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Enhancing Environmental Literacy in Aceh's Tourism through an Ethnoecotourism Based Environmental Education Model

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ENHANCING ENVIRONMENTAL LITERACY IN ACEH'S TOURISM THROUGH AN ETHNOECOTOURISM BASED ENVIRONMENTAL EDUCATION MODEL

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Abstract

Trends in tourism motives include socio-cultural, customs, environment, and panorama, as well as economics and welfare. However, the implementation of tourism will undoubtedly be disrupted by management and development that are not founded on the principles of sustainability. Therefore, through the process of environmental education, preventative and awareness initiatives are required. The main objective of this research was to examine the effectiveness of an ethnoecotourism-based environmental education model for tourism actors in Aceh Province. This model was developed to increase environmental literacy in marine tourism management. Model trials were carried out in the Sabang City Marine Tourism Area. The participants of this research were tourism actors in Aceh Province. The research design uses a quasi-experimental method consisting of pretest-posttest groups and uses multiple-choice questions as a research tool. The data analysis technique applied in this research was quantitative descriptive analysis techniques, in which data were processed inductively using an interactive analysis model. It is known that this model could improve the environmental literacy skills of tourism actors at the research location. It was shown by the significant value obtained at p = 0.000 (< 0.05), where there was a difference in students' scores after being given the learning process, with the average post-test score of 12.43, higher than the pretest score of 8.40, which means there was an increase in understanding of environmental literacy after being given a learning process using an ethnoecotourism-based environmental education model.

Keywords: *Environmental Education; Ethnoecotourism; Environmental Literacy; Marine Tourism.*

A. Introduction

The impact of a lack of ecological understanding, destructive behavior, and the belief that nature was created to be utilized to meet human needs is the emergence of prolonged ecological disasters, such as land and forest fires, landslides, floods, environmental damage, pollution, death and loss of biological resources, and crises in the availability of clean water and air. One form of environmental utilization that is widely found in various regions is in the tourism sector. Danish & Wang (2019), stated that empirical findings prove that the tourism sector significantly drives economic growth but reduces environmental quality.

Tourism has an impact on climate change and marine damage, up to the extinction of protected plants and animals (Buckley, 2011). Tourism development can gradually damage environmental resources (Ghulamrabbany et al., 2013), increase consumption of land, water, and energy, destroy the natural landscape due to the construction of new infrastructure, increase waste production, change ecosystems, lose traditional habits, cause more forest fires, and raise prices of goods and services (Belsoy et al., 2012). The existence of mass tourism increased human activities that caused environmental problems. Extinction such as biodiversity loss, habitat destruction, food crisis, and pollution as consequences of human activities that contribute to the damage of the environment (Wahyudin & Malik, 2019).

Various criticisms emerged against the practice of mass tourism, until finally, a new paradigm emerged, namely ecotourism. Mirsanjari et al., (2013) stated that ecotourism has an idealistic agenda as a progressive educational journey that preserves the environment and benefits local communities. It is not enough just to change the paradigm from mass tourism to ecotourism, the root of the problem of environmental damage is also influenced by human behavior that does not care and is irresponsible for the environment, as well as low awareness of understanding the environment (Aswita et al., 2020; Parker, 2018). Apart from that, urbanization and economic growth also contribute to environmental degradation, while on the other hand, human resources mitigate environmental damage (Ahmed et al., 2020). One mitigation

effort that can be carried out is by changing environmentally literate perspectives and behaviors through the education process.

Several studies related to environmental education have been conducted regarding the necessity of environmental awareness, especially for people of all ages. Various environmental problems have emerged, such as waste management, water pollution, widespread distribution, deforestation, and others. One solution is to integrate environmental issues into formal education, starting with local culture (Hernawan et al., 2022). Furthermore, Vladova (2023) also stated that integrating environmental research into the learning process can encourage sustainable development, environmental protection, awareness of nature, and environmental literacy.

However, environmental education studies, especially in Indonesia, are not effective. Poor teaching methods and a lack of application of experiential learning cause low awareness and low caring attitudes towards nature, resulting in a decline in environmental quality (Supadmini et al., 2020; Asrial et al., 2022). This is proven in research by Palmberg et al., (2019), which found that the level of knowledge of students, teachers, and the community about the environment experienced a significant decline throughout the year. Other recent research shows that more and more people are biologically illiterate (Hooykaas et al., 2019). Even though they learn from the environment, they do not understand how to integrate environmental concepts and sustainable development (Vladova, 2023).

This experiential learning can be done by utilizing the surrounding environment, one of which is the tourism environment. Everyone can utilize the tourist environment to learn about the environment. An extraordinary combination occurs when students, tourists, tour guides, teachers, the community, and researchers can create a learning atmosphere in a tourist environment. To help people learn more deeply about how to manage nature and the tourism environment and help communities that have the potential to become environmentally literate agents, researchers need to develop an etnoecotourism-based environmental education model.

This model is expected to accommodate an educational process that can transmit and internalize cultural values to suit the individual's life

context. Culture-based education is an enabling factor in realizing a learning process that is contextually appropriate and supports the formation of environmentally literate characters. Environmental literacy is important because it involves awareness, understanding, and acceptance of meaning and context, which ultimately can give rise to reflective action (UNESCO, 2011). Environmental literacy is needed to understand environmental issues and sustainable behavior that can help reduce negative impacts on the environment (Khairani et al., 2023; Sukri, 2023).

Various efforts in the education sector have been made to increase environmental literacy, starting from early childhood education to higher education, but have not had a significant impact. This is in line with what was stated by Sumirat et al., (2023) that students' environmental literacy knowledge and attitudes in several studies showed that the results were not optimal. However, there is no known specific environmental education model that incorporates marine tourist activities while internalizing local values. It is anticipated that this model will raise tourist actors' awareness of environmental issues. This model is constructed using the constructivist paradigm, which is a social paradigm that assumes that truth or social reality can be seen as a form of construction in the social environment (Allen, 2008; Almulla, 2023; Bada & Olusegun, 2015). Consequently, it is envisaged that by implementing this model and integrating it with tourism activities, environmental knowledge can be created. Especially for those who are active tourism actors, because they are agents of environmental literacy for everyone who visits these tourist locations.

Based on this, an ethnoecotourism-based environmental education model was developed to answer this challenge and become an alternative for educating and developing individuals who are responsible for the environment. This model was developed for adult education, namely for tourism actors who are active and directly involved in utilizing the tourist environment. This research aims to assess the effectiveness of an ethnoecotourism-based environmental education model in increasing environmental literacy.

B. Method

This research uses a quasi-experimental method with a one-group pretest-posttest design. The sampling technique was purposive sampling among marine tourism actors in Gampong Iboih, Sabang City, Aceh Province, with 40 respondents in total. The sample criteria are those who have businesses in the tourism sector, including dive shop owners, restaurant owners, inn/ homestay owners, as well as tourism service providers such as tour guides, diving guides, and snorkeling guides. The sampling was only for tourism actors, with the assumption that they are agents for conveying environmental education to other people, especially tourists who use their services when traveling. The research was carried out from May 2023 to August 2023.

Practitioners were given questionnaires to complete to gather information about the model's practicality. Experts and practitioners tested the model's practicality to ensure that the information provided in the Book of Supporting Materials is simple to use and suitable for tourism actors. Implementation observation data and respondent activities were analyzed according to the following equation:

$$P = \frac{\sum x}{\sum xi} \times 100\% \qquad (1)$$

P = percentage of practicality
Σx = total number of respondents' answers
Σxi = The total number of ideal scores in one item

The results of the practical analysis are then converted into qualitative data (interval) with the following scale:

Table 1. Practicality conversion guidelines

Percentage of Implementation	Qualification	Information
90 – 100%	Very Practical	No revision is required
79 – 90%	Practical	Revisions
68 – 78 %	Quite Practical	Revision Sufficiently
≤ 68%	Impractical	Many things have been revised

Following an evaluation of the model's practicality, data was collected on the effectiveness of the model. Data effectiveness of the model

was collected by observation and administering environmental literacy tests. There is a pretest and a posttest for the test. The pretest and posttest scores are used to measure the improvement in environmental literacy. The effectiveness of the model can be seen from its success in increasing the environmental literacy of marine tourism actors. The paired t-test was used to determine the effectiveness of the model (Cresswell, 2012; Rostina, 2014).

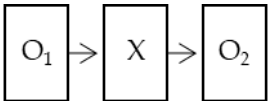

Figure 1. One group pretest & posttest design

O_1 = Pretest score
O_2 = Posttest score
X = Experiment

The test contains 20 multiple-choice questions, which are constructed based on environmental literacy indicators, namely ecological knowledge, ecological attitudes, cognitive skills, and behavior (Hollweg et al., 2011; Nasution, 2016; Rusmawan, 2017).

The data analysis technique in this research uses quantitative descriptive analysis, which aims to assess the effectiveness and practicality of the model. The data is in the form of expert reviews, observations, and tests. The data that has been collected is then processed inductively using an interactive analysis model.

C. Result and Discussion

The underlying hypothesis of this study is that tourism actors' environmental literacy can be considerably raised through effective environmental education. Departing from the theoretical framework discussed in the previous section, the method used in this research was designed to test the effectiveness of an ethnoecotourism-based environmental education model. The results that will be presented below not only reflect the direct effectiveness of the implemented interventions but also provide insight into critical aspects that support or hinder the environmental learning process in the tourism context.

1. Result

The main objective of this research is to examine the effectiveness of an ethnoecotourism-based environmental education model for tourism actors in Aceh Province. This model was developed to increase environmental literacy in marine tourism management. An ethnoecotourism-based environmental education model was developed for adult education; this model is intended for tourism actors in Aceh Province. Joyce et al., (2019), state that a learning model must have five elements of model characteristics: syntax, social system, reaction principle, support system, and instructional & companion impact. Based on this, the process of developing an ethnoecotourism-based environmental education model consists of the following aspects:

Table 2. Important aspects of environmental education model development based on ethnoecotourism

Aspect	Description
Syntax	This model has four stages: thought construction, idea development, reflection to develop, and increased awareness.
Social System	This model requires a collaborative climate, cooperation, and purposeful behavior. Educators help students build literacy based on the principle of living together (learning to live together).
Reaction Principle	Educators are tasked with ensuring that students can carry out learning activities well so that they can construct their understanding individually. Assistance provided by educators takes various forms, including discussions, questions, and answers, evaluating and giving appreciation to students, as well as providing reading materials that can help students learn.
Support System	When implementing the model, a book of supporting material for the model is required (see Figure 2), which has been prepared according to the local wisdom context of the local community as well as various other additional materials that are expected to increase literacy and understanding of the environment.
Instructional & Companion Impact	The instructional impact to be achieved is the formation of environmental literacy. The accompanying impact that can emerge is the formation of a caring and environmentally ethical character.

The learning model is a systematic procedural framework that explains how learning is managed to achieve learning goals. The practical learning

model requires learning tools, one of which is a textbook. The textbooks in question are as follows (see Figure 2).

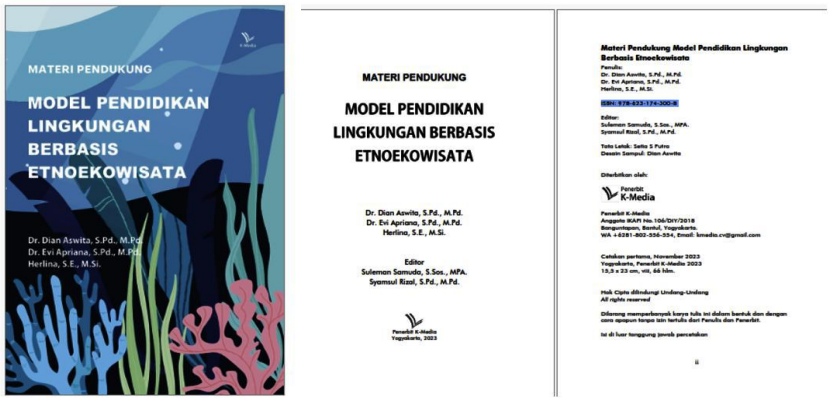

Figure 2. Book of Supporting Materials for the Ethnoecotourism-Based Environmental Education Model

After validating all components of this model and having been declared valid by experts, the practicality of the ethnoecotourism-based environmental education model is then tested before testing the effectiveness of the model. Practicality testing is carried out through observation and field testing of learning implementation. The practicality referred to the implementation of the model syntax and the use of supporting material books (Figure 2) as supporting tools. The practical test results are shown in Table 3.

Table 3. Practicality test of ethnoecotourism-based environmental education model

No.	Aspect	Meeting Implementation Score to							Mean	Criteria
		I	II	III	IV	V	VI	VII		
1.	Syntax	75	85	89	88	85	79	80	83	Practical
2.	Social System	85	88	88	89	86	84	84	86,3	Practical
3.	Reaction Principle	80	90	88	87	89	90	90	87,7	Practical
4.	Support System	84	86	88	88	87	89	89	87,3	Practical
Total Mean		**81**	**87,3**	**88,3**	**88**	**86,8**	**85,5**	**85,8**	**86,1**	**Practical**

Based on the results of the model practicality test, it is known that the implementation of learning and application of aspects of the ethnoecotourism-based environmental education model generally meets practical criteria, with a score of $83 \leq p \leq 87.7$ (p = percentage of practicality; see formula 1). In conclusion, this model is suitable for application in the environmental education process in the community, especially for those who are directly involved in tourism management in Aceh. Next, this model was revised, and the model's effectiveness in increasing environmental literacy was tested.

The research results have a positive impact on increasing the environmental literacy of tourism actors. Increasing environmental literacy can be done through educational programs using an ethnoecotourism-based environmental education model. The educational process is provided classically in the tourism environment that they manage using a predetermined syntax and applying model-supporting material books as a support system.

The research subjects who are tourism actors are grouped as follows:

Table 4. Tourism actors who are research subjects

No.	Group	Quantity
1.	Dive Shop Owner and Manager	5
2.	Hotel/ Inn/ Cottage Owner	6
3.	Restaurant/ Eating House Owner and Manager	5
4.	Snorkeling & Diving Guide	10
5.	Tour guide	3
6.	Boat Man Tour	4
7.	Seller of clothes, souvenirs, and accessories	7
	Total	40

Tests for increasing environmental literacy were given to 40 respondents (see Table 4), which were based on four predetermined indicators: ecological knowledge, ecological attitudes, cognitive skills, and behavior. It is known that ecological knowledge improved by 9.7%, ecological attitudes increased by 28.13%, and cognitive skills increased by 18.83% based on the findings of the examination of each environmental literacy indicator. However, different things were shown in behavior indicators that did not increase. This might be the result of unheard-of

environmental initiatives. The factor that influences this behavior change is whether there is refraction, which is done repeatedly without thinking. In this study, the behavior that emerged was not a repeated refraction in the 14 subjects studied so there was no increase in their behavior.

Based on testing, it is known that there is an increase in environmental literacy after the learning process is completed. To see the effectiveness of the ethnoecotourism-based environmental education model by looking at the differences in increasing understanding of the environment through administering pretests and posttests. The test used to analyze this data is called a statistical test, namely the t-paired test. The results of the data analysis are presented as follows.

Table 5. Normality test results

	Pre – Post Type	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Pre & Post Results	Pretest	.147	40	.29	.954	40	**.102**
	Posts	.216	40	.109	.922	40	**.090**

Because the sample is less than 100, the normality test used is the Shapiro-Wilk normality test based on the following assumptions:

a. If the sig value is > 0.05, then the value is normally distributed.
b. If the Sig value is < 0.05, then the value is not normally distributed.

Based on the results, it is known that if the sig. for the pretest and posttest scores are 0.102 and 0.090 (more than 0.05), then the scores are normally distributed. Next, data analysis continued with a homogeneity test, which aims to find out whether the pretest and posttest data are homogeneous or not.

Table 6. Homogeneity test results

		Levene Statistic	df1	df2	Sig.
Pre & Post Results	Based on Mean	.411	1	78	**.524**
	Based on Median	.510	1	78	.477
	Based on the Median and with adjusted df	.510	1	75.496	.478
	Based on trimmed mean	.524	1	78	.471

Based on the homogeneity test using the Levene test, normality test results can be obtained based on the following assumptions:

a. If the sig value is based on a mean > 0.05, the data is homogeneous.
b. If the sig value If based on a mean < 0.05, then the data is not homogeneous.

Because of the sig value. Based on the mean 0.524 > 0.05, the data in this study is homogeneous. Based on this, the data was then analyzed using a t-test to see the effectiveness of the model based on the presence or absence of differences in increasing environmental literacy. The t-test results are displayed as follows:

Table 7. Results of ethnoecotourism-based environmental education model effectiveness tests

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest-Postest	-4.025	2.402	.380	-4.793	-3.257	-10.599	39	**.000**

The significant value obtained is 0.000, because 0.000 < 0.05, there is a difference in respondens' scores after being given the learning process. The average post-test score was 12.43, higher than the pre-test score, namely 8.40, which means there was an increase in scores after being given a learning process using an ethnoecotourism-based environmental education model. Thus, it can be stated that the ethnoecotourism-based environmental education model developed is effective in increasing participants' environmental literacy, which is shown in increasing ecological knowledge, ecological attitudes, and cognitive skills.

The fact that there were only 40 respondents included in the data collection period limits the scope of this study. This is a result of the fact that just 40 respondents agreed to participate in the study.

2. Discussion

This ethnoecotourism-based environmental education model is the result of research and development (R&D) using Thiangarajan's Four-D model (define, design, develop, and disseminate) (Thiagarajan, 1974). The define stage is a research activity that involves collecting information from tourism actors about the potential for natural tourism and the local wisdom of Aceh related to the environment, as well as determining the concept for developing an ethnoecotourism-based environmental education model. The design stage is a research activity to design an ethnoecotourism-based environmental education model. The development stage is a validation activity for experts, practitioners, and the effectiveness of the model, and at this stage, product trials and revisions are carried out. The dissemination stage is to socialize the model with the public through training activities, seminars, and journal writing.

This model is intended for tourism actors and was developed to provide a common understanding for all tourism actors in Aceh about how to ensure the sustainability of the environment used as tourist objects and destinations. Environmental sustainability is a key factor in determining the economic and socio-cultural sustainability of local communities. This is in line with the opinion of Tang (2015) that tourism development is very dependent on the environment, which is not only an important basis for sustainable tourism development but can also be a special attraction for tourists.

It cannot be denied that the environment damaged and destroyed due to the implementation of mass tourism will have an impact on reducing the level of tourist visits and reducing economic growth in the community. On the other hand, a beautiful environment that has abundant and unique objects will attract tourists to visit and have an impact on increasing the economic growth of the local community. So, to ensure environmental sustainability, it is important to pay attention to and receive support from all stakeholders and shareholders. Several expert opinions state that environmental education currently plays an important role in sustainability (Boca & Saraçli, 2019; Varela-Losada et al., 2016) and forms individuals who act positively

toward the environment (Ardoin et al., 2020; Leelapattana et al., 2019). Shutaleva et al., (2020) stated that environmental education is educational and developmental, is lifelong learning, and is not only intended for children and the younger generation.

In line with the opinions of these experts, this model is intended to answer challenges related to the use of the environment as a tourist destination by emphasizing the principles of environmental education, which can foster environmental literacy in everyone so that together they can achieve ecological sustainability and economic sustainability.

The values obtained from the effectiveness test were taken using prepared multiple-choice questions and tested using pre-test and post-test instruments, and effective results were obtained. This statement is strengthened by looking at the results obtained with an average pre-test score of 8.40, then a post-test was carried out, and there was an increase with an average score of 12.43. So, it can be concluded that the model that researchers developed is effective in increasing the environmental literacy of tourism actors. This is because this model was built using a constructivist paradigm. According to the constructivism paradigm, learning is an active, constructive process that takes place in sociocultural contexts and is intended to actively create meaning changes through practical activities. This effectively increases students' capacity for critical thought, problem-solving, and reflective writing (Nugroho & Wulandari, 2017). According to this theory, people build their cognitive structures through social interaction, active experience interpretation, and other activities (Suhendi & Purwarno, 2018; Supardan, 2016). From a fundamental perspective, learning can be understood as an active process in which experience shapes and builds knowledge.

The results of previous research also reveal that learning models that contain environmental education have been proven to be effective in increasing environmental literacy for everyone involved in tourism activities (Andersen & Miller, 2006; Berman, 2021; Zheng et al., 2020). Although not all environmental literacy indicators increased, overall it can

be concluded that there was an increase in environmental literacy after the learning process. The same thing was reported by Saribas et al., (2017), where the results of the study showed that participants' attitudes towards the environment, perceptions of environmental use, and self-efficacy beliefs increased significantly, although there were no significant changes in their knowledge and concern for the environment.

The ethnoecotourism-based environmental education model integrates the local wisdom values of the Acehnese people as part of the learning process, contains and regulates human behavior so that it is wise towards the environment. This model is on the context and daily life of the community itself, so it is hoped that it can provide meaning and constitute lifelong learning, as well as have an impact on the environmental and socio-cultural sustainability that they have. This is following research by Li et al., (2022), where cultural tourism can create connections and interactions with tourists, thereby creating social value and helping society at a broader level by preserving natural environmental resources. Additionally, Locke et al., (2013) stated that everyone must be knowledgeable, listen to, and live in harmony with their local environment to achieve local and cultural sustainability.

This ethnoecotourism-based environmental education model was developed for a non-formal education process to form human individuals who have integrity towards the environment and are environmentally literate, caring, responsible, and committed to managing the environment. In this development process, there are several limitations, namely: (1) the selection of subjects in product trials is based on convenience factors, namely the willingness to cooperate and agree between the research team and tourism actors at the research location; (2) there is no comparison between the educational process using this model and other models on the same or similar test subjects, environment, and tourism conditions; and (3) the application of this model is limited to tourism actors in Sabang City, meaning that tourism actors in other regions or other places can explore the various local wisdom values they have to be able to support the realization of meaningful learning for the sustainability of the tourism environment.

D. Conclusion

Based on the analysis, it was found that there was a positive response to the use of an ethnoecotourism-based environmental education model to increase the environmental literacy of tourism actors at the research location. There is a change in the understanding and knowledge of research subjects after the implementation of the ethnoecotourism-based environmental education model, namely that the average post-test score of 12.43 is higher than the pre-test score of 8.40, with a significance value obtained of 0.000 because 0.000 < 0.05 means there is a difference in respondents' scores after being given the learning process. So it can be concluded that the ethnoecotourism-based environmental education model is effective in facilitating and developing environmental literacy skills.

This research was carried out in a marine tourism area, so this model can be adapted to other marine tourism areas. This is also reinforced by the practicality value of the model which generally meets practical criteria, with a score of $83 \leq p \leq 87.7$. This practicality shows that there are opportunities for adapting the model to other regions.

After examining some of the research's constraints, a few factors can be taken into consideration. This research should be carried out at a time when tourist visits are not too busy so that the implementation of the model can be carried out effectively and efficiently. In addition, many findings have reported models of environmental education and environmental literacy as well as pro-environmental behavior. Other researchers can further explore the relationship between environmental education models, environmental ethics, and self-efficacy in the environment.

Limitations in this research are (1) subject selection based on convenience factors; (2) there is no comparison with other educational models; and (3) the application of this model is only limited to tourism actors in one marine tourism area.

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