

# **CONCEPTUALIZING ENVIRONMENTAL LITERACY AND FACTORS AFFECTING PRO-ENVIRONMENTAL BEHAVIOUR**

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## **ABSTRACT**

Environmental problems today are global in nature, requiring young and old alike to behave pro-environmentally in order to rectify environmental problems and prevent new problems from occurring. Environmentally literate individuals possess the knowledge and skills required to analyze environmental issues, which would enable the individual to behave pro-environmentally. The purpose of this study is to design a conceptual framework that links environmental literacy and factors affecting pro-environmental behaviour. Firstly, the development in formal and non-formal Environmental Education, within Malaysia and internationally are reviewed. This is followed by a review on Environmental Literacy over the past three decades, after which the concept of pro-environmental behaviour and relevant theories of behaviour are compared. The development of Environmental Education in Sabah and Malaysia, as well as the challenges faced between environmental sustainability and development in the tourism sector of Sabah, is then discussed. A conceptual framework that links environmental literacy and pro-environmental behaviour, for use among primary school students is proposed. This conceptual framework allows Environmental Education providers, curriculum developers and policy makers, to better understand the components within environmental literacy and the factors that need to be considered when providing and assessing current Environmental Education programs and interventions. Effective use of the framework will allow Environmental Education programs to be more effective in improving environmental literacy.

**Keywords:** Pro-Environmental Behaviour; Environmental Education; Environmental Literacy; Malaysia; Sabah.

## **1. INTRODUCTION**

Most Malaysian students today are expected possess some knowledge of both local, as well as global environmental problems. Through efforts in formal and non-formal education, many adults

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and students are aware of the loss of rainforests, global warming, and the need to reduce, reuse and recycle.

On-going programs in Sabah, such as the conservation of orang utans in Sepilok, Sandakan, have created opportunities for local students to become more aware of efforts to care for the flora and fauna closer to home. Recent bouts of haze and alleviated air pollution index due to open burning in neighbouring countries have brought about greater realization that environmental problems today are global in nature. Therefore, a global effort from environmentally literate individuals and groups is needed to rectify environmental problems and prevent new problems from occurring.

## 2. ENVIRONMENTAL EDUCATION

In an effort to create environmentally literate citizens, various forms of environmental education (EE) have been introduced throughout the world. In 1970, the term *Environmental Education* was formalized in Nevada, USA by The International Union for the Conservation of Nature and Natural Resources. Eventually, at UNESCO's Tbilisi Intergovernmental Conference (UNESCO, 1978a, 1978b), sets of goals and objectives as well as guiding principles were agreed upon. Hence, the Tbilisi goals, objectives and principles became the fundamental guide for proposals and further recommendations. This was the result of the United Nations Conference on Environment and Development (UNESCO, 1992), as well as other international gatherings from then on. Through education and awareness on the ecosystem, host region and culture informing the tourist on the consequence of their actions, can in return enhance the visitors' experience and encourage them to engage in sustainable behaviours (Siow, Ramachandran, Shuib & Afandi., 2014)

### 2.1. *Development of environmental education in Malaysian formal curriculum*

In line with the global development in EE, and in an effort to create an environmental education curriculum, the Malaysian Ministry of Education first introduced Alam dan Manusia (Man and the Environment) to Primary School students in 1982. In 1996, the Education Department began actively promoting EE in all primary and secondary schools throughout Malaysia through the introduction of Environmental Education across curriculum. EE was thus, integrated into every subject, in the hope that students would be presented with a more holistic emphasis in environmental matters (Pudin, 2006). Arba'at et al (2009) reported that at the tertiary level; many local universities had begun to offer degree courses in environmental science, as well as courses related to the environment.

### 2.2. *Non-formal environmental education efforts*

Formal education, has been the main channel through which students gain knowledge and gain further understanding with regards to the natural environment in the last 3 decades, however, non-formal education efforts has also played a vital part to develop pro-environmental individuals. Agenda 21, which emerged at the Rio Earth Summit in 1992, stated that the ultimate potential of societies and mankind in general, can be obtained through education. These included training, awareness programs as well as formal education.

### **2.3. Non-formal EE in Malaysia and Sabah**

In 2002, the Green Strategy planned by the Malaysian National Policy included education and environmental awareness (MOSTE, 2002). In Sabah, efforts to bring about further progress in EE resulted in the setting up of Sabah Environmental Education Network (SEEN) in 2005 (Environment Protection Department, 2008). SEEN has since provided a network for all organizations involved in the implementation of EE, allowing stronger co-operation and co-ordination amongst its members (Arba'at et al, 2009). In 2005, the Sustainable School Program (Sekolah Lestari) was launched in Malaysia, with the aim to assist schools to enhance the implementation of current environmental EE being carried out. Pudin (2006) stated that the Education Department also co-organises various environmental courses and workshops such as the Bornean Biodiversity and the Ecosystems Conservation (BBEC) Program for the public. In schools, EE programs including 3K Competition (*Kebersihan, Keceriaan dan Keselamatan*), SERASI, and Environmental Science Quiz are carried out.

### **2.4. Environmental literacy**

The primary goal of EE is environmental literacy (Culen, 2001). Disinger and Roth (1992) defined Environmental Literacy (EL) as ones ability to assess the health of the environment, and take corrective action to rectify problems and maintain the systems that are in operation within the environment. Hence, the measurement of EL is ones responsible environmental behaviour. Dunlap, Gallup & Gallup (1993), highlighted the fact that environmental awareness and concern is widespread throughout most industrialized and developing nations. However, Chawla (1988) has expressed concern that while environmental concern has increased, it has yet to be followed by a corresponding increase in pro-environmental behaviour. Several scholars also stressed the importance of environmental sustainability that will ensure holistic development (Prabhakaran, Nair and Ramachandran, 2016; Ng, Chia, Ho, & Ramachandran, 2017).

### **2.5. Pro-environmental behaviour**

Pro-Environmental Behaviour (PEB) is ones conscious actions that seek to lessen the impact brought upon the natural environment. These include minimizing the use of natural resources and harmful toxic substances, reducing the production of wastes and lessening the use of energy (Kollmuss and Agyeman, 2002). Although EE has succeeded in creating greater awareness towards the various types of pollution being faced daily throughout the world, most people experience 'action paralysis' in that they hold the belief that they are incapable of making a difference other than small efforts such as recycling their wastes products (Connell et al, 1999). In order to produce students who are truly pro-environmental, whose behaviour are able to benefit the environment the most, students need to be confident in their ability to accomplish their goals. They also need feel competent to act, either individually or collectively (Chawla & Cushing, 2007).

### **2.6. From environmental education to environmental literacy**

In 2001, a survey related to the implications of the EE across the Curriculum Program was carried out in 31 selected schools in Malaysia. The findings indicated that students had a high level of awareness and attitude towards the environment (Pudin, 2006). However, based on "Environmental Citizenship: A Report on Emerging Perspectives in Malaysia" (EC Report) by WWF-Malaysia (2008), 96% of the educators and 89.3% of the teacher trainees agreed that EE was needed, while

almost all participants realized that it was vital that children understand the issues faced by the environment. Furthermore, a gap exists between what is taught and what is practised in schools and other educational institutions. The existence of this gap was also mentioned by Nadeson (2014), who reported that although EE has been infused in textbooks in both primary and secondary schools, the holistic approach to EE is relatively superficial.

### **3. CHALLENGES BETWEEN ENVIRONMENTAL SUSTAINABILITY AND TOURISM DEVELOPMENT IN SABAH**

The Sabah State Development Agenda has highlighted tourism as one of three priorities (Teh & Cabanban, 2007). The state of Sabah recognizes that its tourism sector depends heavily on the natural biodiversity of the state and that it plays a crucial role in its human and economic development. To ensure the sustainability of this industry and the biodiversity, the government of Sabah has been working together with non-profit organizations such as WWF (World Wide Fund for Nature), UNDP (United Nations Development Plan) and Danish Co-operation, (Kim, 2011). However, while tourism is poised for rapid expansion, scholars have highlighted that sustaining this industry may be a problem if major environmental aspects are not looked into (Ali, 2010; Praveena, Siraj, & Aris, 2012).

On the other hand, Fien (1993) stated that the economic wellbeing and the environmental protection in many developing countries are on two ends of a continuum. In spite of various projects carried out to educate the local communities, such as The Semporna Island Darwin Project (SIDP), involvement of The Marine Conservation Society, as well as other various policies, laws and conservation efforts, scholars are still concerned with the sustainability of these areas (Corpuz, 2008; Jakobsen et al., 2007; Praveena et al., 2012; Teh et al., 2005; Teh & Cabanban, 2007).

Research to test the effectiveness of EE programs by assessing their effect on behaviour rather than attitude change is greatly needed (Lucas, 1980). Volk and McBeth (1998) reported that less than 50% of research measure environmentally responsible behaviour or ecological knowledge, while none measured cognitive skills related to environmental literacy or additional determinants of environmentally responsible behaviour.

### **4. ENVIRONMENTAL LITERACY FRAMEWORKS**

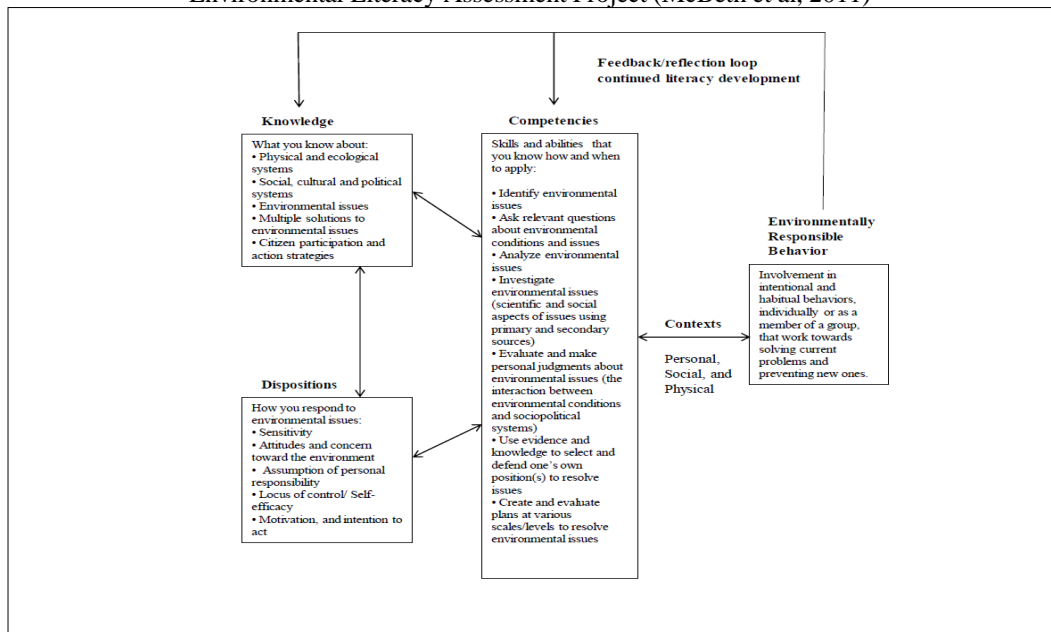
Various environmental literacy frameworks were formulated in the 1990s based on the guiding principles, goals and objectives of UNESCO's Tbilisi Intergovernmental Conference (Roth, 1992; Simmons, 1995; Wilke, 1995). Wilke (1995) reported that a second EL framework was developed to assess EL of students and EE needs of teachers. Both frameworks reflect the Tbilisi categories, namely: knowledge, affect, skills and behaviour. Furthermore, they address three thematic emphases: the natural world, environmental problem and issues, as well as sustainable solutions to these problems and issues.

The framework for EL was developed based on reviews of research over 25 years, within North America. These include EE goals and objectives (Iozzi, 1984), meta-analysis of studies on responsible environmental behaviour (Hines, 1986/87), studies related to EL components (Volk & McBeth, 1997), environmental sensitivity and significant life experiences (Chawla, 1998, Sward &

Marcinkowski, 2001), and reviews on studies related to sensitivity, knowledge, attitudes and behaviour (Hart & Nolan, 1999, Rickinson, 2001). Based on these reviews, the definition, and measurements of the EL components of the framework was selected. Consequently, the framework by Simmons was used as a basis for a research review by Volk and McBeth (1997) and the formation of the North American Association for Environmental Education (2011), National Guidelines for Excellence Project.

The components of the EL domains, as assessed in the National Environmental Literacy Assessment (NELA) Project by McBeth et al (2011) consist of knowledge, dispositions, competencies and environmentally responsible behaviour, as well as the feedback loops between the four components (Figure 1). Opportunities through both formal and non-formal EE could be the basis for assessing current results as well as future plans, and ultimately leading to more effective PEB (Hollweg et al., 2011).

**Figure 1:** Components of the domain of environmental literacy assessed in the National Environmental Literacy Assessment Project (McBeth et al, 2011)



In the United States of America, the Middle School Environmental Literacy Instrument (MSELI) and the Secondary School Environmental Literacy Instrument (SSELI) were developed based on the four components of EL (McBeth, 1997, Wilke, 1995). NELA then revised the MSELI and carried out firstly, a National level, baseline study on EL among sixth and eighth grade students (McBeth et al., 2008; McBeth & Volk, 2010), and secondly, a study involving 64 schools, that compared the effects of different types of EE programs on the EL of sixth to eighth graders (McBeth et al., 2011). Similar national assessments have been carried out in Korea (Shin et al., 2005), Israel (Negev et al., 2008), and Turkey (Erdogan, 2009). In 2006, the PISA 2001 Science Assessment was the first international assessment which incorporated the various EL components in its assessment (OECD, 2009). Based on its wide range of components which reflect the broad

definition of EL, and its applicability in both national and international EL assessments, the EL framework (Figure 1) is invaluable in its ability to guide EL related assessments and plans.

## 5. REVIEWED BEHAVIOUR CHANGE FRAMEWORKS

The goal of EL is Pro-environmental behaviour (PEB), therefore behaviour theories need to be considered to understand the factors that lead to PEB. Beginning in the 1970s until 2002, several models and theories with regards to behaviour and the factors that lead to it have been looked into.

The early US Linear Models used since the early 1970s, are among the simplest models of PEB. Although it has been proven inaccurate, in that research has often shown, an increase in knowledge and awareness did not result in behaviour change, yet to date, this model is still the base of most campaigns by government and Non-governmental Organisations (Kollmuss & Agyeman, 2002).

In the model of Pro-environmental Behaviour by Fietkau and Kessel (1981), PEB is influenced by: attitude and values, possibilities to act ecologically, behavioural incentives, perceived feedback about ecological behaviour, and knowledge. The possibilities to act ecologically or to hinder PEB depend on external, infrastructural and economic factors. Whereas research by sociologists, Blake (1999) points out that limitations exist within most PEB models, as they do not consider personal, social, and organisational barriers, while assuming that people are rational and systematically use their knowledge. However, Redclift & Benton (1994), highlight the fact that values are often negotiated, transitory and contradictory.

Based on the short-comings of the earlier models, Kollmuss & Agyeman (2002) proposed their model of PEB. The arrows in their model indicate the various factors that influence each other, whereby the larger the size of the arrow, the greater the positive influence on PEB. This is most evident when the internal and external factors work synergistically. Research findings of Hines, Hungerford and Tomera (1986-87), showed that PEB was related to: knowledge regarding environmental issues and action strategies, locus of control, attitude, verbal commitment, and ones sense of responsibility. Although more factors are identified in this model, Kollmuss and Agyeman (2002) contend that only a weak link exists between knowledge and attitudes, attitudes and intentions, and intentions and PEB.

The Theory of Reasoned Action (Fishbein & Ajzen, 1975) is a theory that links attitude and subjective norms to behavioural intention and behaviour. It has been a vital social psychology model, and its strength lies in a mathematical equation derived from it which allows empirical studies to be conducted based on it. However, in 1985, Ajzen proposed the Theory of Planned Behaviour by including the perceived behavioural control component to cover non-volitional behaviour, thereby overcoming the weaknesses of the former model with regards to behaviour that individuals had incomplete volitional control.

### 5.1. *Combining the Theory of Planned Behaviour (TPB) and environmental literacy framework*

Various theories have been developed that aim to improve on previous theories, frameworks and models that already exists. While each theory, framework and model tries to improve on aspects lacking from the previous ones, the results may end up being complicated and less applicable to

other studies. In order to understand the factors which may influence PEB among primary school students, this research adopts the TPB framework (Ajzen, 1991).

Among the reasons for using the TPB framework, is firstly because this framework takes into consideration both volitional as well as non volitional aspects of behaviour. Students' PEB can be explored based on the TPB framework, because compliance with school rules to keep the school environment clean and eco-friendly can be considered as an intentional and conscious act of students. Furthermore, in a primary school setting, students are generally taught to think rationally, and use the information given to them prior to making decisions whether or not to engage in certain behaviours. However, variables exists that may affect PEB that are encompassed by the perceived behaviour control (PBC) construct of the TPB framework.

Secondly, in a primary school setting, students' attitude towards PEB is rooted in their belief of the positive and negative outcomes that the behaviour may cause (Ajzen, 1991). Furthermore, the attitude of students may be further modified by subjective norms, which include what the students suppose the important people to them do and like, and what they suppose they do not do, and do not like.

The third reason for using the TPB model is because it is a popular model in studies related to PEB including environmental-related behavioural studies such as participation in environmental activism, purchasing organic products, and picking-up litter, conserving water, as well as predicting the intentions to include environmental risk education by teachers. Moreover, Ajzen (1991) expressed the possibilities of making further distinctions among additional kinds of beliefs and related dispositions. Thus, the TPB is open to the inclusion of other predictors, if they greatly influence the variance in intention or behaviour.

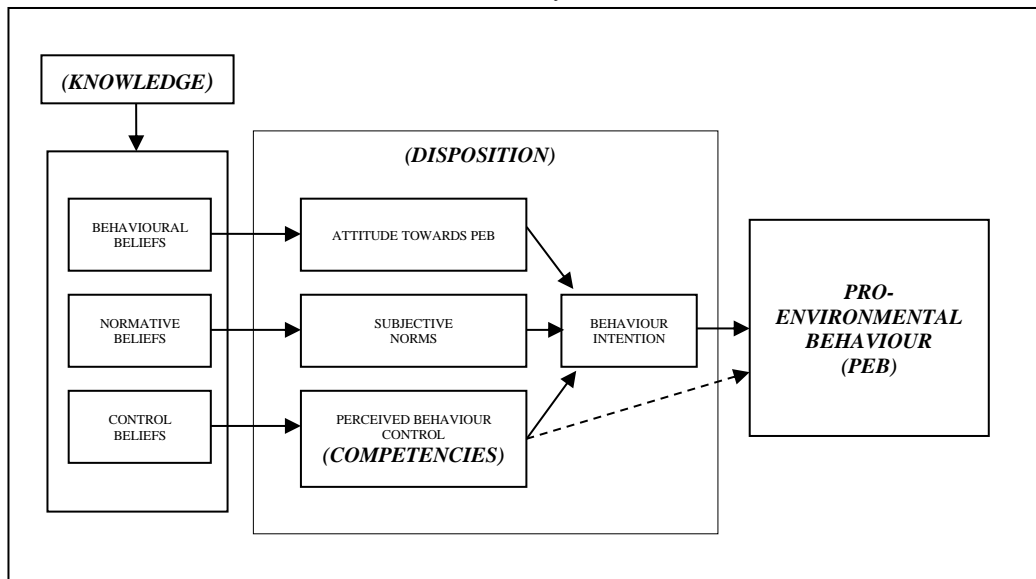
Furthermore, in this study, all components within the environmental literacy framework (Figure 1) correspond to every component of the TPB framework. The knowledge component forms the belief of students, whereas the disposition component encompasses the attitude, subjective norm, and PBC, as well as the behaviour intention of students. The competencies component forms part of the PBC. Moreover, both frameworks end with the behaviour component, or in this study, PEB. As such when both EL framework and TPB framework are combined, both EL as well as the factors that lead to PEB can be assessed. Therefore, for the purpose of this study, the TPB and EL Frameworks have been combined to enable the literacy level of the students to be assessed, and to identify the variables influencing PEB among them.

## **6. ENVIRONMENTAL LITERACY AND TPB CONCEPTUAL FRAMEWORK**

Figure 2 shows the four components of the EL framework within the TPB framework. Knowledge, disposition, competencies, and PEB interlink and overlap components within TPB. When used within the context of a primary school, students' PEB is determined by their PEB attitude, subjective norms, and PBC over PEB. Based on the theory of reasoned action, when PEB of students are considered to be positive (attitude), and those who are of importance to them want PEB to be carried out (subjective norm), this would result in greater intention (motivation) and students would most probably exhibit PEB.

In TPB, PBC which includes motivation, performance and frustration due to the lack of success, influences both effect and actions. Bandura (1977) from which ‘perceived behavioural control’ in the TPB model originates, emphasised that the most important precondition for behavioural change is the person’s certainty of being able to carry out the action and attaining the desired results.

**Figure 2:** Conceptual Framework of Theory of Planned Behaviour (TPB) & Environmental Literacy



In this study of PEB among primary school students, PEB carries a positive normative belief, as environmentally friendly behaviour is widely promoted as positive behaviour in school. As such, a greater behaviour intention should lead to greater PEB among students. However, since this is often not the case, PBC can be influenced by the students’ belief that their PEB will not be effective. Furthermore, if students want to behave pro-environmentally but they are constrained by lack opportunity or accessibility to perform the action, therefore the action may not be carried out. Thus, the contradiction between the students’ attitude and PEB can be explained using this framework.

## 7. SIGNIFICANCE OF THE STUDY

This study on designing a conceptual framework that links EL and factors affecting PEB of among primary students is important for several reasons. In the forefront, the natural environment is being exploited more and more to support the increasing world population and its unending demands (Kunasekaran, Gill, Talib, & Redzuan, 2013). In order to enjoy better quality of life and the modern lifestyles of today, nature is being destroyed in the name of development resulting in global environmental problems (Tung, Huang & Kawata, 2002). Due to this, EE programs need to be assessed systematically and on a regular basis, while taking into account all the factors that encompass EL, as well as the factors that lead to the desired goal of PEB. This would ensure that



an environmentally literate generation that demonstrate PEB will be created. Information gathered through effective use of the Environmental Literacy and Behaviour Framework (Figure 2), will help EE providers and curriculum developers to better cater for the EL needs of different groups of individuals.

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