Potential of mangrove ecosystem as learning sources of Biology through online learning

Farida Dwi Susanti¹,∗

¹University of Muhammadiyah Malang, Indonesia
∗Corresponding author: lactobaycus@gmail.com

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ABSTRACT As an archipelago, Indonesia has thousands of islands and stretched coastlines. It is, therefore, Indonesia has many mangroves as a characteristic of plants exists on the coast. There have been many studies and trials of mangrove utilization for economic and ecological purposes, yet it is limited use of mangroves for educational purposes. This study aims to promote the mangrove ecosystem for educational purposes, particularly as a source of biology learning, increase students’ interest in studying biology, and increase students’ interest in conserving mangroves. This study used a qualitative approach with three instruments, namely observation, interview and questionnaire. The result indicated that the mangrove ecosystem could be used as a source of learning biology and be able to increase students’ interest in studying biology and conserving mangroves.

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1. INTRODUCTION

Mangrove is a vegetation zone located in muddy areas, the confluence of land and sea with tidal influences (Noor et al., 2006). Various species of mangroves are able to grow and develop in coastal environments that are extremely saline and water-saturated; unstable soil conditions and anaerobes are able to develop mechanisms that allow it to actively remove salt from the tissues (Pramudi, 2001). Mangrove has several benefits including ecological and economic benefits. Ecological benefits of mangroves are as a natural protection for abrasion, to accelerate sedimentation, control seawater intrusion, and preserving the areas behind mangroves from high waves and strong winds, spawning grounds, foraging for food, and shelter for fish, shrimp, crabs, and other marine biotas. Meanwhile, sources of food, beverages, medicines, natural dyes, and as ecotourism objects are economic functions (Riwayati, 2014).

Sidoarjo Regency is a delta plain with an altitude between 0 to 25 m, the altitude is 0 to 3 m with the area of 19,006 Ha, where 29.99% areas are aquaculture that located in the eastern region. The brackish water area in Sidoarjo is located in the east which is directly adjacent to the Madura strait. There is a mangrove ecosystem found in the east area, in which it becomes a typical ecosystem in Sidoarjo Regency (Portal Kabupaten Sidoarjo, 2020). Diversity of mangrove ecosystem in Sidoarjo that located in the east area is formed naturally and artificially, of which ecosystem has a potential to be delivered as learning sources for the students in Sidoarjo Regency. It is expected that it can support the students’ knowledge in Sidoarjo Regency since there are a lot of students who do not know well about the potential of mangrove in Sidoarjo Regency. Identification of mangrove ecosystem located in Lusi Island, Jabon District, Sidoarjo Regency becomes the initial stage of this study. Mangrove vegetation found includes Acanthus ilicifolius, Acanthus ebracteatus, Avicennia alba, Avicennia marina, Rhizophora mucronate, Sonneratia alba, Hippomane maccinella, and Terminalia catappa. From those identification results, biology learning sources from the observation results can be taken in the form of video as teaching material. The use of video media assists the students their learning in developing their learning processes during the Covid-19 pandemic.

The COVID-19 pandemic is a disaster that has a tremendous impact on the Indonesian population including the world of education and others (Syafirzal, 2020). On January 30, 2020, WHO stipulated the Covid-19 as a Public Health Emergency of International Concern (PHEIC) or a Public Health Emergency Concerning the World (KKMMD). The increase of COVID-19 cases took place quite quickly and spread outside the Wuhan area and other countries. The number of infected cases continues to increase, in which it is quite significantly increased with a relatively fast time. In 6 months, 216 countries in the world have contracted this virus. According to WHO, the number of confirmed cases as of June 25 has reached 9,296,202, with a death rate of 479,433 (WHO, 2020).

Since the COVID-19 pandemic crisis came in March 2020, the Indonesia government decided to close face-to-face learning activities in schools and diverted the activities into online learning (daring). On March 24, 2020, the Ministry of Education and Culture of the Republic of Indonesia issued Circular Number 4 of 2020 concerning the
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Spread of COVID, in which this circular clarified the learning processes that carried out at home thru an online learning/distance learning to give a meaningful learning experience for the students.

Distance learning, then called as daring (online), becomes a choice when the teaching and learning activities should be continued during the COVID-19 pandemic. Online learning is first introduced by Illionis University thru a computer-based learning system (Ryiana, 2020). Online learning is learning carried out face-to-face directly by using technologies that can assist the distance teaching and learning process. Online learning gives massive and open network quality learning services to reach more and wider study space enthusiasts (Sofyana & Abdul, 2019:82).

Internet and Learning Management System (LSM)-based interactive model is used in online learning, it can use Zoom, Google Meet, Google Drive, and so on. Webinar and online classes are the example of online learning in which the whole activities are used internet connection and computer (Hasibuan, Simarmata, and Sudirman, 2019).

Distance learning must still pay attention to the learning objectives (Kurniasari, 2020). The learning objectives should be a reference in establishing what to achieve. One of the ecosystem learning objectives is that the students are expected to be able to discover various kinds of the ecosystems along with their constituent components. Appropriate learning sources can be used to achieve the expected learning objectives. Supradi (2015) asserts that learning sources are everything in the form of objects or people that can support the learning so that the students can get the impact in the form of behavior changes. Th environment is a learning source that can be directly used. The utilization of the environment by uniting the students directly can improve the students’ interests (Irwandi et al., 2019).

The students need to be introduced to various kinds of the ecosystems directly and their constituent components so that those will be easy to understand. The use of local ecosystem ad learning sources can improve the students’ productivities (Irwandi, 2019). Local culture existed in the society to preserve mangrove needs to be improved thru a study so that it can support the mangrove forest conservation (Finckew, 2015). Integrating local potential by means of utilizing local advantages in each area as a learning source can assist the students to solve the environmental problems and develop their self-potential (Juniati, 2016). A typical local ecosystem needs to be utilized to enrich the students’ knowledge to local ecosystem knowledge, and (4) increasing the students’ interest in learning, look for supporting references, and active desire in the online learning process. The respondents of this study are the 10th-grade students of SMAN 3 Sidoarjo who participate in online learning during the Covid-19 pandemic. The online method used is by delivering the material and Student Worksheet (LKPD) about the ecosystem and conduct a discussion by means of WA group.

2. METHOD

Data collection techniques used are observation, interview, and questionnaire. The observation of mangroves is carried out in the mangrove vegetation at Lusi Island, Jabon District, Sidoarjo Regency, and the students of 10th grade of SMA Negeri 3 Sidoarjo are used as the samples of the study. This study is conducted from September to December 2020. The parameter of students’ interest is seen from high and low of students’ desire to succeed in learning, looking for supporting references, and active desire in the online learning process. The respondents of this study are the 10th-grade students of SMAN 3 Sidoarjo who participate in online learning during the Covid-19 pandemic. The online method used is by delivering the material and Student Worksheet (LKPD) about the ecosystem and conduct a discussion by means of WA group.

3. RESULTS AND DISCUSSION

This study aims: (1) to discover whether the mangrove ecosystem be used as a source of biology learning, (2) can the use of mangroves as a biology learning source increase the high school students’ interest in learning biology about mangrove vegetation, and (3) can the use of mangroves as a biology learning source increase the high school students’ interest to conserve the mangrove vegetation. This study is expected to have several benefits, namely: (1) the use of ecosystem can assist the teachers in delivering the material during the teaching and learning processes, (2) generating the students’ interest in learning, (3) increasing the students’ knowledge to local ecosystem knowledge, and (4) it can be used as a reference for further similar research or study.

Based on the explanation above, research problems that can be formulated encompass: (I) can the mangrove ecosystem be used as a source of biology learning, (2) can the use of mangroves as a biology learning source increase the high school students’ interest in learning biology about mangrove vegetation, and (3) can the use of mangroves as a biology learning source increase the high school students’ interest to conserve the mangrove vegetation. This study is expected to have several benefits, namely: (I) the use of ecosystem can assist the teachers in delivering the material during the teaching and learning processes, (2) generating the students’ interest in learning, (3) increasing the students’ knowledge to local ecosystem knowledge, and (4) it can be used as a reference for further similar research or study.
Mangrove ecosystem that occupies the estuaries and intertidal zones throughout the tropics and subtropics consist of woody plants whose diversity depends on habitat conditions between islands and even the continents (Field, 2010). The diversity of mangrove vegetation existed in Lusi Island, Jabon District, Sidoarjo Regency comprises Acanthus ilicifolius, Acanthus ebracteatus, Avicennia alba, Avicennia marina, Rhizophora mucronate, Sonneratia alba, Hippomane mancinella, and Terminalia catappa, of which diversity can be used as the learning sources. This can be seen from the results of a questionnaire which shows that more than half of the samples like the mangrove ecosystem as learning sources. Local excellence can be a learning source that provides real experiences for students to participate in conserving the local excellence of their region (Sulasih, 2017). The mangrove ecosystem in Lusi Island that has mangrove diversity is local excellence that can be used as learning sources. This is in line with the statement of Cahyono (2015) who assumes that the mangrove ecosystem can play a role as a learning source so that it can support the learning process about the ecosystem in biology learning.

The environment is a natural laboratory used as an effective learning source for the students (Haryati, 2016). The use of the environment brings out the students to observe directly, in which it provides a positive impact on the learning development of students (Ikhsan, 2017). The learning observation is implemented online by delivering the material and Student Worksheets (LKPD) about the ecosystem and conducting a discussion thru WA group. From the observation results, 90% of students can accept the mangrove as a learning source. The students who appreciate to mangrove as a learning source are the students who understand the potential benefits of mangrove, in which it can be developed to be an interesting educational tour. The learning activities carried out using outdoor strategy certainly attract the students’ interest and it can improve the learning that has direct meaning with its learning source. According to Setyawan (2006), mangrove area has a potential that can be developed into tourism and education. Sulasih (2017) asserts that outdoor learning activities by utilizing the local excellences can be more fun and can optimize the students’ learning achievements.

On the observation of learning interest about mangrove, it obtains a number of 87%, this indicates that there is a level of acceptance from students who like learning us-
ability so that the earning outcomes increased (Nicolaou, 2019). The use of audiovisual media in an effective way can improve the students’ interests and learning outcome (Wahyuni, 2015). High interest can improve the students’ learning achievements (Triarisanti, 2019).

Increased interest in student learning about mangroves brings out the impacts on how the students can think about participating in mangrove preservation. After the students adore mangroves in Sidoarjo Regency, the students are increasingly interested in studying mangroves, and in the end, it can improve their thinking skills to be able to conserve the mangrove vegetation.

4. CONCLUSION

Departing from the results of the study, it can be concluded that the mangroves ecosystem can be used as biology learning sources. The use of mangrove as biology learning sources can improve the interests of High School (SMA) students in studying biology, especially about mangrove vegetation. The use of mangroves as biology learning sources can improve the interests of High School (SMA) students in preserving the mangrove vegetation.

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