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Effects of Environmental Education and Environmental Facilities on Visitors' Environmental Literacy - A Case of Rural Tourism

Qiujin ZHENG¹, Yunjian ZHENG², Qiuqin ZHENG³, Xiaofeng SU⁴

Abstract

From various mass media, it is discovered that environmental anomaly is constantly occurred in past years. It proves that global ecological crises have gradually impacted the earth and the public behavior involving in environmental issues cannot be solved simply by environmental experts, but requires people's correct environmental understanding and behavior. The solution of environmental issues lies in the development of environmental education; in other words, environmental education is an important tactic to improve environmental issues. Aiming at rural tourism visitors to Fujian Province, total 420 copies of questionnaire are distributed, and 288 valid copies are retrieved, with the retrieval rate 69%. The research results show positive and significant effects of environmental facilities on environmental education, environmental education on environmental literacy, and environmental facilities on environmental literacy. According to the results, suggestions are proposed, expecting to assist in the sustainable development of domestic rural tourism and cultivate the environmental literacy and responsible environmental behaviors of the citizens.

Keywords: environmental education, environmental facilities, environmental literacy, rural tourism.

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Introduction

Since Industrial Revolution, people largely develop resources and destroy the environment for economic and industrial development resulting in unprecedented disasters of the ecological environment. Environmental issues are caused by deviant human thoughts and behaviors; such deviation is originated from human-centered environmental value. From various mass media, the constantly occurred environmental anomaly proves the impact of global ecological crises on the earth that the survival and development of global creatures are facing unprecedented crises. People are aware of the importance of protecting natural environment that humans could survive merely with environmental protection and sustainable development. Environmental issues involve in the public behaviors that they could not be simply solved by environmental experts, but could be effectively solved by people's correct environmental understanding and behaviors. The solution of environmental issues therefore lies in the development of environmental education, i.e. environmental education as an important tactic to improve environmental issues.

Along with the prevalence of leisure tourism, outdoor recreation becomes a part of people's life. Various ecological resources in outdoor environment, after the recreational use of visitors, might be affected to appear distinct impacts. To cope with tourists' consumption needs for natural ecology and cultural tradition and the pursuit of fresh and different tourism as well as rising environmental awareness, the new trend of rural tourism rapidly emerges in past years. Rural tourism could bring vitality to communities, enhance diverse development of countryside, and benefit the conservation of rural culture and the protection of natural resources. Nevertheless, the overdevelopment for rural tourism would result in the overuse of local resources and impacts on the society. In this case, maintaining natural and humane environment in tourism with responsible attitudes is the sustainable development rule for rural tourism. Meanwhile, local residents should actually participate in the operation of rural ecotourism to acquire real economic benefits so that rural ecotourism is permanently and stably developed to further enhance the sustainable development of communities. Rural tourism and ecotourism are the industry with the core concepts of "nature", "education", and "sustainability" to promote ecological cognition. After the participation in the tour, visitors would further appear stronger attachment to local natural resources to affect the responsible environmental behaviors. For this reason, rural tourism and ecotourism therefore present the function of environmental education. The effects of environmental education and environmental facilities on visitors' environmental literacy - a case of rural tourism are discussed in this study, expecting to assist domestic rural tourism in the sustainable development and cultivate the environmental literacy and responsible environmental behaviors of the citizens.

Literature review

Rahman & Nasri (2018) defined environmental facilities as organization-structured and non-profit service units, aiming at education, scientific research, and cultural conservation, allocated professional work teams and were open to the general public at planned time, and the nature center had to manage the land, related facilities, and local indigenous species and enhance people to know and understand the nature; besides, the center had to frequently hold environmental education activity and programs for general people. Meloni *et al.* (2019) regarded environmental facilities and locations as the areas with the teaching materials for outdoor environmental education (natural ecological environmental education) where the management institutions were established, through the planning of outdoor environmental education field, and teaching aids, teaching resources, and executive personnel were provided. Alonso-Vazquez *et al.* (2019) mentioned that environmental changes would change human behaviors. The promotion of sustainable environment therefore should be started from environment in order to implement sustainable environment. Visitors learning, playing, and exploring in environmental facilities could find out problems from the past experiences and learn skills to solve environmental problems through interaction. Consequently, remodeling environmental facilities was the first important task. Flanagan *et al.* (2019) proposed the point of tourism environmental remodeling as the remodeling of tourism hardware facilities, aiming to materialize the idea, through the establishment of environmental facilities, and enrich tourism environment; it would be the best physical materials for environmental education in rural tourism. Campana *et al.* (2019) indicated that sustainable environment was a part of sustainable development, but the considerations were broad. It was the process to practice ideas in the life and each part should be actually executed and considered so as to root the concept of sustainable development. Environmental education through the remodeling of environmental facilities allowed the ideal of sustainable environment being practiced. Accordingly, it is proposed in this study that

H1: Environmental facilities show positive and significant effects on environmental education.

Otto & Pensini (2017) stated that the central thought of environmental education was the sustainable development of humans in healthy environment. The promotion of environmental education could help people understand the ecological role in the natural environment and the effect on the environment to adopt proper prevention and improvement measures when facing environmental issues. Samuelsson *et al.* (2018) considered that the philosophy of environmental education was to construct human environmental literacy of environmental knowledge, skills, attitudes, and participation. Essentially, environmental education presented the features of interdisciplinarity, integrity, value, life, practicality,

lifetime, and nationwide. Aregay *et al.* (2018) pointed out the general objective of environmental education as to cultivate humans' understanding and concern about human environment and the relevant issues and to teach people related knowledge, skills, attitudes, willingness, and perseverance to solve contemporary and prevent future environmental issues. Rentzou (2019) regarded environmental education as to cultivate positive environmental attitude and actively participate in environmental protection actions, according to the responsible awareness of the environment, as well as enhance the environmental literacy through the knowledge of natural ecological conservation and standing up for environmental justice. Hosany *et al.* (2017) considered that environmental education aimed to cultivate the citizens presenting environmental literacy and taking responsible environmental behaviors. The promotion of environmental literacy should base on the understanding of ecology, the evaluation of environment, and responsible behaviors; students would evaluate and be responsible for environmental ecology after understanding the value and importance of ecology. Moseley *et al.* (2019) proposed that developing the function of environmental education, inspiring humans' environmental awareness and environmental sensitivity, enriching the environmental protection concepts, implementing the environmental protection actions, and cultivating the environmental ethics and value through environmental education goal and teaching methods could promote environmental literacy as well as solve current environmental threats. Cheeseman & Wright (2019) studied the effect of environmental education on the learning outcome of students' environmental literacy and proposed that students' environmental awareness and sensitivity, environmental concept and knowledge, environmental value and attitudes, as well as environmental action skills and environmental action experience could be effectively promoted. The hypothesis is then proposed in this study.

H2: Environmental education reveals positive and remarkable effects on environmental literacy.

Boca & Saracli (2019) regarded environmental literacy as the ability to be aware of and explain the health of an environmental system and to maintain, recover, or promote the health of the environmental system with actions. "Literacy" was an internal and complicated concept, and the formation of each type of literacy would go through the integration process of thinking, discussion, interaction, and value judgment. Rajaobelina *et al.* (2019) pointed out environmental literacy as the knowledge of natural systems and ecological ideas, the understanding of environmental issues, and the application of investigation, thinking, and communication to solve environmental issues. Samuelsson *et al.* (2019) mentioned that tourism environmental facilities played an important role in the cultivation of visitors' environmental literacy. A visitor in favor of the environment would protect the asset. In this case, the cultivation of visitors' environmental sensitivity was the key to understand the surrounding environmental issues, to understand the solution

of environmental issues through participation, to induce the thinking and feeling through experience and observation, to appreciate the beauty of the surrounding environment, and to make commitment to the surrounding environment and protect the environment. Leelapattana *et al.* (2019) indicated that environmental facilities, through the inspiration of space, facilities, and environment as well as interesting activity participation and experience, satisfying people's physical and mental pleasure and needs for tempering spirit and encouraging users to pursue meaningful outdoor leisure activity allowed visitors and community residents comprehending the long-term change of local environment and accumulating the experience to realize the long-term interaction between people and environment, understand the effects and interaction among human life, culture, and environment, and promote visitors' environmental literacy. Dynia *et al.* (2018) indicated that environmental facilities had to make definite goals, design tourism activity with the establishment of software/hardware facilities, the arrangement of personnel, and the successive management measures, as well as provide visitors with rich and complete environmental experiences. Woosnam *et al.* (2018) covered houses and buildings, education facilities, environmental interpretation facilities, living facilities, and environmental facilities to provide visitors with the ability of understanding environmental concepts and evaluating environmental issues as well as cultivate the environmental literacy and responsible environmental behaviors. The hypothesis is therefore proposed in this study.

H3: Environmental facilities present positive and notable effects on environmental literacy.

Methodology

Operational definition

Environmental facilities. Referring to Hui *et al.* (2018), environmental facilities in this study contain the following dimensions: (1) Natural environment: natural environment greening and environment cleaning; (2) Public facilities: complete public service facilities and diverse leisure facilities; (3) Tourism activity: provision of relevant tourism activities.

Environmental education. Referring to Jo *et al.* (2018), environmental education includes three dimensions of environmental knowledge, environmental skills, and environmental attitude: (1) Environmental knowledge: Assisting social groups and individuals in acquiring various experiences and basic understanding of environment and the related issues; (2) Environmental skills: Providing social groups and individuals with the acquisition of the skills to identify and solve environmental issues; (3) Environmental attitude: Assisting social groups and individuals in acquiring the value to concern about environment and promise to actively participate in environmental improvement and protection.

Environmental literacy. Referring to Jiang *et al.* (2017), environmental literacy covers the following dimensions: (1) Environmental sensitivity: awareness of various environmental disruption and pollution as well as the appreciation and sensitivity to natural environment and artificial environment; (2) Action experience: environmental protection behaviors in daily life and the participation in environmental protection activities.

Research sample and object

Aiming at rural tourism visitors to Fujian Province, total 420 copies of questionnaire are distributed, and 288 valid copies are retrieved, with the retrieval rate 69%.

Reliability and validity test

Confirmatory Factor Analysis (CFA) is an important part in SEM that the measurement model should be tested in the evaluation of structural model in the two-stage model modification during CFA. When the measurement model fit is acceptable, the second step SEM evaluation is preceded. In CFA in this study, the factor loadings of dimensions appear in .65~.90, the composite reliability appears in .70~.90, and the average variance extracted appears in .60~.80, conforming to the standards of 1.factor loading being higher than .5, 2.composite reliability being higher than .6, and 3.average variance extracted being higher than .5. The dimensions therefore present convergent reliability.

Results

Structural model analysis

Structural model analysis contains the model fit analysis and the explanatory power of the overall research model. Referring to experts' opinions, 7 numerical indices are therefore used for testing the overall model fit, including chi-square (χ^2) test, χ^2 -degree of freedom ratio, goodness-of-fit index, adjusted goodness-of-fit index, root mean square error, comparative fit index, comparative hypothesis model, and chi-square difference of independent model. The overall result analyses are organized in *Table 1*.

Taking χ^2 -degree of freedom ratio to test the model fit, the ratio is the smaller the better; this research model shows χ^2 -degree of freedom ratio < 3 (1.57). GFI and AGFI are better close to 1 and have no absolute standards to judge the model fit; and, GFI > .9 and AGFI > .8 are acceptable. This research model reveals GFI and AGFI being .97 and .86, respectively. RMSEA between .05 and .08 shows good model with reasonable fit; this research model shows RMSEA=.03. The

allowable standard of CFI is $>.9$; this research model appears $CFI=.94$. NFI should be at least higher than $.9$; this research model reveals $NFI=.93$. Overall speaking, the fit indices conform to the standards, revealing the acceptable model of the research results. The research samples therefore could be used for explaining the observation data.

From previous overall model fit, the model structured in this study shows favorable goodness-of-fit with observation data that the theoretical model could fully explain the observation data. After the model fit test, the correlation coefficient and the coefficient estimate of environmental facilities to environmental education and environmental literacy could be understood.

Table 1. Fit analysis of research model

Fit Indices	Allowable range	This research model	Model fit judgment
χ^2 (Chi-square)	The smaller the better	27.42	
χ^2 -degree of freedom ratio	<3	1.57	match
GFI	$>.9$	0.97	match
AGFI	$>.8$	0.86	match
RMSEA	$<.08$	0.03	match
CFI	$>.9$	0.94	match
NFI	$>.9$	0.93	match

The research data are organized in *Table 2*. The analysis results reveal that three dimensions of environmental facilities (natural environment, public facilities, tourism activity) could remarkably explain environmental facilities ($t>1.96, p<0.05$), three dimensions of environmental education (environmental knowledge, environmental skills, environmental attitude) could notably explain environmental education ($t>1.96, p<0.05$), and two dimensions of environmental literacy (environmental sensitivity, action experience) could significantly explain environmental literacy ($t>1.96, p<0.05$). Apparently, the overall research model presents good preliminary fit.

In terms of internal fit, environmental facilities reveals positive and remarkable correlations with environmental education ($0.83, p<0.01$), environmental education shows positive and notable correlations with environmental literacy ($0.88, p<0.01$), and environmental facilities appears positive and significant correlations with environmental literacy ($0.87, p<0.01$). H1, H2, and H3 are supported.

Table 2. Overall linear structural model analysis result

Evaluation item	Parameter/evaluation standard		Result
preliminary fit	environmental facilities	natural environment	0.67*
		public facilities	0.70**
		tourism activity	0.68*
	environmental education	environmental knowledge	0.73**
		environmental skills	0.71**
		environmental attitude	0.69*
	environmental literacy	environmental sensitivity	0.77**
		action experience	0.75**
internal fit	environmental facilities→environmental education		0.83**
	environmental education→environmental literacy		0.88**
	environmental facilities→environmental literacy		0.87**

Note: * stands for $p < 0.05$, ** for $p < 0.01$, and *** for $p < 0.001$.

Conclusion

The research results show that the practice of environmental education through environmental facilities in rural tourism remarkably enhances visitors' environmental literacy. Due to the effect of environmental facilities on environmental education and environmental literacy, rural tourism management units therefore have to grasp visitors' characteristics and maintain the attraction of environmental facilities, e.g. activity and experience, environmental resources, and facility conditions, to satisfy different visitors' needs. Without damaging natural environment, rural tourism management units providing consistent resources of environmental facilities to visitor needs could have visitors present positive attitudes toward the environment and further understand the importance and irreplaceability of natural resources. Furthermore, rural tourism visitors particularly regarding the environment as the most important and favorable place would intend to visit the place permanently and better concern about the environmental changes. Regarding environmental education, different visitors should be given proper teaching contents. In the interpretation, it is necessary to educate visitors to obey the regulations of the park and respect natural environment in order to remain the environment. The environmental education of rural tourism could promote the idea of sustainability.

Suggestions

By organizing the research results and findings, the following practical suggestions are proposed in this study.

– Most rural tourism visitors select motorcycles or cars as the transportation, but seldom take mass transit. It would result in traffic jam on holidays. The promotion of taking mass transit and the increase of bus stops should be reinforced to improve heavy traffic and inconvenient parking on holidays.

– Rural tourism management units should understand what resources and education content are able to meet visitors' needs that different interpretation could be increased to provide more human-environment interaction and allow visitors participating in resource protection and relevant skill cultivation.

– Rural tourism management units could separate the parks into several themes, plan the system introduction with various routes (including walking hours, distance, and resource characteristics), provide routes for visitors' selection, according to the experience and ability, to acquire better recreation experiences, and increase environmental facilities to enhance visitors' intention of visiting rural tourism and taking environmental education actions.

– Proper environmental education activities should be designed for different groups in rural tourism. It is therefore suggested that the management units should ask visitors' staying hours in advance and precede interpretation with the interest of most people to promote the environmental cognition. To enhance visitors' environmental attitudes and cultivate the environmental responsible behaviors, the interpretation content and the teaching goal should be integrated, particularly environmental issue related to biology. Moreover, interpreters should find out environmental education topics conforming to real life to promote young groups taking proper environmental actions so that the global environmental protection issues could be locally solved and awakened.

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