

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/303635593>

# Influencing secondary school STUDENTS' conservation behavior intention through an interpretive education...

Article in Evaluation and program planning · May 2016

DOI: 10.1016/j.evalprogplan.2016.05.008

CITATIONS

0

READS

53

4 authors, including:



**Evelyn Lim**

Universiti Putra Malaysia

8 PUBLICATIONS 3 CITATIONS

SEE PROFILE



**Azlizam Aziz**

Universiti Putra Malaysia

28 PUBLICATIONS 52 CITATIONS

SEE PROFILE



**Mohamed Zakaria**

Universiti Putra Malaysia

112 PUBLICATIONS 539 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Foraging behaviour of wetland birds in Malaysia [View project](#)



Ecology of Southeast Asian Woodpeckers [View project](#)



# Influencing secondary school STUDENTS' conservation behavior intention through an interpretive education program on the malayan tapir



E.A Lim<sup>a</sup>, M. Manohar<sup>a,b,\*</sup>, Azlizam Aziz<sup>a</sup>, M. Zakaria<sup>a</sup>

<sup>a</sup> Faculty of Forestry, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

<sup>b</sup> Institute of Tropical Forestry & Forest Products (INTROP), Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

## ARTICLE INFO

### Article history:

Received 31 August 2015

Received in revised form 20 April 2016

Accepted 23 May 2016

Available online 27 May 2016

## 1. Introduction

Environmental education programs have long sought to positively influence participants' behavior, yet studies have been inconclusive on precisely which elements of a program design are more effective at promoting positive environmental behaviors. According to Heimlich (2010), one of the factors contributing to the inconsistencies in the research findings is the wide range of individual program characteristics and goals, which leads to variations in program outcomes. Carleton-Hug and Hug (2010) stated that the irregularities in the research findings were also attributed to a lack of clear objectives, a reliance on limited research approaches and a lack of articulation of the program's theory. Such variation makes comparison difficult and limits the ability to identify which programs and strategies really work (Rickinson, 2001; Keene & Blumstein, 2010). This led to the suggestion that there is a need for unique program development and evaluation to determine the changes in environmental awareness, knowledge, attitudes, skills, intention and behavior (Monroe, 2010). Turek's (2006) review of the environmental education literature suggested that interpretation offers environmental education key strategies to promote engagement in conservation efforts.

The present study utilized the pre-test post-test experimental design to determine the effectiveness of interpretation as a communication tool in designing an interpretive education program to influence secondary school students' behavioral

intention to be involved as an organizer of the Malayan tapir education program at school.

## 2. Literature review

The ultimate goal of environmental education is to change human behavior (Hungerford & Volk, 1990). To promote positive change in human behavior, we need to 'develop a population that is aware of, and concerned about the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones' (UNESCO, 1978). Interpretation is often used as a persuasive communication tool to influence behavior (Knudson, Cable, & Beck, 2003; Ward & Wilkinson, 2006; Powell & Ham, 2008).

Interpretation translates technical language into terms and ideas that lay people can understand (Ham, 1992). It reveals meanings through provocation by delivering targeted information rather than presenting in-depth facts or figures. Interpretation is also a process that engages people to connect intellectually and emotionally with the information received and on-site experiences gained before forming their own thoughts.

Ham (1992) developed the EROT interpretive communication model based on an over a century of cognitive research. The model states that for communication to be successful, it must consist of four essential qualities: enjoyable (E), relevant (R), organized (O) and thematic (T).

Enjoyable (E) is an important characteristic in the interpretive learning process. One way to make learning fun is to make the program informal. Simple as it may be, it is an essential element to retain participants' interest and attention (Ham, 1992). Studies by Hines, Hungerford and Tomera (1987); Leeming et al. (1993); and

\* Corresponding author at: Department of Recreation and Ecotourism, Faculty of Forestry, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.  
E-mail address: [mano@upm.edu.my](mailto:mano@upm.edu.my) (M. Manohar).

Zeleny (1999) showed that informal setting interventions were less effective in improving environmental behavior compared to classroom settings. Although Leeming et al. (1993) and Zeleny's (1999) meta-analysis found that interventions in non-formal settings were less effective than the interventions in formal settings, they reiterated that it does not mean that non-formal interventions should be abandoned because these meta-analyses are limited by the diversity and quality of studies. Leeming et al. (1993) stated that reviews of the studies highlighted several methodological limitations: lack of application of rigorous psychometric techniques, use of weak designs, procedures and inappropriate statistical techniques, and lack of follow-up data to demonstrate the effect over time. Zeleny (1999) attributed the findings to the limitations in the study set-up of the non-traditional setting intervention itself; it involved adult participants (above 18 years), shorter periods of time (mostly less than 10 h) and no active participant involvement in the interventions.

In addition to making the program informal, an enjoyable program is also created when learners are provided the opportunity to experience nature and their surroundings (Athman & Monroe, 2001). Duerden and Witt (2010) showed that both indirect and direct experiences can influence behavior, but the influence had different impacts. Indirect experience increases environmental knowledge, but the impact on environment behavior is only activated in the direct experience portion of the program. Ernst and Theimer's (2011) study found that two of its seven environmental programs were successful in fostering connectedness to nature. Many studies have supported the importance of direct exposure to nature in environmental education programs (Dresner & Gill, 1994; Dettmann-Easler & Pease, 1999; Kruse & Card, 2004; Cheng & Monroe, 2012; Collado, Staats, & Corraliza, 2013).

Athman and Monroe (2001) stated that when programs move beyond what is relevant and meaningful, learning becomes too abstract. Creating a program that is relevant (R) to the targeted participants is an important element in interpretation. According to Ham (1992), information that is relevant must be meaningful and personal to the receiver. Meaningful information is communicated when the object in focus is something that the receiver cares about and when the information provided is within their knowledge, personality and experiences. One way of providing such meaningful experience is for interpreters to present information based on the local beliefs and context, providing opportunities to explore and experience the surroundings. Knapp and Benton's (2004) multi-case study of five national parks reinforced the importance of relating to on-site resources and issues in implementing successful interpretive programs. Ham and Weiler's (2007) study, which aimed to isolate and quantify the interpretive dimensions experiences of 727 national and international tourists in the Panama Canal Watershed, showed that the group's global satisfaction was primarily due to their satisfaction with the interpretive dimensions of their visits (e.g., presentations and exhibits at visitor centers, explanations by area staff, brochures about the area, visitor centers, parking areas, and maps of the areas) as opposed to other services and setting attributes.

Similarly, the process of delivering relevant emotional information and providing meaningful emotional experiences can stimulate cognitive processing about the specific issue and its possible impacts. According to Lerner et al. (2015), considerable evidence have revealed that emotions can influence decisions through the (1) content of thought, (2) depth of thought, and (3) content of implicit goals. They explained that whether a specific emotion improves or degrades a specific decision, it depends on interactions among the cognitive and motivational mechanisms triggered by each emotion. In addition, Perrin (2011) emphasized on the importance of establishing emotional connection between

its receiver and the issue at hand to form a more positive intention to engage in pro-environmental behavior. For example, Loeb et al's (2010) study showed that when the energy use in the dorm were connected to the emotion and well-being of a polar bear through real-time feedback data, students' responded by reducing energy use in the dorm. Similarly, Russell and Ashkanasy's (2011) manipulation of emotional display (e.g. words, facial expressions, body language and voice) in the video showed significant effect on participants' recycling behavior. Interestingly, the study found that emotional arousal was important in differentiating discrete negative emotions (angry and fear) but not between positive emotion (neutral and contentment). Lapinski et al's (2013) content analysis on diving websites showed that the most well represented components of message sensation value that yields arousal is the use of shark images as well as intense language including verbs and adverbs to portray susceptibility of shark-related threats to human

Organized (O) and thematic (T) program provides the opportunity to present relevant information and meaningful experiences. This is achieved through the presentation of information in an organized sequence and easy to understand manner and by focusing on program themes. The identification of a program theme is an important process in developing an interpretive program because a theme has a major point that carries an important message (Ham, 2008). The message helps participants make relevant connections to the information received and the on-site experiences gained. More importantly, an effective communication of the program theme can also influence behavior because themes are developed based on participants' important beliefs toward the specific environmental issue and behavior. The important beliefs form the basis of attitudes and behavior of the target group (Ham, 2008). In contrast, most school programs at natural sites are information-based because they are mainly organized to complement the classroom curriculum, particularly in geography, science and biology subjects. Hence, these programs tend to deliver a breadth of information covering a wide scope of study. McKenzie-Mohr (2000) concurred that most programs organized to instill conservation behavior focused on providing information. Although it cannot be denied that the lack of information can be a barrier towards behavioral change, detailed and technical knowledge does not influence and change behavior (Kollmuss & Agyeman, 2002). Ajzen et al. (2011) stated that appropriate focus on accuracy of information and making the information relevant to support the behavior can influence behavior. Ardion et al. (2013) concurred that information that provided clear and specific guidance on the desired behavior were more likely to motivate environmental behavior than providing background information.

Based on these EROT elements, the communication model states that a strong relevant theme that is presented in an enjoyable, relevant and organized manner may provoke participants to think and establish connections with what is being presented. A strong theme, coupled with strong interpretive presentations (relevant and meaningful to the existing beliefs), can alter, reinforce or form new beliefs. These will influence an audience's attitude and behavior and ultimately increase the likelihood of the theme-relevant behavioral outcome. For example, studies have shown that interpretive programs at tourists sites are capable of producing desirable behavioral changes (Orams, 1997), on-site behavioral change and longer-term intention to engage in marine conservation actions (Zeppel, 2008), philanthropic behavior (Powell & Ham, 2008), picking up litter (Brown, Ham, & Hughes 2010), or, to a certain extent, changes in selected behaviors (Kim, Airey, & Szivas, 2011; Poudel & Nyaupane, 2013) in support of the management and conservation objectives and strategies at the sites. In fact, interpretive studies have found that two years after an interpretive program, individuals could recall extensive details of

the program, particularly aspects of the interpreter (including personality traits and teaching techniques) and experiential parts of the program (Knapp & Benton, 2005).

Thus, the present study compares the effectiveness of a non-interpretive and interpretive education program in influencing secondary school students' intention to be involved as an organizer of the Malayan tapir education program at school. The study designs an interpretive education program based on the EROT (enjoy, relevant, organized and thematic) interpretive communication model, and the Theory of Planned Behavior (TPB) framework was used to measure the effect of the non-interpretive and interpretive education program in influencing secondary school students' intention to be involved as an organizer of the Malayan tapir education program at school. The study also determines the effect of the EROT interpretive elements on the interpretive program.

### 3. Methodology

#### 3.1. Site selection

Pahang National Park is located in the district of Jerantut in the state of Pahang. The park was selected as the study site because the state of Pahang records the highest number of Malayan tapirs in the Peninsular Malaysia. Based on the estimate of 1500 Malayan tapirs in the Peninsular Malaysia, approximately 327 tapirs are found in the state of Pahang (Misliah, 2011). Unfortunately, the state also records the highest number of displaced Malayan tapirs in the country. Magintan, Traeholt and Karuppanannan (2012) stated that between the years 2006 and 2010, the Department of Wildlife and National Parks recorded a total of 142 displaced Malayan tapir. From the total displaced, 46 of the tapirs were found to be displaced in the state of Pahang. The park itself supports a substantial population of the Malayan tapir and is one of the two important Malayan tapir research sites in Peninsular Malaysia (The Malay Tapir Conservation Project, 2011). The park is also part of the four major complexes of the Central Forest Spine (CFS) in Peninsular Malaysia, which is important for the protection of the forest habitat and its wildlife.

#### 3.2. Sample selection

This study utilized an experimental design to determine the cause-effect of the non-interpretive and interpretive education programs in influencing students' intention to organize a Malayan tapir education program at school. Experimental designs not only "test for the presence of a distinct cause and effect" but is also effective in controlling for potential extraneous variables (Salkind, 2006; pp.218).

The present study involved students from four schools located in the district of Jerantut in the state of Pahang. The students involved in both the eliciting study and interventions were Secondary Four school students in the year 2012 from government schools categorized as Ordinary Daily National Secondary Schools.

#### 3.3. Sample size

Eighty students were involved in the eliciting study, whereas the pre-test post-test experimental design involved 180 school students, involving male and female students from the science and humanities classes (Table 1). However, there were more female students (57.78%) involved compared to male students (42.22%). Similarly, more students from the humanities classes (82.78%) were involved as these schools had only a small group of students in the science classes (17.22%).

**Table 1**

Students' Background Information according to Intervention Groups.

Students' details	Intervention groups			N	%
	Control (n=56)	Non-interpretive (n=54)	Interpretive (n=70)		
Gender					
Male	18	21	37	76	42.22
Female	38	33	33	104	57.78
Form 4 classes					
Science	6	14	11	31	17.22
	50	40	59	149	82.78

Because the study utilizes an experimental design with controlled extraneous variables, the general rule of thumb for the minimum requirement for experimental research is 15 subjects per group (McMillan, 2008; pp.124) and/or 30 participants per group (Neuman, 2009; pp.200). The number of samples collected in the present study was higher than the minimum requirement to accommodate for the loss of sample due to last minute absenteeism or withdrawal. Environmental education experimental studies that utilized similar sample sizes to determine the effectiveness of the intervention programs include the studies of Chong, Noor Azlin and Manohar (2006); Kingston et al. (2006); Tarlton and Ward (2006); Duerden and Witt (2010); and Othman et al. (2013).

#### 3.4. Interventions

The intervention involves two methods of presentation of information: the information-based program (non-interpretive) and the program developed based on the EROT interpretive communication model (interpretive). The researcher conducted all interventions to minimize experimenter effects.

Student school groups were randomly assigned to the intervention groups. From the total number of students, 56 students were assigned to the control group that did not receive any form of intervention.

Fifty-four students participated in a half-day non-interpretive program, which took the form of a poster exhibition that focused on the topic of 'Malayan Tapirs'. The poster exhibition involved a systematic organization of the following information: background information on the *Tapiridae* species and Malayan tapir (scientific information, distribution and evolution of the tapir species), folklore on the Malayan tapir in Malaysia, the characteristics and functions of tapirs, threats and tapir conservation efforts in Peninsular Malaysia. The poster included pictures, diagrams and maps that were used to enhance students' understanding of the Malayan tapir. Although the program was held at the national park, the poster exhibition was held in the closed hall throughout the program duration.

Seventy students participated in a one-day interpretive program held in the park. Students learned similar information as the non-interpretive group. However, the presentation of information to enhance students' understanding about the Malayan tapir was based on identified themes and sub-themes that infused strong interpretive elements to provoke students' thinking thoughts, senses and emotions. Indoor and outdoor activities were also conducted in the park to provide students a meaningful experience.

Although random assignment was employed to assign schools into their respective intervention groups, pre-tests were used to further equalize the group statistically. A pre-test is included in a randomized-to-group pre-test-post-test experimental design when there may be small, subtle effects of different treatment

or when differential subject attrition is possible (McMillan, 2008). Although randomization may better control for testing validity, the conduct of pre-test could still possibly lead to testing validity, where pre-test would sensitize participants to respond to the treatment differently than they would without a pre-test. Thus, the presence of a control group enables us to discount the possibility of differences between the experiment and control groups. In the current study, a control group and pre-test were utilized to maximize validity.

### 3.5. Obtaining approval from the relevant agencies and students involved

The researcher sought approval from the Ministry of Education (The Education Planning & Research Department) to gain approval of the research methodology and instruments used on students. Based on the approval from the Ministry of Education, permission from the Pahang State Education Department and the Jerantut District Education Office were obtained to gain access to the identified secondary schools. Because the implementation of the study required more than 6 months in the year 2012, discussions were also held with the schools' principal and teachers-in-charge. The researcher also obtained parent's consent for their child's involvement in the study through the parent's consent form.

### 3.6. Processes involved in the designing of the interpretive program and developing of the self-Reported questionnaire

#### 3.6.1. Eliciting study

A focus group discussion (FGD) was utilized to elicit students' beliefs and emotions toward the Malayan tapir. Students' beliefs toward their involvement as an organizer of a Malayan tapir education program at school were also elicited through the guidance of the TPB framework. The beliefs identified were utilized to develop an interpretive education program and a quantitative self-reported questionnaire to determine the effectiveness of the non-interpretive and interpretive education program in influencing secondary school students' intention to be involved as an organizer of the Malayan tapir education program at school. Students' beliefs on the important elements that made a program enjoyable, relevant, thought-provoking and emotionally stimulating and that influenced their desire to participate and share with friends were also sought based on the adaptation of the research instrument developed by Weiler and Ham (2010).

The eliciting study is an important process in both the TPB framework and the EROT interpretive communication model to identify the underlying determinants of students' intention. The determinant of students' intention is based on students' beliefs as reflected in students' attitudes, norms and perceived control. According to Ajzen (1991), the underlying foundation of beliefs provides the detailed descriptions needed to gain substantive information about the behavioral determinants. Interpretation reiterates that to ensure effective communication that influences behavior, it is important to understand and target students' salient beliefs because "beliefs are the building blocks of attitudes and behavior" (Ham, 2008; pp.2).

The findings of the eliciting study are presented into two sections:

Section1: Eliciting students' cognitive beliefs and emotions toward the Malayan tapir

Pictorial stimulations were used to elicit students' beliefs and emotions towards the Malayan tapir. Focus group discussions data were analyzed, and two themes were identified: students' cognitive beliefs (knowledge and experience) and emotions.

The eliciting study results showed that students were intrigued by the physical characteristics of the Malayan tapir, with the most

frequently mentioned unique characteristic being a) its body shape and size, b) its body color and pattern and c) its proboscis. Other less-mentioned characteristics were the uniqueness of the Malayan tapir's ears, eyes, tail and toes. Students described the Malayan tapir as important to Peninsular Malaysia because it enriches wildlife diversity in the country. Many students stated that conserving the Malayan tapir would benefit the ecotourism industry through wildlife tourism activities. They knew little about its ecological functions and threats to its population.

Pictorial stimulations of the Malayan tapir were classified according to Parrot's (2001) Primary Emotion classification. The study elicited positive (surprise, love, happiness) and negative (sadness, anger, fear) emotions. Several students stated no emotion toward the pictorial stimulations, whereas a few stated that they were 'not sure how to describe what they felt' or that they were simply 'not bothered'. Negative emotions of sadness, anger and fear were obvious emotions cited when pictures of dead and injured Malayan tapir were shown.

Section 2: Questions pertaining to students' behavioral beliefs, normative beliefs, perceived control beliefs and EROT interpretive elements

Students' beliefs towards their involvement as an organizer of the Malayan tapir education program at school were elicited based on the TPB framework. The important beliefs were chosen based on one of Ajzen and Fishbein's (1980) recommendations – that the important beliefs were selected based on the most frequently mentioned beliefs (at least 75%) by the school groups. The important beliefs were selected to form themes that would represent items in each TPB construct in the self-reported questionnaire.

The self-reported questionnaire consisted of eight items representing the attitude construct, four items representing the subjective norm construct and seven items representing the perceived control construct. Three items represented the behavioral intention construct.

The eliciting study also obtained students' beliefs on the important elements that make a program enjoyable, relevant, mentally and emotionally stimulating and influence their desire to participate and share with friends.

#### 3.6.2. Designing the interpretive program

The program theme and sub-themes were developed based on students' important beliefs and emotions towards the Malayan tapir as identified in the eliciting study. Clusters were formed based on the topic of concern; i.e., the 'Malayan tapir' and information were crosschecked to identify an appropriate program theme and sub-themes. The process of identifying the program theme and sub-themes were based on the steps recommended by Ham (1992); Regnier, Gross and Zimmerman (1992); and Ward and Wilkinson (2006).

The main theme, 'Habitat lost is threatening the survival of Tahan in the Malaysian forests', was identified to influence students' beliefs on the importance of supporting the conservation of the Malayan tapir in Pahang National Park through their intention to be involved as an organizer of the Malayan tapir education program at school. The program focused on an individual named Tahan, a semi-wild Malayan tapir that can be found roaming in the grounds of the park. Using Tahan as the main character in the program makes the delivery of the messages more focused and personalized. The self-referencing technique is important to help students relate better to the unique physical characteristics and the emotional experiences of Tahan.

To support the communication of the program theme, three sub-themes were identified. The eliciting study showed that most students had positive attitudes and emotions towards the physical appearance of the Malayan tapir. However, a few students showed

negative emotions of anger and fear because of its similar body shape to a pig, which is a prohibited animal among the Muslims. Therefore, the first sub-theme of 'Tahan is a unique wildlife in the Malaysian forest' was chosen to enhance students' existing positive attitudes and emotions towards the Malayan tapir while eliminating isolated cases of misconceptions. The activity began with the facilitator asking questions to engage and re-establish students' attitudes towards Tahan. Utilizing their existing knowledge and experiences, students were asked to identify physical characteristics that made Tahan a unique wildlife in the Malaysian forest. They were asked to visualize Tahan by molding the unique characteristics on a group member using newspapers. The activity was followed by an interpretive talk that utilized the Malaysian Chinese and Orang Asli folklores to emphasize the unique creation of the Malayan tapir and make relevant its existence in the Peninsular Malaysian forest. The hilarious folklores injected elements of fun to enhance emotions of happiness and love towards the Malayan tapir. To seize the positive emotions and enhance the emotional connection created during the activity, the black and white body coloration of Tahan was compared to the similarity of the color of the Pahang state flag to evoke a sense of pride and to stimulate and make relevant the Pahang students' involvement in the Malayan tapir conservation efforts at the park.

The second sub-theme was 'Tahan helps to keep the Malaysian forest healthy by becoming an important seed disperser'. This sub-theme was selected because many students either shook their head or remained silent when asked about their thoughts on the role of the Malayan tapir in the forest. To counter the ignorance on its ecological importance, the presentation of the second sub-theme focused on the survival of Tahan in the forest by highlighting its dependence on the forest for food and protection. At the same time, the important role it plays as a seed disperser that helps to maintain the sustainability of the forest was also emphasized. The activity was conducted in the Malayan tapir's habitat to enable students establish the physical and emotional connection with the on-site resources. On-site resources such as the forest as its habitat; young shoots, fruits and seeds found along the trail; rivers; and the Malayan tapir's dung were used to enable students understand the Malayan tapir's interdependent relationship with the forest. Students were also asked to look for seeds in the dung to stimulate and connect students to the important ecological role of the Malayan tapir as a seed disperser.

The third activity highlighted the program theme 'Habitat lost is threatening the survival of Tahan and his family in the Malaysian forest'. Students were stimulated to understand the concept of habitat lost and its impact to Tahan and his family through two games, 'Habitat loss' and 'Threats and Barriers'. Contrived situations and self-referencing techniques were emphasized throughout the activity to enable students to feel the emotions of the injured and suffering tapir and to evoke the students' sense of responsibility to support the conservation of the Malayan tapir by being involved as an organizer of a Malayan tapir education program at school. Survival stories of Tahan and his family were used to provoke students' emotions of sadness, fear and anger over the challenges that the Malayan tapirs have to face due to habitat loss. A story of how Tahan survived the ordeal of losing his habitat was followed by stories of his three other family members, namely, Megat, who was found lost and trapped in a monsoon drain in Kuantan, Pahang; Kai, a roadkill victim on the East-West Highway, and Im, who got its leg trapped in a snare and had its leg amputated but eventually died. These stories were told with strong emotional elements using pictures as teaching aids.

The final activity focused on the sub-theme 'You can help Tahan and his friends by initiating an education program at school to support the conservation of Tahan in Pahang National Park'. The word 'you' was included in the sub-theme to personalize the

message and emphasize students' individual role and responsibility to support the conservation effort through their involvement as an organizer of a Malayan tapir education program at school. Discussion sessions and group presentations were used to stimulate students' intention to take action by identifying interesting activities that they can organize at school; and to improve students' perceived control by minimizing perceived control barriers and enhancing facilitators of their involvement.

### 3.6.3. Instrumentation

The self-reported questionnaire consisted of three sections. Section 1 of the questionnaire consisted of 45 items measuring secondary school students' attitudes, subjective norms, perceived control and behavioral intention towards their involvement as an organizer of the Malayan tapir education program at school. A 5-point Likert scale of strongly agree (5) to strongly disagree (1) was utilized to measure both the belief strength and evaluative statements. To avoid patterned responses, the belief strength and evaluative statements for the attitude, subjective norm, perceived control and behavioral intention constructs were mixed to ensure that the process of answering the statements in the questionnaire was thoughtful. A pre-test was conducted 3 days before the intervention programs for the non-interpretive and interpretive groups. The post-test was conducted at the end of both the intervention programs. For the control group, the post-test was conducted six days after the pre-test due to the difficulty in scheduling the post-test at school as many students were involved in an outside of school co-curriculum activity.

Section 2 of the questionnaire was developed based on the adaptation of the research instrument developed by [Weiler and Ham \(2010\)](#) to determine the effect of the interpretive elements on the interpretive program. A 5-point Likert scale of strongly agree (5) to strongly disagree (1) was utilized to measure the strength and evaluative statements of the EROT constructs. Section 2 of the questionnaire was only distributed during the post-test to both the non-interpretive and interpretive groups.

Section 3 of the questionnaires consisted of the students' background information such as students' names, school name and class stream.

### 3.7. Data analysis

Comparisons between groups and tests were conducted based on the TPB framework and the EROT interpretive elements. The independent *t*-test was utilized to determine the similarity between the intervention groups while the paired sample *t*-test was used to compare the differences in the group's intention to be involved, before and after participating in the intervention programs.

The one-way between groups ANOVA was used to determine significant differences between the three intervention groups. Post-hoc analysis was conducted for significant results to determine the differences between groups. The Bonferroni procedure was used as it is generally a conservative procedure and has control over Type 1 error ([Field, 2005](#)).

## 4. Results and discussions

### 4.1. Effectiveness of the interpretive education program based on the TPB framework

Cronbach's alpha scores for the attitude, subjective norms, perceived control and behavioral intention constructs were tested for the non-interpretive and interpretive groups. The results demonstrated Cronbach's alpha scores of more than 0.70 for all constructs and groups. According to [Allen and Bennet \(2008\)](#), an

alpha value of 0.70 and above is considered an acceptable level of internal reliability for most research purposes.

4.1.1. Comparison between groups

Table 2 compares the tests mean scores between groups. At pre-test, the groups were similar for all constructs except the attitude construct  $F(2177) = 4.527, p = 0.012$ . A post-hoc comparison showed that the interpretive group ( $M = 4.376, SD = .395$ ) had a stronger positive attitude compared to the control ( $M = 4.238, SD = 0.453$ ) and non-interpretive ( $M = 4.137, SD = 0.494$ ) groups. No statistically significant differences between groups were observed for the other TPB constructs in the pre-test.

The post-test mean scores show statistically significant differences for the attitude  $\{F(2167) = 6.042, p = 0.003\}$ , subjective norm  $\{F(2167) = 8.699, p.0001 = 0.0001\}$ , perceived control  $\{F(2167) = 5.055, p = 0.007\}$  and behavioral intention  $\{F(2167) = 4.133, p = 0.018\}$  constructs between groups. A post hoc comparison showed that the interpretive group had statistically significant stronger positive attitudes, subjective norms and behavioral intention mean scores compared to the control and non-interpretive groups. However, the perceived control mean scores were only statistically significant different between the control and interpretive groups.

The results show that the interpretive program had a significantly stronger positive influence on students' attitudes towards their involvement compared to the other groups. The interpretive group also had statistically stronger beliefs that people important to them (e.g., parents, teachers, siblings and friends) would support their involvement. Motivated by stronger beliefs that they can counter the barriers and enhance the facilitators (e.g., funds, facilities, free time, knowledge on the Malayan tapir, parent's consent, support from friends and cooperation from all involved), the interpretive group also showed statistically stronger intention to be involved compared to the other intervention groups.

4.1.2. Comparison between tests

The results in Table 3 show no improvement in the mean scores between tests for the control group. However, statistically significant differences were observed for the mean scores of attitude, subjective norm and perceived control constructs. The delay in the conduct of the post-test may have resulted in diffusion of treatment that contributed to the significant differences between the tests' mean scores.

The non-interpretive group also showed no improvement in the mean scores between tests, with statistically significant difference observed for the subjective norm construct. The significant

Table 3

Comparing the Group's Tests Mean Scores based on the Theory of Planned Behavior (TPB) Constructs.

Intervention Groups/TPB Constructs	Tests <sup>1</sup>		t-value	p-value
	Pre-test	Post-test		
Control group (N=56)	4.238	4.100	2.683	.010*
Attitude				
Subjective norm	3.985	3.835	3.357	.001*
Perceived control	3.750	3.631	2.444	.018*
Behavioral intention	3.941	3.875	0.820	0.416
Non-interpretive group (N=51)	4.137	4.130	0.282	0.779
Attitude				
Subjective norm	3.954	3.891	2.161	.035*
Perceived control	3.712	3.745	-0.722	0.474
Behavioral intention	3.920	3.895	0.308	0.760
Interpretive group (N=63)				
Attitude	4.382	4.378	0.177	0.860
Subjective norm	4.050	4.180	-2.551	.013*
Perceived control	3.720	3.752	-0.576	0.567
Behavioral intention	4.021	4.173	-2.536	.014*

Notes: <sup>1</sup>All entries are mean scores based on 5 point Likert scale; 1 = strongly disagree; 2 = Disagree; 3 = neutral; 4 = Agree; 5 = strongly disagree. \*Mean differences across the row are significantly different at  $p < 0.05$ .

differences for the subjective norm construct could be attributed to the belief that people important to the non-interpretive group (e.g., parents, teachers, siblings and friends) would not be supportive towards their involvement.

The interpretive group's mean scores improved between tests for most TPB constructs except for the attitude construct. The attitude construct mean scores showed no improvement between tests. This indicates that the interpretive program did not change students' beliefs towards the Malayan tapir and their involvement as these students already showed that they had significantly more positive attitude, compared to other groups as reflected in the results in Table 2. Statistical significant improvement was observed for the subjective norm and behavior intention constructs.

Based on the findings, the most important determinant of a person's behavior in the TPB framework is the behavioral intention. With the determinants of an individual's behavioral intention being the attitude toward behavior, subjective norms and perceived control, the results show that the interpretive program was statistically successful in influencing students' intention through the significant improvement in the subjective norm and behavioral intention constructs.

Table 2

Comparing Tests Mean Scores of the Theory of Planned Behavior (TPB) Constructs between Intervention Groups.

Tests/TPB constructs	Intervention Groups <sup>1</sup>			F	p
	Control (n = 56)	Non-interpretive (n = 54)	Interpretive (n = 70)		
Pre-test					
Attitude	4.238 <sup>a</sup>	4.137 <sup>a</sup>	4.376 <sup>b</sup>	4.527	0.012
Subjective norm	3.986 <sup>a</sup>	3.954 <sup>a</sup>	4.032 <sup>a</sup>	0.434	0.649
Perceived control	3.750 <sup>a</sup>	3.717 <sup>a</sup>	3.860 <sup>a</sup>	1.711	0.184
Behavioral intention	3.941 <sup>a</sup>	3.870 <sup>a</sup>	3.986 <sup>a</sup>	0.441	0.644
Post-test					
Attitude	4.100 <sup>a</sup>	4.130 <sup>ab</sup>	4.378 <sup>c</sup>	6.042	0.003
Subjective norm	3.850 <sup>a</sup>	3.891 <sup>ab</sup>	4.202 <sup>c</sup>	8.699	0.0001
Perceived control	3.631 <sup>a</sup>	3.745 <sup>ab</sup>	3.889 <sup>b</sup>	5.055	0.007
Behavioral intention	3.875 <sup>a</sup>	3.895 <sup>ab</sup>	4.175 <sup>c</sup>	4.133	0.018

Notes: <sup>1</sup>All cell entries are mean scores based on a 5 point Likert scale; 1 = strongly disagree; 2 = Disagree; 3 = neutral; 4 = Agree; 5 = strongly disagree. Means with different superscripts across the row differ significantly at  $p < 0.05$ . Bonferroni was used for the post-hoc test.

#### 4.2. EROT interpretive elements

Table 4 determines the effect of the EROT interpretive elements on the interpretive program. The six interpretive elements measured were enjoyable, relevant, provoke, emotion, desire to participate and desire to share. Cronbach's alpha scores for all of the elements were tested for the non-interpretive and interpretive groups. The results showed Cronbach's alpha scores of more than 0.60 for every element in both groups. Kline, as cited by Field (2005), explained that "when dealing with psychological constructs, values below 0.70 can realistically be expected because of the diversity of the constructs being measured" (pp. 668). McMillan (2008) stated that "reliability is affected by homogeneity of the subjects and the study of groups that can contribute to lower reliability, sometimes as low as 0.50 in exploratory research" (pp. 156).

#### 4.3. Non-interpretive program

The non-interpretive program presented information based on the topic of the 'Malayan tapir'. By focusing on a topic, the program focused on providing in-depth information about the Malayan tapir. The results in Table 4 show that the non-interpretive group felt the program was significantly lacking in the interpretive elements of enjoyable, relevant, provoke, emotion, desire to participate and desire to share, compared to the interpretive group. These have contributed to the program's lacked of capability to positively influence students' intentions to be involved as shown in the results in Table 3.

The focus of the non-interpretive program on a topic made the program less relevant to students and was less likely to provoke students' thoughts or emotions because a topic is a subject matter that carries no specific message about the subject (Ham, 1992).

The use of a single presentation technique (poster exhibition) and the program conducted indoors made it less enjoyable and provoking to the thinking thoughts and emotions. The lack of direct experience with the natural surroundings of the Malayan tapir lacked the capability to trigger the senses of smell, hear, touch and taste that play an important role to provoke thinking thoughts and emotions. Besides, the emotional elements presented either in words or in pictures lacked the capability to stimulate students' beliefs (attitude, norm and control beliefs) and encourage students to engage in discussion among themselves or with the program facilitator.

A disadvantage of the non-interpretive program was that it did not provide any suggestion on what students could do to support the conservation of the Malayan tapir in Pahang National Park. Hence, the non-interpretive program may not have fully delivered

its message clearly to the students. These factors contributed to the limitation of the non-interpretive program's capacity to improve students' attitude, subjective norm and behavioral intention mean scores between tests.

#### 4.3.1. Interpretive program

4.3.1.1. *Enjoyable.* The enjoyable element was strongly infused into the interpretive program, especially in the first sub-theme, 'Tahan is a unique wildlife in the Malaysian forest'. The enjoyable element was strongly infused into the Tapir model making activity and the interpretive talk that was presented in a fun and hilarious manner to enhance the group's existing positive attitude and emotions towards the Malayan tapir.

The interpretive group also enjoyed the use of various teaching methods such as model making, talks, simulations and games, discussions and presentations as opposed to the single teaching method used in the poster exhibition for the non-interpretive program. The use of various teaching methods was important because each of the teaching methods had different effects on the interpretive group's beliefs and emotions. For example, the model-making teaching method was used to enhance students' positive attitudes and emotions towards the Malayan tapir and to enhance the belief that the Malayan tapir is a unique wildlife in the Malaysian forest. The interpretive talk focused on the similarity of the Malayan tapir body color to the Pahang state flag color to establish a sense of connectedness and pride in the existence of the Malayan tapir in their vicinity. Games were used to simulate the journey of Tahan after losing its habitat to enable students identify and relate to the threats, the physical and emotional torture the Malayan tapir have to endure to survive. These methods were used to rectify misconceptions and to positively influence students' beliefs on the Malaysian tapir and their involvement as an organizer of the Malayan tapir education program at school.

The interpretive group also enjoyed the use of various teaching aids, such as the use of on-site resources and pictures to enhance the theme-relevant message. For example, on-site resources such as the forest, young shoots, fruits and seeds found along the trail and rivers were used as teaching aids to enable students make the connection to the importance of the forest as the Malayan tapir's habitat and source of food and to influence students on Tahan's important role as a seed disperser. The act of finding seeds in the Malayan tapir dung was used to provoke and establish a relevant connection between the role of the Malayan tapir as an important seed disperser and the dependence of forest on the Malayan tapir for its regeneration. The use of pictures to show the suffering of Tahan and his family members were used to evoke students' emotions of anger, fear and sadness to influence students' intention to be involved.

The interpretive group also enjoyed the two-way interaction between the facilitators and participants as opposed to the one-way interaction experienced by the non-interpretive group in the poster exhibition. The interpretive group favored the two-way interaction because it provided students with more opportunities to get connected and interact with the facilitators, interact with other participants and be actively involved in the program activities.

4.3.1.2. *Relevant.* The relevant element was represented by items that measured the relevance of the site selection for the program and the importance of the theme to the students.

The results showed that the interpretive program was significantly more meaningful to the interpretive group compared to the non-interpretive group. Both intervention programs were held in the Malayan tapir's natural habitat to establish the relevance of organizing the program at Pahang National Park. It

**Table 4**  
Comparing the EROT Interpretive Elements between Intervention Groups.

EROT interpretive elements	Intervention Groups <sup>1</sup>		t-value	p-value
	Non-interpretive (n = 51)	Interpretive (n = 63)		
Enjoyable	3.863	4.484	-7.719	.0001*
Relevant	4.059	4.458	-3.636	.0001*
Provoke	4.016	4.294	-3.399	.001*
Emotion	3.721	4.051	-2.828	.006*
Desire to participate	4.098	4.396	-2.338	.021*
Desire to share	4.049	4.344	-2.229	.028*

Notes: <sup>1</sup>All cell entries are mean scores based on a 5 point Likert scale; 1 = strongly disagree; 2 = Disagree; 3 = neutral; 4 = Agree; 5 = strongly disagree. \* Mean scores for negatively worded items based on a 5 point Likert scale; 5 = strongly disagree; 4 = Disagree; 3 = neutral; 2 = Agree; 1 = strongly disagree. \*Mean differences across the row are significantly different at  $p < 0.05$ .

was also to provide students a meaningful experience and to establish emotional connection with the Malayan tapir (i.e., Tahan) and its habitat. The program held at the park also aimed to establish the relevance of the targeted schools' involvement in the program. Through the activity with the theme 'You can help Tahan and his family by initiating an education program at school to support the conservation efforts of Tahan at Pahang National Park', the relevance of students' involvement was established by emphasizing on the close proximity of the schools to the park. Athman and Monroe (2001) stated that "when environmental education is taught in place where they live, a learner's own experiences become a part of their education" (pp. 39). Although both groups experienced their programs at the Pahang National Park, the program was more relevant and meaningful to the interpretive group because they had the opportunity to experience the habitat of the Malayan tapir. Many researchers have agreed that on-site experiences and connection with its resources are particularly important in influencing emotional and motivational components of conservation behavior. Researchers agree that direct experiences have stronger influence on people's behavior than indirect experiences (Newhouse, 1991; Dresner & Gill, 1994; Chawla, 1999; Kruse & Card, 2004; Duerden & Witt, 2010; Perrin, 2011; Marseille et al., 2012; Collado, Staats, & Corraliza 2013).

**4.3.1.3. Provoke.** The provoke element measures the influence of the message presentation on students' message processing capabilities. Interpretive group recorded significantly better mean scores compared to the non-interpretive group.

The interpretive program was significantly more successful in making students want to 'know more', 'discuss further' and 'do something to support the conservation efforts of the Malayan tapir at Taman Negara Pahang National Park'. Kenrick, Neuberg and Cialdini (2010) stated that the presentation of messages is made more valid and believable by increasing the cognitive readiness through the presentation of repetitive ideas and asking an audience to imagine an idea or event. The interpretive program utilized various interpretive techniques such as contrived situations, self-referencing, labeling, imagery, and identification of similarities and differences to personalize and establish relevant connection between students, the Malayan tapir and the intended behavior outcome. Recalling previous sub-themes were also conducted at the end of the activity and at the beginning of each new activity to ensure a smooth transition and connection between activities.

The use of various teaching methods and interpretive techniques helped to provoke the group's message processing capabilities. The simple presentation of information and the two-way interaction used throughout the program were important approaches to continually enhance students' understanding and provoke their cognitive processes and emotional responses. More importantly, these processes are used to bridge information gaps particularly information that may contradict to students' personal beliefs. This is in contrast to the non-interpretive group that was only exposed to information about the Malayan tapir through a single teaching method. With the non-interpretive program being informative and presented in a one-way interaction, it is likely that students would avoid reading information that had no relevance or connection to them.

Besides that, the students from the interpretive program were also more 'satisfied with the further explanation provided by the facilitators when needed' while request for further explanation was few for the non-interpretive program. Thus, the interpretive program was better designed to provoke students to process the information, thus leading to better influence on students' intention to be involved.

**4.3.1.4. Emotion.** The results showed that the strong emotion element in the interpretive program was able to influence students' emotion of anger, fear and sadness towards the Malayan tapir and its threats compared to the non-interpretive program.

The identification of specific emotion to target helps in the identifying of appropriate emotion words, body language and facial expressions to use. The use of various facial expressions and voice tones to evoke students' emotions of anger, sadness and fear were important interpretive presentation techniques. These techniques were successful in provoking the interpretive group's emotions as people can perceive emotion on others' faces relatively quickly (Lindquist & Gendron, 2013). The results were in tandem with Russell and Ashkanasy (2011) manipulation of emotional display to influence recycling behavior. The use of pictures of injured and/or dead Malayan tapir at the end of each story was also instrumental in provoking emotion. The findings were similar to results of Loeb et al. (2010) and Lapinski et al's (2013) studies.

Based on the differences in the presentation approaches, students from the interpretive group showed a stronger emotion of 'anger' because the Malayan tapir is threatened with such cruelty. Similarly, the interpretive group also showed a stronger emotion of sadness because the number of Malayan tapirs is declining in the state of Pahang. Schultz (2000) showed that participants who were instructed to take the perspective of an animal being harmed by pollution scored significantly higher in biospheric environmental concerns than participants who were instructed to remain objective. Hockett and Hall (2007) showed that the emotion of fear was highly effective in changing beliefs about feeding wildlife. Similarly, Berenguer's (2007) study showed that university students who were induced to empathize with a natural object had stronger empathic feelings and emotions towards the natural object and nature as a whole. Hipólito (2011) study further reinforced findings that choosing the right emotion to address and activate through sensorial pictorial stimulations can lead to adequate mood and consequent behavior decisions while Slagle, Bruskotter and Wilson's (2012) study further proves that affect had greater effect than knowledge on beliefs.

#### 4.4. Desire to participate and desire to share

The interpretive group shows statistically significantly more students had the desire to participate in future programs similar to the interpretive program. Similarly, they also had a stronger desire to share the knowledge and experiences gained from the program with their friends and to encourage their friends to participate in the program. This is similar to Lim's (2011) findings, which showed that more than 95% of the students who had participated in the MNS organized programs would want to participate in future programs and share what they have learned with their friends in school.

#### 4.5. Limitations of the study

The use of TPB and the experimental design limits the generalization of the study to the overall Malaysian secondary school student population. The study results may not be representative of the groups of students outside the sample assumptions and the desired behavior of study. This is because the TPB model emphasizes on the importance of salient beliefs of the target group toward the specific behavior. Thus, salient beliefs of the present group of students and desired behavior may differ between different groups of people (e.g., children or adults) or other behaviors (i.e., buying organic products, using cloth bags at shopping centers) because these beliefs are shaped by different factors such as knowledge, experiences and cultural beliefs.

The present study determines the effectiveness of the intervention based on the presentation of information, i.e. information-based program (non-interpretive) and the interpretive program. The use of the TPB theoretical framework raises concern as it does not take factors such as personality, demographic variables and external factors (program duration: half-day versus full day) into consideration. Although these factors may have contributed to the differential impacts, the present study does not include them in the analysis as these factors are considered “background variables” in the TPB framework (Ajzen, 2011; pp.83).

Another limitation of the study is that it does not measure the actual behavior. The study determines individual's behavioral intentions as a combination of behavior beliefs, normative beliefs and control beliefs with actual behavior that enables the model to predict the performance of behavior. Future studies could include the study of actual behavior by utilizing observations and interviews as additional data collection techniques to the existing self-report questionnaire quantitative data collection technique.

## 5. Conclusion

The present study shows that the program designed with interpretive elements of enjoyable, relevant, organized and thematic was more effective in positively influencing secondary school students' subjective norms and behavioral intention to be involved as an organizer of the Malayan tapir education program at school.

The effectiveness of the interpretive program was attributed to the specificity of the program towards the object of concern (Malayan tapir) and its desired behavior (to be involved as an organizer of the Malayan tapir education program at school). The positive effect towards the subjective norm and behavioral intention was also attributed to the program targeting themes that target students' beliefs towards the Malayan tapir and the desired behavior to influence students' intention. This is in tandem with Fishbein and Ajzen's (1975) recommendations that for attitude to predict behavior, it must be specific and based on the target groups' salient beliefs. Although both the non-interpretive and interpretive programs were also presented in a systematic and organized manner, the interpretive program that emphasized the main theme and supported by sub-themes was able to better influence students' intention because themes are beliefs that form the basis of attitude and behavior (Ajzen & Fishbein 1980).

The design of the interpretive program using the EROT interpretive communication model that focused on the presentation of themes and sub-themes were also more successful in presenting the conservation messages in a simple but enjoyable manner, and the theme was made relevant to students to stimulate students' existing beliefs and emotions through the use of various teaching methods and interpretive techniques. The theme and sub-theme were also presented clearly and provided guidance towards the desired behavior outcome. Thus, it was more capable of influencing theme-relevant behavioral intention. Hence, the EROT interpretive communication model is an effective tool to design education programs that is capable of influencing behavioral intention.

## Acknowledgment

This study was supported by a grant provided by the Malaysian Ministry of Science, Technology and Innovation Science grant (Ref. No. 06-01-04 SF 1372).

## References

- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Ajzen, I., Joyce, N., Sheikh, S., & Cote, N. G. (2011). Knowledge and the prediction of behavior: the role of information accuracy in the theory of planned behavior. *Basic and Applied Social Psychology*, 33, 101–117.
- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour and Human Processes*, 50, 179–211.
- Ajzen, I. (2011). Behavioral interventions: design and evaluation guided by the theory of planned behavior. In M. M. Mark, S. I. Donaldson, & B. C. Campbell (Eds.), *Social psychology for program and policy evaluation* (pp. 74–100). New York: Guilford.
- Allen, P., & Bennet, K. (2008). *SPSS for the health & behavioural sciences*. Australia: Thompson Learning Australia.
- Ardirion, N., Heimlich, J., Braus, J., & Merrick, C. (2013). *Influencing conservation action: what research says about environmental literacy, behaviour and conservation results*. New York: National Audubon Society.
- Athman, J. A., & Monroe, M. C. (2001). Elements of effective environmental education programs. In A. Fedler (Ed.), *Defining best practices in boating, fishing, and stewardship education* (pp. 37–48). Washington DC: Recreational Boating and Fishing Foundation.
- Berenguer, J. (2007). The effects of empathy in proenvironmental attitudes and behaviours. *Environment and Behavior*, 39(2), 269–283.
- Brown, T. J., Ham, S. H., & Hughes, M. (2010). Picking up litter: an application of theory-based communication to influence tourist behavior in protected areas. *Journal of Sustainable Tourism*, 18(7), 879–900.
- Carleton-Hug, A., & Hug, J. W. (2010). Challenges and opportunities for evaluating environmental education programs. *Evaluation and Program Planning*, 33, 159–164.
- Chawla, L. (1999). Life paths into effective environmental action. *Journal of Environmental Education*, 31(1), 15–26.
- Cheng, J. Chen-Hsuan, & Monroe, M. C. (2012). Connection to nature: children's affective attitude toward nature. *Environment and Behavior*, 44(1), 31–49.
- Chong, M. I., Noor Azlin, N. Y., & Manohar, M. (2006). Preliminary findings of the effectiveness of environmental education program in Malaysia. In O. Sahir, Y. Siti Hawa, E. Sivananthan, M. N. Shukor, A. Norhayati, & M. S. Shahruil Anuar (Eds.), *Management and status of resources in protected areas of peninsular Malaysia* (pp. 75–81). Kuala Lumpur: Department of Wildlife and National Parks.
- Collado, S., Staats, H., & Corraliza, J. A. (2013). Experiencing nature in children's summer camps: affective, cognitive and behavioural consequences. *Journal of Environmental Psychology*, 33, 37–44.
- Dettmann-Easler, D., & Pease, J. L. (1999). Evaluating the effectiveness of residential environmental education programs in fostering positive attitudes toward wildlife. *The Journal of Environmental Education*, 31(1), 33–39.
- Dresner, M., & Gill, M. (1994). Environmental education at summer nature camp. *Journal of Environmental Education*, 25(3), 35–41.
- Duerden, M. D., & Witt, P. A. (2010). The impact of direct and indirect experiences on the development of environmental knowledge, attitudes and behaviour. *Journal of Environmental Psychology*, 30, 379–392.
- Ernst, J., & Theimer, S. (2011). Evaluating the effects of environmental education programming on connectedness to nature. *Environmental Education Research*, 15(5), 577–598.
- Field, A. (2005). *Discovering statistics using SPSS*, 2nd ed. Oxford: Sage Publications Ltd..
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: an introduction to theory and research*. Philippines: Addison-Wesley Publishing Company.
- Ham, S. H., & Weiler, B. (2007). Isolating the role of on-site interpretation in a satisfying experience. *Journal of Interpretive Research*, 12(2), 5–24.
- Ham, S. H. (1992). *Environmental interpretation: a practical guide for people with big ideas and small budgets*. Colorado: Fulcrum Publishing.
- Ham, S. H. (2008). *An approach to thematic interpretation: based on the TORE model*. USA: University of Idaho. [Accessed 27.03.11] [http://www.coloradoopenspace.org/2008\\_SHam\\_TORE\\_model.pdf](http://www.coloradoopenspace.org/2008_SHam_TORE_model.pdf).
- Heimlich, J. E. (2010). Environmental education evaluation: reinterpreting education as a strategy for meeting mission. *Evaluation and Program Planning*, 33, 180–185.
- Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: a meta-analysis. *Journal of Environmental Education*, 18(2), 1–8.
- Hipólito, J. (2011). The sensorial effect: dynamics of emotion in pro-Environmental behavior? *Applied Environmental Education & Communication*, 10(4), 189–200.
- Hockett, K. S., & Hall, T. E. (2007). The effect of moral and fear appeals on park visitors' beliefs about feeding wildlife. *Journal of Interpretive Research*, 12(1), 5–27.
- Hungerford, H. R., & Volk, T. L. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education*, 21(3), 8–22.
- Keene, M., & Blumstein, D. T. (2010). Environmental Education: a time for change, a time for change. *Evaluation and Program Planning*, 22, 201–204.
- Kenrick, Neuberger, & Cialdini (2010). *Social psychology: goal interaction*, 5th ed.) New York: Allyn & Bacon.
- Kim, A. K. J., Airey, D., & Szivas, E. (2011). The multiple assessment of interpretation effectiveness: promoting visitors' environmental attitudes and behavior. *Journal of Travel Research*, 50(3), 321–334.

- Kingston, T., Juliana, S., Rakhmad, S. K., Fletcher, C. D., Benton-Browne, A., Struebig, M., et al. (2006). The Malaysian bat conservation research unit: research, capacity building and education in an old world biodiversity hotspot. In O. Sahir, Y. Siti Hawa, E. Sivananthan, M. N. Shukur, A. Norhayati, & M. S. Shahrul Anuar (Eds.), *Management and status of resources in protected areas of peninsular Malaysia* (pp. 41–57). Kuala Lumpur: Department of Wildlife and National Parks.
- Knapp, D., & Benton, G. M. (2004). Elements to successful interpretation: a multiple case study of five national parks. *Journal of Interpretation Research*, 9(2), 9–25.
- Knapp, D., & Benton, G. M. (2005). Long-Term recollections of an environmental interpretive program. *Journal of Interpretation Research*, 10(1), 51–53.
- Knudson, D. M., Cable, T. T., & Beck, L. (2003). *Interpretation of cultural and natural resources*, 2nd ed. Pennsylvania: Venture Publishing, Inc.
- Kollmuss, & Agyeman (2002). Mind the gap: why do people act environmentally and what are the barriers to pro environmental behavior? *Environmental Education Research*, 8(3), 239–260.
- Kruse, C. K., & Card, J. A. (2004). Effects of conservation education camp program on campers' self-Reported knowledge, attitude and behavior. *Journal of Environmental Education*, 35(4), 33–45.
- Lapinski, M. K., Neuberger, L., Gore, M. L., Muter, B. A., & Ven Der Heide, B. (2013). Shark bytes: message sensation value and emotional appeals in shark diving websites. *Journal of Risk Research*, 16(6), 733–751.
- Leeming, F. C., Dwyer, W. O., Porter, B. E., & Cobern, M. K. (1993). Outcome research in environmental education: a critical review. *Journal of Environmental Education*, 24(4), 8–21.
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and decision making. *Annual Review of Psychology*, 66, 799–823.
- Lim, E. A. L. (2011). *Evaluation on the effectiveness of the MNS school nature club nature environmental education programs*. Kuala Lumpur: Malaysian Nature Society.
- Lindquist, K. A., & Gendron, M. (2013). What's in a word? language constructs ecotone perception. *Emotion Review*, 5(1), 66–71.
- Loeb, L., Siccardo, G., Tregubov, T., & Tice, E. (2010). Emotionally engaging students to change behaviors and conserve resources: unplug or the polar bear gets it! *The International Journal of Environmental, Cultural, Economic and Social Sustainability*, 6(2), 19–34.
- Magintan, D., Traeholt, C., & Karuppanannan, K. V. (2012). Displacement of Malayan Tapir (*Tapirus indicus*) in Peninsular Malaysia from 2006 to 2010. *Tapir Conservation*, 21(29), 13–17.
- Marseille, M. M., Elands, B. H. M., & van den Brink, M. L. (2012). Experiencing polar bears in the zoo: feelings and cognitions in relation to a visitors' conservation attitudes. *Human Dimensions of Wildlife*, 17(1), 29–43.
- McKenzie-Mohr, D. (2000). Promoting sustainable behavior: an introduction to community-based social marketing. *Journal of Social Issues*, 56(3), 543–554.
- McMillan, J. H. (2008). *Educational research: fundamentals for the consumer*, 5th ed. USA: Pearson Education Inc.
- Misliah, M. B. (2011). Issues and threats related to malayan tapirs and their conservation in peninsular Malaysia. *Keynote address at the 5th international tapir symposium*.
- Monroe, M. C. (2010). Challenges for environmental education evaluation. *Evaluation and Program Planning*, 33, 194–196.
- Neuman, W. L. (2009). *Understanding research*. USA: Pearson Education.
- Newhouse, N. (1991). Implications of attitude and behaviour research for environmental conservation. *Journal of Environmental Education*, 22, 26–32.
- Orams, M. B. (1997). The effectiveness of environmental education: can we turn tourists into 'Greenies'? *Progress in Tourism and Hospitality Research*, 3, 295–306.
- Othman, R., Harun, R., Muda, A., & Ismail, I. A. (2013). The effect of teaching and learning of environmental education through mural painting activity in enhancing the knowledge and awareness of secondary school students toward the environment. *Asia Pacific Journal of Educators and Education*, 28, 11–31.
- Parrot, W. G. (2001). *Emotions in social psychology*. Philadelphia, PA: Psychology Press.
- Perrin, J. L. (2011). Emotional Responses to environmental messages and future behavioral intentions? *Applied Environmental Education and Communication*, 10(3), 146–157.
- Poudel, S., & Nyaupane, G. P. (2013). The role of interpretive tour guiding in sustainable destination management: a comparison between guided and non-guided tourists. *Journal of Travel Research*, 52(5), 659–672.
- Powell, R. B., & Ham, S. H. (2008). Can ecotourism interpretation really lead to pro-conservation knowledge, attitudes and behavior? evidence from the galapagos islands. *Journal of Sustainable Tourism*, 16(4), 467–489.
- Regnier, K., Gross, M., & Zimmerman, R. (1992). *The interpreter's guidebook: techniques for programs and presentations*. WI: UW-SP Foundation Press Inc.
- Rickinson (2001). Learners and Learning in Environmental Education: a critical review of the evidence. *Environmental Education Research*, 7(3), 207–320.
- Russell, S. V., & Ashkanasy, N. M. (2011). Getting to the Heart of Climate Change: three studies of the effectiveness of emotionally framed messages to encourage workplace proenvironmental behavior. *Proceedings 24th annual australian and New Zealand academy of management conference: managing for unknowable futures*.
- Salkind, N. J. (2006). *Exploring research*, 6th ed. New Jersey: Pearson Education International.
- Schultz, P. W. (2000). Empathizing with nature: the effects of perspective taking on concern for environmental issues. *Journal of Social Issues*, 56(3), 391–406.
- Slagle, K. M., Bruskotter, J. T., & Wilson, R. S. (2012). The role of affect in public support and opposition to wolf management. *Human Dimensions of Wildlife: An International Journal*, 17(1), 44–57.
- Tarlton, J. L., & Ward, C. J. (2006). The effect of thematic interpretation on a child's knowledge of an interpretive program. *Journal of Interpretation Research*, 11(1), 7–33.
- The Malay Tapir Conservation Project. [http://www.malaytapir.org/conservation\\_project.html](http://www.malaytapir.org/conservation_project.html) (2011) Accessed 16.01.11.
- Turek, E. M. (2006). Form follows function: interpretive wisdom for environmental educators. *Journal of Interpretation Research*, 11(2), 47–51.
- UNESCO (1978). Intergovernmental conference on environmental education: final report. Tblisi, USSR. . [Accessed 23.10.11] <http://unesdoc.unesco.org/images/0003/000327/032763eo.pdf>.
- Ward, C. W., & Wilkinson, A. E. (2006). *Conducting meaningful interpretation: a field guide for success*. Colorado: Fulcrum Publishing.
- Weiler, B., & Ham, S. H. (2010). Development of a research instrument for evaluating the visitor outcomes of face-to-face interpretation. *Visitor Studies*, 13(2), 187–205.
- Zeleny, L. C. (1999). Educational interventions that improve environmental behaviors: a meta-analysis. *Journal of Environmental Education*, 31(1), 5–14.
- Zeppel, H. (2008). Education and conservation benefits of marine wildlife tours: developing free-choice learning experiences. *The Journal of Environmental Education*, 39(3), 3–17.

**Evelyn Lim** is a Senior Lecturer in the Faculty of Forestry, Universiti Putra Malaysia. Her research interests are in the field of environmental education and interpretation.

**Manohar Mariapan** is an Associate Professor in the Faculty of Forestry, Universiti Putra Malaysia and his research fields include environmental interpretation and, human dimension of natural resources and the environment.

**Azlizam Aziz** is an Associate Professor in the Faculty of Forestry in Universiti Putra Malaysia. His research emphasizes on recreation business.

**Zakaria M.** is a Professor in the Faculty of Forestry, Universiti Putra Malaysia. His research focuses on wildlife management.