Development of learning in conservation education subject based on the natural resources potency in the Taman Wisata Alam Bengkulu City

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Abstract. The aims of this study is to develop conservation education based on the potential of natural resources in the city of Bengkulu to improve scientific writing skills. This type of research is research and development (analysis, design, development). The steps of research are exploring of Taman Wisata Alam (TWA) as area conservation, collecting data of each ecosystem, identifying of biodiversity, make a map of potency TWA area, designing of material teaching. The results of this study are: 1) There is a coastal forest ecosystem that has vegetation types of trees, shrubs, bushes, grass, fungi, pteridophyte, and bryophyte; 2) Mapping the potential of conservation have coastal, swamp, and mangrove 3) Teaching materials developed from potential TWA conservation areas have introduction of TWA, instructions for students to exploring area conservation, guide activity of writing article based on the exploration experience of conservation area. The conclusion of this research is that research can be developed by utilizing the potential of conservation areas and designing teaching materials that guide students to practice writing.

1. Introduction
The aim of higher education of Indonesia is to create graduates who’s able to apply their knowledge to solve the problems. The focus of these higher education is on knowledge and skills to be more adaptive in changing situations [1,2]. Learning activities in tertiary institutions must be interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centred in order to master skills [3]. Learning development that focuses on mastering skills is one of the efforts to improve the quality of learning in higher education.

Quality learning will be able to empower students to mastering skill in the 21st century. 21st century skills of collaboration consists of four competencies, critical thinking, communication and creativity. Empowerment of 21st century skills can be done through learning that has been designed. It is expected capable of charging a provision of level of thinking [4], life skills, mental preparation in the face of globalization and respond to a variety of education issues at the international level [5].

Learning innovations became one of the efforts to support the improvement of education quality. Efforts to do that is organizing the material, learning model, and local knowledge-based learning tools that facilitate the learning more meaningful. The learning activity not just giving information to the students as much as possible without considering its significance.
The quality of learning has associated with the ability of pedagogy professor as a facilitator to bring meaningful learning. Learning will be meaningful if it is developed with a combination of local potential contained environment. However, the development of learning has not been done for several reasons including the limited sample development environment based learning.

One of the subjects in Science Education, University of Bengkulu S2 namely Conservation Education. Based on the 2018/2019 school year, teaching conservation education that has been done is not maximized in the student's competency empowerment aspects involved in designing the concept of conservation. So that needs to be improved in the organization of learning and presenting more contextual activities for students. One only use the area as a learning resource conservation Education. Area conservation is a potential to develop learning activities Conservation Education. Bengkulu city has a conservation area of Forest Park Raja Lelo (Tahura) and the Natural Tourism Park (TWA) which can be reached easily.

Based on the problems in Conservation Education learning it is necessary to the development of learning by utilizing the conservation area be the solution. Conservation Education Learning will further facilitate students in developing the ability of concepts, skills and attitudes to the environment. Development effort conservation education learning is carried out by using conservation areas as learning resources to design teaching materials that facilitate students to gain learning experiences and practice writing skills. So that the development of learning-based Conservation Education in Bengkulu City conservation area needs to be done.

2. Methods

2.1. Research methods
This type of research is research and development (R & D) as effort developed conservation learning in science education master program in university of Bengkulu. Step-by-step method using R & D tailored to the needs of researchers but remain guided by Bord and Gall model [6]. The development of conservation learning is carried out by analysing the potential of the conservation area and designing teaching materials based on the results of the analysis.

2.2. Research subject
Population samples in this study consisted of postgraduate students in Natural Sciences and conservation areas in the city of Bengkulu. Students of master program have 19 in total (5 male and 14 females) took Conservation Education courses in the 2019/2020 academic year. The conservation area in Bengkulu City have natural tourism park with biodiversity of plant, animal and ecosystem.

2.3. The time and place of study
This research was conducted from June to November 2019. Research activities was conducted in several places in the S2 Science Education study program, conservation education classes for the 2019/2020 academic year, and conservation area Taman Wisata Alam in Bengkulu city.

2.4. Research instrument
The instruments used in this study were interview guidelines dan questionnaire sheet. Interview guides are used to collecting data about TWA from conservation area management officer. Questionnaire sheet has the function of knowing students' perceptions of the development of conservation education learning.

2.5. Data collection technique
Data collection in this research uses observation, interview, survey and literature study techniques. Observation activities are carried out when conducting exploration activities in conservation area. Interviews were conducted at the beginning of development activities with the chief resource person.
managing the conservation area. Survey activities carried out on students studying conservation education.

2.6. Data analysis technique
The analysis technique used is descriptive qualitative. The data analysed are the results of interviews, student perceptions, field observations about biodiversity in the observation area, and teaching materials.

3. Result and discussion

3.1. Potential of natural resources in TWA Bengkulu city
Based on the observation, TWA consists of three different ecosystems, namely the coastal forest, coastal and mangrove ecosystem. Those three ecosystem can be mapped in accordance with the zoning respectively (Figure 1).

![Figure 1. Conservation area of Taman Wisata Alam Bengkulu City.](image)

3.1.1. Coastal forest ecosystems. TWA coastal forest ecosystem consists of trees, shrubs, bushes and grass. Types of trees dominate TWA areas are hibiscus, ketapan, pine. Dominated by shrubs. Types of shrubs and grass that dominates the Dutch grass, elephant grass, wedelia. The vegetation on the forest floor TWA coastal forest ecosystems have a high biodiversity. The dominant species of bushes, shrubs making up the forest floor is *Acacia auriculiformis*, *Acanthus ilicifolius*, *Avicennia sp*, *Calotropis gigantea*, *Casuarina equisetifolia*, *Hibiscus tiliacus*, *Ipomoea prescaprae*, *Mimosa pudica*, *Pandanus odorifer*, *Rhizophora apiculata*, *Sonneratia alba*, *Terminalia catappa*, *Wedelia uniflora*.

3.1.2. Swamp ecosystem. Swamp forest region is located at the middle of the Natural Park of the city of Bengkulu. The total area of the ecosystem around 4-5 hectares. Location swamp ecosystem can be shown in Figure 1 on the ecosystems found in the TWA. Distance swamp to the sea approximately 200 meters. The situation is causing a swamp affected by salinity of seawater so the waters become brackish marsh. The dominant plant species in the brackish marsh ecosystem area TWA region dominated by the type of nail sea, sedges, mangrove.
3.1.3. TWA Mangrove ecosystem. TWA mangrove ecosystem in the area of Long Beach has a fairly wide area. Mangrove species that make up the ecosystem is *Rhizophora apiculata*, *Sonneratia alba*, *Bruguiera gymnorrhiza*, *Xylocarpus granatum*, *Avicennia alba*, *Hibiscus tiliaceus*, *Lumnitzera littorea*, *Ceriops tagal* and *Acrostichum aureum*.

3.2. Learning strategies conservation area conservation education in Bengkulu city TWA

Part of the development strategy is carried out by the achievement of conservation education graduates and an inventory of results in natural resources in the TWA conservation area. Learning strategies are outlined in the form of learning activity units and field activity guide sheets (Figure 2). Both products have been logically validated by experts in the field of environmental education.

The composition of the developed field guide consists of an introduction, activities and reporting activities. The preliminary part was prepared by material about the potential of TWA consisting of three ecosystems already known based on exploration activities by researchers. The core activities section provides instructions for conducting TWA observation activities. Closing Section there are instructions for compiling scientific articles based on guidelines from accredited journals. The guide structure developed in the field consists of concluding, competence, introduction of TWA, procedures, tools and materials, and preparation of reports.

Learning activities for development consist of four stages, namely field orientation, observation, exploration, interpretation. Details of the activities are shown in the conservation education learning unit. Conduct field orientation in the room to explain the general state of the TWA region. Students then make initial observations to determine the area to be observed. In the exploration activity, two meetings were held. In the interpretation phase, students discuss with groups to develop scientific article writing.

![Figure 2](image)

**Figure 2.** Guide of field trip conservation education based on conservation area TWA Bengkulu City.

4. Conclusion

Based on the research conducted, the following conclusions have been obtained that the TWA region has the potential of natural resources that are grouped in three coastal forest ecosystems, coastal ecosystems and mangrove ecosystems. Conservation education learning strategies developed in the form of practical activities are arranged to guide students to carry out exploration activities and write them in a scientific article.

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