can be made more effective for people in the form of education. The application of green skills in the education system can create a society with high awareness of the environment, and also produce highly ethical Malaysian society (Chen, Hill, Ohlemüller, Roy and Thomas, 2011). When green skills are instilled at an early stage through education, students will be able to apply these elements continuously until they start to work (Coljin, 2014). This is because they are the next generation who will continue to take care of the environment, and therefore must be exposed to skills related to environmental sustainability.

The respondents stated that technical institutions should produce students with high environmental awareness. This is supported by Pavlova (2017) who states that environmental awareness and willingness to learn

about sustainable development is one of the green skills competencies. This is because individuals with high level of awareness of the environment can ensure that their activities can reduce the risk of pollution and environmental damage. The environment affects the quality of human life. The irresponsibility of the society has led to negative impacts on the environment, and consequently affected the quality of human life (Jamilah, Hasrina, Hamidah and Juliana, 2011).

Respondents also suggest that technical institutions in Malaysia provide more environmental trainings and courses for students before they graduate. This is supported by Pavlova (2016) who points out that green and environment related programs and trainings play an important role in enabling workers to participate in the green economy. It is because this kind of trainings and courses can prepare students for important matters related to the environment before they start to work. They are ready and know how to deal with environmental problems. Green skills issues can be solved by increasing training programs because it will help in delivering green skills training to employees in the construction sector effectively (Mc Coy, Patrick O'Brien, Novak and Cavell, 2012).

Leadership skills are an important element of an organization especially in achieving a goal. National leaders should take the issue of producing students with high leadership in driving the development of the country seriously (Supaat, 2012). In addition to technical skills in the green industry, workers should also have non-technical skills such as leadership, teamwork, problem solving, creative and critical thinking skills to enable them to become better individuals at workplace and for a sustainable development (Zolkifli, Kamin, Azlan, John and Awang, 2016). Respondents agree that leadership skills need to be mastered by all students so that they can easily organize their work while at workplace and make decisions.

Recycling is not a new practice in Malaysia, but recycling culture is still not practiced among Malaysians and its response is still low (Saripah, Latif, Omar, Awang and Zainudin, 2012). All three (3) respondents stated that they practiced recycling practices at their construction sites and suggested that all technical students should make recycling as their daily practice. Recycling is an activity that contributes to environmental sustainability and reduces damage to nature, and the use of raw materials becomes more efficient as it can be used several times before being discarded. Students are encouraged to use recycled materials such as rattan, bamboo, boxes, plastic bottles, shells, wooden castings and plastic pipes regularly when carrying out educational activities in order to save costs and learn about the resources available around them (KPM, 2015).

The efficiency aspects of electricity need to be emphasized as they are one of the biggest contributors to climate change through the process of generating energy and burning fuel. Excessive electricity consumption, especially during peak times, has led the world towards serious energy-related crisis. The same thing happens to water sources. The society is still unaware and ignores this problem by committing domestic water wastage especially through wastage of clean water sources in their daily practice (Che Ngah, Saleh, Hashim, Nayan and Ibrahim, 2013). Respondents state that the most common characteristic of individuals in the workplace today is workers who practice green skills, such as minimizing water and electricity use. The jobs that are gaining attention in the industry are related to efficient use of renewable energy, energy saving, sustainable water systems, green development and recycling (Brown, 2013). Mustapha (2015) states that energy saving can be best interpreted as any activity that can reduce electricity costs.

VII. CONCLUSION

Green skills are indispensable in the education curriculum in Malaysia because these skills are required by green jobs to be able to develop the green economy (Asnawi & Djatmiko, 2016). According to Coljin (2014), students who apply these green skills can re-apply what they have learned when they go to higher education, and eventually produce green products. TVET is also in desperate need of green skills in the educational curriculum (Syazwani, Safarin and Sukri, 2012). According to Mohd Zolkifli (2014), it can be seen in the TVET curriculum that green skills are still not fully integrated and also the references and studies are still unsatisfactory. Green skills are skills that are highly needed by all ages. This view is strongly supported by UNESCO (2012) which states that education of environmental sustainability or green skills should be integrated at all levels of education from the elementary school level all the way to workplace. The application of green skills in TVET is a prerequisite for a successful environmental sustainability. Green skills are essential in order to produce highly skilled, committed, and motivated individuals. The current major issue is the lack of emphasis on green skills in education in Malaysia. If the concept of development based on environmental sustainability is not practiced, the country will be at risk by producing skilled workers but neglecting the responsibility to conserve nature and the need for energy conservation and natural resources. Therefore, green skills need to be incorporated in the school curriculum (Arasinah, Amarumi, Haryati, Faizal Amin and Ridzwan, 2016). Therefore, there is a need to produce graduates who are equipped with the skills required by today's industry which is green skills.

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