



Exploration of the Northern Part of East Java as a Natural Laboratory in the Internship Course in the Geography Education Masters Study Program

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Abstract. This research is an exploratory research that focuses on how to analyze locations in northern East Java to be used as natural laboratories in the Internship course in the Geography Education Masters Study Program. The data collection technique is in the form of observation, which is reinforced by documentation and literature study to examine natural laboratory locations. The results of the research are identification of requirements and identification of geographic natural laboratory locations, identification of potentials and identification of strategies for internship activities. Several locations such as Mushroom Hill (Gresik Regency), Tanjung Kodok Beach, Maharani Cave, Bonorowo (Lamongan), Ngerong Cave, Maibit Baths (Tu-ban), and Kayangan Api (Bojonegoro) have the potential to become natural laboratories in the internship course of the Masters Study Program Geography Education. This potential is supported by several things such as: complete karst lithology phenomena, locations close to affordable infrastructure, unique social, cultural and economic conditions of the community, as well as well-developed geotourism activities

Keywords: Natural Laboratory, Geography, Internship.

1 Introduction

Learning experiences through direct interaction with nature or the environment will provide a more memorable learning experience for students. Learning through contextual learning is one strategy that can be taken to provide direct experience to students [1]. Contextual learning is a learning concept that helps lecturers relate the material taught to real-world situations and encourages students to make connections with the knowledge they have and its application in their lives as members of their families and communities [2]. The learning process takes place naturally in the form of work and experience activities, not transferring knowledge from lecturers to students, learning strategies are more important than results [3].

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Contextual Teaching and Learning is learning that focuses on student activities that involve the application of constructivism, finding, asking, learning communities, modeling, reflection, and actual assessment. Neftyan et al.,[4] added that contextual learning has an influence on learning outcomes and positive responses to subjects, because students are directly involved in the teaching and learning process and directly relate the concepts learned to everyday life.

Lecturers can provide learning experiences directly to students by utilizing the natural environment. This is in line with what was stated by Sitanggang et al.,[5] that one of the ways to provide meaningful learning experiences for students who are later expected to improve the quality of learning is to optimize the use of learning resources from the environment around the school. Not only limited to as a learning resource but also a learning media as well as a laboratory.

Environment-based learning has several advantages, including: 1) the environment provides a variety of things to be learned by students, 2) learning activities are more interesting, 3) the learning process is more meaningful, 4) student activity is increased, and 5) personal character formation occurs students [6]. The natural environment provides real things and concrete objects that can be used as examples to instill concepts [7]. The availability of an environment that is wide enough and has a variety of different types of environments will provide many opportunities for lecturers and students to use it as a natural laboratory.

Direct learning in the field is good learning to do because it can see the object of study in real terms as a source of student learning and can be an alternative for lecturers in the process of teaching and learning activities [8]. Because teaching will be more easily understood by students and can increase student interest, motivation, and enthusiasm. Learning that is carried out by utilizing the surrounding environment is closely related to geography learning that is carried out in schools because geography learning studies a lot about natural phenomena. The earth's surface consists of layers of air (atmosphere), layers of water (hydrosphere), layers of the earth's crust (lithosphere), layers of life (biosphere), layers of human life (anthroposphere). The existence of the environment has more value in its use as a learning resource.

Utilization of a natural laboratory in northern East Java in the internship program of the S2 Geography Education Study Program at Surabaya State University can be used as an alternative in the learning itself. The northern part of East Java is a location that has good environmental conditions, especially karst and coastal lithology. Students can study and observe various rock appearances in the Nature Laboratory in northern East Java itself so that students can see directly the objects in the Natural Laboratory related to these geosphere phenomena.

The importance of learning in the field through intenseship provides direct experience for students. According to the classification of experience (Cone of Experience) in an effort to use the media as a tool, Dale [9] states that direct experience occupies the most concrete level of experience. Through field internships students can actually see, touch, smell, hear and experience the subject matter firsthand. Field internship learning in a natural laboratory is very important because not all of the phenomena and processes that exist in the human environment can be learned in the classroom in the room; Geography material studies various aspects of

the interaction of the natural and social environment so that an environmental-social interaction is realized on the surface of the earth. Related to this, we need an area that has the potential for a natural laboratory that provides as much material for practicum as possible in the implementation of learning outside of Geography material [10].

The selection of areas for the location of the natural laboratory was in the East Java region itself, namely Tuban, Bojonegoro, Lamongan and Gresik Regencies. The northern part of East Java is identified as a natural laboratory because it has karst topography (Limestone lithology) with various appearances such as caves, water sources, dolina (karst lakes), hot springs (geysers), waterfalls, ponds, and so on. The people of northern East Java also have various patterns of life in various livelihoods, tourism, culture, religion and society in order to adapt to the natural conditions which are karst topography. The karst potential of northern East Java can be identified as a "natural laboratory for the internship course in Geography Education Master's Degree Program. Therefore, this study aims to identify the northern part of East Java as a potential study for natural geography laboratories.

This research will explore the potential of the study of the northern part of East Java to identify locations that can be used as objects of natural laboratory studies both as places of observation and practical activities. The results of this identification will determine the feasibility level of the area as a natural laboratory for field internship courses.

2 Method

This research is an exploratory research using a qualitative approach. The purpose of this exploratory research was to explore and collect data and information as material for analyzing the potential of the northern part of East Java as a natural laboratory in the intership course of the Geography Education Masters study program. This research was conducted in Gresik, Lamongan, Tuban and Bojonegoro districts. This region has complex Karst phenomena. These locations will be identified and analyzed for their potential to be used as natural laboratories. Location exploration forms the basis for collecting data used in observation and documentation and is strengthened in literature. Observations are used to collect data related to the formation and processes of the geosphere that are relevant for internship learning in the field.

3 Results and Discussion

3.1 Identification of Requirements and Location of Natural Geography Laboratory

To identify the requirements for a suitable natural laboratory, it must be adjusted to the analysis of the content of the Geography material, so that the learning objectives of Geography will be constructed through internship laboratory learning activities in the field. Of course, several locations are dominated by geographic discipline content which includes various geosphere phenomena, including: atmosphere, lithosphere,

hydrosphere, biosphere, anthroposphere. Nonetheless, an interdisciplinary approach will make each location an integrated learning [11]. Table 1 and Figure 1, shows the location of the natural laboratory in northern East Java and the content of the material analyzed.

Table 1. Location of the natural laboratory in northern East Java

No	Location	Content
1	Mushroom Hill, Gresik	Geoeconomic analysis, geotourism
2	Maharani Cave, Lamongan	Interdisciplinary analysis of karst topography in the form of inactive underground prayer or rivers, tourism analysis.
3	Tanjung Kodok Beach, Lamongan	Interdisciplinary analysis of the morphology of the north coast of Java, tourism, and marine ecosystems.
4	Ngerong Cave, Tuban	Karst topography analysis in the form of underground rivers that are still active and social analysis
5	Sendang Maibit, Tuban	Analysis of karst topography in the form of doli-na and agriculture
6	Kayangan Api Bojonegoro	Interdisciplinary analysis of biology, nature tourism, geology-geophysics, history and culture.
7	Bonorowo, Lamongan	Interdisciplinary analysis of Socio-Economy, religious-tourism, culture, history, folklore, geography and their influence on the lives of the surrounding population.

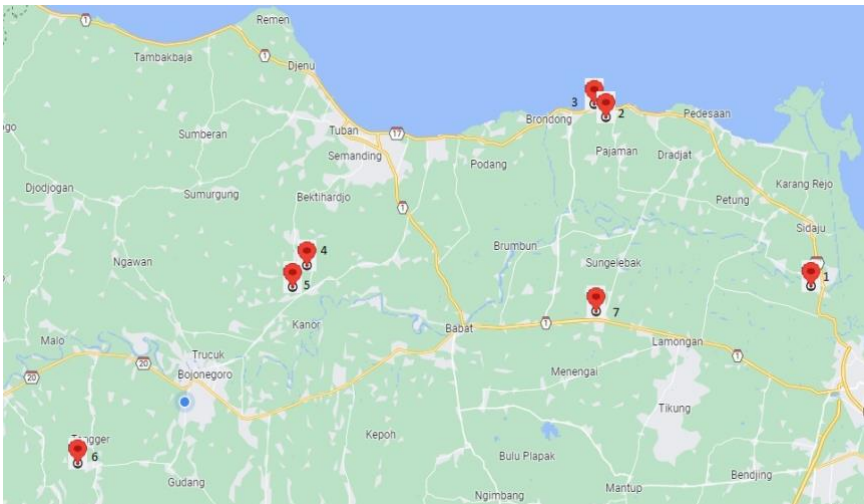


Fig. 1. Distribution of natural geographic laboratory locations in northern East Java

The selection of the area for the location of the natural laboratory in the East Java region itself is not only more efficient in terms of funding and time, but also related to the implementation of contextual learning. This learning will be more meaningful by using learning resources and/or media that exist in the natural surroundings of one's own residence (East Java) rather than exploiting the potential that exists in other provinces. Based on the description above, the North East Java Region was chosen as the area planned as a natural laboratory for the internship course for the Geography Education Masters Study Program.

3.2 Identification of Natural Laboratory Potential

The formulation is carried out so that later the developed learning resources can become an alternative for educational institutions to answer the challenges of learning Geography in the future. There are various aspects of the northern part of East Java which are reviewed as potential natural geography laboratories, including:

3.2.1. Strength

The strength factor is viewed from the potential for managing tourism areas which are useful for the process of designing geography learning resources as well as for other educational purposes. The reinforcing factors are as follows:

- The location is close to Surabaya. The distance between the natural laboratory locations from the Surabaya State University campus is not too far where the maximum distance traveled is 130 km which can be reached in less than one day. The infrastructure connecting the two locations is very good and both have direct access to the northern coast of Indonesia. Karst areas in northern Java which are close together have a positive impact and distinct benefits for internships and geotourism because the costs and time spent will be cut more efficiently.
- The economic activities of the surrounding community from the management of the karst area. The economic activity of the community around the karst area is one of the aspects that can be studied in economic geography [12]. Students are invited to map existing potentials through spatial studies which include climate, regional topography, geological aspects and distribution activities. Economically, the management of karst areas based on the community's economy can encourage the economic feasibility of the region. Most of the karst areas in northern East Java are to function as economic development in the tourism sector.
- The uniqueness of the cultural values and traditions of the surrounding community. Geography also studies human activities on earth. In geography, humans learn about social behavior that exists around society by observing

behavior, traditions, ways of life, and belief systems associated with their natural environment. The dynamics of society in an area involve social processes in which there are changes in the values, norms and culture of society. According to Prasetya et al [13]., The karst area on the north coast of Java has various social phenomena that have developed into traditions and cultural values inherent in the surrounding community.

- Unique karst area by combining natural beauty, culture, history and religious system [14]. The karst area in northern East Java has different characteristics with authentic characteristics. The location of the karst area in the northern part of East Java offers a wide panorama of karst structures with a blend of historical elements, economic values and indigenous culture of the local community. In addition, the presence of tourist sites around karst areas can encourage sustainable conservation actions in the area without damaging the environment.

3.2.2. Weakness

The weakness factor is observed from the constraints experienced in the management of the northern part of East Java as a natural laboratory. This weakness factor influences efforts to design geography learning resources by exploiting the potential of karst areas. The weaknesses encountered are as follows:

- Lack of educational planning that is informative about karst areas. The absence of an educational plan that accommodates information about karst landscapes has resulted in difficulty accessing information and low public understanding of the functions of karst areas in northern East Java. Material is needed that is able to interpret karst functions in geography learning so that it attracts students' interest to increase their insight and awareness about the importance of the role of karst areas for ecosystems and fosters educational environmental conservation actions
- The lack of government contribution in the utilization of karst areas. The Department of Tourism and Culture is considered unable to contribute to the development of regional tourism potential. Relevant agencies should stand together for smooth development through guidance, mentoring and direction. Collaboration between the village government and the center is needed for professional management of karst areas. the involvement of the government and education practitioners needs to be increased in order to maximize the geographical potential which is studied using a geography perspective.

3.2.3. Opportunities

Opportunity factors are formulated from a review of potentials that have been well managed, to be further developed for both economic purposes and the design of learning resources. The potential that is owned should be utilized in a professional and sustainable manner. The opportunities that can be developed so that the utilization of karst areas can be maximized, among others:

- Utilization in the field of education. Innovation in the use of karst areas in the field of education is very useful as a learning tool [15]. In the independent curriculum, learning activities actively facilitate students to explore learning competencies related to local content. Educational units and regional governments are permitted to add additional content according to the needs and characteristics of the area around students. The program provides flexibility in integrating learning integration methods, namely: integrating local content into subjects, developing special local content subjects that stand alone. The uniqueness of the karst area in northern East Java is a geological and morphological element that has the potential to be utilized as a source of geography learning but has not been studied in depth. Collaboration with various parties is needed, in this case the local government, educational institutions or units, geography teachers, and other relevant stakeholders.
- Improving the economic level of the surrounding community. The karst region of northern East Java has great potential in the tourism sector [16]. Tourism activities can encourage the activities of local residents, ranging from the transportation business, making souvenirs such as t-shirts and hats, homestay rentals, the service sector to handicrafts and processed food products. Product marketing is currently only limited to the karst area, so collaboration with large industries is needed so that businesses can continue to innovate following market demand.

3.2.4 Threat

Threats can occur at any time if the management of the karst area is not running properly. The review was carried out based on the management strategy currently being implemented. This review can also help stakeholders to anticipate any threats that may occur. The threat factors in question, among others:

- Environmental damage and local cultural crisis. Environmental damage due to mining activities is very pronounced especially mining activities in karst areas have an impact on the environment, especially on the underground water flow system, existing flora, fauna and vegetation [17]. This threat is very serious if there is no post-mining countermeasures. Especially in Mushroom Hills, Gresik and Rengel Regencies, Tuban Regencies, people live and depend on the karst area to meet their subsistence needs. The beauty of the karst area must be

maintained. Communities in the karst environment are unique because community settlements were built on karst hills [18]. This is related to the early history of the arrival of several Sunan (waliyullah) in the area so that it has historical value attached to the traditions and living habits of the local community.

- Mining exploitation of the sustainability of karst areas. Mining activities are still being carried out in line with the increasing need for limestone on an industrial scale [19]. The karst area in northern East Java, which is located around residential areas, is still actively used as a mining site [20]. Backfill activities in various areas such as Surabaya, Sidoarjo, Malang and Jakarta have affected the demand for and production of limestone from Gresik, Tuban and Lamongan. Therefore, the cooperation of related parties is needed to limit mining exploitation activities so that they remain under control. According to Schiappacasse et al., [21] Mine expansion will have an impact on other locations and threaten karst areas that have not been used as mining exploitation areas.
- Low interest in community literacy in environmental management. The low interest in community literacy in environmental management is influenced by various factors. These factors include: 1) The lack of learning in educational institutions that emphasize the importance of managing the surrounding environment, 2) Lack of motivation and initiative to attract interest in environmental literacy, 3) Low public interest in accessing information related to environmental management, 4) Lack of instilling character values based on a culture of respecting and protecting the surrounding environment, 5) There is still a high poverty rate in various regions, so that people tend to prioritize their needs principal than environmental management.

3.3 Identification of Internship Activities Strategy

The use of field internships to run effectively, its implementation needs to pay attention to the following steps:

3.3.1. Preparation Period by setting

- Formulation of clear instructional objectives.
- Consideration of the selection of the technique.
- The need to contact the leader who will be visited to negotiate everything.
- Preparation of careful planning dividing tasks and preparing facilities.
- Group division.

It is important to prepare for field internship activities carefully, considering safety aspects, learning objectives, and student involvement [22]. Teachers need to be flexible in adapting learning to natural conditions that may change [23]. Clear learning in the field supported by clear preparation can provide deep and satisfying learning experiences for students and promote a better understanding of the natural world [23].

3.3.2. Field internship implementation period

- The group leader manages everything assisted by other officers.
- Fulfill the rules that have been determined together.
- Supervise officers in each section, as well as group assignments according to their responsibilities.
- Give directions when necessary

Through field internships, students can carry out experiments outdoors, such as weather measurements, observing plant growth, or studying geology and soil [24]. This helps students to connect theory with real experience [25]. Students are given challenges or problems that they have to solve outdoors [26]. Examples are navigation using maps, building natural shelters, or identifying natural signs. It develops problem solving and cooperation skills.

3.3.3. Return from field internships period

- Hold discussions on all matters resulting from field internships
- Prepare reports or papers or conclusions obtained.
- Follow up on the results of outdoor study activities such as making graphs, drawings, models, other tools, and so on [27].

As a follow-up to the field internship, students prepare a report after the internship activity; Students can conduct more in-depth analyzes after field observations and practice [28]. For example, they can study local ecosystems, collect data, and analyze the results. According to Henrietta and Felecia [29], projects like this provide research-based experience. After field internships activities, it is important to allow time for students to reflect on their experiences. Group discussions or reflective journals can help them relate field experiences to academic concepts.

4 Conclusion

The northern part of East Java, which has a very complex karst topography, can be used as a natural laboratory in an internship course in the Masters in Geography Education study program. Natural laboratories are explored to serve as targets, resources and learning tools that can be used as a place to practice, demonstrate,

experiment, research, and take knowledge in the learning process of Geography. Several locations such as Mushroom Hill (Gresik Regency), Tanjung Kodok Beach, Maharani Cave, Bonorowo (Lamongan), Ngerong Cave, Maibit Baths (Tuban), and Kayangan Api (Bojonegoro) have the potential to become natural laboratories in the internship course in the Geography Education Master's Degree Program. This potential is supported by several things such as: complete karst lithology phenomena, locations close to affordable infrastructure, unique social, cultural and economic conditions of the community, as well as well-developed geotourism activities.

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Author contribution

The authors confirm contribution to the paper as follows: : study conception and design Exploration of the Northern Part of East Java as a Natural Laboratory in the Internship Course in the Geography Education Masters Study Program: Sukma Perdana Prasetya; analysis and interpretation of results: Lidya Lestari Sitohang and Fahmi Fahrudin Fadirubun; data collection: Fajar Bayu Priyambodo, Ayu Nurhanian, and Nur Jannah.

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