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Green Skills Understanding of Agricultural Vocational School Teachers around West Java Indonesia

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ABSTRACT

This study investigated understanding of agricultural vocational school teachers about green skills and its entity in the curriculum. Data were gathered through survey of teachers from fifteen agricultural vocational high school of agricultural food processing technology study program in West Java Province, Indonesia regarding their understanding about green skills. The results showed that the teachers had less knowledge of green skills, limited to environmental issues. However, they agreed that students needed to be equipped with green skills. The entity of green skills has not been stated explicitly in the curriculum of agricultural vocational school. However, the teachers argued that green skills could be embedded in the subjects of the existing curriculum. The findings of this preliminary study indicated the need to increase teacher understanding of green skills and curriculum development in agricultural vocational schools to meet industrial needs in order to support sustainable development in accordance with the UNESCO strategy for vocational education.

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1. INTRODUCTION

Developing countries in Asia experience serious environmental problems that threaten future growth, food security, and regional stability. There are four main environmental challenges, as follows: water management, air pollution, deforestation, and land degradation, as well as climate change (Howes & Wyrwoll, 2012). There has been an economic shift due to mitigate the environmental problems. This shift will create green jobs, greening the existing occupation in the industries (Zaituni *et al*., 2010; Setiawan, 2017; Strietska-Ilina *et al*., 2012).

In order to overcome environmental issues and encourage sustainable development to ensure energy security, green growth is needed. This requires new skills development for new jobs in green sector as well as existing jobs that are changing to be more environmentally friendly (Jahonga *et* al., 2015). Generic green skills are classified into the following categories (Pavlova, 2014):

(I) cognitive competencies (for example environmental awareness and a willingness to learn about sustainable development; systems; and risk analysis skills; innovation skills to identify opportunities and create new strategies to respond to green challenges);

(II) interpersonal skills (for example coordination, management, and business skills to facilitate holistic and interdisciplinary approaches that encompass economic, social, and ecological objectives, communication and negotiation skills for discussion of conflicting interests in complex contexts, as well as marketing skills to promote greener products, and services);

(III) intrapersonal competencies (for example adaptability and transferable skills to enable workers to learn and apply new technologies and processes required to green their jobs, as well as entrepreneurial skills to seize opportunities presented by low-carbon technologies).

Vocational education plays an important role in producing competent students, which contribute to a source of skilled manpower (Kamis *et* al., 2017), who have green skills to do green jobs in order to promote sustainable development. There can be no sustainable development without education and without appropriate green skills for employability (Acedo, 2014). One of the priority areas of UNESCO strategy for vocational education in 2016-2021 is facilitating the transition to green economies and sustainable societies. UNESCO will promote green skills for a smooth transition to greening economies. Integrating greening skills for sustainable development in vocational education is one of the recommendations in the declaration of Asia-Pacific Conference on Education and Training to advance TVET (technical and vocational education and training) in Asia-Pacific. Indonesia supports the green jobs campaign together with ASEAN, such as holding a vocational training session with green skill elements, green productivity, occupational health, and safety.

Vocational education prepare students to work in a productive and professional. It is also able to plan to develop a career in a particular area of expertise and provide skills to students to develop themselves in order to match the demands required by employers (Asnawi & Djatmiko, 2015). In the context of Indonesia educational system, there are two terms associated with specifically vocational education in secondary education and in higher education. Agricultural vocational school is one of the sec-

ondary vocational education institutions, covering study program of animal husbandry plant cultivation and agricultural food processing technology. The last study program of the school prepares students for the jobs in food industries.

Meanwhile, the food industry is one of the world's largest users of energy (Tiwari *et al*., 2013). The industry contributes to increasing greenhouse gas emissions from energy usage during the production process as well as distribution also emissions from food processing waste. The production process in the industry consumes a lot of water and absorbs energy from fossil fuels such as coal as well as gas to operate machinery and equipment. In addition, many products from the industry use packaging made from plastic, which is difficult to decompose in the environment. Waste and by-products from the production process of agricultural products are an important issue that needs to be considered in the agricultural food processing technology. Therefore, green jobs need to be encouraged in food industry as well as workers who need to have green skills. Environmental awareness and green practices are the key to industrial success and increased labour force. Workers with green skills are more likely to be hired in the future and are valuable assets that must receive solemn concern (Zolkifli *et al*., 2016).

Teachers play an important role in shaping students' future since they are leaders and organizers of the education process, as well as implementing curriculum (Murati, 2015). They have to deliver the knowledge and content for the student to master and apply. If teachers intend to teach a course, it would be wise for them to have a thorough understanding of the subject before teaching others. All this time, there have been no studies explaining the understanding of agricultural vocational school teachers regarding green skills. This study explored teachers' understanding of agricultural vocational schools, study program of agricultural food processing technology, about green skills, and its entity in the existing curriculum of agricultural vocational school.

2. METHODS

In this preliminary study, a survey was used to gather information from the agricultural vocational teachers where schools are used as clusters in sampling techniques. In Indonesia, there are 39 public schools around West Java Province who offer study program of agricultural food processing technology. Then, 15 schools were randomly selected to represent each district in West Java Province. Random cluster sampling is usually used for groups of subjects where the group already exists or is already established (Ali, 2019).

An invitation to complete the online questionnaires (Google Form) was sent to the schools. An online survey design (Cohen *et al*., 2017) was used in this study since it was easy to create and convenient for the participants to answer. This online survey was considered to be more efficient both in terms of time and cost, considering the location of participants who are far apart covering various districts in West Java, namely Ciamis, Tasikmalaya, Banjar, Bogor, Kuningan, Purwakarta, Karawang, Subang, Sukabumi, Cirebon, Sumedang, and Bandung. The participants' responses were automatically compiled to collected or interpret the data. The interviews with five participants lasted about 5-10 minutes per person and were conducted via a video call using WhatsApp Application.

The teachers were asked the following questions:

(I) Are you familiar with the term of green skills?
(II) What do you think about green skills?
(III) In your opinion, which students need to have green skills?

(IV) In your view, does the existing curriculum of agricultural vocational school develop students' green skills?
(V) According to your idea, what course or subject in the curriculum could be embedded green skills development?

In total, 45 teachers (80% female) voluntarily responded to the questions as participants. Their age ranged from 25 to 49 years old. All of these teachers have at least three years teaching experience with bachelor degree holders, specializing in education and agricultural food processing technology. They were productive teachers who teach agricultural technology processing subjects.

Thematic analysis has been adopted as the method used in analysing data of this study. Thematic analysis is a method used to search for themes that emerge as being important to the description of the phenomenon (Fereday & Muir-Cochrane, 2006). The analysis begins with coding process where the object of the coding process is to make sense out of the collected data (Cresswell, 2003). Afterward the theme (category) will form the major idea of the database (Cresswell, 2003). In this study, there are two themes that will be discussed in the results. The analysis of responses from the open-format online questions were elaborated through interviews with selected participants in order to explore their responses.

3. RESULTS AND DISCUSSION

This preliminary study was intended to explore teachers' understanding of green skills, and its entity in the existing curriculum. In general, most participants did not know well to the term of green skills. Moreover, some teachers argued that green skills had not been incorporated into the existing curriculum clearly and thoroughly, even though they are needed by students.

3.1. Awareness of Green Skills

Vocational teachers play an important role in producing skilled labour that has green skills (Kamis *et al*., 2017). They should be the people to have a high level of awareness compared with other people or groups of people (Arunkumar, 2012). Then, they are able to deliver the knowledge and train students (Nagra & Kaur, 2014).

Of the teachers who completed the online survey, 60 percent stated not familiar with the term of green skills and the rest answered the opposite (see **Figure 1**). Then, many teachers (40%) were not able to describe about green skills, while some of them (20%) linked green skills to environmental preservation and the rest interpreted different definitions (see **Figure 2**). Although green skills are not yet popular among participants, most teachers agreed on the need for students' green skills (see **Figure 3**).

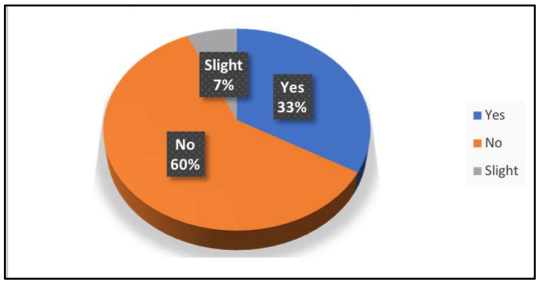

Figure 1. Awareness of Green Skills Regarding Question "Are you familiar with the term of green skills?"

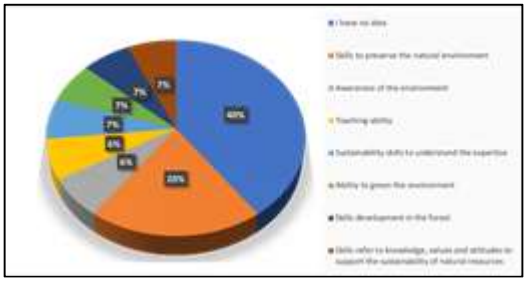

Figure 2. Awareness of Green Skills Regarding Question "What do you think about green skills?"

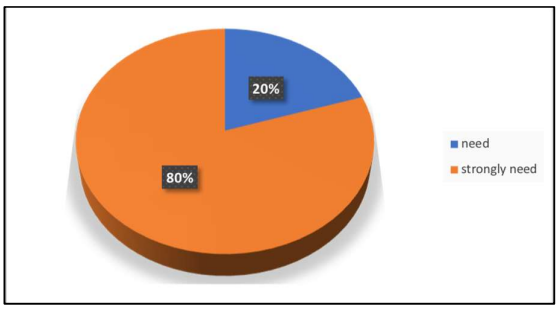

Figure 3. Awareness of Green Skills Regarding Question "In your opinion, whether students need to have green skills?"

The lack of agricultural vocational teacher awareness to green skills has been confirmed through interview. Some interviewees explained by saying:

"I just heard the term of green skills. Oh, I'm not updating (while laughing shyly). Perhaps it is about skills to green the environment. Especially since we are in agricultural schools, students really need to have green skills"

"I've heard at a glance, but I don't know more clearly. It's not yet familiar among teachers and students in our school. But I think it is pertaining to teaching ability and encourage students in order to protect the environment"

"I happened to have read about green skills. As I recall, it is skills refer to knowledge, attitude, and values to support the sustainability of natural resources. In my opinion, Indonesian youth should have green skills to be able to respect and maintain the natural environment well. So, vocational high school students should be accustomed to green skills"

"What? green skills? Umm, I think it relates to how people to take care of their environment. Right? (while smiling). Thus, students should have the skills in order to become competent graduates."

The limited knowledge of teacher about green skills can have a negative impact on improving student competencies. Teachers must be competent in green skills for educating the students well. They should be skilled in planning teaching strategies so students are interested in learning green skills (Kamis *et al*., 2017). Teacher, who has a low level of green skills and lack awareness of the importance of protecting the environment, needs a lot of training in these skills in order to be competent in developing a green economy (Jahonga *et al*., 2015).

Agricultural vocational teacher understanding of green skills must connect to preserving the environment. This opinion is not entirely incorrect, since one of the generic green skills is environmental awareness, attitude, and willingness to learn about sustainable development (Pavlova & Huang, 2013). Green skills, which are also known as sustainable development skills, refer to skills, knowledge, and attitudes needed by employee to promote sustainable social and economic development in order to improve environment development in business and societies (Ramli & Affandi, 2018). Generic green skills are required in almost any occupation to understand and appreciate the issues and demands of green growth.

Vocational education prepares students to enter certain jobs that match the demands required by employer and provide skills to students to develop themselves (Asnawi & Djatmiko, 2015). Inclusion of green skills into competence-based vocational and professional education is an important foundation for greening vocational and professional education and economies (Pavlova, 2017). Vocational school students need to be equipped with technical and soft skills, as well as green skills in order to develop green practices in the workplace (Yapin *et al*., 2017).

Green skills are developed through curriculum development, education, training, teaching, and learning. Consequently, it needs to be applied in the school curriculum

(Arasinah *et al*., 2016). As vocational education is the major producer of labor absorbed in industry's, meeting the demand for green economy skills should be a priority (CEDEFOP, 2010). Each vocational education institution should determine its best strategy to meet industry's demand including agricultural vocational school. Agricultural teachers and students must be aware that their current and future agricultural practices will have an impact on the health of the earth, therefore sustainable agricultural development cannot be ignored (Koulaouzides, 2003).

According to the online survey in this preliminary study, some teachers (53%) argued that the existing curriculum of agricultural vocational school develops students' green skills and the rest gave the opposite response (see **Figure 4**).

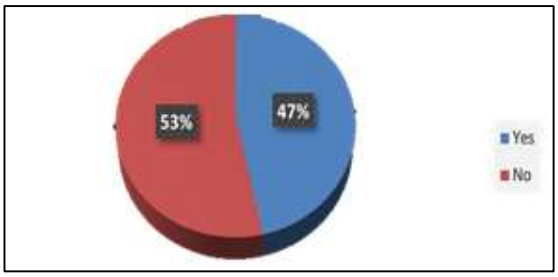

Figure 4. Entity of Green Skills in the Existing Curriculum Regarding Question "In your view, does the existing curriculum of agricultural vocational school develop student's green skills?"

Furthermore, recognizable that many teachers (46%) could not answer what subjects can be embedded into the curriculum as developing green skills. However, the other teachers responded with a variety of courses instance processing by-products of food processing, food packaging, handling waste management, production of agricultural, and livestock food processing (see **Figure 5**).

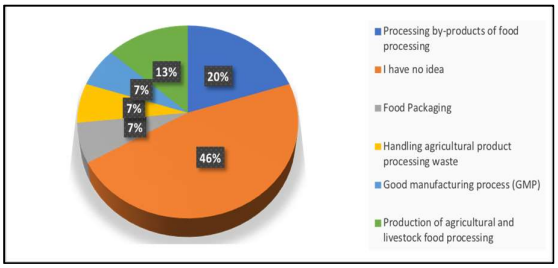

Figure 5. Entity of Green Skills in The Existing Curriculum Regarding Question "According to your idea, what course or subject in the curriculum could be embedded green skills development?"

Entity of green skills in the existing curriculum of agricultural vocational school also has been explored through interview. Some interviewees clarified by saying:

"*In plain view, it is not clearly stated (while thinking) … It must only exist in some productive subjects. For example, processing agricultural waste into fertilizer. But later, green skills were not adopted in the current curriculum*."

"*Green skills in the existing curriculum? I don't think there is yet. Which subjects can be included? What is it? I don't have an idea yet (while laughing). Pardon me*"

"*Actually I'm not sure, it's green skills or not. A few weeks ago, we processed dragon fruit peel waste into various food products precisely as coloring ice cream, yogurt, and pudding. Next, we plan to develop other various products from food processing waste. So, I think, green skills can be integrated into the subjects of handling waste or producing agricultural products*."

"*Really, we hope the curriculum can train students to get used to taking care of their environment, instance small things just throw garbage in its place. I am not sure, the existing curriculum can meet those expectations or not, since it is not clearly stated*

about green skills. Even so, I think some subjects can be invested in green skills (while thinking)…. food packaging. We can develop something like.. eco-friendly or sustainable food packaging.. the development of edible packaging to minimize the use of plastic."

Findings from this preliminary study revealed that green skills have not been stated definitely in the existing curriculum of agricultural vocational school of agricultural product processing study program. In line with Setiawan (2017), the acquisition of green skills has not been clearly integrated into the existing Indonesian vocational education curriculum. In addition, the 2013 curriculum, the current vocational school curriculum applied in Indonesia, has not explained, discussed, applied, and integrated the concept of green jobs as well as green skills (Asnawi & Djatmiko, 2015).

However, a different opinion was found, which stated that the 2013 curriculum includes some green skills in the health and safety modules. For example, refrigerant recovery from air conditioners and ways to process electronic waste are included as part of safety competencies. Energy saving, and waste recycling are addressed in many major subjects (Maclean, 2017). This is allegedly due to differences in perspective in looking at the curriculum. UNESCO defines curriculum as a systematic competency bundle (including knowledge, skills, attitudes, values) that students must obtain through organized learning experiences in both formal and non-formal surroundings.

In Indonesia, the structure of the 2013 curriculum for vocational secondary school were divided into three groups of subjects, namely (Ministry of Education & Culture, 2013):

1) Group A (compulsory) covers subjects: Religious and Character Education, Pancasila, and Citizenship Education, Indonesian Language, Math, History of Indonesia, and English.
2) Groups B (compulsory), includes: Arts and Culture, Crafts and Entrepreneurship, Physical Education, Sports, and Health.
3) Groups C (specialization) which includes specialization in subjects of academic and vocational. In agricultural product processing study program, cover subjects are handling agricultural products, production of processing of crops, forests, plantations and animals, as well as food safety.

From those structure, there are not explicitly subjects that proclaim environmental-friendly jobs. However, each subject in group C (specialization), can be developed into learning goals oriented to the development of green skills. Thus, the teaching materials developed should also cover green skills, such as learning modules or textbooks for students. This perspective inspired the teachers in this preliminary study to integrate green skills into several subjects. For example, sustainable food packaging and handling waste in food processing production developed into production of processing of crops, forests, plantations, and animals. Previous studies showed development of agricultural waste to valuable things. Agricultural waste, such as rice husk, rice straw, corn cobs, and bagasse could be isolated into silica (Permatasari *et* al., 2016). Banana stem as waste could be fabricated to biomembrane for removing Pb from waste water treatment (Sulastri & Rahmidar, 2016).

In accordance with Hungerford's literature, Infusion Model revealed that the generic concepts/ skills/ attitudes of sustainable development are injected or embedded into the various conventional disciplines and subjects without introducing new subjects or courses (Majumdar, 2009). In line with that, Fogarty (1991) initiated a curriculum integration model, namely the webbed model. This model views the curriculum through a telescope, covering all disciplines

at once. The webbed integration model usually uses a central theme to integrate various subject matter.

4. CONCLUSIONS

An investigation has been made in this preliminary study. Some conclusions from the investigation are as follows:

- The term of green skills is not yet familiar among teachers of agricultural vocational schools, so their understanding is still lacking. Teachers interpreted green skills as skills related to environmental issues. However, they agreed that students need to be equipped with green skills.
- The current curriculum has not stated green skills clearly and explicitly. However, they argued that green skills can be trained through learning development in subjects of the existing curriculum.

Further research needs to be carried out to improve teacher understanding of green skills and curriculum development in agricultural vocational schools to suit industry needs in order to support sustainable development in accordance with UNESCO's strategy for vocational education.

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6. THE AUTHOR'S NOTES

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the data and the paper are free of plagiarism.

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