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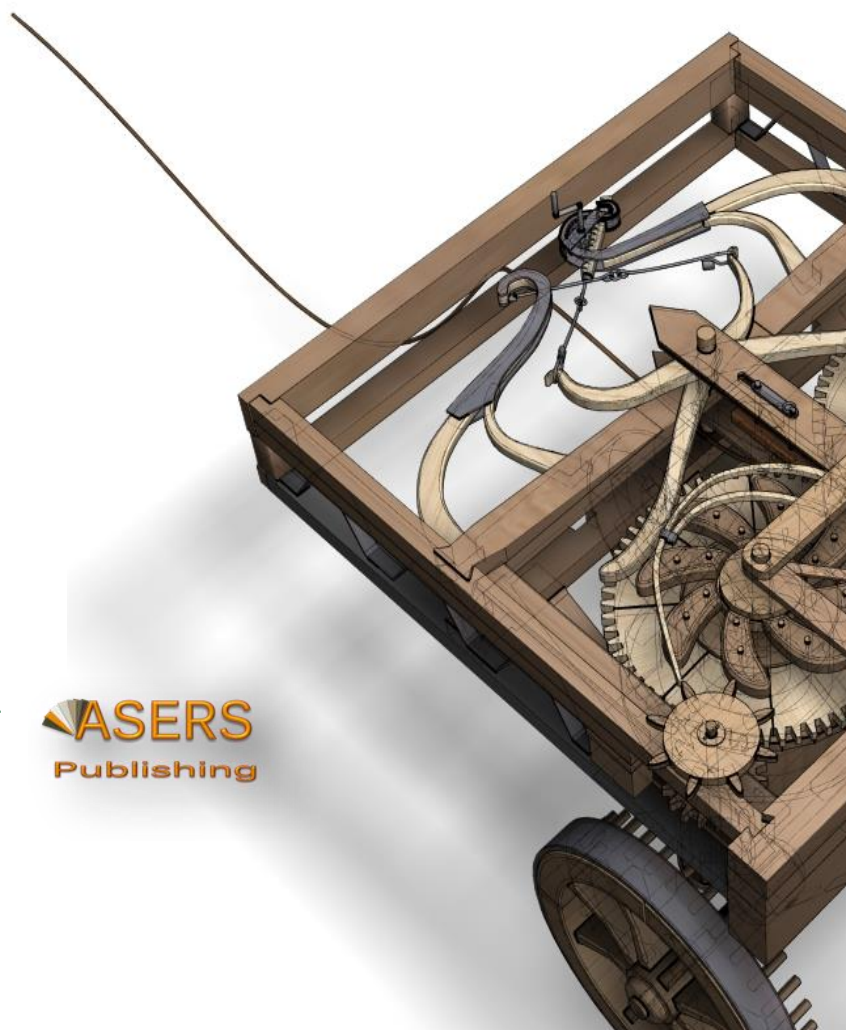
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Developing Nature Interpretation and Alternative Management Strategies to Promote Pro-Environmental Behaviors among Visitors to Thailand's National Parks

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Abstract:

The purpose of this study was to recommend nature interpretation and alternative management strategies to enhance pro-environmental behaviors among visitors by studying the factors that influence these behaviors. The samples were 1400 Thai visitors and 20 national park officers. Questionnaire data was analyzed using path analysis and content analysis. Taking into account research findings, the 11 of interpretive messages were created to promote the behaviors in national parks across the country. The message that is deemed most appropriate for encouraging visitor behaviors was: "A national park is a treasure for everyone, and it is important that we all do our part to protect it. If you see any activities that have the potential to destroy natural resources or harm the environment, please inform the park officers immediately." Besides, developing effective nature interpretation and preparing public facilities have been recommended as major alternative management strategies. The most appropriate high-level strategy for developing effective nature interpretation was found to be "utilizing new technologies to support nature interpretation." The survey respondents identified "setting up different colored garbage bins" and "installing fences to preserve fragile areas" as the most effective strategies for preparing public facilities and managing visitor behaviors in Thailand's national parks.

Keywords: pro-environmental behavior; national park; Thailand; nature interpretation; alternative management strategy.

JEL Classification: L82; L83; Q26; Z32.

Introduction

Encouraging the pro-environmental behaviors of visitors in a national park is an important visitor behavior management strategy for conserving natural resources and environment (Phongkhieo 2012). Thailand's national parks are facing a growing issue of environmental damage caused by visitor behaviors such as disturbing the local flora and fauna, burning wood for cooking, and littering from moving vehicles (Department of National Parks, Wildlife and Plant Conservation: DNP 2021). In the present, nature interpretation is a key strategy used to

promote the behaviors for reducing the negative environmental impacts caused by visitors' inappropriate behaviors (DNP 2012). However, relying on a single strategy is unlikely to be successful in promoting pro-environmental behaviors among visitors. Instead, park officers should integrate nature interpretation strategies with alternative management strategies. This study aims to provide park officers with additional nature interpretation and management strategies for promoting pro-environmental behaviors in Thailand's national parks. According to psychological theories, individual behaviors, including pro-environmental behaviors, are influenced by internal thoughts and feelings, which stimulate the expression of those behaviors. In order to develop nature interpretation and alternative management strategies based on the actual behaviors of park visitors, it is important to research the factors that influence visitors' pro-environmental behaviors. Finally, Department of National Parks, Wildlife and Plant Conservation will use the information on all nature interpretation and alternative management strategies developed as a result of this study to further promote pro-environmental behaviors among visitors to Thailand's national parks.

1. Literature Review

1.1. Definitions of Pro-Environmental Behaviors

In the late 1900s, pro-environmental behaviors were widely studied, particularly in the context of supporting environmentally friendly businesses and products. Researchers from various fields investigated the behaviors to inform marketing strategies for private organizations and national environmental policies (Robert 1996). Several scholars have defined pro-environmental behaviors in various ways. For example, Dolnicar *et al.* (2008) defined them as "participating to decrease a low ecological footprint at the destination," while Tartaglia and Grosbois (2009) described them as responsible behaviors toward the natural environment and local communities while visiting. Ting and Cheng (2014) defined them as intentional attempts to minimize negative impacts on the natural and built environment. In various studies within the field of environmental management, pro-environmental behaviors in tourism destinations have been defined as actions taken by visitors to consider environmental issues, promote sustainable resource use, and reduce negative impacts on the environment in the areas visited (Tang *et al.* 2022; Hoshyar *et al.* 2022). In summary, pro-environmental behaviors of visitors in national parks are actions that reduce negative impacts of tourism on the environment and conserve natural and cultural resources in destinations and surrounding communities.

Pro-environmental behaviors can be divided into a variety of categories, with different classification systems focusing on various aspects of environmental preservation. Sanchez and Lafuente (2010) categorized behaviors based on their cost. Low-cost behaviors, like recycling and conserving water, are simple ways to minimize negative impacts on the environment. Besides that, individuals can adopt a more sustainable lifestyle by engaging in high-cost behaviors, such as choosing environmentally friendly products and services and opting for public transport over personal vehicles. Chiappa and Romero (2014) grouped the behaviors as per the characteristics of personal responsibility, comprising of actions that promote local economy and community, personal commitment to using eco-friendly products and services, and environmentally responsible behaviors. Debicka and Jastrzabek (2014) further classified the pro-environmental behaviors of visitors in relation to local communities surrounding national parks into three categories: learning about local cultures, showing respect for local customs, and purchasing local products and services. Moreover, the pro-environmental behaviors can also be grouped into various categories, including those related to environmental law enforcement (such as reporting acts of vandalism to authorities), green consumption (such as boycotting products made from endangered species), learning about sociocultural and environmental issues (such as acquiring knowledge about the history and culture of a natural attraction before visiting a national park), and behaviors in the public interest (such as supporting environmental policies and legislation) (Asilsoy 2012; Chen 2015). Likewise, the pro-environmental behaviors of visitors to Thailand's national parks are divided into three categories (Amornwitthawat, Phongkhieo 2019). Firstly, learning behaviors are any visitor's educational actions to explore and appreciate the natural and cultural environments. Likewise, visitors who violate laws and regulations, such as removing and collecting natural resources in the areas, can face legal consequences. Therefore, the officials should encourage "respecting laws and regulations" for visitors to follow legal means to prevent environmental devastation. Finally, environmentally responsible behavior is defined as visitor action that is requested of the officers in order to concern, avoid, and reduce environmental impacts in the areas as well as use natural resources in a sustainable way, such as recycling, conserving water, and returning trash to the outside while leaving the national parks. Interestingly, Cao *et al.* (2022) noted that green consumption and environmentally responsible behaviors are conceptually similar to pro-environmental behaviors, rather than classifying them as a specific type of pro-environmental behaviors.

1.2. Nature Interpretation and Alternative Management Strategies

National parks are areas that have been established to preserve natural resources and promote environmental conservation research. Furthermore, tourism and recreation are permitted in this area in order to increase visitors' pro-environmental behaviors and conservation consciousness (International Union for Conservation of Nature: IUCN 2008). Visitor behavior management is an important role of national park officers, with the primary objective of encouraging conservation behaviors and minimizing visitors' negative impacts on natural resources and the environment (Phongkhieo 2012). One strategy of managing visitor behavior in national parks is to organize environmental education activities, e.g., nature interpretation. Nature interpretation is the distribution of information through various media to educate visitors about the natural environment and the importance of protecting it as well as alternative recreation sites and low-impact activities on the environment in the area (DNP 2012). Nature interpretation can be an important tool for increasing awareness and understanding of environmental issues and for promoting pro-environmental behaviors. Jamaliah *et al.* (2021) confirmed that in the case of international nature-based destinations, nature interpretation provided by tour guides had a positive and significant effect on the pro-environmental behaviors of visitors, specifically in regard to avoiding damage to plants and wildlife in fragile areas during visits to protected areas. Nature interpretation in Thailand's national parks to raise awareness and pro-environmental behaviors of visitors has been applied in organizing the significant project to reduce carbon dioxide emissions from the tourism sector. The project has operational guidelines that encourage visitors to reduce their fuel consumption by using public transportation powered by clean energy, to avoid using plastic and foam containers, and to sort and take their trash home. To promote visitors' pro-environmental behaviors and decrease the negative impacts on natural environment caused by inappropriate visitor behaviors, national park officers should concentrate on nature interpretation and alternative management strategies. In addition to the nature interpretation strategy, other important strategies have been implemented to encourage visitors' pro-environmental behaviors in national parks, such as limiting the number of visitors, preserving traditional and historical cultures to provide educational opportunities and experiences to visitors, enforcing regulations strictly, and giving visitors access to the area's essential administrative facilities related to environmental conservation (United Nations Development Programme: UNDP 2009). As a notable instance of the implementation of multiple techniques for encouraging pro-environmental behaviors among park visitors, many national parks in Australia have integrated nature interpretation strategies into the design of facilities that further environmental conservation efforts. This includes encouraging energy saving behaviors, water conservation, and reducing visitor waste. As a result, visitors not only enjoy the natural beauty of the park but also contribute to its preservation (Queensland Government 2020). In the context of Thailand, the Green National Park project is the result of a collaboration between the Department of Environmental Quality Promotion and the Department of National Parks, Wildlife and Plant Conservation. The primary purpose of the project is to promote environmentally friendly management in national parks across the country. Managing clean energy, minimizing waste, and segregating garbage are three major management strategies that influence changing visitor behaviors. Likewise, there is a strategy for providing basic facilities (e.g., restrooms, restaurants, lodges, and camping grounds) that encourage the behaviors of visitors (Department of Environmental Quality Promotion: DEQP 2015). Thailand's national parks have suffered the detrimental effects of unsustainable tourism due to the negative impacts on the natural environment caused by inappropriate visitor behaviors. To address this issue, national park officers must implement strategies, such as effective nature interpretation and alternative management, to continuously encourage the pro-environmental behaviors of visitors (Ministry of Tourism and Sport 2017). To develop nature interpretation and alternative management strategies that effectively address visitor behaviors, it is crucial to first examine the factors that influence pro-environmental behaviors among park visitors.

1.3. Factor Influencing the Pro-Environmental Behaviors

Pro-environmental behavior has been recognized as an environmentally conscious action that is able to persuade and change one's mind (Steven 2005). Many factors have an impact on the visitors' behaviors, both directly and indirectly. Fundamentally, the major factors influencing behaviors are environmental values and environmental knowledge. Environmental values are defined as enduring beliefs about the inherent value of the natural environment, including the importance of preserving natural resources for future generations and the responsibility of humans to protect the environment. Environmental behaviors, motivated by values, often have the expectation of benefiting oneself, others, and all living beings on the planet (Sharma, Gupta 2020). These values can serve as a guiding force when making decisions about environmental behaviors (Stern *et al.* 1993). Understanding the diversity of environmental values is crucial for fostering cooperation and collaboration in efforts

to protect the environment and address environmental issues. Environmental knowledge has been identified as a key internal factor that influences behavior through its impact on values, both directly and indirectly. In the Model of Knowledge-Attitude-Behavior, knowledge is a significant predictor of behavioral tendencies (Carmi *et al.* 2015). Environmental knowledge refers to the understanding and retention of facts, information, skills, or practical guidelines related to minimizing the negative impacts of recreational activities on the natural environment (Kaswarm *et al.* 2010). Environmental knowledge includes information about the negative impacts of visitors on the natural environment, the benefits of environmental conservation, and laws, regulations, and ethical principles related to the environment. In addition to environmental values and knowledge, other psychological and situational factors can influence visitor behaviors. Other psychological theories, such as Reasoned Action and Planned Behavior (Fishbein, Ajzen 1975; Ajzen 1985), posit that behaviors are strongly influenced by perceived behavioral control. Perceived behavioral control refers to an individual's perception of their ability to control their behavior. In the context of a study on pro-environmental behaviors of visitors, perceived behavioral control is important because it can impact a visitor's decision to engage in pro-environmental behaviors. Visitors with a higher level of perceived behavioral control were found to be more likely to engage in pro-environmental behaviors (Zarei *et al.* 2021). Furthermore, Kollmuss and Agyeman (2002) suggested that situational factors have an impact on pro-environmental behavioral change in the Model related to Predictor of Environmental Behavior. Effective nature interpretation should begin with the design of interpretive messages. Visitors to the national park can expect to receive interpretive messages through various media located within the park. These messages are often used in nature interpretation to encourage visitors to engage in pro-environmental behaviors (Phongkhieo, 2012), and thus were investigated as situational factors influencing behavior in this study. An interpretive message is a central piece of content used in nature interpretation strategies that explains facts and information about natural and cultural environments, as well as the importance of environmental conservation in national parks (Swedish Centre for Nature Interpretation: SCNI 2022). These messages should be easy to understand and capable of enhancing visitor enjoyment. Promoting pro-environmental behaviors through interpretive messages in nature interpretation requires presenting the positive aspects of these actions in an engaging and compelling way that inspires visitors to take action (Duncan, Martin 2002). Visitors should frequently receive interpretive messages through various media, such as official publications and interpretive signs (DNP 2012). Accordingly, this research hypothesized that environmental values, environmental knowledge, perceived behavioral control, and interpretive messages influence the pro-environmental behaviors of visitors to Thailand's national parks. In summary, the study's findings on factors influencing pro-environmental behaviors can be used to develop nature interpretation and alternative management strategies for the Department of National Parks, Wildlife and Plant Conservation and national park officers, with the goal of enhancing pro-environmental behaviors in Thailand's national parks.

2. Methodology

Doi Inthanon, Pa Hin Ngam, Namtokphliu, and Khao Luang National Parks were purposefully selected as study sites for this research. A preliminary survey process was conducted in the study sites for the purpose of compiling a list of items in the research tool, *i.e.*, questionnaire. In four further steps, the research tool met the review's criteria, including the index of item-objective congruence, difficulty index, Kuder-Richardson 21 formula, and Cronbach's alpha coefficient formula. The study population included domestic visitors aged 18 and over who engaged in recreational activities within the national parks. Furthermore, the participants in the study were national park officers and that they were required to have at least one year of work experience. The sample size for this study, which was determined using the formula provided by Cochran (1977), was 1420 respondents. This study combined quantitative and qualitative research methods to analyze factors influencing the pro-environmental behaviors in Thailand's national parks and develop strategies for promoting the behaviors through nature interpretation and alternative management. The procedures for collecting data from the samples and identifying statistical analysis can be explained in accordance with the research's objectives, as follows.

1) To investigate factors influencing the pro-environmental behaviors of visitors, a sample size of 1,200 visitors, 300 visitors per study site, was evenly selected using a convenience sampling technique to collect the questionnaires at the study sites. The path analysis method was applied to test the hypothesis of this study and evaluate a causal relationship model by examining the potential effects (*i.e.*, direct, indirect, and total effects) of factors (*i.e.*, environmental values, environmental knowledge, perceived behavioral control, and interpretive messages) on the behaviors.

2) To develop nature interpretation and alternative management strategies, the sample included 50 visitors and 5 officers at each of the study sites. Thus, a sample size of 200 visitors and 20 officers was selected to

assess the suitability of nature interpretation and alternative management strategies for encouraging the pro-environmental behaviors of visitors. Content analysis was conducted to synthesize the preliminary findings on the factors influencing the behaviors of visitors and present the groups with newly nature interpretation and alternative management strategies. Furthermore, descriptive statistics were utilized to summarize the sample's opinions on the appropriateness of the various strategies that were developed in order to enhance the behaviors.

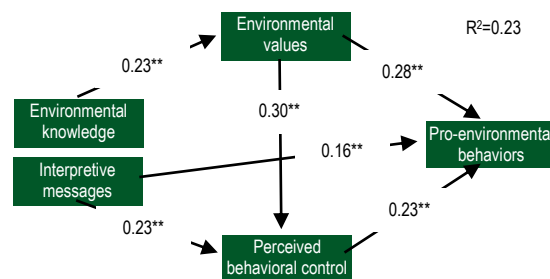
3. Result

Firstly, the results of the descriptive statistical analysis indicated that visitors demonstrated a high level of pro-environmental behaviors ($\bar{X}=3.68$, $S.D.=0.55$). Besides, our study found that perceived behavioral control ($\bar{X}=3.96$, $S.D.=0.59$) and environmental values ($\bar{X}=3.75$, $S.D.=0.54$) had a strong influence on behaviors, while environmental knowledge ($\bar{X}=2.80$, $S.D.=0.75$) and interpretive messages ($\bar{X}=2.59$, $S.D.=0.62$) had a moderate influence.

3.1. Factor Influencing the Pro-Environmental Behaviors of Visitors to Thailand's National Parks

As demonstrated by the causal relationship model in Figure 1, environmental values exert a more significant total and direct effect on the pro-environmental behaviors of visitors than any of the other factors examined, as indicated by coefficients of 0.35 and 0.28, respectively. In our study, we found that both perceived behavioral control and interpretive messages had a significant impact on the pro-environmental behaviors of visitors. Specifically, perceived behavioral control had a total effect with a strength of 0.23, while interpretive messages had a total effect with a strength of 0.21. Environmental knowledge had an indirect positive effect on the behaviors of visitors through the values at a level of 0.07. The coefficient of determination (R^2) was 0.23; therefore, all factors in the causal relationship model were able to accurately explain the variance of the pro-environmental behaviors by 23%. Our path analysis found that the causal relationship model fit the empirical data well, as evidenced by the acceptable levels of goodness of fit indices ($\chi^2/df=0.09$, $GFI=0.99$, $CFI=1.00$, $AGFI=0.99$, $RMSEA=0.04$, $SRMR=0.01$) (Diamantopoulos, Siguaw 2000).

Figure 1. Causal relationship model of the pro-environmental behaviors of visitors to Thailand's national parks



Remark: **($p<0.01$)

This study provides valuable insights into the factors that influence pro-environmental behaviors, based on a strong foundation of research. Its findings can be used to inform the development of nature interpretation and alternative management strategies. This research is consistent with the findings of many other studies, as described below.

1) The Value-Belief-Norm Theory proposed by Stern *et al.* (1993) suggests that environmental values influence the behaviors such as compliance with environmental policies and willingness to pay for conservation. Furthermore, it has been observed that the environmental values held by visitors can also exert an influence on pro-environmental behaviors, such as recycling, conserving water, and purchasing eco-friendly products, within Denali National Park in the United States of America (van Riper *et al.* 2019).

2) The research conducted by Sun *et al.* (2022) has determined that perceived behavioral control plays a significant role in shaping the cleanliness behavior of visitors within national parks. Besides, the availability of public facilities can also affect the impact of perceived behavioral control on the behaviors such as following laws and regulations and performing environmentally responsible behaviors (Mosquera 2016; Duzgnunes, Demirel 2016).

3) The use of interpretive messages delivered through various media has effectively reduced inappropriate littering behavior and firewood use for cooking among national park visitors. Effective interpretive messages are traditionally characterized by credibility and attractiveness, in addition to being easy to understand and capable of enhancing visitor enjoyment (DNP, 2012).

4) Environmental knowledge about civil laws, regulations, and environmental ethics plays a strong role in influencing visitor compliance through the intention to comply (Phongkhieo, Sangchoey 2018). Increasing knowledge about environmental practices in national parks will motivate visitors to willingly adhere to the terms of agreement while traveling in these protected areas, thereby preventing social disapproval and legal punishment. Previous research conducted by Kim *et al.* (2018) yielded similar results, indicating that individuals with higher levels of environmental knowledge were more likely to exhibit concern for the negative impacts on the environment at destinations and to engage in pro-environmental behaviors.

3.2. Developing Nature Interpretation and Alternative Management Strategies

As part of efforts to develop nature interpretation and alternative management strategies for national park officers, this study introduces the implementation of new interpretive messages as the first strategy.

Table 1. Descriptive statistics related to the appropriateness of interpretive messages for promoting the pro-environmental behaviors of visitors to Thailand's national parks.

Interpretive messages	Appropriate levels of the messages evaluated by the visitors (n=200)	Appropriate level of the messages evaluated by the officers (n=20)
1. A national park is a treasure for everyone, and it is important that we all do our part to protect it. If you see any activities that have the potential to destroy natural resources or harm the environment, please inform the park officers immediately.	4.44* (0.61)**	3.96 (0.50)
2. To conserve fuel and reduce pollution, please turn off your vehicle's engine. Excessive and continuous engine operation can be a nuisance to the public and have a negative impact on wildlife.	4.37 (0.70)	3.83 (0.58)
3. Food storage containers made of Styrofoam can harm plants and wildlife, generate excess waste, and create an unsightly appearance in the area. Please do not bring them to the site.	4.36 (0.68)	4.05 (0.64)
4. Drinking alcohol is prohibited in national parks. This behavior has the potential to cause road accidents, conflicts, and loud activities that disturb other visitors and wildlife.	4.36 (0.70)	4.00 (0.47)
5. For your own safety, please do not walk outside the designated areas. It is also important to prevent the destruction of endangered plants and wildlife habitats.	4.36 (0.66)	3.96 (0.47)
6. To reduce pollution and the park's waste management costs, please take any waste that you generate outside of the national park.	4.36 (0.64)	3.78 (0.45)
7. To protect yourself, your property, others, and wildlife from road accidents, please limit your driving speed to no more than 60 km/h and comply with all traffic regulations.	4.35 (0.66)	3.91 (0.61)
8. Feeding wildlife can reduce their foraging ability and cause health problems. It can also lead to road accidents.	4.35 (0.65)	3.87 (0.55)
9. To prevent dangerous encounters and the spread of disease to humans, do not touch or feed wildlife.	4.34 (0.61)	3.71 (0.65)
10. Using public transportation can reduce fuel consumption, improve air quality, and generate revenue for national parks and local communities.	4.31 (0.74)	3.61 (0.72)
11. To avoid destructive behaviors and create an excellent environmental condition; please read all of the interpretive signs and pay attention to the information provided in the visitor information center.	4.30 (0.71)	3.66 (0.59)
Total	4.35 (0.56)	3.85 (0.44)

Remark: *($\bar{X}$), ** (S.D.)

The 11 interpretive messages were designed with educational objectives to promote environmental values, such as conservation of natural resources and the environment, as well as reducing the environmental impacts of visitor behaviors in national parks. In addition, all messages were designed to be easy to understand, able to enhance the enjoyment of visitors, and highlight the benefits of pro-environmental behaviors for oneself, others, natural resources, and the environment (Stern *et al.* 1993). The samples subsequently assessed the appropriateness of all developed interpretative messages in promoting pro-environmental behaviors among visitors to Thailand's national parks, and the results were shown in Table 1.

According to national park visitors ($\bar{X}=4.35$, S.D.=0.56) and officers ($\bar{X}=3.85$, S.D.=0.44), the appropriate levels of all interpretive messages for promoting pro-environmental behaviors were achieved at high levels. According to the opinions of the visitors, the interpretive message that is deemed most appropriate for promoting the behaviors among all the others was "A national park is a treasure for everyone, and it is important that we all do our part to protect it. If you see any activities that have the potential to destroy natural resources or harm the environment, please inform the park officers immediately." ($\bar{X}=4.44$, S.D.=0.61). The park officers believed that the message "Food storage containers made of Styrofoam can harm plants and wildlife, generate excess waste, and create an unsightly appearance in the area. Please do not bring them to the site." is the most effective message for encouraging the behaviors ($\bar{X}=4.05$, S.D.=0.64). According to the results of a content analysis, the study participants expressed the belief that effective interpretive messages for promoting pro-environmental behaviors in national parks should highlight the benefits of these behaviors. This is consistent with the findings of Duncan and Martin (2002), who stated that effective messages must emphasize the benefits of adopting pro-environmental behaviors.

The development of effective nature interpretation is proposed as a second strategy in response to the study of the influence of interpretive messages on visitors' pro-environmental behaviors. Five strategies were developed to guide the design of interpretive messages and the use of media in support of natural interpretation. The samples evaluated the appropriateness of previously developed nature interpretation strategies in promoting pro-environmental behaviors among visitors to Thailand's national parks, and that the results of this evaluation are presented in Table 2.

Table 2. Descriptive statistics related to the appropriateness of nature interpretation strategies for promoting the pro-environmental behaviors of visitors to Thailand's national parks.

Developing effective nature interpretation	Appropriate levels of the strategies evaluated by the visitors (n=200)	Appropriate level of the strategies evaluated by the officers (n=20)
1. Utilizing new technologies, such as mobile applications, social media sites, and official websites, to support nature interpretation.	4.56* (0.66)**	4.50 (0.68)
2. Creating concise messages that do not contain complicated or excessive details in order to prevent decreasing visitors' curiosity and interest and to avoid providing incomplete information.	4.52 (0.72)	4.35 (0.81)
3. Highlighting interpretive messages that address laws and regulations, and the benefits of the behaviors for visitors and others.	4.50 (0.73)	3.95 (0.99)
4. Distributing the messages through various interpretive media, such as official publications or personal media to visitors in front and inside of the national park areas.	4.48 (0.67)	4.35 (0.74)
5. Providing a request form for visitors to report inappropriate behaviors of others and travel-related situations.	4.35 (0.80)	3.75 (1.16)
Total	4.48 (0.55)	4.18 (0.68)

Remark: *($\bar{X}$), ** (S.D.)

Overall, both visitors ($\bar{X}=4.48$, S.D.=0.55) and officers ($\bar{X}=4.18$, S.D.=0.68) assessed all strategies as being highly suitable for promoting pro-environmental behaviors among visitors. Furthermore, the strategy that received the highest evaluation from both visitors ($\bar{X}=4.56$, S.D.=0.66) and officers ($\bar{X}=4.50$, S.D.=0.68) involved the use of new technologies, including mobile applications, social media sites, and official websites, to support nature interpretation. Several international studies have found that a particular strategy is effective in improving

the visitor behaviors at tourist sites. For instance, Milman (2019) found that in addition to providing nature interpretation, new technologies can be used to inform visitors about crowd levels in recreational areas and guide them to less crowded areas in order to reduce negative impacts on the environment. Visitors to national parks in Queensland, Australia now have the opportunity to utilize a free application that enables them to document and share their observations and photographs while gaining knowledge about the natural environment within the designated areas (Queensland Government 2020). The use of web and mobile applications for nature interpretation at nature-based attractions can greatly enhance the pro-environmental behaviors of visitors, while also providing them with exceptional experiences (Wheaton *et al.* 2015). This demonstrates the potential for technology to enhance the visitor experience while also protecting natural resources.

Finally, the facility management strategy was proposed as the third strategy based on the study's findings regarding the influence of perceived behavioral control on pro-environmental behaviors among visitors. Alternative management strategies aimed at preparing public facilities to enhance the behaviors have been consistently regarded as successful strategies for increasing perceived behavioral control, which has a positive impact on the behaviors of visitors in nature-based attractions. It is possible that national park visitors are unable to engage in pro-environmental behaviors due to a lack of public facilities and infrastructures provided in national parks (Stern *et al.* 1993). To address this issue, it is important for national parks to provide adequate facilities to support the engagement of visitors in pro-environmental behaviors (Duzgnunes, Demirel 2016). Six strategies were developed and evaluated by a group of samples for their appropriateness in promoting pro-environmental behaviors among visitors to Thailand's national parks, and the results of this evaluation are presented in Table 3.

Table 3. Descriptive statistics related to the appropriateness of public facility preparation strategies for promoting the pro-environmental behaviors of visitors to Thailand's national parks.

Preparing public facilities	Appropriate levels of the strategies evaluated by the visitors (n=200)	Appropriate level of the strategies evaluated by the officers (n=20)
1. Setting up different colored garbage bins and installing instructional signs to suggest visitors in the waste segregation process.	4.70* (0.62)**	4.35 (0.87)
2. Providing adequate clean toilets to prevent visitors from using and potentially damaging natural water sources.	4.68 (0.59)	4.30 (0.86)
3. Installing fences to preserve fragile areas from visitors walking outside the main trail.	4.60 (0.68)	4.45 (0.68)
4. Providing public transportation services and additional facilities such as car parking and bus stop signs with the timetable to make it more accessible for people to visit the national park.	4.58 (0.68)	3.95 (0.88)
5. Implementing the use of renewable energy sources such as wind turbines and solar panels in shelters and facilities to set an example of sustainability and encourage the pro-environmental behaviors of visitors.	4.57 (0.70)	4.35 (0.74)
6. Installing interpretive signs in the accommodation facilities and camping sites to inspire visitors to adopt natural resource and energy-conserving behaviors.	4.44 (0.68)	3.95 (0.82)
Total	4.59 (0.50)	4.22 (0.56)

Remark: *($\bar{X}$), **($S.D.$)

The strategy of preparing public facilities was evaluated by both visitors ($\bar{X}$ =4.59, $S.D.$ =0.50) and officers ($\bar{X}$ =4.22, $S.D.$ =0.56), and found to be highly effective in improving visitors' pro-environmental behaviors. According to the assessment by the visitors, setting up different colored garbage bins and installing instructional signs to guide visitors in the waste segregation process was recognized as the most effective high-level strategy for enhancing pro-environmental behaviors, compared to all other park interventions ($\bar{X}$ =4.70, $S.D.$ =0.62). The officers assessed that installing fences to protect fragile areas from visitors who stray from the main trail was given priority as the most effective high-level management strategy with the aim of promoting pro-environmental behaviors ($\bar{X}$ =4.45, $S.D.$ =0.68). In general, the implementation of basic strategies such as installing colored garbage bins and fences has been shown to improve the visitor behavior in protected areas in several national parks. For instance, two-thirds of visitors in U.S. national parks use park recycling facilities, including recycling bins and instructional signs, which educate them about the importance of recycling and waste segregation. These

efforts help to keep the parks clean and healthy for wildlife (National Parks Conservation Association: NPCA 2016). Finally, fencing installed in a national park resulted in significant improvements to the condition of nature trails and fragile areas, and protected these areas from visitors who disturb plants and wildlife by hiking and walking off the main trail (Dolnicar, Grun 2009).

Conclusion and Recommendation

Based on the results of our study, we propose the following guidelines for encouraging pro-environmental behaviors among visitors and adapting them for future research. The interpretive messages developed in this study can be translated into the native language and used for nature interpretation to improve pro-environmental behaviors among visitors in the area. It also emphasizes the importance of ensuring that these interpretive messages are tailored to comply with the relevant national park laws and regulations in different countries. Interpretive messages should be designed to be easy to understand and inform visitors about pro-environmental behaviors in national parks and the benefits that result from these behaviors. In order to maintain visitor curiosity and attention, it is important to carefully create interpretive messages without providing excessive detail. Furthermore, the messages should be delivered through a variety of media, including those related to new technologies such as mobile applications and social media sites. Public facilities should be designed and maintained in a way that encourages pro-environmental behaviors among visitors and minimizes inappropriate behaviors. Our proposed alternative management plan for public facilities within the Green National Park project includes the implementation of electric public transportation and the utilization of renewable energy in shelters and facilities. These strategies are crucial for enhancing the environmental management policies of the park and promoting effective clean energy management in protected areas.

While beyond the scope of this study, there are interesting aspects of the results that are relevant to the pro-environmental behaviors of marine national park visitors, such as damaging coral reefs during snorkeling and scuba diving. Thus, further research on interpretive messages and foreign visitors' behaviors is worth considering. Since most visitors in marine national parks are foreigners traveling with travel agencies, a comparative study could examine differences in the behaviors between free independent travelers (FITs) and those on agency-guided tours. In addition, the interpretive messages that encourage visitors to read for pleasure and provide the benefits of the behaviors for their daily lives should be further studied in order to develop effective interpretive messages.

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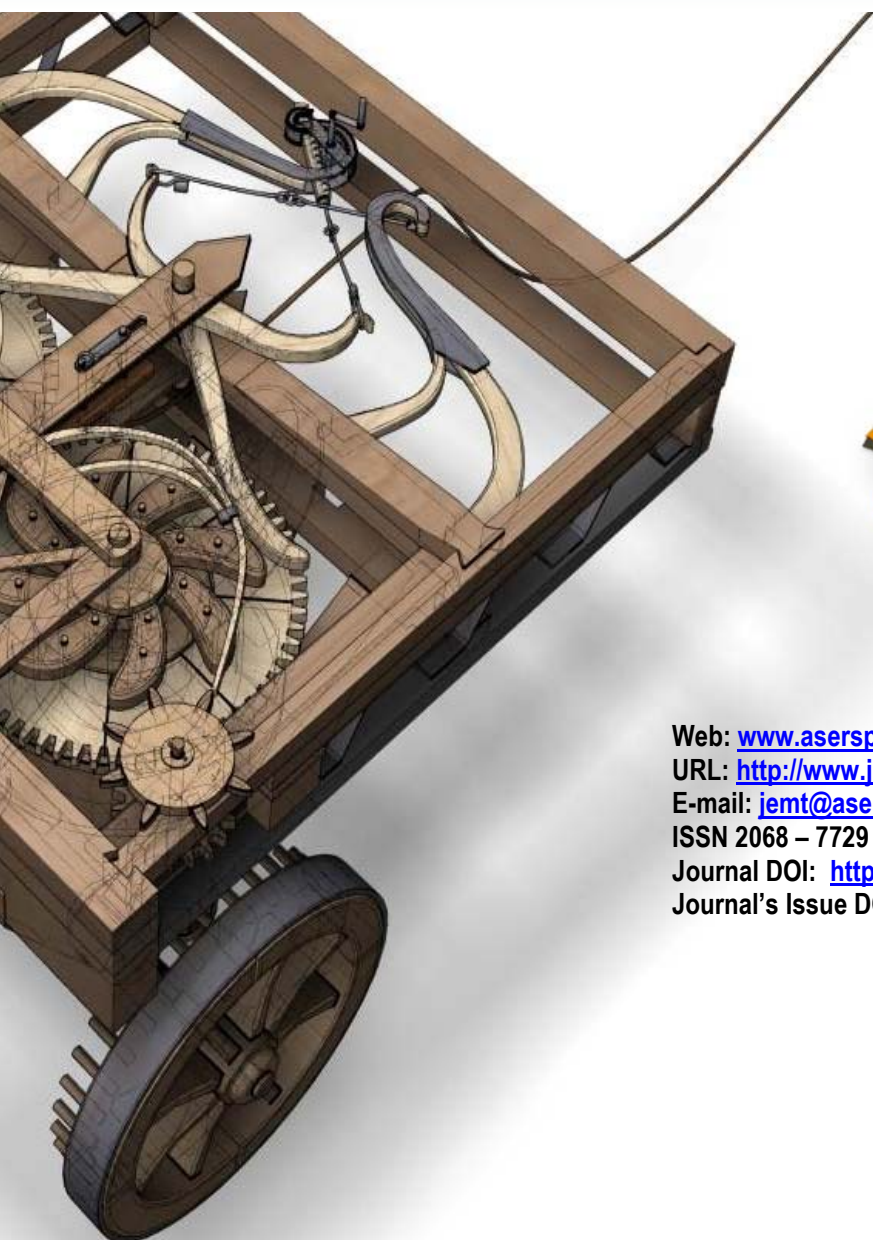
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