Experiential Learning and Pro-Environmental Behavior

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Abstract—This paper examines the implementation of a guided learning and behavioral enhancement to predict and explain observed pro-environmental behavior (PEB) in an eco-tourism experiential study. The development, implementation, and maintenance of nature-based experiences as part of higher education learning have significant effects on PEB. The authors employ the ordered probit model to predict the variables under study. The research suggests that personal norms and affective evaluation of behavior account for variances in behavioral intentions. The results also indicate that attitudes toward the behavior; perceptions of subjective norms; and perceptions of behavioral control, personal norms, and affective evaluation significantly predict PEB.

Keywords—experiential learning, experiential trip, ordered probit model, pro-environmental behavior.

I. INTRODUCTION

Environmental education is education about the world [1]. It impacts on climate change, biodiversity, and nature [2].

To exert sustainable behavior, changes to the patterns of behaviors adopted by the public are called for [3]. According to [4] and [5], a common premise to promote sustainability is an increase in awareness and education amongst the public.

The concept of education for sustainable development gained momentum and exposure through the United Nations Decade of Education for Sustainable Development (2005–2014), which advanced the notion that challenges of environmental sustainability in developing countries were inextricably connected with higher education and learning [6]. The widespread interest in environmental sustainability in developing countries has put pressures on higher education to undertake the responsibilities for leadership in environmental sustainability [7]. Because of the high density of environmental properties in developing countries [7] and [8], this agenda stressed the prominence of environmental sustainability on them.

II. RESEARCH CONTEXT

The traditional concept of learning among higher education students is on rote learning and memorizing in favor of student-centered and task-based approaches [9]. With the increased tension in creating competitive students (not restricted to classroom learning alone) and promoting the adoption of progressive education practices, including a more holistic approach that focuses on individual students’ needs and self-expression, more higher education programs are now geared toward the dimensions of experiential learning [10]. Given this orientation, [11] stipulated that because learning is both a process and a product, the process of learning and understanding what is happening outside textbooks should be built into the curriculum.

[12] defined PEB as behaviors that consciously seek to minimize the negative impact of one’s actions on the natural built world. Behaviors refer to the actions people take and the choices they make to consume products and services or to live in certain ways [13]. The literature on PEB consists of two major streams: one focused on social-psychological constructs and the other focused on socio-demographic variables [14]. Experiential learning experience is a stimulus to the natural environment because it leads to greater appreciation of nature, thus promoting environmentally responsible behavior [15], [16], [17].

This paper employs an eco-tourism study trip as a case study in an attempt to examine the extent to which experiential learning influences PEB and sustainability behavior among higher education students using an ordered probit model. The experiential trip was a three-day two-night stay at an eco-tourism resort located in the northern part of Malaysia. During the trip, students visited one of the oldest tropical rainforests in Malaysia to understand the challenges and prospects of sustainability. All students were encouraged to participate in the experiential trip and participated in seminars and forums on survival skills. The students were also asked to conduct additional research on their own after the trip as part of their assessment.

III. RESEARCH FRAMEWORK AND PROPOSITIONS

[18] found that attitudes toward behavior were positively related to environmental awareness and that the type of information provided had direct implications in shaping the attitudes to perform the targeted behavior [19], [20], [21], [22], [23]. Prior research has shown that experiential learning emphasizing self-discovery, participation, and sensory involvement leads to greater awareness and subsequent promotion of the attitude to perform PEB [24] and [22].

H1. Environmental awareness has a positive impact on PEB.

A person who is energized or stimulated to perform certain behavior is characterized as being motivated [25]. [26] asserted that the level of self-determination for one’s behavior...
can be either intrinsic or extrinsic motivations. Intrinsic motivation refers to the satisfaction a person gains from performing certain actions [27]. Extrinsic motivation exists when a person acts mainly to receive rewards or to avoid feeling guilty [28]. [29] further agreed that activity-based teaching, such as experiential learning, is valuable and productive because students attain more extrinsic motivation to perform environmental actions.

H2. Intrinsic motivation has a positive impact on PEB.
H3. Extrinsic motivation has a positive impact on PEB.

[30] suggested that people who embrace a strong internal locus of control tend to believe that they possess the ability to drive the outcomes. [31] further claimed that locus of control can lead to participation in environmental activities. Some studies suggested that in the presence of experiential learning, a shift occurs in a person’s locus of control [32], which leads them to attempt to change the environment [33].

H4. A person’s internal locus of control has a positive impact on PEB.

Moral norms are a person’s perception of the moral correctness or incorrectness of performing a behavior [34]. In general, [35] and [36] suggested that the more favorable a person’s perception of the moral correctness and moral norm of a certain behavior, the stronger is his or her intention to perform the behavior. [37] agreed that experiential learning can provoke people’s negative feelings of regret and their moral correctness or incorrectness, which serve as a positive catalyst for their conservation behaviors [38] and [39].

H5. A person’s moral norm has a positive impact on PEB.

[40] suggested that a person’s feelings regarding a behavior outweigh the rational assessment of his or her evaluation of the costs and benefits of performing the behavior and cause the person to behave environmentally. People who are more affectionate tend to perform PEB. [41] suggested that anticipated regret is an important predictor of behavioral expectations in the context of environmental behavior. [42] indicated that the affective evaluation of PEB allows for the supposition that the decision to act environmentally is not purely based on a rational decision but also on affective feelings regarding the behavior.

H6. Affect has a positive impact on PEB.

In the second stream, three demographic variables that might affect PEB: gender, urban upbringing, and exposure to nature. Women are more attentive and tend to have more knowledge about “green” issues than men, and thus they are more likely to have higher levels of PEB [43] and [44] and stronger levels of concern [45].

In contrast, [46] stated that environmental concern is developed at early stages in life—that is, environmental concern and behaviors are highest among the young, as well as educated people residing in urban areas [47]. High levels of environmental problems (e.g., industrial activities), which tend to be prevalent in cities, provide first-hand experience to urban residents, which in turn leads to greater environmental concern [48] and [49]. Therefore, in general urban communities are more supportive in environmental protection [50].

H7. Women have higher levels of PEB than men.
H8. Urban upbringing has a positive impact PEB.
H9. People who are exposed to nature at a younger age have higher levels of PEB than those who are not.

IV. METHODOLOGY

Non-probability purposive sampling was employed to examine the effect of experiential learning on student’s behavior. The respondents were students who participated in an experiential study trip. A self-administered drop-off survey method was employed to collect responses from 100 students who visited eco-tourism sites as part of their learning curriculum at the end of the semester.

An ordered probit method was used to assess both the independent measures of behavior and behavioral intention and other alleged cognitive precursors of behavior on PEB. Ordered probit analysis was employed for the study. This method is more beneficial than the commonly used regression because it allows the predictors to translate into the probability of observing a particular ordinal outcome (i.e., the strength of PEB). Another advantage is that the model can produce a reading on the marginal effects. Marginal effect refers to the strength and direction of an independent variable; that is, the extent to which it can explain the dependent variable while holding all other variables constant.

The estimation is performed using the ordered-response model [51] and [52] under a variety of assumptions about the latent error distribution.

Ordered probit is a generalization of the popular probit analysis in case there are more than two outcomes of an ordinal dependent variable (performance of PEB can be classified into weak, neutral, or strong). The independent variables in the study are the social psychological variables and the control variables, including age and exposure to nature. The dependent variable is ranked from the following list: strong, moderate and weak. The predictors were translated into the cumulative estimated probability of observing a particular ordinal outcome (ordered categories: performance of PEB).

The questionnaire items were obtained through reviews of the extant literature on PEB and environmental awareness [53] and [54], self-determined motivation [55], perceived behavioral control [31], [32] and [33], moral norms [56], affective evaluation [57], exposure to nature, upbringing environment [58], and gender.

A. Model Specification

The analysis focused on identifying and measuring the marginal impacts of variables that may condition a person to perform different levels of PEB after an experiential study trip.
The dependent variable for PEB is a composite index of various environmentally responsible behaviors. This index was computed as the sum of responses on the individual questions regarding frequency of performing pro-environmental actions, including refusing excess packaging, using biodegradable packaging and double-sided printing, reusing or recycling plastic bags, conserving energy, not harming the fauna and flora, being concerned about biological and cultural diversity and heritage; and educating others about the importance of environmental conservation.

An ordered probit model was employed to analyze the ordered outcomes (in this case, the strength of PEB (weak, moderate and strong) and its impact on the independent variables) and to capture the marginal effects from different levels of behaviors. The general estimation of the model is as follows:

\[ Y^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \epsilon, \]

where \( Y^* \) is the dependent variable (PEB), \( X_i \) is a series of independent variables, and \( \epsilon \) is the error term. The estimation that the dependent variable will fall into a \( j + 1 \) interval (weak, moderate, and strong) is expressed as follows:

\[ \text{prob (} y = j \mid x \text{)}, \quad (2) \]

where \( j \) is the different levels of the PEB. The estimation of ordered choice models is based on the maximization of the likelihood function, which is expressed as follows:

\[ \log L = \sum_{j=1}^{J} \log \text{Prob} (y = j \mid x) \]

A positive coefficient signals a positive shift in the distribution of responses, implying a drop in the probability of weak PEB and an increase in the probability of strong PEB. The sign and magnitude of the changes in the probabilities cannot be inferred from the estimated coefficients alone. To obtain the results, a preferred basis for comparison is calculated (category-specific marginal effects). The marginal effects for a given variable will always sum to zero across the different ordinal categories [59].

Cronbach’s alpha as a measure of the coefficient of reliability and internal consistency was used to access the items of PEB. Cronbach’s alpha for the 10 PEB items was 0.881, which is within the acceptable range of reliability [60] Nunnally 1967). According to [51], to capture the marginal probability effects of psychological behaviors and factors affecting behavior, the data must be recoded into three categories: 0 = weak, 1 = neutral, and 2 = strong (range = 0, 1, 2; \( \bar{X} = 1.59, \sigma = 0.53 \)). The dependent variable (PEB) is idealistically assessed using a three-point scale based on the individual frequency of actions, because behavior cannot be captured by dummy but rather by frequency of actions [61] Barr 2003). Therefore, a PEB index was computed to serve as the dependent variables for the PEB model.

B. Empirical analysis

As an expansion of equation 1, the following model expresses the model under study:

\[ Y = \alpha + \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4 + \beta X_5 + \beta X_6 + \beta X_7 + \beta X_8 + \beta X_9 + \epsilon, \]

where \( Y \) is the PEB index, \( X_1 \) is environmental awareness, \( X_2 \) is the locus of control, \( X_3 \) is self-determined motivation, \( X_4 \) is moral norm, \( X_5 \) is affective evaluation, \( X_6 \) is exposure to eco-tourism (1 = yes, 0 = no), \( X_7 \) is childhood upbringing environment (1 = urban, 0 = suburban), and \( X_9 \) is gender (1 = women, 0 = men).

As the ordinary regression results show (see Table 1), in terms of the goodness-of-fit model (\( R^2 = 0.32 \)), the F test for independent variables are jointly significant at the \( p < .01 \) level. A potential dilemma from using five psychological and behavioral variables in a model is the possibility of multicollinearity and normality assumption in the ordinary regression model. According to [51] and [59], these problems can be addressed using the ordered probit model with interaction terms, following a cumulative density function. Thus, the analysis computes the ordinary regression, basic ordered probit model, and improved ordered probit with interaction terms (Table 1) to compare the results and variation explained.

According to the basic ordered probit and improved ordered probit model (see Table 2), the pseudo-R-square showed an increase from 0.28 to 0.42. When the childhood upbringing environment index and urban and suburban variables are included as interaction terms in the PEB model, the model collapses. This indicates that there is no reading for the childhood upbringing environment and urban and suburban coefficients in the improved model. This could be due to the close nature between these two variables, and thus a singular matrix problem could be present.

The rationale for including an interaction term of exposure to eco-tourism (\( \text{AFF} \times \text{EXP}, \text{AWA} \times \text{EXP}, \text{LOCUS} \times \text{EXP}, \text{MOR} \times \text{EXP}, \text{and MOT} \times \text{EXP} \)) into the ordered probit model is to identify the interactivity of the extra effect caused by exposure to eco-tourism on the five psychological and behavior variables of PEB. As the improved ordered probit results show, the interaction term of self-determined motivation and exposure to eco-tourism (\( \text{MOT} \times \text{EXP} \)) is significant at \( p < .01 \). That is, for two people with the same level of self-determined motivation, the extra effects of PEB could be associated with past exposure to nature. As a result, on average, people exposed to nature would have a 34.47% stronger PEB than those not exposed (a computation based on the coefficient values of 8.57, using equations 2 and 3), all else being equal.

Table 1. Ordered probit estimation model: basic model and interaction terms

<table>
<thead>
<tr>
<th></th>
<th>Ordinary Regression</th>
<th>Basic Ordered Probit</th>
<th>Improved Ordered Probit</th>
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<tbody>
<tr>
<td>AFF</td>
<td>0.01</td>
<td>0.09</td>
<td>47.46**</td>
</tr>
<tr>
<td>AWA</td>
<td>-0.56</td>
<td>-1.51</td>
<td>18.22</td>
</tr>
<tr>
<td>LOCUS</td>
<td>0.01</td>
<td>0.07</td>
<td>30.97**</td>
</tr>
<tr>
<td>MOR</td>
<td>2.25**</td>
<td>5.83**</td>
<td>-67.86**</td>
</tr>
</tbody>
</table>
Table 2. Marginal effects for the ordered probability model

<table>
<thead>
<tr>
<th></th>
<th>Probability toward category of:</th>
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<tbody>
<tr>
<td>1% increases in Index</td>
<td>Weak PEB</td>
</tr>
<tr>
<td>Environmental awareness</td>
<td>0.02</td>
</tr>
<tr>
<td>Locus of control</td>
<td>0.04</td>
</tr>
<tr>
<td>Self-determined motivation</td>
<td>0.05 (M)</td>
</tr>
<tr>
<td>Moral norm</td>
<td>0.09 (H)</td>
</tr>
</tbody>
</table>

**V. DISCUSSIONS AND MANAGERIAL IMPLICATIONS**

This paper investigated how social-psychological factors influence PEB through the marginal effect based on the ordered probit model.

Although prior research has found that environmental awareness is a dominant factor in predicting PEB [62] and [22], this was not the case in the current study; therefore, H1 is rejected. This finding is in line with [63], who found that a positive attitude toward behavior (positive awareness) is not a sufficient motivation to instigate action; thus, the measurement of ethical or moral behavior responses is subjected to social desirability bias.

Accordingly, prior research has also found that though people might be aware of the effects of their behavior, this awareness will not necessarily translate into positive behavior [64], [65] and [66]. [65] claimed that overt behavior is influenced by a multitude of factors beyond the particular attitudes of interest.

The findings from this study support H2 and H3; that is, intrinsic and extrinsic motivations have a positive impact on PEB. This finding is in line with [67], [38], [68] and [39], who asserted that intrinsic motivations of behavior can be strengthened by fostering feelings of personal responsibility to sacrifice time and effort for the environment. Intrinsic motivations enable people to keep motivated and act proactively rather than to obtain material or extrinsic rewards [69] and [70] and to feel pleasure about and satisfaction with the well-being of their community [71].

The results also support H4, which suggests that the belief in one’s ability to drive positive environmental outcomes plays a critical role in PEB. In a similar vein, according to [33], students who had greater internal locus of control were more likely to participate in PEB. Similarly, the propensity to affect outcomes tends to increase students’ participation in environmental behaviors [42] the feelings of personal control and obligation to participate in environmentally responsible activities carry significant positive coefficients in the PEB model.

The results also support H7—that women have higher levels of PEB than men. The knowledge that demographic characteristics and contextual features facilitate PEB is crucial.
in implementing strategies for environmental education and preservation [72]. Women are considered more vigilant and careful than men. Similarly, it is more common for women to attend meetings and lead activities in their neighborhoods than men [73].

The findings also support H8—that urban upbringing has a positive impact on PEB. As a result of lost green and sustainability properties in urban areas, society overall and urban dwellers in particular have come to realize that more efforts should be given to sustainability [74] and [75]. [14] suggested that there is increasing social pressure at all societal levels, including marketers, to develop and implement programs and measures that will help convince people to become more sustainable. This pressure is in line with the modernity ecological theory of social change, which suggests that the shift in society’s behavior from being less environmentally conscious to having greater PEB is due to the deterioration of modern ecological environments [76].

Finally, the findings support H9, which posited that respondents exposed to nature during a younger age would have higher levels of PEB than other age groups. Educating people from an early age and the transferable values and knowledge which they developed play a significant role in establishing PEB [77]. Accordingly, [78] found that as populations age, they begin to play a larger role in contributing to environmental problems.

REFERENCES

[21] P. Hartmann, and V. Apaolaza-Ibáñez, “Consumer attitude and purchase intention toward green energy


