Green skills in knowledge and attitude dimensions from the industrial perspective

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Abstract: Nowadays, employers have started hiring workers with green skills criteria. Green skills have been in high demand since most of the industries shifted to the green industry in order to minimise the effects of greenhouse gases and protect the environment from climate change. However, some graduates from the higher learning institutions could not meet the demands from the industry due to a lack of green skills. In order to reduce the gaps, the present study attempts to reveal the elements of green skills which are highly demanded among the green industries. The qualitative approach was implemented to explore the perspectives among the participants. A set of protocol interview was used and validated as an instrument of the study. Semi-structured interviews were conducted among six experts from the green industries. The selection of experts for this study was based on their qualification, designation, experience, and knowledge of green practices. Data were transcribed manually, and themes were generated. A total of five elements of green skills in the dimensions of knowledge and attitude have been found specifically: 1) green technology knowledge, 2) waste management knowledge, 3) problem solving and critical thinking knowledge, 4) behaviour, and 5) awareness.

Keywords: green skills, knowledge, attitude

1. Introduction
Environmental issues are increasing day by day, as reported every year [1]. Even though the government has created and applied environmental policies and acts, the issues never ends. In the context of Malaysia, the government has pledged to minimise the greenhouse gases by 45% by year 2030 [2], but if no pragmatic action is taken, the mission would not be accomplished. The effects of the environmental issues include high temperature, extreme drought, changing weather patterns, rising ocean levels and so on [3]. All of these consequences of climate change are due to the pollution which will affect the social, economy, and environmental conditions. A total of three sectors have been identified as huge contributors to climate change in Malaysia, namely: energy (including road transportation, power generation, fugitive emissions from oil and gas operation, fuel manufacturing and processing, and activities or sectors involving energy production), waste disposal, and industrial processes [4]. The energy sector holds the largest proportion for the contribution of greenhouse gases,
and within that the energy industries are leading, followed by transportation [4]. Thus, some countries start taking precautions and introducing steps to deal with these environmental issues by shifting the present economic model to a green economy [5]. The green economy model promotes some green aspects such as the green industry which created green jobs [6]. The presence of green jobs is not introducing new jobs, rather it can be any job at any sector such as manufacturing, construction, research and development [7], that requires someone who is competent in green skills [8].

Green skills are not new skills, and the issue has been debated across the world. This is because green skills have been listed for the prevention of climate change and pollution [7]. Generally, the definition of green skills refers to the technical skills, knowledge, value, and attitude which are needed for green jobs in supporting a sustainable economy, society, and the environment through activities performed in the industries, businesses, and the community [9]. There are two terms that can be found related to green skills namely, low carbon skills [8], and generic green skills [10], but most of the researchers are using the term, green skills instead of those two terms. The green skills consist of three main dimensions: 1) skills, 2) knowledge, and 3) attitude [11]. Green skills are quite synonymous to a gardener because of their duty and activities [11]. However, the situation has changed due to the implementation of the green economy model whereby most of the present jobs are emphasising on green skills [8]. Table 1.0 shows the elements of green skills commonly demanded by the industries according to a literature review study [11].

| No. | Element                  |
|-----|--------------------------|
| 1   | Design skills            |
| 2   | Energy skills            |
| 3   | Communication skills     |
| 4   | Procurement skills       |
| 5   | Leadership skills        |
| 6   | City planning skills     |
| 7   | Waste management skills  |
| 8   | Financial skills         |
| 9   | Management skills        |
| 10  | Landscaping skills       |

(Source: Sern, Zaime, and Foong, 2018)

According to Table 1.0, a total of ten elements in green skills have been identified starting with designing skills, followed by energy skills, and ends with landscaping skills. Even though there are many frameworks for green skills, the skill shortages among the workers are still existent [12]. In order to reduce the gaps, some higher learning institutions have implemented the green skills framework in their training curricula. In the context of the Malaysian Higher Learning Institution, there is still a lack of implementation of green skills within the training curricula. Most of the training curricula only emphasise on the generic and technical skills [13]. Thus, the objective of the present study is to discover the elements of green skills which are highly demanded by the industries. The study will only discuss the elements of green skills in the dimensions of knowledge and attitude, as both dimensions are less explored in previous empirical studies compared to the dimension of skills.

2. Lack of knowledge and attitude on environmental issues

Knowledge is important in order to evaluate someone’s mastery in any field, and attitude is important to recognise behaviour and action. In the context of the environment, knowledge and attitude are important elements to promote awareness towards environmental care among the people [14]. However, past studies revealed that most people are lacking in knowledge and attitude regarding the
environmental issues [11]. A study reported that the knowledge among people was low on environmental issues [15]. This is supported by Agboola and Emmanuel (2016), which discovered that people did not clearly understand about the effects of climate change and pollution in their environment [16]. Studies also reported that most adults did not answer correctly about the risks and the fundamental questions for climate change and pollution [17, 18]. Furthermore, some studies showed that the level of attitudes among female adults was low [19]. According to a study by Hassan, Abd Rahman, and Syed Abdullah (2013), the behaviour and action of practices for reducing waste were low among the respondents [14]. Besides, Neo, Choong, and Aharnad (2015), reported that most Malaysians paid very little attention to climate change and they did not realise that negative effects of climate change [20]. They also stated that the increasing number of car usage among Malaysians showed that people do not care about the negative impact on the environment due to air quality deterioration [20]. Thus, all of these findings demonstrated that many people around the world are lacking in terms of good knowledge and attitude towards environmental care. Education is important in order to properly guide and cultivate environmental awareness among the graduates. The lack of this component in the education system would reflect on the skills of the graduate who could not fulfil the requirement from the industry. In this aspect, the technical and vocational education and training (TVET) is playing an important role in producing green skills manpower because TVET is closely connected to the development of economy and the community [11]. In the Malaysian Education system, the Malaysia Education Blueprint 2015-2025 (higher education) stated that the fourth thrust is producing quality technical and vocational education and training (TVET) graduates through a university-industry collaboration [21]. Thus, in developing a framework for a TVET curriculum, it is better to invite related industry as a lead. This is also in line with the mission of the Malaysian Polytechnic which is to produce an industry-led curriculum design. The industries are more experienced on the knowledge and skills which are practical and should be added into the training curricula through the technologies, products, and services.

3. Research Objective
The sole objective of the study is to discover the elements of green skills in the dimensions of knowledge and attitude from the industrial perspective.
4. Research Methodology
The researcher used the qualitative approach in the study. Each sub‐chapter will discuss about: 1) population, 2) sampling, 3) research instrument, 4) data collection, and 5) data analysis.

4.1 Population
The green industries were chosen as the population for the study. A total of three sectors from the green industries were chosen namely, the environmental, manufacturing, and construction industries. All of the participants have been certified or participated in one of the industry standard procedures such as the ISO 14000, EMAS, and P5 standard by the GPM. The aim of the standards was to improve their environmental performance.

4.2 Sampling
The purposive sampling technique was used in the study. The participants were selected according to the predetermined criteria such as the qualification related to green skills, job position (manager, engineer, executive, and human resources), work experience of more than five years, and knowledge in green practice. A total of six participants had been selected for this study.

4.3 Research instrument
A protocol interview was used as the research instrument and the semi‐structured interviews were conducted among the participants.

4.4 Data collection
Data were collected from the in‐depth interviews to explore more profound elements of green skills from the industrial perspective.

5. Findings and Discussion
According to Sern, Zaime and Foong [11], there are three main dimensions in green skills; 1) knowledge, 2) skills, and 3) attitude. However, most of the previous studies have only emphasised on the dimension of skills, while the dimensions of knowledge and attitude are still unclear. Thus, the present study attempted to discover the findings from the dimensions of knowledge and attitude which are important as guidelines for the Malaysian Education curricula to make improvements towards environmental care.

5.1 Dimension of knowledge
A. Green technology knowledge
The first element discovered in the study was green technology knowledge. Three experts stated how they use this technology during work. Generally, green technology is the technology used to promote practices for improving the environmental performance to other technologies [22]. There are various green technology practices which have been regularly used, such as energy conservation, water treatment, environmental remediation, air pollution control, sewage treatment, hydrogen and fuel cells, renewable energy, green building, green transport, and so on [23]. This technology might be improved every year since each country has developed initiatives on awareness towards environmental care [23]. Thus, education must be beyond to be in line with globalisation. Due to that, the aspect of green technology knowledge must be emphasised among the students in order to fulfil this demand from the industry.

“…For example, they carry out energy audit electrical measurement. One of the related knowledge is to check fire protection alarm indicator lamp. In order to perform the work, he must have the knowledge of (the fire) protection alarm indicator lamp…”
“…they must have knowledge in protection action such as (how to) perform anaerobic digester biogas plant lab inventory procurement and instrument assessment. One of the related knowledge is they need to know (the) lab layout plan, list of suppliers, equipment, chemical / reagent, consumables, apparatus, list of testing procedures, manuals, related ISO compliance, pH meter, spectrometer, COD, BOD, Dissolved Oxygen (DO) meter, and others…”

“…kita kena beri penekanan ialah bagaimana satu silibus yang mana melihat apakah teknologi yang berteknologi hijau maksudnya hijau ialah dia boleh menurunkan pelepasan gas rumah hijau itu gashouse emission…”

[…we must emphasise on a syllabus that would look at the technology referring to green technology by which means he could reduce the greenhouse gases and emission…]

B. Waste management knowledge
The next element mentioned was waste management knowledge. Most of the institutions only emphasise on waste management knowledge for civil and environmental studies students. For example, they learn subjects such as environmental engineering, solid and hazardous waste management, and nature conservation. However, in this study, the experts stated that waste management knowledge should be taught to all students. The fundamental knowledge that a graduate must know include the 4R’s and knowledge of materials.

“…secara asasnya pengetahuan yang perlu ada dalam membezakan tong-tong kitar semula yang disediakan oleh syarikat…”

[…basically, the knowledge they should have is how to differentiate the recycle bins provided by the company…]

“…dari segi pengetahuan contohnya asas 4R’s, waste management, waste minimisation…”

[…on the knowledge they should have include the basics of 4R’s, waste management, waste minimisation…]

“…mampu membezakan material atau waste yang boleh dikitar semula dan perlu dilupuskan, dan saya rasa mampu mengendalikan material atau waste dengan baik satu knowledge di perlukan, kemudian di sini SOP kerja tu dah ada jadi pekerja tidak akan sevenang-wenangnya melangkaui SOP tersebut…”

[…the ability to differentiate the material or waste which can be recycled or disposed of, and I think knowing how to handle or organise the material or waste properly is also a needed knowledge, other than that, at the workplace the SOP has been in place so the workers would not simply overstep the SOP…]

C. Problem-solving and critical thinking knowledge
Another element in green skills from the findings was knowledge in problem-solving and critical thinking. Basically, this element is always placed in the dimension of skills. However, experts stated that this element should be categorised as basic knowledge for the workers in order to know how to make the right decision and take the necessary actions related to the green aspect.

“…it is advantage if a worker knows how to differentiate what is work and what is good for the environment as well…”
“...contoh seperti saya setiap cadangan atau tindakan yang ingin dilakukan saya perlu mengambil faktor alam sekitar supaya ia tidak menjejaskan kepada kedua-dua pihak...”
[...for example, I would make recommendation or action which is needed to be done only after considering the environmental aspect so that it does not affect both parties...]

5.2 Dimension of attitude
D. Behaviour

The findings of the study also revealed that the next element of green skills was behaviour. The experts stated that behaviour is important in order to implement the green practice at the workplace. The green practice needs someone to be alert, conscious, patient, and meticulous during the activities at the workplace.

“...alert and conscious during implementation at workplace...”

“...patient and meticulous while carrying (out) data entry activities in green practice...”

“...tindakan sekiranya pekerja tidak mengikut peraturan yang ditetapkan...”
[...the penalty will be given if the worker does not follow the rules or regulation which are stated ...]

E. Awareness

The last element found from the results of the study was awareness on environmental care. This finding supported the previous study which suggested that the elements of awareness is important in order to develop a positive personality among people towards environmental responsibility [14]. The experts highlighted that as a worker, they must realise the importance of environmental care, reducing and minimising paper usage and energy consumption, and becoming aware of the effects and impact of climate change and pollution.

“...concern on environmentally friendly issues...”

“...ada sikap awareness terhadap alam sekitar yang makin terancam...”
[...must have an awareness attitude towards the environment which is becoming endangered...]

“...sedar terhadap kepentingan alam sekitar terhadap komuniti...”
[...realise the importance of environment for the community...]

“...awareness in a person about the green policies is simply what they can do every day such as reduce paper usage and reduce electricity consumption...”

“...ada pekerja yang tahu mengenai keburukan pencemaran dan ada juga yang tak tahu, jadi majikan juga turut memberi serba sedikit knowledge sebagai kesedaran dan kesan mengenai alam sekitar...”
[...there are some workers who are aware about the bad effects of pollution and some of them do not know, so an employer needs to educate their workers to increase awareness and knowledge about the impact on the environment...]

6 Suggestion and Conclusion

Hiring someone knowledgeable and has a positive attitude is the dream among employers. However, how far the education system, especially the TVET system, can afford to produce the graduate with the knowledge and positive attitude towards green aspects is unknown. In order to reduce the gaps, the present study has found several elements of green skills in the dimension of knowledge and attitude. A total of five elements have been discovered, specifically: 1) green technology knowledge, 2) waste management knowledge, 3) problem solving and critical thinking knowledge, 4) behaviour, and 5) awareness. The results should help us to reflect on all the negative findings from previous studies which stated that knowledge and attitudes among the people were low, but suggesting that some actions needed to be done.

In order to make these actions possible, some recommendations of the actions are needed. Firstly, the TVET institution should revise the present training curricula and need to integrate the elements of green skills in the new framework. The elements should synthesise all three dimensions of green skills which are skills, knowledge, and attitudes. Invite the industry players as panels to evaluate the new training curricula. This is to reduce the mismatch of perspectives between institution and industry, and also to fulfil the demands from the employers in the industry.

Secondly, green skills should be implemented for all members of the institution. As a step to cultivate the right attitude towards environmental care, the green practice needs to be carried out every day. Thus, a positive attitude towards environmental care will become a natural attitude among the members. The institution would also need to organise some interactive activities involving green aspects such as instituting a paper-free day, recycling waste to create fabulous art projects, organic composting, and so on.

In conclusion, the green skills are important elements to be implemented in higher learning institutions in order to educate students on how to effectively minimise the greenhouse gases, increase knowledge about green practice among students, and cultivate a positive attitude towards environmental care. Additionally, these findings are useful in realising the current situation in the industry which demands the green criteria among graduates, and also as a tool for guidance to the institutions to revise the present training curricula.

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