

CULTIVATING SCIENTIFIC LITERACY AND ENVIRONMENTAL MANAGEMENT TOWARDS A SUSTAINABLE URBAN POOR COMMUNITY

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ABSTRACT

The application of science is the main aspect of the scientific literacy culture. However, the application of science within the urban poor community is not holistically practiced. The study investigates the relationship between scientific literacy and environmental management that focuses on sustainable community b40. It also seeks a significant connection between the level of interest, exposure on science, awareness towards environmental management and the practices to preserve it. This study has analyzed previous studies to explore the way to cultivate the scientific literacy and environmental management towards a sustainable urban poor community. With the world facing critical environmental problems, an interdisciplinary approach to teaching science and environmental issues may help the people to regulate their learning, foster curiosity, and stimulate their motivation to learn, all of which would influence their overall knowledge on science and environment as well. The B40 Community holds the majority number in The Income Classifications of Malaysia so it is vital to educate this community on this issue. The urban poor community has an awareness of the culture of scientific literacy and environmental management, but the practices of managing it in daily life is at a low stage. To ensure that the goals of sustainable development are achieved, the application of science is vital to be practiced by the community, especially the urban poor.

Keywords: Science application; community well-being; applied sciences; education; sustainable development

INTRODUCTION

Scientific literacy is the ability to use scientific knowledge, identify questions, and conclude evidence, based in order to understand and decide on nature and the changes made through human activities. The importance of scientific literacy to be mastered by the people is related to how they can understand the environment, health, economy, and other problems faced by modern societies that rely heavily on science and technology development (Bybee and McCrae, 2011).

Science literacy is also an ability of a person to use the concept of science to apply it in daily life, explain the scientific phenomenon and describe the phenomenon based on scientific evidence. According to the Organization for Economic Co-operation and Development (OECD) of 2003, science literacy is defined as the ability to use scientific knowledge, identify questions, and draw conclusions based on evidence. Science literacy assessments is not just a measure of understanding of scientific knowledge, but also an understanding of various aspects of the scientific process, as well as the ability to apply science and the scientific process in the real situation encountered in everyday life. Like the research conducted by (Odegaard, 2014), developing a science literacy learning method on inquiry learning activities. The goal is to

integrate the human's ability to acquire science knowledge with the literacy ability of learners to science.

The environment is an important space for community's life. In a normative way, a clean environment can guarantee the comfort and well-being of the occupants. The clean environment is the result of the efforts to maintain the personal, common, and public spaces cleanliness by various community and authority levels. The efforts to preserve this environment are related to community awareness and attitude to ensure that the environment is always clean and healthy to live (Mohd Yusof Hj. Abdullah et.al, 2010)

Environmental sustainability is the key to the quality life of the community. Society needs the environment to fulfill all their needs and wants for survival while the environment depends on society to ensure its sustainability. However, society needs to be 'controlled' in establishing its relationship with the environment because the environment is easy to be defended, transformed and exploited. Modern lifestyles and technological sophistication have caused human relationships with the environment to be limited to the relationship between natural resources to meet the needs and the human economy alone. Hence, the whole society needs to understand and appreciate the environmental ethics in driving the interaction between humans and the environment. (Haliza Abdul Rahman, 2019)

This paper reviews that both scientific literacy and environmental management are related to each other. These relationships point to the need for a new transformation approach to scientific knowledge and the connection towards environmental management. It is argued that creating a scientifically and environmentally literate citizenry requires such broad-based cooperation from the community. (Roberts, 2007; Holbrook & Rannikmae, 2009; Choi et al., 2011) put more stress on the values aspect as well as metacognition and thus see a scientifically literate society as one where people need social and environment as components of scientific literacy.

In this study, several research questions have been stated to achieve the objectives that are in line with the topic of this study. Some research questions have been identified that is: what is the level of knowledge, exposure and awareness of scientific literacy among the sustainable community urban poor, what is the level of awareness and practices of environmental management among the sustainable community urban poor and how do the culture of scientific literacy relate to environmental management in the sustainable community urban poor.

The main boundary which can be identify through this study was, there is less scientific knowledge among the sustainable community urban poor. Thus, knowledge and application of science is at a low level and has led to very poor environmental management practices among the sustainable urban poor communities in Malaysia. Apart from that there are no many research papers discussing about sustainable community urban poor since its only known in Malaysia. Besides that, there is less research or studies carried out to find out the relationship of scientific literacy or environmental management since the importance of science is still lack in our country. This has become the limitation for this review paper.

Aim of the study shows that the level of scientific literacy in knowledge, exposure and awareness is correlated with the level of environmental management in awareness and practices. The main objective of this research is to find whether these two issues are connected to each other when comes to sustainable community urban poor that plays huge role in Malaysian Economics.

REVIEW OF LITERATURE

Scientific Literacy Among Malaysians

The Scientific Knowledge

Education is the process of acquiring knowledge, skills and values as personal and social, for the sake of community life. The Science course emphasizes on producing individuals who prioritize nature management and its resources on a foundation of balanced and visionary community based on pure values. (Muhd Ibrahim Muhamad Damanhuri et.al, 2016) STEM is an acronym for Science, Technology, Engineering, and Mathematics. STEM is a philosophy or way of thinking in which several subjects namely Science, Math, Engineering and Technology are integrated into an area of education that is considered more appropriate and relevant for teaching in schools, as it emphasizes aspects practicality and reality. This way children learn Science and Math in real, realistic and meaningful contexts through technology and design applications. Learning this way is fun, involves hands-on and provides a lively experience that stimulates children to think and solve problems (Mazlini Adnan et.al, 2016)

In Malaysia, there are various systematic efforts has been taken to develop and improve scientific literacy in society over the last 50 years. Among the initiatives are policies related to the development of Science and Technology S&T in various Malaysian Economic Plans and policies to ensure a 60:40 science ratio to art students in schools. Because of this, scientific education has always been a priority in the school curriculum from elementary to secondary. Science is a compulsory subject for all. The scientific community's agendas have been implemented in the formal science curriculum and in every stages (Lilia Halim, 2014)

Science has characteristics of how to learn it different from other ways of learning. In the absence of formal education, people learn by interacting directly with nature, and the results are gradually recorded and communicated to the public. The way of learning science turns into a shift as knowledge becomes more and more science-based. This knowledge is communicated in a variety of ways, so that those who study science focus more on the results or the science outcome products. With the increase of knowledge and the development of science, it becomes increasingly difficult for people to study science in this way. Learning should emphasize the development of the ability to process and produce the knowledge and effects of accompanying or accompaniment, otherwise known as processes, products and values (Nuryani Y. Rustaman, 2005)

Exposure towards scientific literacy

Aspects of learning can be applied to develop the literacy skills of teachers with the learning of Science, Technology, Engineering, And Mathematics. Through STEM, students are able to develop their competencies to compete in an era of globalization and to be able to solve daily problems through the application of technology. In order to enhance science literacy interdisciplinary approaches to teaching science and environmental issues can help enhance learning, grow their curiosity, and stimulate their motivation for learning, which in turn affects the overall science of science.

An excellent and efficient learning begins from school and from there it creates the first-class minded people with scientific exposure but due to some errors there is lack of interest shows in learning of science. It appears that the conception of science and its nature which

emphasizes on inquiry, even though embrace in the science curriculum and syllabus and its being documented but the teaching and learning process does not reflect that and not being experienced by students. This brings to the second challenge mainly to encourage science teachers to change the teaching and learning approach to be more hands on and inquiry based. It is clear that in order for this to happen, the characteristics and pedagogy of the teachers need to be enhanced through the development of quality science teachers. A trained teacher is a professional that has both pedagogical skills and other professional knowledge related to teaching science (Lilia Halim, 2014).

AWARENESS ON SCIENTIFIC LITERACY

According to Lilia Halim (2012), the importance of science is seen from four perspectives. First is the Utilitarian perspective, where science and technology are vital for those who are interested in pursuing a career in science and technology and for individuals to function effectively in the current economic world that is highly dependent on science and technology. Second is the democratic perspective, a basis to increase the involvement of the society in socio-scientific consciousness and develop civic consciousness among the society towards those issues encountered in daily situation. This would make a human's daily life much easier. People will start to realise the importance of having the scientific literacy.

This perspective appears to be the driving force for a developing nation such as Malaysia to develop a scientific literate society so that the country is able to compete at the global level. Fourth, the cultural perspective that views scientific knowledge as a body of knowledge that needs to be inherited understood and acquired, which in turn signifies that the nation attains the highest level of civilization. Based on the four perspectives, it is crucial that a developing nation such as Malaysia, should have the individuals in the society to be scientific literate that is not only to be aware of science but to be intelligent in science. Intelligent here means to be able to understand scientific knowledge, the processes and values associated with it in making an informed decision when dealing S &T issues related to personal life, environment, community, workplace and country as a whole.

Sustainable Community

Sustainable communities tend to focus on environmental and economic sustainability, urban infrastructure, social equity, and municipal government. Our understanding of the 'sustainable city' works and redefining the concept of sustainable development. Lately, sustainable development has been fundamental almost all social and economic development efforts since the 1980s, especially after the worldwide environmental conference in Rio de Janeiro, Brazil 1992. The summit of the earth takes a resolution to leading into economic growth estimates and environmental well-being so that the present generation can continue to enjoy the benefit of the development being carried out but in order to fulfil the responsibility for future generations to also enjoy the benefits of the development back then. It means efforts of economic development is now demanding a trade-off economic growth with environmental protection, in particular relation to resource exploitation and environmental protection for the well-being of the people in city and country. Economic development has a goal in one way, which is to generate as high as possible growth and pile wealth through production and sale of goods and services. The production activity is using as much as probably the source of the

latest technology. Economic growth with care that environment in the end is actually an attempt to maintaining the well-being of the physical environment. (Abdul Samad Hadi, 2004)

Through the knowledge and technology human society constantly strives to adapt the space and opportunities around it including the environment to ensure the comfort and survival of their lives. According to Hamirdin, 2008, human habitat is often associated with development. However, if this relationship is 'one-sided', people without one who monitor their behavior will cause environmental quality and health to deteriorate as a result of the development, then such a development will ultimately harm the community itself (Haliza Abdul Rahman, 2019)

Innovation in green technology creates economic importance while protecting the environment, it requires the subject of innovation to strengthen production networks, improve process innovation and waste recycling production, to avoid the dependable use of resources. The traditional model of technological innovation is based on a straightforward one-way foundation, in the traditional technology of innovation activities, human beings as unlimited demand, production and consumption, resulting in scarcity of resources, environmental pollution, economic development and society appears unsustainable (Xian Zhiyong, 2017).

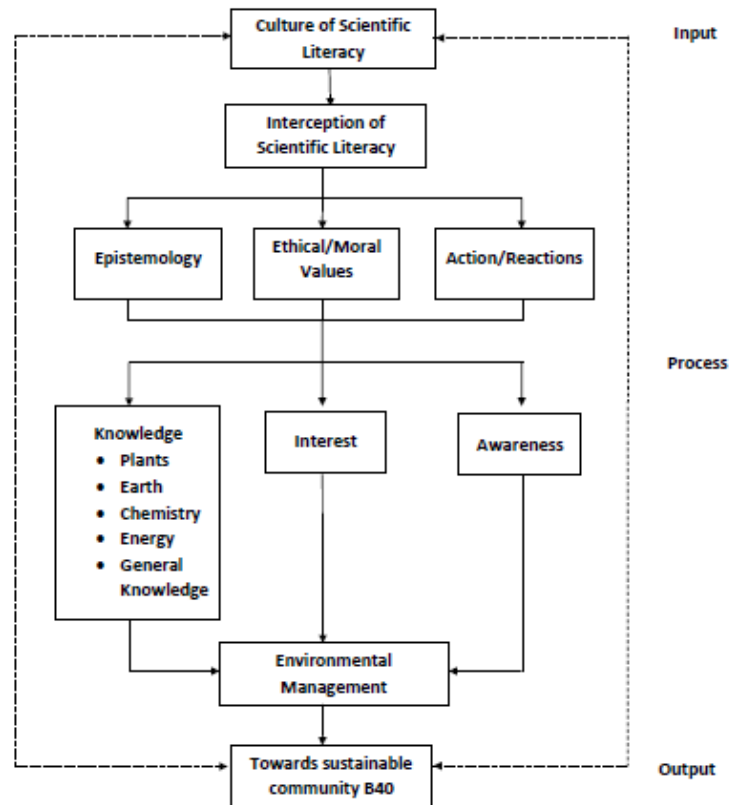
Community urban poor: The struggling to make ends meet

Nowadays unstable economic changes not only negatively impact the entire society but also have a huge impact on the lower income group. Low-income group known as the urban poor are households earning RM3855 a month and below. This group is particularly vulnerable to high risk of economic pressures in a country. Based on studies low income negatively affects the psychological aspects of individuals and family well-being. This is because low-income individuals have limited financial resources and have a low education which results in lower job opportunities. Low income is one of the leading causes of mental illness among adults. Low monthly income also directly and indirectly affects the future generation's development. Thus, through the Eleventh Malaysia Plan (2016) for the years 2016-2020, the people-driven growth goal is aiming to increase the average total income of RM2,537 to RM5,270 by 2020 for the community urban poor (Zarinah Arshat, 2018).

In Malaysia, many efforts, time, energy, and money have been used to address the issue of poverty and improve the quality life of the people. Various strategies and ongoing efforts were taken including providing infrastructure and developing human capital. The poverty eradication program in Malaysia is said to be very successful and very rewarding. This is evidenced by the continuous reduction of poverty rates from 8.5% in 1999 to 5.7% in 2004, and subsequently to 0.6% in 2014 (Economic Planning Unit, 2016). However, this poverty rate is determined based on the poverty line income. Therefore, interpretation of these statistics should be made with caution. Today the concept of 'poor' based on poverty line income is less used (probably because of very low poverty rates) and is replaced by the bottom 40% income concept (urban poor). The fact is that many people still live-in poverty (Laily Paim, 2017).

SCIENTIFIC LITERACY VERSUS ENVIRONMENTAL MANAGEMENT CRITICAL DISCOURSE AMONG SUSTAINABLE COMMUNITY URBAN POOR

The conceptual framework shows the relationship between scientific literacy and environmental management. The elements in the frameworks are the issues mentioned by Graber, (2011) and Jamaluddin Md. Jahi (2010).



Source: Model Scientific Literacy Graber (2011) and Jamaluddin Md. Jahi (2010)

According to Model scientific literacy Graber (2011), scientific literacy is the result of the intersection between epistemological skills (nature of science), ethical or moral values and action or reactions of human being (consisting of learning skills, socializing skills, ability to perform procedures, communication skills). This conceptual framework emphasizes the need for balance between various skills and requires skill in decision making on sociocultural issues. This model also describes the application of science in the daily life of people and this study focused more into community urban poor. Studies shows that 40% of urban poor people in Malaysia, so it is important for them to be excel in science. Many efforts have been taken throughout the years in order to improve the S&T in Malaysia.

Jamaluddin Md Jahi (2010) has mentioned that environmental education in Science subjects is introduced through themes such as: human and the diversity of life around us; the richness of the earth's produce and its management; energy for life; and humans and balance in nature. These themes emphasize the study of nature which discusses human action in developing human well-being and the responsibilities that each individual must play in managing and caring for the environment. Environmental knowledge is vital to educate the upcoming generations on the importance of clean and healthy environment. Interest and awareness have been tested to define the people's reaction or concern towards their surroundings. The output of the framework is to find the result of this research, which is to identify the level of awareness and environmental practices among community urban poor.

CONCLUSION

Poor sustainable community who is struggling in their daily is an important issue to be considered. The shame of poverty and hunger seems to leave many of us indifferent. This study wonders if it is due to our resilience to hardship, which is sometimes necessary yet other times can mislead us? The eradication of this plague will require a fundamental shift in the way we perceive the world and our place in it. Rationality tells us that the whole of humanity should be able to share equally the economic, social and cultural benefits of our natural resources. Solutions though require the necessary political will and commitment of all nations and will require concerted actions of different segments of society including public sector science.

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