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Effectiveness of Wetland Interpretation in Affecting School Children's Attitude Towards Scratching of Trees

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ABSTRACT

Scratching or carving on trees by visitors is a common depreciative behaviour in most recreational forest. Besides spoiling the tree's beauty, damaging its wood, causing infection, thwarting tree's growth or even causing its death, scratch marks on trees will potentially make visitors feel angry and uneasy. Wetlands Environmental Interpretation Program (WEIP) was designed by the Forest Research Institute of Malaysia (FRIM) to tackle this problem. About 72 fifth graders of two approximately similar classes from a National Primary School in FRIM were participants of an experiment. The effects of WEIP on the children's attitude towards depreciative behaviour were investigated. A self-administered questionnaire was given *in situ* to both the intervention and control groups. The respondents' behaviours were monitored for depreciative behaviours. The results revealed that interpretive learning experiences positively affected the school children's attitude towards scratching on trees. The message conveyed through environmental interpretative learning experiences could help resource managers in curtailing depreciative behaviours by influencing human attitude on the negative acts on flora, fauna, human and the environment.

Keywords: Wetland, environmental interpretation, attitude, depreciative behaviours, conservation

INTRODUCTION

The Wetland Environmental Interpretation Program (WEIP) was a systematically designed environmental learning experience. It was developed and evaluated based on two fundamental grounded theories, namely, the Theory of Reasoned Action (Ajzen & Fishbien, 1992) and Bennett's Hierarchy of Program Effectiveness (Bennett, 1976). A thematic interpretive trail, known as the Sebasah Trail, was developed with 10 interpretive stations. The stations are used to reveal the main interpretive theme in a

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storyline. The theme was "Appreciating wetlands ecosystems that keep on serving humans".

The storyline was designed to help visitors gain positive perceptions towards the complexities of being in co-existence within a wetland environment. Interpretive messages also provoke people to appreciate preservation of unique ecosystems by not engaging in depreciative behaviours. This study produces evidence on how interpretive learning experiences like WEIP can positively affect human attitude on depreciative behaviour.

DEPRECIATIVE BEHAVIOURS AND THEIR NEGATIVE IMPACTS

Depreciative behaviours seem to be noticed and taken into account in conservation efforts as more of Malaysia's natural treasures and landscape disappear. Today, due to the increase in the population, the demands for recreation areas have increased, thus, depreciative activities such as scratching on trees may have serious impacts on our natural resources in the long run. Tree scarification is also experienced by the recreational areas in the Forest Research Institute Malaysia (FRIM), in Kepong, Malaysia. This is due to the demands for public recreation areas by people from the ever expanding residential areas adjacent to FRIM.

Increasing affluence and leisure time, stimulated by the change in values and life styles, depreciative behaviour could further escalade as more areas became accessible to people. With increasing participation in outdoor recreation by local people, this problem is likely to intensify (Wirshing *et al*., 2003). In most forested-natural, recreation areas, the effects of depreciative behaviour may be significant and show both physical and psychological impacts. The observable findings can be seen in physical destruction. Many facilities such as signboards, exhibits, labels, signs and buildings suffer serious damages and can be very costly to repair. This form of devastation or defacement causes some natural features to get damaged beyond restoration (Sharpe, 1976).

The low level of responsiveness and the lack of feeling of ownership among users, one can see the scars of depreciative behaviours in FRIM today. Noor Azlin and Syamsul (2001) reported that depreciative behaviours in FRIM's recreational areas included littering, damage to facilities, graffiti and improper use of signs.

In investigating depreciative behaviour, it is apparent that there are two aspects contributing to the problem. Sharpe (1976) claims that the first aspect is behavioural, i.e. the complex inner elements, and the second that is the physical aspect, i.e. the external environmental factors. It is believed that the behavioural aspect of depreciative behaviour is determined by controls from within an individual. Through an understanding of human nature and behavioural psychology, the interpreter can have an effect on these controls.

MANAGING VISITORS' DEPRECIATIVE BEHAVIOURS

Humans are capable of modifying biophysical systems from local to global scales. The mediator of these modifications is human behaviour which interfaces between human cognition (social and psychological) and human actions (social and biophysical). Aleesa *et al*. (2003) examined the effects of knowledge, personal attribution and perception of ecosystem health on depreciative behaviours in the intertidal zone of Pacific Rim National Park and Reserve. The study revealed that most resource damaging acts perpetrated by tourists were intentional but not intended to be vandalism or done for the purpose of damaging something and are more correctly termed 'depreciative behaviours'.

According to Roggenbuck (1992), researchers and managers have implemented a host of direct and indirect management actions to tackle the impacts caused by depreciative behaviours by visitors. Persuasive communication, education and related indirect management techniques have often been preferred because they do not contravene visitors' freedom and are often considered as more cost-effective than direct actions such as regulations and law enforcement (Hendee & Dawson, 2002). Written appeals posted on signs are the persuasive communication technique commonly used by park and recreation management agencies, even though other types of media such as computers, the internet and television are also increasingly used (Doucette & Cole, 1993; Manning, 2003). While many studies have evaluated the effectiveness of written appeals, only a small number are directly linked to visitor-impact management issues. Collectively, these studies have investigated the attractiveness and the ability to capture attention from written appeals, visitors' preferences of appeals, knowledge gained, as well as attitude and behaviour change. Namba and Dustin (1992) suggested that depreciative behaviour mitigation would be most effectively addressed by providing information about the behaviour and its consequences. Roggenbuck (1992) concluded that persuasion or interpretation was an effective means of doing this, particularly in the situations where the behaviours were uninformed, unintentional or careless. According to persuasive communication and interpretive research, four factors (namely, sources, message, channel and receiver) influence the effectiveness of the communication process.

One important purpose of nature interpretation, such as signs and written appeals, is to transfer knowledge to receivers so as to influence their attitudes and behaviour. Dowell and McCool (1986), who evaluated low-impact education messages, revealed that boy scouts had increased knowledge on a post-test after they had been shown a booklet and slide shows on leave no trace (LNT) practices. Knowledge levels were tested again; a month following completion of the programme revealed that the scores had significantly decreased, although they were still above pre-test scores. This finding suggests that there

is a need to reinforce newly acquired information.

On the other hand, Leung and Attarian (2002) reported that there was only a slight increase in visitor's knowledge when surveyed four to six weeks after they had been exposed to trailside LNT signs on resource impact topics. A small increase in the visitor's knowledge was also found with the trailside interpretive signs in an Australia ecotourism setting (Hughes & Morrison, 2002).

BEYOND THE DEFINITION OF ENVIRONMENTAL INTERPRETATION

Freemen Tilden (1957) defines interpretation as "an educational activity which aims to reveal meanings and relationships through the use of original objects by first-hand experience, and by illustrative media, rather than simply to communicate factual information." Sharpe (1976) added that interpretation is a service for visitors to parks, refuges and similar recreation areas. Although visitors to these areas come for leisure, many also wish to learn about the area's natural and cultural resources. Ham (1992) remarked that environmental interpretation involves translating the technical language of a natural science or related field into terms and ideas that people who are not scientists can enthusiastically understand.

Environmental interpretation programme benefits visitors, managers or service providers as well as natural resources in park and recreation areas. In fact, it enriches a visitor's experience and gives a clearer picture of natural processes. It can also be used to affect the visitors' attitude on the importance of preserving it. Hence, it is an effective tool that can be used by recreation managers and service providers to reach out to the public. A knowledgeable, caring and sensitive individual, with a positive attitude towards the environment, will make wiser decisions on matters related to environmental management. This positive attitude will also reduce unnecessary destructions of park properties by the visitors, resulting in lower maintenance and replacement costs.

This research was conducted with the objective to examine the effects of interpretive learning experiences like WEIP on the school children's attitude towards scratching on trees.

MATERIALS AND METHODS

Design of the Study

The Wetland Environmental Interpretation Program (WEIP) was developed to affect the school children's knowledge, emotion and behavioural intentions towards the negative impacts of depreciative behaviours, particularly scratching on trees on flora, fauna, human and environment. This study provided the first step in creating reliable and valid data on the impacts of this type of programme.

This study was conducted using a quasi-experimental approach as the only deviation from true experimental design was that the subjects were not selected randomly. This deviation was necessary as all the subjects in a class were used in the study and therefore

randomness was a non issue. Furthermore, the purpose of the study was to examine the effectiveness of WEIP after controlling for extraneous parameters and not generalizing the findings to school children's attitudinal changes. Three major components of this research were control, manipulation and observation. In this study, relevant independent variables were manipulated, while any other extraneous variables[1] were prepared as a control.

Control plays a vital role in this study to unambiguously evaluate the effects of WEIP on the children's attitude. Meanwhile, manipulation of independent variables involved the setting up of different treatment (intervention) groups. WEIP was used as an intervention for the group of students taking part in the WEIP programme. Three primary independent variables or attitudinal structures that were evaluated were changes in the cognitive, affective and behavioural processes, both before and after the intervention on the negative impacts of scratching on trees (Fig.1).

Study Site

This study was carried out along the Sebasah Trail in Forest Research Institute of Malaysia (FRIM), in Kepong, Kuala Lumpur, Malaysia. The Sebasah Trail, coupled with the 10 interpretive stations, served as the parameters for the experimental intervention.

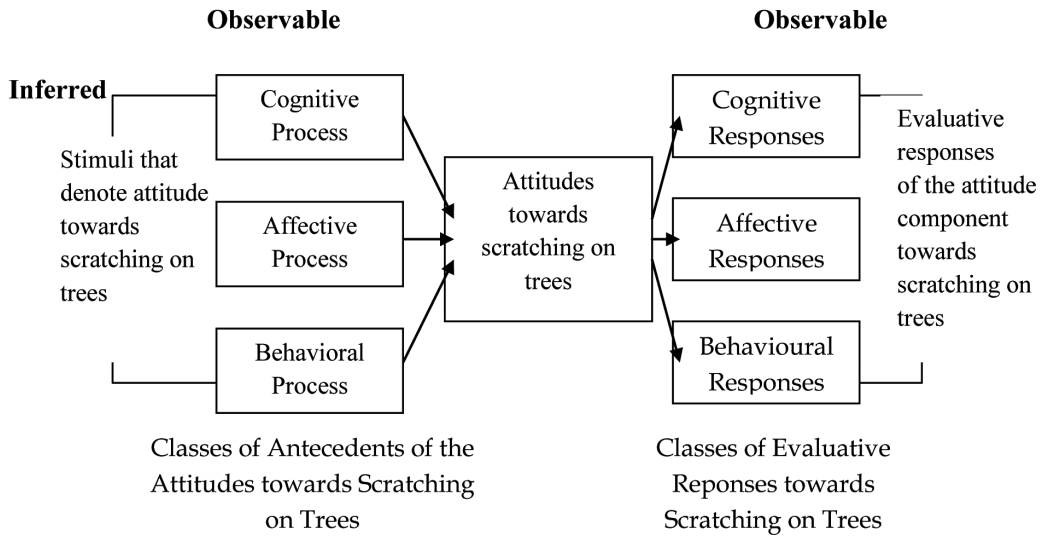
[1] Extraneous variable: Refer to a variable that is not related to the purpose of the study but may have an effect on the dependent variable (Ary *et al*., 1996). The extraneous variables for this study include the students' intelligence and their socio-demographic background.

Measurement and Instrument

The changes in the children's attitudinal structures were measured using a self-administered questionnaire before and after the programme. A questionnaire with bipolar five-point Likert scaled attributes was used to measure the changes in the respondent's knowledge, emotional and behavioural intentions. Each construct comprised of at least 10 items requiring a response on a bipolar five-point score gradient from low to high.

Subjects and Sampling

Seventy two (72) standard five pupils (11 year olds) from two approximately similar classes were selected from a National Primary School in FRIM. One class served as the programme (intervention) group and the other served as the control group. Both the programme and control groups were then divided into five smaller groups, respectively. Each of the ten groups was supervised by a facilitator and an observer. The pupils were selected because of their school's proximity to FRIM and they were not involved in UPSR (the major examination for Malaysian Primary School Children). Eleven year old pupils are regarded as being old enough to participate in WEIP, which involved trekking exploration along the Sebasah Trail. In addition, the school was also selected because it is abutting the FRIM compound.



(*Source*: Adapted and Modified from Fishben & Ajzen, 1992; Eagly, 1993)

Fig.1: The Physiological Construct of the Attitudes and the Application of the Theory of Reasoned Action

Observation on the Nature of the Depreciative Behaviour in FRIM

The research activities started with an early observation on the nature of the depreciative behaviour among the visitors to FRIM using an observation sheet. The observation was conducted in order to answer the first research question addressed in this research, that is, "what kind of depreciative behaviour that was occurring in FRIM, where and when the behaviours occurred and who are the people involved in it". Some evidence was collected during the observation including some photographs and where the behaviours were recorded.

Data Collection and Analysis

WEIP was carried out by three (3) research officers, one (1) assistant research officer, two (2) research assistants, two (2) general supporting staff and four (4) intern students from the Forest Recreation and Nature Education Section of FRIM. Meanwhile, twelve (12) undergraduate students from Universiti Putra Malaysia (UPM) were also trained as observers for this study. Before the programme was started, a set of pre-test questionnaire was given to each of the respondents in both the programme and control groups.

Firstly, the intervention group attended a presentation by the researcher. Then, both the groups went for an exploration hike along the Sebasah Trail. In order to maintain the internal validity of the research designs, no verbal or non-verbal instructions and interpretation on the negative impacts of scratching on trees was given to either group during the hike. Then, the students' behaviours, particularly of the depreciative kind, were recorded by a group of trained

observers along the trail. Finally, both the groups answered the post-test questionnaire after their hike to compare their responses from before and after the intervention.

Test for internal consistency of the items within the constructs (Cronbach's Alpha coefficient) was done the proportion of variance that was consistent in a set of scores. The data were analyzed using the paired sample T-test at 95 percent level of confidence.

RESULTS

Respondents' Profiles

All the 72 respondents chosen for this experimental research were from two standard five classes (11 year olds) from a National Primary School in FRIM. They were from two approximately similar standard five classes of the school. A quasi-experimental design (all the students were picked without random selection) was used for this study under the existing situation of classroom setting. A total of 38 students from one class served as the programme (treatment) group and 34 other students from the other class formed the control group. Most the students are males (52.8%) and the rest are females (47.2%). Majority of the students (56.9 %) chose cartoon as their favourite television programme. Some of their favourite cartoon programmes are 'SpongeBob Squarepants', 'Transformers', 'Naruto', 'Doraemon', 'Spies Girl', and 'Kampung Boy.' During their leisure time, most of the students spent their time playing football (18.1%), cycling (16.7%), reading (13.9%) and playing badminton (12.5%).

The Nature of the Depreciative Behaviours and the Visitors' Negative Behaviour in FRIM

Observations carried out from November 2004 to Mac 2005 revealed that littering was an endless problem in FRIM. It occurred most seriously at the wetland and waterfall areas. Meanwhile, improper uses of facility signs were also common, where vandalism of the signage was observed and improper use of station markers as exercise stations or places to perch on, were also rampant.

The visitors had also purposely scratching or carving trees as obvious scratch marks could visibly be seen along FRIM's nature trails. Another serious problem discovered in FRIM was illegal collection of flora and fauna. This was found to be mostly done by joggers who entered FRIM. Among the common collections include mushrooms, durians and other fruits, as well as plants with medicinal properties. On the other hand, observation results also indicated that children, teenagers, and adults collected tortoises, prawns and fish.

Reliability Analyses of the Cognitive, Affective and Behavioural Intention Constructs towards Scratching on Trees among the Respondents

The scale for cognitive process resulted in a low Alpha Coefficient value of 0.419. The inter item correlations for the items in the scale ranged between 0.136 and 0.328. Meanwhile, the scale for the affective process had an Alpha Coefficient value of 0.556. The inter item correlations for the items in the scale ranged between 0.231 and 0.437. The scale for the behavioural

TABLE 1
A Comparison of the Effectiveness of Wetlands Environmental Interpretation Programme in Affecting Attitudinal Structures towards Scratching on Trees between Programme and Control Groups

Depreciative Behaviours	Groups	df	Attitudinal Structures					
			Cognitive		Affective		Behavioural Intention	
			t-value	p-value	t-value	p-value	t-value	p-value
Scratching on Plants	Programme	37	-3.024	0.005	-2.175	0.036	-0.578	0.567
	Control	33	-1.308	0.200	-3.057	0.004	-0.812	0.422

intention process resulted in a high Alpha Coefficient value of 0.715. The inter item correlations for the items in the scale ranged between 0.180 and 0.615. All the items in the three scales were kept for the new subscale construction since these are the best measures available and the multiple items indicators are by far more reliable than the single ones. The errors in these subscales were reduced and the 5 point Likert scale was also improved considerably.

A Comparison of the Changes on the Attitudinal Constructs towards Scratching of Trees between the Programme and Control Groups

As shown in Table 1, the use of WEIP as an intervention was found to be effective in increasing the children's knowledge towards scratching on trees. Compared to the control group (t=-1.308, p=0.200), children in the programme group (t=-3.024, p=0.005) were more likely to develop a basic belief that scratching of a tree would bring negative impacts to the tree. They were more likely to believe that scratching on trees would damage its wood, harmful to the tree, thwart its growth and might also lead to its fatality.

However, children from both the programme (t=-2.175, p=0.036) and the control groups (t=-3.057, p=0.004) were more likely to become emotionally affected after the programme. In more specific, the WEIP intervention was found to be not effective in affecting their emotion towards the depreciative behaviour. Most children from both of the groups were more likely to feel uncomfortable and disturbed to see scratch marks on a tree. For them, scratch marks on the trees spoil its beauty and also ruin the overall scenic of a natural area. The exploration hike along the Sebasah Trail was found to be sufficient enough to affect the children's emotion towards the negative impacts of scratching on trees.

As for behavioural intention, there was no significant difference found within the control group (t=-0.812, p=0.422) and the programme group (t=-0.578, p=0.567). In other words, WEIP was not effective in affecting these children's behavioural intention towards scratching on trees. This means they were more likely to not taking any action when seeing other people scratching on a tree. They most probably would be silent and just let the perpetrators

with the behaviour or walk away from the site.

CONCLUSION

As asserted by Eagly (1993), attitudes are manifested in the cognitive, affective and behavioural responses based on cognitive, affective and behavioural processes. According to Eagly (1993), attitudes can be formed mostly or exclusively based on any one of the three types of processes. It may be formed primarily by affective or behavioural processes or by a mix of processes. Moreover, Eagly (1993) further asserted that when human directly encounter attitude objects, attitude formation will probably occur by a variety of processes. Thus, it is concluded that WEIP is effective in affecting the attitude of selected school children towards scratching on trees. Through interpretive learning experience at the site, the programme has positively strengthened the children's beliefs that scratching of trees will bring negative impacts to the tree. They were more likely to believe that scratching of trees would damage its wood, harmful to the tree, thwart its growth and might also lead to its fatality after the intervention.

Wetland interpretation setting can be a difficult yet rewarding venue for presenting an environmental interpretation programme. Even though short interpretive programme such as WEIP may bring short-term impacts, repetitive and continuous efforts in providing effective yet enjoyable learning experiences to our children may bring long-term effects. Through this type of programme, there is a possibility of creating young stewards of the environment who will continue to make environmentally sound decisions throughout their lives. If taught early, it is anticipated that these children would grow into adults who valued the environment and helped to protect it. Hence, this study has confirmed that Wetland Environmental Interpretation Program (WEIP) is effective in affecting the attitude of selected school children towards scratching on trees at FRIM's wetland area.

REFERENCES

Aleesa, L., Bennett, S., & Kliskey, A. D. (2003). Effects of knowledge, personal attribution and perception of ecosystem health on depreciative behaviors in intertidal zone of Pacific Rim National Park Reserve. *Journal of Environmental Management*, *68*, 207-218.

Ary, D., Jacobs, L. C., & Razavieh, A. (1972). *Introduction to Research in Education*. New York: Holt, Rinehart and Winston.

Bennett, C. (1976). *Analyzing Impacts of Extension Programmes, Agricultural Cooperative Extension, Report 511*. Washington, D.C.: USDA Cooperative Extension Service.

Dowell, D. L., & McCool, S. F. (1986). Evaluation of a Wilderness Information Dissemination Programme. In E. D. Lucas (Ed.), *Proceedings-National Wilderness Research Conference: Current Research; 1985 July; Fort Collins, CO. General Technology Report INT-212* (pp. 494-500). Ogden, UT; U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

Eagly, A. H. (1993). *The psychology of attitudes*. Fourth Worth: Harcourt Brace College Publishers.

Ham, S. H. (1992). *Environmental Interpretation: a Practical Guide for People with Big Ideas and*

Small Budgets. Golden, CO, North American Press.

Hendee, J., & C. P. Dawson. (2002). *Wilderness Management: Stewardship and Protection of resources and values* (3rd edn.). Golden Colo.: Fulcrum Publishing.

Leung, Y. F., & Marion, J. L. (2000). Recreation Impacts and Management in Wilderness: A State of Knowledge Review. In D. N. Cole , S. F. McCool, W.T. Borrie, & J. O'Loughlin (Eds.), *Proceedings of the Wilderness Science in a Time of Change Conference: Wilderness ecosystems, Threats and Management* (pp.23-48). Missoula, MT. Proceedings RMRS.

Manning, E. R. (2003). Emerging Principles for using Information/Education in Wilderness Management. *International Journal of Wilderness, 9*(1), 20-27.

Manfredo, J. (1992). *Influencing Human Behavior: Theory and Application in Recreation, Tourism and Natural Resources Management.* Champaign, IL.: Sagamore Publishing.

Morford, S. S., Kozak, K., Suvedi, M., & Innes, J.(2006). Factors affecting programme evaluation of Natural Resource Extension Practitioners: Motivation and capacity building. *Journal of Extension, 44(3)*, 3FEA7.

Namba, R., & Dustin, D. (1992). Towards new definitions of depreciative behaviour and vandalism. In H. Christensen, D. Johnson, & M. Brookes (Eds.), *Vandalism: Research, Prevention and Social Policy* (pp. 61-69). General Technical Report PNW-GTR-195. Portland, OR: USDA Forest Service Pacific Northwest Research Station.

Noor Azlin Y., Philip, E., & Roslina, N. (2006). Management Alternatives to Reduce Recreational Impacts at Forest Research Institute Malaysia. Poster presented at *14th Malaysian Forestry Conference*, September 12-16, 2005, Magellan Sutera Hotel, Sutera Harbour Resort, Kota Kinabalu, Sabah.

Noor Azlin, Y., & Syamsul, H. M. A. (2001). Forest Research Institute Malaysia as Recreation Site: Opportunities and Conflicts. Paper presented at *11th IFLA Eastern Regional Conference*. 9-12 July 2002. Putra World Trade Centre, Kuala Lumpur.

Sharpe, G.W. (1976). *Interpreting the Environment*. John Wiley & Sons, Inc.

Tilden, F. (1967). *Interpreting Our Heritage.* The University of North Carolina Press.

Wirsching, A., Leung, Y. F., & Attarian, A. (2003). Swatting litter bugs: What agencies can do to decrease depreciative visitor behaviour. *Park and Recreation,* 16, 18-21.