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Sarsvathy Thirupathy, Ramlee Mustapha

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Development of Secondary School Students' Green Skills for Sustainable Development

Sarsvathy Thirupathy, Ramlee Mustapha

Universiti Pendidikan Sultan Idris

Email: sarsvathy23@yahoo.com

Abstract

According to the literature, lack of environmental awareness is a significant challenge in nurturing the green mind-set among the youngster. People who are not aware of the importance of environmental conservation may involve in activities that could contribute to global warming and environmental pollution. This concept paper discusses about the implementation of green skills in the learning process for secondary school students. Activities which contribute toward the preservation of the environment and the conservation of energy are considered as part of generic green skills. Generic green skills could be defined as non-technical or soft skills which emphasize on sustaining the environmental and energy saving initiatives. Elements of green skills need to be nurtured in order to produce competent students in green features and to sustain the environmental balance. Education is the best platform to teach generic green skills to the students. In this study, the researchers will find practical strategies to develop the green skills for the students who take the Design and Technology (D & T) class where the students will embark on several green projects. This study will propose a new framework for green skills for secondary school students

Keywords: Green Skills, Secondary School Students, Design and Technology, Environmental Awareness, Malaysia.

Introduction

On the 21st century educational sector faced with the challenge of preparing students who are really competitive. The four C's of 21st century skilling are related to several skills that are required such as communication, creative, collaboration and critical thinking. According to Zolkifli et al., (2018) highlighted ten important skills necessary by employers in the 21st century which are complex problem solving, critical thinking, creativity, people management, coordinating with others, emotional intelligence, judgment and decision making, service orientation, negotiation and cognitive flexibility Zakaria et al., (2018). In this context, the role of country objective to develop a generation that has 21st century skills in equivalent to the green technology policy. Student has preparing various skills for global society.

According to the educational sector this is no small challenge, and it is all our responsibility to prepare our students for the unique demands of a 21st century world (Giacalone, 2015). In 21st

Century Skills, students not only act as knowledgeable technology users but also provide them with product creators and triggers new ideas. At the level of National Education, the government's effort to provide personnel with knowledge and skills that are balanced on the industry, manifested through the National Education Philosophy. In this context, the role of philosophy to produce balanced individuals physically, emotionally, spiritually and intellectual.

Education is the most effective means that society takes for challenging the challenges of the present and future. Education helps humanity in a variation of ways. (UNESCO, 2014a). The aim of education is to make people intelligent, more knowledgeable, better educated, ethically responsible, identify hurtful practice and replace them by useful ones, strengthen individuals and societies problem solving ability, realize their full potential and participate meaningfully in humanity and skilled by providing a critically consideration on the world especially it's failing and injustice and by promoting a greater consciousness awareness, exploring new visions and concepts and creating new techniques and tool. (Setiawan, 2017). The level of public awareness of green technology has not yet reached reasonable level. Through the education we can distributing knowledge and rising skills for getting preferred changes in behaviours, values and life style and needed public support for ongoing and necessary changes that will be required.

The greatest education is humanity's best hope and it is also most effective in the journey to achieve sustainable development. The world problem can be solved by having such abilities and qualities which is gained from education. With a great understanding of the function that education has to the society and to the nation as whole, the world is striving to deliver education to every child. It is documented that Environment problems cannot be determined by looking at only technological solution. Thus, in order to overcome the problems humanity must turn his face to education and act in a new way. According to McKeown (2002), education is considered to be fundamental for sustainable development. One of the 4 out of 8 agendas in the declaration is to integrate greening skills for the preservation of the TVET program to achieve sustainable development including curbing poverty and inclusive of economic development. We should approach a great awareness and understanding of our action to the environment. It also plays an important role in changing the behavior of people towards their environment.

Therefore, it completes the TVET system all together as a training and learning center to increase the professional teachers and coach's capacity. In secondary schools now days, students learn Design Technology which starts at the age of 13 to 17. This is to produce individuals who are independent, creative, has initiative and tech-savvy. Hence, there is a need to include a consistent green skills component to develop green technology in primary school level to increase awareness towards the importance of conserving the environment (Brown, 2013). We should approach a great awareness and understanding of our action to the environment. It also plays an important role in changing the behavior of people towards their environment.

We should approach a great awareness and understanding of our action to the environment. It also plays an important role in changing the behavior of people towards their environment in the same vein, Zaharim et al., (2009) described personel attributes as good attitudes and traits of an individual that are used to get, maintain and succeed in employment. On the other hand, Kamis et

al., (2017), include technical skills into green skills i.e., the view expressed by (Setiawan, 2017) where green skills is imparting of both hard skills and soft skills. Now with standing that the 4th industrial revolution, Malaysia enable to develop in accordance with the green economy, it is very important for future human resource development to be prepared with generic green skills.

Green Skills

Green skills are involved in the list of skills that a student has to obtain in order to increase self- quality and it also gives an added value to individuals to compete in this globalization era. In Malaysia, the Ministry of Energy, Green Technology and Water is responsible to plan and formulate policies and program related to green technologies. Green skills refer to the abilities, values and attitudes needed by human to support the sustainable and effective utilization of resources in the work place (Cox, Carta, Marangozov & Newton, 2012). The green skills which contain green environment energy are seen as intermediate to help preserve and conserve the environment through green technological industry (Dlimbetova, Zhylbaev, Syrymbetova & Aliyeva, 2016). Rapid growth of green technology industry is not only important in the mission to develop a nation based on the green economy, it also leads to effort to produce future human wealth with high awareness of environmental care. The best platform to teach generic green skills in students makes the role of academicians' overriding as upon graduation, graduates are expected to be ready to be part of the entry-level of employees. The process of entering the workforce graduates must be prepared with generic green skills also known as employability skills, non-technical skills and soft skills. According to Zolkifli (2018), it is fairly evident that personal competence is a critical component of soft skills, which discusses to doing the right thing and doing it right.

Green soft skills are most necessary skills required by secondary school to enter the workforce which (Benavot, 2016) refer to as behavioural skills. Moral values it's about someone's good activities where it's become part and parcel of individual characteristics. According to Arasinah, Ramlee, Waliza & Limuna (2016) interpretation that the behavioural element gives students the opportunity to act in accordance with their moral values. Mahat et al., (2017), soft green skill is a non-technical skill which includes the attitude and skill needed to attain the objective of sustainability. It also refers to decent work. Therefore, to meet the demand of 4th Industrial Revolution, educators need to consider the relevant skills needed by future human talents (Heong, Sern, Kiong, & Binti Mohamad, 2016). In the same vein, Zaharim et al., (2009) described personel attributes as good attitudes and traits of an individual that are used to get, maintain and succeed in employment. On the other hand, Kamis et al., (2017), include technical skills into green skills i.e., the view expressed by Agus (2017) where green skills is imparting of both hard skills and soft skills. Green skills are indeed in all industrial sectors as a response towards climate change and sustainable imperatives ("Green Skills Model As an Added - Value Element in Producing Competent Students," 2013).

Green jobs mean " green collared jobs", which are individuals who contribute towards a better environment or to increase sustainability (The Australian Conservation Foundation 2012) The Council of Australian Governments (COAG), (2008) stated that green skills is a form of skills that is on the path towards a sustainable preserved development from a technical aspect, value and attitude knowledge. All these skills are needed in the work force to develop and support the social, economic

and environmental outcome that is established in business, industry and community. Green skills is also defined as a skill that is needed to adapt one's self, product, service and process for climate change and a related environment according to the specific requirements and rules (Cedefop, 2012a). Strietska-Illina, Hofman, Haro and Jeon (2011) defined green skills as a knowledge, ability, value and attitude that is needed to live in growth and support the formation of a community that is sustainable and efficient management of resources. Green skills are deeply needed by all sectors no matter in the education sector, construction, industry and in all levels of workforce.

Role of Education

Role of education is most significant and effective for challenging the challenges of the present and future. It will also shape the world of tomorrow. Education plays major role in the growth and progress of a society (Heong et al., 2016). Education serves the society in diversity ways. The aim of education is to make people more challenging, more educated, well informed, ethically responsible, identify harmful practice and replace them by useful ones, strengthen individuals and societies problem solving capacity, realize their full potential and participate meaningfully in society and capable of education serve the society by providing a critically reflection of the world (Dlimbetova et al., 2016). It is also defined as the transmission of certain attitudes, knowledge and skills to the members of a society. Education is humanity's best hope and most effective means in the mission to achieve sustainable development. Through the education they can having such a good abilities and qualities and can help to cope with the world's problems (Yapin, Suhadi, & Esa, 2017). By a great understanding of the purpose of education has to the humanity and to the country as whole, where the world is motivated to deliver education to every child.

The inevitability of lifelong learning in knowledge-oriented societies implies that school systems should have different objectives and characteristics than if education were considered to have been completed when a student leaves initial education (Mekeownr, 2002). Yet in practice, there remains a tendency for school education to be assessed in terms of the achievements and targets that systems have set themselves, rather than their broader success in laying the foundation for lifelong learning. According to Pavlova (2009) analysis that the behavioral component gives students the opportunity to act in accordance with their moral values. Moral values about someone's good activities, it becomes part and parcel of personal characteristics.

In the knowledge economy, memorization of facts and procedures is not enough for success. Educated workers need a conceptual understanding of complex concepts, and the ability to work with them creatively to generate new ideas, new theories, new products, and new knowledge (Chi Diep & Hartmann, 2016). They need to be able critically to evaluate what they read, be able to express themselves clearly both verbally and in writing, and understand scientific and mathematical thinking. They need to learn integrated and usable knowledge, rather than the sets of compartmentalized and de-contextualized facts. They need to be able to take responsibility for their own continuing, life-long learning (Salina, Eza & Azman, 2015).

Environmental skills and environmental awareness are becoming an importance and a task for secondary school in the current and the coming. Competency standard is to measure the

achievement of learning outcomes in the learning process in vocational education. Thus, the role of vocational education curriculum development towards environmental-friendly vision of education needs careful attention. The curriculum should be designed in accordance with the needs of the industry as a stakeholder oriented to Green Jobs. Consequently, schools should adjust the need for competence of green jobs as an indicator of the competence of its graduates.

Development of Green Skills in Schools

Green skills are needed to produce students who are competent. Therefore, green skills should be included in the school curriculum (Stuhmcke, 2012). Based on 11th Malaysia Plan it contains agenda of generating and emerging human capital that can inspire the national economic growth in the future, so as to the culture of green technology should be encouraged among secondary students, this is an essential phase for secondary school education through the development of a more effective syllabus (Arasinah et al., 2016). Teenagers or youngsters are sustainability who will come into the environment and involve with families and the community. Although environmental education has been implemented via the school curriculum for a long time, environmental awareness remains at a low level (Jamilah and Hasrina, 2011). Student's need to be exposed to the knowledge of negative effects on the environment, which are brought by the inconsiderate acts of humans. Beliefs of environmental sustainability should be educated in line with the skills learnt so that educational institutions can produce an employee that is not only focussing on skilled.

Perhaps one of appropriate to inspire green skills and green technologies in secondary school student first, before they move on to higher level of education. When these students, taught with green elements progress to a higher level of education, they will be capable to apply what they have learned to activities and processes that will produce a green product. They can apply their skills and knowledge before taking into account the aspects of green growth (Coljin, 2014: Fien & Guevara, 2013: KPM, 2011). Green skills and knowledge are required for green jobs; they are also required to develop a green economy, including public awareness about the environmental issues and sustainable development of the country (Asnawi & Djatmiko, 2016).

Inappropriately, there are students who are not aware of the issues related to the environment due to lack of education regarding the environment. Saravanan and Ahmad (2013) mentioned that student's knowledge of and concerns for the environment are still at a moderate level. As stressed by Majumdar (2016), education could be involved in overwhelming global environment issues and help to reservation the earth for the future generations. In addition, there is a shortage of media or public forums that play the role of educating the students (Carbonel et al., 2015).

With a rapid development, industries sector will bring destructive effect of environment. Therefore, green technologies should be exposed in education system for transforming economy model to greener economy modal.

Academics Need to Be Prepared with Green Skills

As the growth of the 4th industrial revolution, the significance of generic green skills is getting greater attention. The term of green skills has grown extensive among industrialize and academicians (Zolkifli et al., 2018). Academicians should be keen in setting teaching strategies to inspire students to study green skills. Teacher can practice a little positive passion to inspire students in generating materials. All these efforts can attract students to be part of the green talent movement (McCoy, O'Brien, Novak, & Cavell, 2012).

The Malaysian Government determination is to implement green skills in the perception of two innovation components, first they need to design the process and second is development of green technology. Primary and Secondary school students are taught and reinvigorated to produce something different such as a simple product that are environmentally friendly and practical for our country. At higher education such as at the university and postgraduates' studies, we can improve technology that is capable to produce useful articles without wasting resources such as green technologies in food production and processing, electrical energy and water. The new eco-friendly designs must be practical that can be commercialized for local and export purposes (Arasinah et al., 2016)

Meanwhile,(Rattan, Librarian, Kahn & Nabha, 2016) are mentioned that some teachers still not interested of green skills and lack awareness of the significance of protecting the environment The academicians need a lot of training in these skills in order to be expert in developing green skills (Dlimbetova et al., 2016). The problems and ways to overcome the issues must starts from the academicians where the teachers should be aware of the concept of environmental education. Teachers can then apply the knowledge to train students in conserving the natural environment (Nagra & Kaur, 2014).

Academicians in higher learning institutions must play a significant role to inspire awareness and guide students to master these generic green skills. These skills as an advanced development on views of academicians with focusing on conserving the environment and reducing food wastage, reducing energy resources consumption.

Design and Technology Subject (D&T)

The Design and Technology subject is a new subject introduced to secondary student starting from Form 1 to Form 3 replaces the Integrated Living Skills subject which has been implemented since 1988. Standard curriculum of Design Technology (D&T) was legislated in 2016 with an emphasis on content and learning standards that need to be known, understood and mastered by students of the secondary school form 1, 2 and 3. This subject provides the students with thinking skills as contained in the Malaysia Education Blueprint 2013-2125 (PPPM) then Design and Technology subjects were introduced. Design and Technology are taught to students on design criteria using technology in construction and product manufacturing to become individuals with global thinking as well as understanding the latest technology capable of solving future problem. (Dokumen Standard Prestasi, (DKSP, 2016).

Besides that, the curriculum also emphasizes the inculcation of moral values, do it yourself (DIY), sensitivity towards surrounding issues and a positive attitude while the schools carry out activities to produce students who are tech-savvy, creative and have entrepreneurial characteristics (Dokumen Standard Prestasi, (DKSP, 2014). It also provides an opportunity for students to combine design and technology skills by thinking creatively to produce products to meet their needs human beings. Pupils develop a range of skills that are in line with the modern industry. Design and Technology subject is an opportunity for students to combine design and technology skills. Pupils also think creatively by participating in improving the quality of life and solving problems as individuals and members in society.

Students learn to use the latest technology and are sensitive to the effects of technology change. As stated by Pavlova (2009), technology in education is seen as a means for developing knowledge, skills, attitudes and values (these are all generic skills) that allow students to maximize their flexibility and adaptability to their future employment. The subject of design and technology suitable lessons that can be applied to add values to our life in terms of green skills (Zuhair, 2015). Green skills providing by the subject of design and technology serve to produce who are capable, and hence forth, this subject should be part and parcel of school curriculum (Arasinah et al., 2016). By implementing the curriculum, a comprehensive approach can be utilized to train students who will grow up to appreciate and protect the environment (Teoh, 2016). As suggested by (Taylor et al., 2015), a different method is needed to teach students about green aspects, although environmental education has long been taught in school, students do not seem to exhibit good behavior towards the environment.

Can Be Interim in Every Subject

As stressed by Ramlee (2015) that the preservation of the curriculum in Technical and Vocational Education (TVET) plays a significance role in addressing the development challenges in this growing country. Suhaimi, Mahmud, Ariff, Hamzah and Saud (2010) mentioned that concept of green skills needs to be introduced across the board in Malaysia. The value to be applied in green skills is love which involves the following: concern of food wastage, hard work, harmony and mutual understanding, morality and reliability, being disciplined and appreciative the simple life and motivated for it. According to Lethoko (2014) that the interactions between the government policy of the green economy, education and training; the purpose was to determine how the educational sector responded to the green economy in South America. Based on the study, (Ifegbesan, 2010) students in the secondary schools of Ogun State recognize the problem of waste in their schools, but very few waste management practices are in place.

According to Pavlova and Huang (2013), mentioned that they concluded that elements of green skills should be included in technical and vocational education as an added value, so no harm would be done to the environment by people who are science and technology sensitive, hardworking, law abiding and with integrity, in the conducts of their everyday life. Issues regarding industry claim for skilled work increases but the amount of skilled labour in the market still sleeve behind. This is supported by McCoy, O'Brien, Novak and Cavell (2012); Ramlee (2015); Asnawi and

Djarmiko (2016) problems regarding green skills need to be resolved through education and training programs, which help deliver green skills training for workers in the construction field effectively.

According to Jagannathan (2013), advised that education and training should emphasis on the skills, education and training needed by the whole range of the greening of the economy and society. Pollution, creating cities and transportation systems can be reducing by focusing scientific and technical skills. Education playing a main role to progress a new training curriculum and launch green business promotion campaigns. Thus, the availability of technical and vocational training will be critical to building basic foundation skills of workers needed for green jobs (Razeman, 2011; Strietska-Illina et al., 2011)

Applicable Green Skills to Be Applied at Secondary School

Green skills topics that emphasis with green technology should be incorporated in the curriculum and taught to pupils at secondary school. The knowledge will be deeply embedded in their minds (Brown, 2013; Cedefop, 2014; Zuhair, 2015). Students are suggested to be green by applying green skills in their daily lives as much as possible, starting to use recycled and recyclable resources such as cane, bamboo, containers, plastic bottles, shells, wood parings and scrap plastic pipe while conducting educational activities. For example, in their daily lives they can practises to binging lunch to work instead using polystyrene (Arasinah et al., .2016). Then, as stated by Carbonel (2015) that respondents believe the government should provide incentives and carry out promotions so that green practises will continuously be implemented such as reducing the use of Styrofoam or plastic container that are not environmentally friendly, segregation using own plastic bags and own containers when buying food.

According to (KPM: MOE, 2015), the usage of unwanted materials will save costs an inculcate economy as well as innovation when students do a project. This type of method, students will be more conscious of the utility of the existing resources around them and are capable to use them in many creative ways. Therefore, knowledge and practices concerning the recycling of used materials is important and needs to be nurtured in students, especially in the subjects of RBT. Recycling out-of-use materials can conserve the environment and help people apply green practices in daily lives. It is the government's aim to produce highly skilled human capital and at the same time be able to maintain sustainable growth and green technology (Strietska-Illia et al.,2011; Mass, Moss, Hopkins & Ross, 2010). Meanwhile, Pan, Cotton & Murray (2012); McDonough, Braungart and Clinton (2013) describe recycling as "not simply the conservation of resources that went into the production of certain ingredients, but add value contained in it".

By using the skills and knowledge, we will be able to carry out redesigned invention. Therefore, if individuals can add value--economic, intellectual, emotional and material of a product through the process of reuse, it can be called 'upcycled'. Communities are encouraged to adopt green practices as a lifestyle (Sabri & Yong, 2006; Sola, 2014). The government has undertaken a number of initiatives and offered incentives to the public regarding green practices such as using their own containers when buying food and avoiding the use of Styrofoam or plastic containers that are not environmentally friendly (Carbonel et al., 2015). Women show more concern for environmental

problems by engaging in activities that protect the environment such as turning off lights to save electricity, cleaning the surrounding environment, planting trees, conserving water and separating trash (Raudsepp, 2001; Ifegbesan, 2010). Also, they bring their own bags when they go shopping.

Environmental Awareness , Conservation and Protecting

The most important part in launching green skills program is to nurture awareness within the educational community and the public that rejuvenate education to accomplish sustainability is necessary. If school administrators are negligent of the critical linkages between education and sustainable development, rebuild education to address sustainable development will not happened (Raudsepp, 2001). When people realize that education can improve the likelihood of implementing national policies, regional land and resource management programs, and local programs, then education is in a position to be reoriented to help achieve sustainability (Rattan et al., 2016).

Malaysian government objectives to diminish carbon dioxide intensity by up to 40% by the year 2020. In line with this aim, Malaysian government had come out with 11th Malaysian (Zakaria et al., 2018). Plan which puts part of focuses on sustainable development. There are six strategies thrusts under 11th Malaysian Pelan namely, (i) inclusiveness, (ii) improving wellbeing for all, (iii) accelerating human capital development for an advanced nation, (iv) pursuing green growth for sustainability and resilience, (v) strengthening infrastructure to support economic expansion, and (vi) re-engineering economic growth for greater prosperity (Mekeownr, 2015).

According to (Maclean et al., 2018) added that all of these thrusts are to ensure the visions of becoming a sustainable economy and developed nation is achieved by 2020 (Rattan et al., 2016). Specifically, the fourth thrusts emphasizes on green growth focusing on four key areas such as strengthening the enabling environment for green growth, adopting the sustainable consumption and production concept, conserving natural resources for present and future generations, and strengthening resilience against climate change and natural disasters (Horvatinčić, Demonja, & Tišma, 2016). In this context, green growth means to achieve a resilient, low-carbon, and resource-efficient economy model that leads to higher quality of living and promote well-being of the citizens.

Conclusion and Recommendations

As a conclusion, there is a need for green skills to be implementation in the learning process for secondary school students because the components of these skills can produce knowledge, exposure and awareness on green skills for the younger generation and to sustain the environmental balance (Kamis et al., 2017). Green skills are meticulously related to green technology and contribute to sustainability. Green technology refers to eco-friendly, clean and environmental-friendly technology designed to preserve nature and natural resources (Mustapha and Abu, 2014). To produce a sustainable life, everyone should have the affection for the environment. These ideas should be assimilated into school curriculums, learning content, teaching-learning process and also reflected in any practices through Design and Technology Subject. Therefore, students must be prepared with generic green skills. Teachers must play a role to introduce green skills in the process of teaching and learning and also show the actual situations of the environmental so that they can bring variations to the attitudes, behaviours of the students and aware of the environment (Ifegbesan, 2010). The school

also play their role in contribute to the sustainability of the environment in the best way.

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