Improvement of knowledge and attitude in conservation of mangrove and coral reefs through environmental education community network model

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Abstract. Damage to coral reefs and mangroves results in disturbed ecosystem balance. This needs to be anticipated, one of which is through learning. This research developed environmental conservation model through Environmental Education Community Network (EECN) and aimed to know the knowledge and attitude on the conservation of mangrove and coral reefs on students through EECN. This research was experimental research involving 40 high school students in the Jakarta area. Students got lectures on mangroves and coral reefs as well as observation and direct planting of mangroves and coral reefs in Tidung Island, Thousand Islands (Kepulauan Seribu, Indonesia). Knowledge data and attitudes were obtained before and after treatment. The results showed that there were significant differences to the knowledge and attitude on the conservation of mangrove and coral reefs before and after treatment. This implies that direct field recognition supplied benefits and changes in knowledge and attitudes on conservation.

1. Introduction

Indonesia is one country that is rich in natural resources at sea and has a lot of potential in the marine sector. Natural resources in the sea that can be utilized are various types of fish, coral reefs, seaweed and so on. However, many human activities ignore the environmental aspects so that natural resources in the sea are damaged [1,2].

The damage that occurs is in the mangrove ecosystem and coral reefs. Mangroves experienced a decrease in area and coral reefs experienced bleaching. Mangroves have a function to resist ocean waves [3–5], so that the decrease in the number of mangroves can result in sea abrasion and harm the community. While damage to coral reefs can reduce the diversity and sustainability of marine life. This has a negative impact on the preservation of fish and animals in the sea [3]. Coral reefs have many functions including as a place to live fish if coral reefs are lost it will damage the habitat of fish and fish populations in the sea area. This will have an impact on the natural resources in the sea which will decrease [1,6]. One of the mangrove and coral reef damage also occurred on Tidung Island, Thousand Islands (Kepulauan Seribu, Indonesia).

Students are one of the subjects who can be involved in marine conservation, especially in this case mangroves and coral reefs. Students need knowledge about various things about mangroves and coral
reefs. With adequate knowledge, it is a provision for students to be able to preserve mangroves and coral reefs. Students must also have an attitude in protecting mangroves and coral reefs. This is important because knowledge is not enough to preserve the environment [7,8].

Students' knowledge and attitudes can be improved in various ways, such as using learning models, media, and learning strategies. The problem is that many learning media are not relevant to improve students' knowledge and attitudes [9,10]. Environmental Education Community Network (EECN), is a model of community networks in carrying out mangrove and coral reef conservation. The EECN learning model is community-based learning, where students can interact with each other with various elements of society. The EECN model is complemented by several media namely learning media, guidebooks, and student worksheets. Learning offered with EECN is community-based learning, where students can interact with each other [8,11,12]. The purpose of this study is to examine the EECN network model in improving students' knowledge and attitude.

2. Method
The Environmental Education Community network model is applied through experimental research methods using the EECN guidebooks, EECN worksheet and EECN website (www.eecn.or.id), which can be accessed by all elements of society. The study focused on research subjects as many as 40 high school students in Jakarta. The study was carried out during July 2018. The treatment was given to students in the form of training in planting mangroves and coral reefs on the Thousand Islands (Kepulauan Seribu, Indonesia) in Tidung Island. Knowledge and attitudes on the conservation of mangroves and coral reefs were seen to be known for changes and enhancements before and after treatment.

3. Result and Discussion
The results showed that there were significant differences in knowledge and the attitude on the conservation of mangroves and coral reefs before and after treatment. This showed that the treatment supplied good results for student’s knowledge and attitudes on conservation on mangroves and coral reefs (Tables 1 and 2).

Table 1. T-Test Results Pre-Post Test Knowledge Score

|            | Mean | Std. Deviation | Std. Error Mean | t    | df  | Sig. (2-tailed) |
|------------|------|----------------|-----------------|------|-----|----------------|
| Knowledge  |      |                |                 |      |     |                |
| Pre Test   | 2.05 | 1.89399        | .29947          | -6.846 | 39  | .000           |
| Post Test  |      |                |                 |      |     |                |

Table 2. T test results Pre-Post Test Attitude scores

|            | Mean | Std. Deviation | Std. Error Mean | T    | df  | Sig. (2-tailed) |
|------------|------|----------------|-----------------|------|-----|----------------|
| Attitude   |      |                |                 |      |     |                |
| Pre Test   | -3.70| 4.89479        | .77393          | -4.781 | 39  | .000           |
| Post Test  |      |                |                 |      |     |                |

The treatment was carried out by giving lectures on the conservation of mangroves and coral reefs. Students were also practicing on planting mangroves and coral reefs in Tidung Island. The pretest was given before the treatment and post-test was given after the treatment. Based on the t-test showed that the treatment has a significant effect on changes in student’s knowledge and attitude.

This changes in knowledge and attitude showed that the treatment carried out was quite successful. Knowledge and attitude of students can experience changes due to the use of models, media, or learning strategies [13–16]. This is because the training method is a method that invites the participation of students in learning. This method was used to invite students to do something that has never been done before. During the training, students experienced directly about the procedures for planting mangroves and coral reef conservation. Students seemed happy and got new experiences in
the conservation of mangroves and coral reefs. This method was more easily understood by students in learning the environment because students are more actively participating [17,18]. This was a major factor in changing knowledge and attitudes towards the conservation of mangroves and coral reefs.

In addition to direct training, learning is also carried out through websites and guidebooks. The website is an online-based learning media. This media was very in accordance with the development of the times where internet usage has been very much in learning, besides the use of digital learning media had also begun to be widely used [19–22]. Learning media such as websites were also more interesting. Learning using the web makes it easy for students to access information anytime and anywhere, not limited to space and time. This was very consistent with the development of learning lately where learning can be done without face to face in class [23–26].

Furthermore, if we look at the use of technology in the training, besides using the website, we also use a guidebook that is technologically lagging but still relevant. In accordance with the times, there has been a shift in printed books into electronic books [27–29].

The guidebook is developed as a supplementary reading material other than the web so students can get clearer information. The guidebook was developed on the material of the Thousand Islands and the preservation of mangroves and coral reefs. Printed books that are used must certainly be of interest to students, especially students who are still children and are not yet adults. This is because students like interesting pictures, so that as much as possible the book used does not contain too much writing [30–32].

Technological advances other than websites that can be used in learning are related to social media. This media is a medium used for socializing. In its development, social media can be used in learning [25,33–35]. The use of this social media on the theme of environmental learning can serve as a medium to post and share various things related to the invitation to the community to better protect the environment. At least the teacher can use social media to convey the concepts of conservation and environmental learning that the students want to convey. The use of social media has also been proven to have increased the ability of students in various learning materials, this is because messages delivered through social media are easier to understand by students [36,37].

4. Conclusion

The use of mangrove planting and coral reef conservation training methods has a significant effect on improving student knowledge and the attitude of students on the conservation of mangrove and coral reef. The increase was due to the EECN approach to the methods and learning media used appropriately and made it easier for students to understand the various concepts of mangroves and coral reef presented. The use of websites and guidebooks is an important thing for students who receive mangrove bathing training and coral reef conservation.

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