

AN ANALYSIS OF THE SUMBERMANJING WETAN POTENTIAL LANDSCAPE FOR FIELDWORK LEARNING BASED ON THE GEOGRAPHY CURRICULUM IN INDONESIA

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Abstract. Geography learning was mostly conducted classically, inside the classrooms. Its theories and materials were commonly presented by giving stimulus or problems which exist in the surrounding area. Meanwhile, deep learning can be conducted through contextual studies outside the classroom by performing observation directly. Contextual studies for the learners can use the fieldwork method to explain in detail about materials or problems that exist in surrounding area. The aims of this research are to determine the potential landscape that can be used as a fieldwork-based geography learning starting from the geography curriculum in Indonesia, and to apply the contextual study on geography learning through fieldwork in Sumbermanjing Wetan. The method used to meet the first objective was conducting a survey to determine the potential locations for learning based on each location's characteristics, which later correlated to the students' basic competence to achieve learning goals. To meet the second objective of study, the researchers performed a pre-experimental design: one such case study was conducted through fieldwork in locations that had been pre-determined/ mapped. The result of this study showed that there are locations that can be used in fieldwork-based geography learning, such as peak hills, alluvial plains, springs, fishery areas, mangrove ecosystems. Each has different characteristics that can be used in geography learning. Various aspects in basic competence were included in fieldwork location study. Each student actively contributed to fieldwork-based learning in locations that had been mapped to learn about facts and conditions of the sites, so they could deeply analyse the phenomenon that took place there. The activeness of students could be seen from the problem identification process through to the observation activity, from their participation in discussion, to simple experiments on study sites.

1. INTRODUCTION

Geography is the science that describes and explains the nature of the earth, analyses natural phenomena and the population, as well as the unique patterns of life and the functions of the earth's elements in space and time (Bintarto & Hadisuwarno, 1987). The basic competence in geography learning is formulated in the context of the interaction or relationship between humans and the three-

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dimensional environments. Geography sees the dynamic physical environment and the population from the integration aspect and interdependent aspect between places and scales (Kemendikbud, 2017). Geography learning is commonly conducted inside the classroom, by presenting many kinds of material in the form of knowledge or skills. Outside the classroom it is rarely conducted, although students can study and love the nature and the population surrounding them, as well as know the condition of the environment around them.

Outside the classroom, geography learning can be conducted through fieldwork study. This fieldwork is conducted in order to apply the knowledge obtained from classroom learning activities. It covers the physical geography aspect, the demographical aspect, social geography, and so on. Fieldwork in the context of geography learning may cover any geosphere phenomena. Specifically, it can be conducted in various natural locations, geologies, geo-parks, cities, countries, rivers, mountains, and coastal areas, among others. By doing this fieldwork, students will be able to develop the collecting data skills through classroom activities, so as to encourage them doing research, and to provide them with the experience and a valuable learning process, as well as to increase students' learning interest (Onn & Poh, 1978).

Outside classroom study activity was distinctly different from classroom study activity. The learning activity was not synced to the learning competence, which means it did not run well. This fieldwork study contains a refreshing activity and direct experience for students related to the objects they visit. It should be well arranged by the teachers, so that the learning process will be well run based on the curriculum. Besides, this activity should be done in consideration to support students' competence achievement. The location selection is also important in fieldwork implementation. Sumbermanjing Wetan was selected as a fieldwork location because it accommodates distinct setting and learning content, so that joyful learning can be implemented. It can increase the success of learning (Mackenzie *et al.*, 2018; van den Bogerd *et al.*, 2020; Yu *et al.*, 2019).

Geography learning using landscape study in Sumbermanjing Wetan can potentially be done by using fieldwork-based information acquisition (Sahrina & Deffinika, 2021). The coastal area condition in Sumbermanjing Wetan can be the learning object of marine landscape (Sahrina, Sumarmi, Purwanto, Rosyida, Fadlan *et al.*, 2022), karst landscape and coastal area of the island zone (Prabawa *et al.*, 2017), karst landscape (Labib *et al.*, 2020; Sahrina *et al.*, 2020; Salaka, 2018; Suprianto *et al.*, 2017), landscape disaster aspects (Maulana & Wulan, 2016), since landscape configuration also has an impact on social behaviour around the study area where the local wisdom is integral (Rahayuningtyas & Siahaya, 2017; Su'ud & Bisri, 2019). Sumbermanjing Wetan has various and unique landscape characteristics which align with the learning topic in the geography curriculum. For example: Sitiarjo Village has the characteristics of valleys that deal with the threat of floods and landslides. Therefore, the community has developed an adaptive behaviour to these disasters. Another example is the Clungup Mangrove Conservation location which has the characteristics of a coastal ecosystem conservation area by paying attention to ecological, economic, and social aspects (Sahrina, Sumarmi, Purwanto, Rosyida, Fadlan *et al.*, 2022; Sahrina & Deffinika, 2021).

Fieldwork-based geography is used in several universities that integrated a college curriculum which was arranged and supervised by the supporting teachers (Arinta *et al.*, 2016; Khairani *et al.*, 2015; Norsandi, 2018; Sugiharyanto, 2017; Syam, 2017). Learning as part of a college or university is a common situation. The Sumbermanjing Wetan district, which has various landscape forms, can be the learning medium, where study can be conducted in mapped areas by implementing fieldwork-based learning (Sahrina *et al.*, 2022). Aside from universities, fieldwork-based learning can also be used in Junior and Senior High School. The implementation of fieldwork-based education in geography learning will add to the students' experiences and skills in analysing the geosphere phenomena which occur in the studied location. Geography learning in Senior High School (SHS) focuses on developing students' knowledge, skills, and attitudes towards the natural and social phenomena in their surroundings. In

addition, it emphasizes the understanding of the human-environment interactions, upgrading critical thinking, and developing students' skill to analyse the natural and social phenomena relevant to their lives (Reshma *et al.*, 2014).

The second-year geography learning curriculum has 7 basic competencies, namely 3.1) Indonesia as the world's maritime axis, 3.2) Indonesia and the world's flora and fauna, 3.3) the distribution and the management of the forestry resources, mining, maritime and tourism industries according to the sustainable development principles 3.4) national food security, industrial material provision, and the potential of new and renewable energy in Indonesia 3.5) the dynamics of Indonesian population; 3.6) the nation's cultural diversity as a national identity; and 3.7) disasters and their mitigation through education, local wisdom, and the use of modern technology (Kemendikbud, 2018). Thus, the aims of this research are to determine the potential landscape that can be used as fieldwork-based geography learning based on the geography learning curriculum in Indonesia, and to apply a contextual study on geography learning through fieldwork in Sumbermanjing Wetan.

2. MATERIALS AND METHODS

The method used to achieve the first objective was conducting a survey to determine potential locations for learning based on each location's characteristics, which was then correlated to the students' basic competence to achieve learning goals. The survey was conducted in Sumbermanjing Wetan by directly identifying and mapping the potential and unique location characteristics based on the geography learning curriculum and the basic competencies in Indonesia. There were fifteen locations that can be used as fieldwork-based learning (Sahrina *et al.*, 2022). Those fifteen locations each had characteristics such as ecology study, geology and geomorphology, hydrology, conservation, disasters, tourism, and human geography. The uniqueness found in the mapped locations could be used as geography fieldwork-based learning objects (Sahrina & Deffinika, 2021). Not all of them can be used at the same time, but should be adjusted to the needs of implementing fieldwork-based learning.

To achieve the second objective of the study, the researchers conducted a pre-experimental design: one such case study entailed fieldwork study in locations that had previously been determined/ mapped (Campbell *et al.*, 1963). The subject of this research was made up of 38 second-year students of the Laboratory Senior High School State University of Malang, between the ages of 16 and 17 years old. The sampling process was carried out through specific sampling, by considering the homogeneous abilities of students based on the average score and topic of the material that aligns the curriculum with the characteristics of the mapped locations. This fieldwork-based geography learning has stages of preparation, implementation, and evaluation. In the preparation stage, the students received the guidelines concerning the fieldwork location and the activities to be conducted. In the implementation stage, they conducted fieldwork study in the chosen area. Fieldwork learning could be in the form of observation, survey, or interview, all aiming to solve the hypothesis. The tools used by the students to support the implementation of the fieldwork included maps, compasses, GPS, anemometers, clinometers, disto-meters, alkalinity test kits, pH meters, Electrical Conductivity Meters (EC Meters), cameras and drones. The topic material used the same material given in classroom learning as stated in basic competences 3.3 "Analysing the distribution and management of the forestry, mining, marine, and tourism industries according to sustainable development", 3.5 "Analysing Indonesia's population dynamics for development planning", 3.6 "Analysing culture diversity as the national identity based on the uniqueness and the distribution" and 3.7 "Analysing disaster, their types and their mitigation through education, local wisdom, and the use of modern technology". In the evaluation stage, students reported the result of the fieldwork study and did the assessment test to measure their understandings about the study locations topics. The following chart (Fig. 1) shows the steps of fieldwork learning.

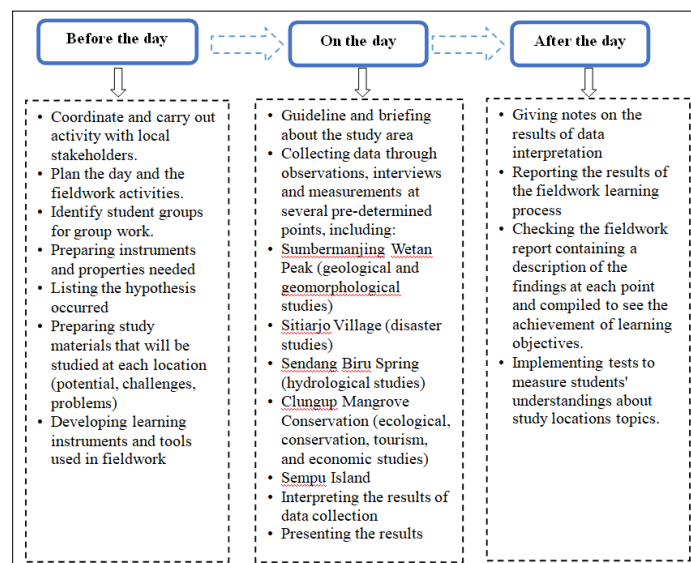


Fig 1 – Fieldwork Procedure, adaptation by (IECC, 2015).

The research instrument was used to answer the first research objective by using field notes to identify the study locations used for fieldwork learning. Each location that had characteristics and uniqueness was identified, described and recorded to determine the coordinates via GPS with the help of the Avenza Maps application. After the location mapping was completed, the data was processed into a fieldwork map using Arc-GIS which was used as a guide for the fieldwork learning route. Furthermore, the instrument used to answer the second research objective was a student activity observation sheet during fieldwork learning. This observation sheet was used to assess student involvement in fieldwork learning, including involvement in conducting identification, discussion, question and answer, simple practice, and interviews with the community in the study object.

3. RESULTS AND DISCUSSION

3.1. Fieldwork Locations Characterization in Correlation with the Geography Learning Curriculum in Indonesia

The field condition check is done by recording all the aspects which might occur in fieldwork learning. Based on survey results and field notes, it showed that there were several aspects that need to be considered in implementing fieldwork learning, such as: licensing, security, track condition, study object characteristics and the achievement of basic competence. Licensing was done by asking permission to conduct research in fieldwork areas. Those areas included Bukit Sumbermanjing Wetan, Sitiarjo and the Clungup Mangrove Conservation (CMC) Zone. The selection of these locations was based on their unique geomorphological characteristics, such as having different morphological features, a high vulnerability to floods and landslides, ecological features in mangrove conservation areas, hydrological features and water resources, bio-geodiversity, and diverse social contexts that aligned with the learning objectives. Bukit Sumbermanjing Wetan, for example, exhibits changes in morphology, from alluvial plains to hills, and offers diverse landscapes. Sitiarjo village was chosen due to its floodplains and river basin, while the CMC area features karst and coastal landscapes. In terms of security, it is achieved by providing the security officer with information that a fieldwork study will be performed in the area. Conducting a survey of the fieldwork area conditions also important to make sure

the fieldwork areas are secure, because the area has a high vulnerability to floods and landslides. The achievement of basic competence is done by identifying the areas used in the fieldwork study. Figure 2 shows the route and fieldwork landscape.

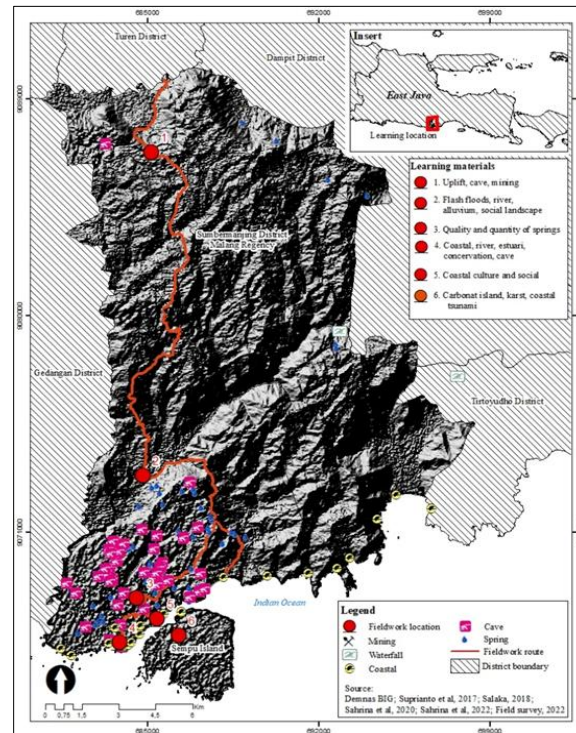


Fig. 2 – Route and Fieldwork-Based Geography Learning.

The fieldwork-based geography learning aspect has different characteristics. Table 1 shows study materials on location with addition information on the distances and the duration in relation to Malang, of the classroom study place, which is Laboratory Senior High School State University of Malang.

Table 1

Location, Characteristics, and Distance between Fieldwork and Malang City

Location	Characteristics that can be explored from the study object	Distance and Duration from Malang City
Sumbermanjing Wetan Peak	Landscape observation, mining, caves	42 km, 1 hr 26 mins
Sitiarjo Village Valley	Disaster (landslide), alluvial plain, hydrology, social and cultural, local wisdom	61 km, 2 hrs
Sendang Biru Spring and Sendang Biru Hamlet	Hydrology (the quality and quantity of the spring), the spring/source of Sendang Biru, karst landscape, disaster (drought), dynamic coastal population, cultural and social diversities, local wisdom	73 km, 2 hrs 20 mins
Clungup Mangrove Conservation	Mangrove conservation zone, karst zone, coastal area, estuary, Edu-tourism management	76 km, 2 hrs 25 mins
Fishery	Social and cultural, economic, local wisdom in the form of “petik laut” and “bersih desa”	74 km, 2 hrs 23 mins
Sempu Island	Nature preserve, geo-diversity and biodiversity, karst and coastal landscape	74 km, 2 hrs 23 mins + on boat

Source: Field Survey, 2024.

Geography learning became unique because the earth's surface was the object of the study. The earth surface configuration could be seen from the landscape. That landscape becomes the learning media of contextual fieldwork-based learning. Geography materials in Indonesia are given to the Senior High School students as subject. The second-year geography learning curriculum has 7 basic competencies, 4 of them aligned with fieldwork based-learning (Table 2). These four basic competencies' goal was that the students be able to analyse the phenomena occurring around them. During this time, geography learning implementation was being held in the classroom activity. To strengthen the basic competence, students could do the fieldwork in some locations according to the goals of the basic competence.

Table 2

Correlation between fieldwork and Geography Learning and the 2nd-Year Curriculum in Senior High School

Basic Competence	Study Materials	Fieldwork-based Learning Activities	Study Location
3.3 Analysing the distribution and sources management, forestry, mining, marine, and tourism industries based on the sustainable development principles (BC1)	Natural Resources Management in Indonesia • Classifying Natural Resources • The potential and distribution of natural resources • Analysing the influence of the environment on development • The use of natural resources and sustainable development principles	• Explaining the kinds of natural resources in the locations across various landscapes • Analysing problems related to the influence of the environment on the fieldwork location • Giving examples of good and sustainable management of natural resources	• Sitarjo Village • Sendang Biru Hamlet • Clungup Mangrove Conservation
3.5 Analysing Social dynamics in relation to development dynamics (BC2)	Population dynamics in Indonesia • Dynamics and the population projection factor • Population and workers' mobility • Quality of population and the human development index • Problems caused by dynamic population • Population data management and analysis	• Explaining the dynamic population in the study location. • Identifying problems about the dynamic population in the study location	• Dynamic population in Sitarjo village • Financial centre in Sendang Biru Hamlet, Southern Malang
3.6 Analysing national cultural diversity as the national identity based on uniqueness and distribution (BC3)	Indonesian Culture Diversity • The influence of geographic factors on cultural diversity in Indonesia • The distribution of cultural diversity in Indonesia • National culture formation • The preservation and use of Indonesian culture in creative economy and tourism • Indonesian Culture as part of Global Culture	• Explaining the development of culture in the study location • Local wisdom in the study location, such as <i>petik laut</i>, <i>bersih desa</i>, etc. • Carnival (<i>Kirab</i>) of spring water as a legacy for the young generation	• Sitarjo Village • Sendang Biru Hamlet

Table 2 (continued)

3.7 Analysing the types and management of natural disasters through education, local wisdom, and the use of modern technology (BC4)	Natural Disaster Mitigation • Types and characteristics of natural disasters • Disaster management cycle • Distribution of areas prone to natural disasters in Indonesia • Community participation in natural disaster mitigation in Indonesia.	• Observing various potential disasters in the study location • Explaining disaster in the study location • Analysing the cause of natural disasters in the study location • Governments' role in disaster mitigation • The adaptation of society involved in disaster mitigation management in the study location	• Track • Sitiarjo Village • Sendang Biru Hamlet • Clungup Mangrove Conservation
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Fieldwork Implementation in Sumbermanjing Wetan Locations

The main material in geography learning had been applied in classroom study by explaining concepts and analysing the problems. Strengthening students' competence and reaching a more valuable learning process could be achieved by providing information and knowledge or directly observing the problems. Table 3 shows four basic competencies of 2nd-year Senior High School students that became this fieldwork study's sample by using the landscape as the object of the study that can make a difference on each study locations that had been mapped.

Table 3

Learning Object and the Correlation with the Basic Competence (BC)

Learning Objects	Questions/Ideas			
	BC 1	BC 2	BC 3	BC 4
Sumbermanjing Wetan peak	• The configuration landscape changing from fluvial to karst	–	–	• Vulnerable landslide along the tack to the location
Sitiarjo Village	• Natural resources potential on hills and in the alluvial plain	• The population dynamics of Sitiarjo Village	• Cultural and social diversities on hills and in the alluvial plain	• Disaster in fluvial landscape • Environmental adaptation and local wisdom in vulnerable flood area • Vulnerable landslide potential area along the hills and karst track
Sendang Biru Spring and Sendang Biru Hamlet	• The natural phenomena of spring occurrence on karst landscape	• Financial Centre in Sendang Biru Hamlet, Southern Malang • Dynamic coastal population	• Culture and local wisdom in preserving the spring • Cultural and social diversities in Karst and coastal region	• Spring management • Water resources conservation to prevent drought in the karst landscape • Disaster in the karst landscape and in the coastal region • Local wisdom in solving drought problems and the threat of tsunamis

Table 3 (continued)

Clungup Mangrove Conservation	• The distribution of mangroves and their potential • The use of eco-tourism in the coastal landscape	–	–	• Mangroves as a coastal abrasion barrier • Location management based on local wisdom
Sempu Island	• Preservation area • Good biodiversity and geo-diversity	–	–	• Education and nature research areas

The learning process is achieved in several stages. The first stage includes preparing and setting up guidelines before doing the fieldwork study. The instruments used were previously prepared, and include maps, terrestrial measurements (GPS, compass, clinometer, anemometer, and disto-meter), water quality tests (Ph meter, Alkalinity test kit, EC meter), cameras and drones (for documentation and aerial photography in areas that students cannot reach). The results of the measurements are recorded and later presented by the learners. Figure 3 shows a preparation for departure, the delivery of basic materials, the field practice, and the directions related to existing conditions in the field.



Fig 3 (a) – preparation and guideline from school headmaster and researchers about the fieldwork (b) identification of the alluvial plain in Sitiarjo Village (c) limestone density measurements in Sendang Biru Spring (d) mangrove identification by CMC (Clungup Mangrove Conservation) management.

The landscape appearance in some locations has different characteristics. They are used as fieldwork-based geography learning media and learning source for the students. The process entails explaining the surrounding environment, identifying the object of study through observation and interviews, conducting simple measurements, providing a real experience for students by answering problems directly in the field. The point is to stimulate students' critical thinking skills so that they are able to analyse a phenomenon. The landscape used is adjusted to the basic competence that had been decided for geography learning in the 2nd year students, and is displayed in table 4.

Table 4

Critical Questions during Fieldwork Learning

Learning Objects	Critical Questions
1. Sumbermanjing Wetan Peak	(BC1) What looks different between first survey condition and the recent condition? (BC4) What makes the difference between this location and others? (BC1) After seeing the location, what can be developed in this area?
2. Sitiarjo Village Valley	(BC1) What will be observed along the way to the tracking area? (BC2) How is the population dynamics? What aspects influenced people movement towards this village? (BC3) What are the culture and the local wisdom, after seeing Sitiarjo Landscape? (BC4) What is the developing threat to this area, given the existence of different house patterns?
3. Sendang Biru Spring and Sendang Biru Hamlet	(BC1) How is the spring potential in karst area? (BC2) Becoming the financial centre of South Malang, what things should be developed to keep the economy sustainable? (BC2) How can the Sendang Biru local wisdom be maintained around the existence of newcomers that bring along their culture to Sendang Biru? (BC3) What keeps local wisdom and culture in the coastal area from being eroded by other cultures? (BC3) What needs to be done to keep the existence of water resources for the local people? (BC4) What needs to be done to anticipate hydro-meteorological disasters and tsunamis in the coastal area? (BC4) How is the management of conservation and springs in Sendang Biru area?
4. Clungup Mangrove Conservation	(BC1) What is the priority, in terms of developing the mangrove ecosystem, given the distribution of mangroves in Southern Malang that has a potential for tourism? (BC4) How can mangroves be managed based on local wisdom?
5. Sempu Island	(BC1) How can the biodiversity and geo-diversity of Sempu Island be maintained? (BC4) What can be done to make Sempu Island valuable and educate the people?

Fieldwork study of geography learning can also be achieved in the form of data collecting. Students can collect the data using survey instrument terrestrial kits, water measurements, and imagery satellite interpretation. The students' activity can be in the form of practical and observation activities, as well as recording the discoveries found in the fieldwork study area. Then, they can present the information gathered as a report, so that there is an interaction between the teacher and the students. Figure 4 shows the activities of students in implementing fieldwork-based geography learning: students make observations, identify areas, and collect data which are then presented in the form of student analysis results.



Fig. 4 – (a) looking up the landscape map (b) terrestrial survey measuring skills (c) water quality test (d) reading the results of the water test.

Based on observations made during fieldwork learning, all students can be involved in this activity. Student involvement can be observed through their participation in identifying and analysing the geosphere phenomena found in each location of the study object. In addition, student involvement was also observed based on their enthusiasm when receiving explanations about the study object, the implementation of questions and answers, the discussions regarding or involvement in carrying out simple practices on determining water quality in the Sendang Biru spring, student involvement in implementing mangrove nurseries in conservation areas, and interviews with the community. Student involvement was recorded and observed on the observation sheet used during fieldwork learning, during the preparation, implementation and evaluation stages.

3.3. Discussion

The main material given during the first step before conducting the fieldwork study became the basic guideline for the analysis during the fieldwork. The landscape approach shows the characteristics of managing an area, so that the students will recognize the complexity of natural and social changes in the study location. Besides, students will be able to see and solve problems. Fieldwork learning provides many advantages for geography learning (Day & Spronken-Smith, 2017; Dunphy & Spellman, 2009; France & Haigh, 2018; Onn & Poh, 1978).

Fieldwork study applied to Senior High School students emphasizes the contextual approach study. Contextual study aims to achieve a more valuable learning and teaching process. Besides, it emphasizes learning inquiry, where students observe, identify, and explore geosphere phenomena. Students also did the measuring process to get new information about environmental problems. The new information obtained by students includes landscape conditions due to rock uplift and changes in rock formation through limestone deposition, the discovery of alluvial deposits between hills and the threat to and adaptation of the community to hydro-meteorological disasters, the characteristics of the Sendang Biru spring which had high limestone deposits, and so on (Sahrina *et al.*, 2023). This type of activity encourages students to actively participate in the fieldwork learning process (Kent *et al.*, 1997). In short, the form of fieldwork study here was done through visitation, and an in-depth identification. Furthermore, it also included scientific investigation and research (Esteves *et al.*, 2019) which allowed the students to obtain various advantages from fieldwork study (Ostuni, 2000; Wilson *et al.*, 2017).

Fieldwork study encourages and motivates students to explore skills and knowledge. The use of instruments makes things easier for students and increases their motivation to study. According to Dunphy & Spellman (2009), fieldwork study provides students with skills and comfort. Students will be more active in study and the pursuit of knowledge. Besides, there is an interaction between the teacher and the students in solving the problems found at the respective location. The use of technology, such as measurement tools, also simplifies the fieldwork study process. It makes the data collecting process go well and swiftly. The use of satellite imagery interpretation or remote sensing has been achieved (Stoltman & Fraser, 2000) by using GPS and GIS maps, which upgrades the value of the fieldwork study (Day & Spronken-Smith, 2017). The mapping work performed during this study is based on satellite imagery as spatial data by using GIS (Geographic Information System). The tools are used for analysing and interpreting the field data, to get valid data and to conclude the natural phenomena that have occurred.

This fieldwork-based geography learning brings changes in the learning style of the students so that they are more valuable, because they can directly know the process of material development that they get during classroom study by seeing the real-time example. In addition, students will increase their critical and spatial thinking following this fieldwork-based study. The result of the study is comparable to the level of critical and spatial thinking, meaning that spatial thinking is easily accepted by the learners by directly seeing the object in field (Bahri, 2020).

The first site of the study is the peak of Sumbermanjing Wetan (later called Sumawe). It has a unique geomorphology, meaning that it is a natural fluvial landscape that is configured on a karst landscape. The location of Sumawe peak is in Sumbermanjing Wetan regency, which is a coastal area. The coastal area is very affected by fluvial and marine conditions (Kurnianto, 2019). The students are required to process the information about the natural changes in Sumbermanjing Wetan peak that has the potential to become a mining area because of the abundant resources. Students can identify and examine the location of Sumbermanjing Wetan peak geographically, by seeing the results of the observable landform process, such as the presence of limestone and caves, which shows that the seabed had been brought to the surface. Students will integrate the BC 3.3 material as the process of real data collection as a source for the study. Through direct activities in the field, students were provided with meaningful learning which enabled them to apply their experiences to other areas, namely the objects of learning studies. The BC 3.7 of the geography study material tackles disaster mitigation and adaptation. Students are expected to be able to identify which areas are prone to landslides. The aim is to increase the sensitivity of students to areas that have the potential for disasters.

The second site is the village of Sitiarjo, which features topography of flat lands transitioning into steep, rugged hills. Here, students have developed their knowledge with the help of the characteristics of Sitiarjo Village. Along the way, students have identified and obtained information about Sitiarjo Village, starting from the condition of the population, the potential of natural resources, local cultural wisdom, and the threat of disaster. The knowledge acquired by the students expanded as the results of the interpretation were being collected during the fieldwork study. Students can process the information that has been obtained by integrating the material provided in class. Among the skills of students in this second object is the ability to read topographic and geology maps in order to identify fluvial land in Sitiarjo Village and determine the variety of local wisdom cultures, which may also represent potential disaster threats in the same village. Students' knowledge also increases through observations of the objects of study and interviews with local communities about hydro-meteorological disasters and community adaptation in dealing with these disasters, such as building larger, two-storey houses, assigning vehicle parking spaces on the upper floors of houses, and setting up multi-storey evacuation areas (Sahrina *et al.*, 2023; Su'ud, M M & Bisri, 2019).

The third site is Sendang Biru Hamlet. Students are brought to a different area from the area in the previous objects. After students understand how fluvial land forms and is processed, they are able to develop their knowledge in coastal areas with dominant karst land. In this study object, students observe the characteristics of karst land. Observations are made by identifying land forms, such as dolines, karst hills, karst valleys, springs and caves (Suprianto *et al.*, 2017; Withuda *et al.*, 2023). Students identify and obtain information about the economic centre and the social condition of the hamlet community by doing observation and interview to the local fishermen and to tourguides near Sendang Biru Hamlet, namely Clungup Mangrove Conservation (CMC). The potential threat of disasters in coastal areas and karst lands elevates students' analytical skills and integrated thinking, for example, by linking the characteristics of karst land with the threat of drought, water pollution and land degradation (Endarto *et al.*, 2016). The students' caring attitude towards the environment can be seen in this third fieldwork site. The students found the condition of the population in Sendang Biru Hamlet which has a finance centre while keep maintaining the ecosystem of its coastal area to reduce the threat of future disasters. Students are also shown other related geographical objects, including; Cluster Mangrove conservation (CMC), Sendang Biru spring, and Sempu Island.

The fourth site is Clungup Mangrove Conservation (CMC). CMC is an ecotourism area in Sendang Biru Hamlet, Tambakrejo Village, Malang Regency (Harahab *et al.*, 2020). Students can find out how the distribution of mangroves in Clungup Mangrove Conservation (CMC) area is achieved, and can come up with ideas about the potential for ecotourism in coastal areas. Students can integrate and implement the material in BC 3.3 which discusses natural resource management. The threat of disaster

in the CMC area makes students think about the correlation between potential disasters in karst areas and the presence of mangrove forests. The increase in the students' caring attitude towards the environment in this fourth object can be seen when visiting the mangrove forest conservation area. Here, students identified various types of characteristics (Ardiansyah *et al.*, 2022) and mangrove habitats whose function was to protect coastal areas from the threat of high waves or abrasion. In addition, students were also involved in protecting the environment in the CMC area by bringing back items that have the potential to produce waste for the object of study (Sumarmi *et al.*, 2021).

The fifth site is the Sendang Biru spring. Karst topography is formed from some of the results of the smelting process controlled by the level of rock solution, precipitation, and rock outcrop which allows for underground systems development (Perdana & Rahardjo, 2022). In addition, students have skills in measuring water quality using tools such as an alkalinity test kit and a pH meter, as well as skills in reading the results of measurements or water quality tests. The results of the spring water quality measurement conducted by the students showed that there was a high carbonate content in the water, as evidenced by the discoloration of the water in the titration test. The students found the pattern of managing Sendang Biru springs as seen from the fluctuations in the flow during the rainy and dry seasons. A slight increase in flow velocity indicates that the blue spring is fractured or has a diffused flow (Perdana & Rahardjo, 2022).

The sixth site is Sempu Island. The Island has an area of approximately 877 ha with a type of coral reef cover which provides shelter for fish and invertebrate species in the Sempu Island Nature Reserve (Luthfi *et al.*, 2018). Students in this object are introduced to the Sempu Island Nature Reserve which is an implementation of the BC 3.3 material on natural resources. Knowledge regarding biodiversity and geo-diversity makes students more enthusiastic about learning, due to the contextual learning resources. Thus, mastery of the material by students is more developed and meaningful because students can make real observations on the natural resources contained in the object of study without the help of the visual media (pictures) presented in the classroom. The students' skill in carrying out inventory is developing because the students directly record the biodiversity and geo-diversity in Sempu Island Nature Reserve, therefore the students' experience related to this becomes more meaningful (students directly interact with the objects present in the field).. Students pay attention to the balance of the coral reef ecosystem. They identified threats to the coral reef ecosystem caused by high waves (natural disasters) as well as human massive activities around Sendang Biru fish auction site (*Tempat Pelelangan Ikan*), settlements and also tourism activities.. The students's attitude of caring for the environment can be seen throughout the fieldwork activities, as they maintain the cleanliness of the environment by not littering and being able to care for the surrounding environment.

Fieldwork study at the university level is achieved in the form of job training (Arinta *et al.*, 2016; Bahri, 2020; Norsandi, 2018; Syam, 2017), which emphasizes the research and material application obtained. These too are aligned with the fieldwork study done in the Laboratorium UM Senior High School that actively involves the students in finding facts in the field of mapped object study. The implementation of fieldwork-based geography learning can increase students' interest in the study (Arinta *et al.*, 2016) and the study results (Norsandi, 2018). Besides, activity fieldwork study also requires detailed preparation before the process starts, such as licensing and deciding the location (Ari, 2019). It is noted that budget constraints and inadequate health and safety standards may pose challenges to conducting the research. . It can be a threat for teachers and schools to implement fieldwork study. In this research, there are six objects of the study that have different characteristics as class materials. The implementation of these six objects will affect the knowledge exchanges between the students, their skills and attitudes after performing the fieldwork study, because students were directly involved with the object of the study and were able to dig up detailed information in order to gain comprehensive knowledge on the phenomenon studied.

The implementation of fieldwork lends importance to the students' knowledge, skills, and attitude.

In general, students' knowledge and critical thinking are increasing. Students who join this learning process have abilities in analysing and evaluating the collected information (Karyadi *et al.*, 2018; Silviariza *et al.*, 2021). Students ask questions about the information obtained and compare it to the field facts. Students can also be better at analysing the social and cultural conditions and at comparing them to the study area landscape. Students can analyse the preservation of mangroves based on the society and local wisdom in Sendang Biru area.

The sharpening of students' critical thinking skills is due to them being able to observe and study the real conditions in the study area. Students are also able to correlate the result of the observation and measurements with the study material provided during classroom study (Rohman *et al.*, 2020). The phenomena found in the field will enrich both learning materials and processes, as well as develop students' knowledge. Furthermore, the information obtained is more accurate because students get direct experience and optimize their potential to communicate with the surrounding nature and environment.

4. CONCLUSIONS

Sumbermanjing Wetan has a landscape that can be a geography learning resource. The landscape features such as hills at the peak of Sumbermanjing Wetan, springs, islands, valleys in Sitiarjo Village, and the Clungup Mangrove Conservation area offered valuable education opportunities for fieldwork-based geography learning. Learning activities in the 2nd year of high school had basic competences that were suitable for fieldwork study. Those basic competences were found in BC 3.3, BC 3.5, BC 3.6, and BC 3.7 with a topic discussion based on natural resources, population dynamics, culture diversity, and the mitigation of natural disasters. Students obtained knowledge and skills in identifying and analysing information, which required an advanced thinking ability. It is because students were required to think actively and develop their skill in analysing and solving problems around them. In addition, all students could be actively involved in fieldwork learning. Student involvement could be observed by participating in identifying and analysing the geospheric phenomena found in each study object location, participating in questions and answers sessions and in discussions, being involved in carrying out simple practical activities and interviews with the community.

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REFERENCES

- Ardiansyah, A. R., Anggara, A., Sartimbul, A. (2022), *Pemetaan Sebaran Mangrove di CMC Tiga Warna, Malang Selatan*. Buletin Oseanografi Marina, **11**(1), pp. 1–10. <https://doi.org/10.14710/buloma.v11i1.37238>.
- Arinta, D., Utaya, S., Astina, K. (2016), *Implementasi Pembelajaran Kuliah Kerja Lapangan Dalam Meningkatkan Minat Belajar Mahasiswa Program Studi Pendidikan Geografi Universitas Negeri Malang*. Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan, **1**(8), pp. 1665–1670.
- Ari, Y. (2019), *Fieldwork in geography undergraduate degree programmes of Turkish Universities : status , challenges and prospects*. Journal Of Geography In Higher Education, **8**265. <https://doi.org/10.1080/03098265.2019.1698016>.
- Bahri, A. S. (2020), *Efektivitas Kuliah Kerja Lapangan (KKL) Dalam Meningkatkan Spatial Thinking “Studi Kasus Pada Mahasiswa Program Studi Pendidikan Geografi FKIP UNISMA Bekasi”* . GEOGRAPHIA Jurnal Ilmiah Pendidikan Geografi, **1**(1), pp. 46–58.
- Bintarto, R., Hadisuwarno, S. (1987), *Metode Analisa Geografi*. LP3S.
- Campbell, D. T., Stanley, J. C., Mifflin, H., Boston, C., Geneva, D., Hopewell, I., Palo, N. J., London, A. (1963), *Experimental and Quasi-Experimental Designs for Research*.

- Day, T., Spronken-Smith, R. (2017), *Geography Education: Fieldwork and Contemporary Pedagogy*. International Encyclopedia of Geography, pp.1–10. <https://doi.org/10.1002/9781118786352.wbieg0523>.
- Dunphy, A., Spellman, G. (2009), *Geography fieldwork, fieldwork value and learning styles*. International Research in Geographical and Environmental Education, **18**(1), pp. 19–28. <https://doi.org/10.1080/10382040802591522>.
- Endarto, R., Gunawan, T., Haryono, E. (2016), *Kajian kerusakan lingkungan Karst sebagai dasar pelestarian sumberdaya air*. Majalah Geografi Indonesia, **29**(1), 51.
- Esteves, M. H., João Hortas, M., Mendes, L. (2019), *Fieldwork in Geography education: an experience in initial teacher training program*. Didáctica Geográfica, **19**, pp. 77–101. <https://doi.org/10.21138/dg.417>.
- France, D., Haigh, M. (2018), *Fieldwork@40: fieldwork in geography higher education*. Journal of Geography in Higher Education, **42**(4), pp. 498–514. <https://doi.org/10.1080/03098265.2018.1515187>.
- Harahab, N., Fanani, Z., Puspitawati, D., Said, A. (2020), *Ketahanan Ekonomi Masyarakat Pesisir Di Kawasan Ekowisata Bahari Dusun Sendangbiru, Desa Tambakrejo, Kabupaten Malang, Provinsi Jawa Timur*. Jurnal Ketahanan Nasional, **26**(1), 71. <https://doi.org/10.22146/jkn.53372>.
- IECC (2015), *NSW DEPARTMENT OF EDUCATION ILLAWARRA EEC IEEC Geographical Toolkit*.
- Karyadi, B., Ruyani, A., Sipriyadi, Johan, H. (2018), *Impact of outdoor learning by step Introduction, Exploration, and Interpretation (IEI) based on environment on students' critical thinking*. Journal of Physics: Conference Series, **1116**(5). <https://doi.org/10.1088/1742-6596/1116/5/052036>.
- Kemendikbud (2017), *Model Silabus Mata Pelajaran Sekolah Menengah Atas/Madrasah Aliyah (SMA/MA)*.
- Kemendikbud (2018), *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 37 tahun 2018 Tentang Perubahan Atas Peraturan Menteri Pendidikan dan Kebudayaan Nomor 24 Tahun 2016 Tentang Kompetensi Inti dan Kompetensi Dasar Pelajaran Pada Kurikulum 2013 Pada Pendidid*. In Kementerian pendidikan dan Kebudayaan Indonesia. jdih.kemdikbud.go.id.
- Kent, M., Gilbertson, D. D., Hunt, C. O. (1997), *Fieldwork in geography teaching: A critical review of the literature and approaches*. Journal of Geography in Higher Education, **21**(3), pp. 313–332. <https://doi.org/10.1080/03098269708725439>.
- Khairani, Rahmanelli, Surtani, Nofrion (2015), *Evaluasi Pelaksanaan Kuliah Kerja Lapangan Geografi di Jurusan Geografi Fakultas Ilmu Sosial Universitas Negeri Padang*. Jurnal Geografi, **4**(1), pp. 33–41.
- Kurnianto, F. A. (2019), *Keberagaman Bentuk Lahan di Wilayah Pesisir Dan Kaitannya Dengan Karakteristik Proses Geomorfologi*. Majalah Pembelajaran Geografi, **2**(2), pp. 1–13.
- Labib, M. A., Suprianto, A., Fitriani, D., Sahrina, A., Hidayat, K., Irianto, P. A., A, A. A. (2020), *Morfometri Dan Tipologi Lorong Gua Di Kabupaten Malang*. Media Komunikasi Geografi, **21**(1), 52. <https://doi.org/10.23887/mkg.v21i1.24236>.
- Luthfi, O. M., Yulianto, F., Pangaribuan, S. P. C., Putranto, D. B. D., Alim, D. S., Sasmita, R. D. (2018), *Kondisi Substrat Dasar Perairan Cagar Alam Pulau Sempu, Kabupaten Malang*. Journal of Marine and Aquatic Sciences, **5**(1), 77. <https://doi.org/10.24843/jmas.2019.v05.i01.p09>.
- Mackenzie, S. H., Son, J. S., Eitel, K. (2018), *Using outdoor adventure to enhance intrinsic motivation and engagement in science and physical activity: An exploratory study*. Journal of Outdoor Recreation and Tourism, **21**(January), pp. 76–86. <https://doi.org/10.1016/j.jort.2018.01.008>.
- Maulana, E., Wulan, T. R. (2016), *Pemetaan multi-rawan kabupaten malang bagian selatan dengan menggunakan pendekatan bentangalam*. Simposium Nasional Sains Geoinformasi, January 2015, pp. 526–534. <https://doi.org/10.13140/RG.2.2.33969.79208>.
- Norsandi, D. (2018), *Pengaruh Kuliah Kerja Lapangan (KKL) Terhadap Prestasi Belajar Mahasiswa Pendidikan Geografi Universitas PGRI Palangkaraya*. Jurnal Meretas, **5**(1), pp. 66–71.
- Onn, Y. S., Poh, W. P. (1978), *Ieldwork in Geography—Importance, Objectives and Scope*. Singapore Journal of Education, **1**(1), pp. 24–27. <https://doi.org/10.1080/02188797808548515>.
- Ostuni, J. (2000), *The Irreplaceable Experience of Fieldwork*. https://doi.org/10.1007/978-94-017-1552-2_5.
- Pannekoek, A. J. (1949), *Garis-garis Besar Geomorfologi Pulau Jawa*. Terjemahan Budio Basri.
- Perdana, R. G., Rahardjo, P. P. (2022), *Pelarutan Batugamping Melalui Konsentrasi CaCo3 Pada Mataair Sendang Biru Dan Beji Di Kawasan Karst Malang Selatan*. Jurnal Green House, **1**(1), pp. 32–36.
- Prabawa, Bayu Argadyanto, Cahyadi, Ahmad, Adrian Valentino, T., Anggraini, D. F. (2017), *Kajian Genesis Dan Dinamika Wilayah Pesisir Kawasan Karst Pulau Sempu Kabupaten Malang Provinsi Jawa Timur*. Universitas Gadjah Mada, pp. 1–9.
- Rahayuningtyas, D., Siahaya, T. (2017), *Tradisi Petik Laut dalam Komodifikasi Pariwisata Sendang Biru*. Studi Budaya Nusantara, **1**(2), pp. 40–46. <https://doi.org/10.21776/ub.sbn.2017.oo1.02.05>.
- Reshma, C., Sheheersha, S., Saravanabavan, D. (2014), *Enhancing The Quality And Accessibility Of Geographic Learning Through Modern Instructional Strategies In The School: Its Implications And Opportunities*. IOSR Journal of Research & Method in Education (IOSRJME), **4**(3), pp. 25–30. <https://doi.org/10.9790/7388-04322530>.
- Rohman, A. A. N., Jumadi, Wilujeng, I., Kuswanto, H. (2020), *The Influence of outdoor learning models on critical thinking ability*. Journal of Physics: Conference Series, **1567**(3). <https://doi.org/10.1088/1742-6596/1567/3/032093>.
- Sahrina, A., Deffinika, I. (2021), *Potensi Laboratorium Alam Sumbermanjing Wetan dalam pembelajaran Geografi berbasis kerja lapangan (fieldwork)*. Jurnal Pendidikan Geografi, **26**(2), pp. 61–72. <https://doi.org/10.17977/um017v26i22021p061>.

- Sahrina, A., Fitrianti, D., Suprianto, A., Labib, M. A. (2020), *Potential and Challenges of Karst Water Resources in Sumbermanjing Wetan District of Malang Regency*. IOP Conference Series: Earth and Environmental Science, **412**(1). <https://doi.org/10.1088/1755-1315/412/1/012032>.
- Sahrina, A., Sumarmi, Purwanto, Rosyida, F. (2023), *Laboratorium Alam Sumbermanjing Wetan dalam Pembelajaran Geografi* (M. N. Creative (ed.)).
- Sahrina, A., Sumarmi, Purwanto, Rosyida, F., Fadlan, M. S., Prasetyo, D., Withuda, F. A. (2022), *A Study of Tourism Objects in Supporting Fieldwork-Based Geography Learning in Sumbermanjing Wetan, Malang Regency, Indonesia*. IOP Conference Series: Earth and Environmental Science, **1066**(1). <https://doi.org/10.1088/1755-1315/1066/1/012003>.
- Sahrina, A., Sumarmi, Purwanto, Rosyida, F., Shafie, A. Bin, Prasetyono, D., Suprianto, A., Fadlan, M. S., Labib, M. A. (2022), *The Use of Smartphones in Geography Learning: A 21st Century Learning Innovation in Identifying Nature Appearances Based on Fieldwork*. International Journal of Interactive Mobile Technologies, **16**(22), pp. 15–31. <https://doi.org/10.3991/ijim.v16i22.36151>.
- Salaka, M. J. (2018), *Eksplorasi Kawasan Karst Sendang Biru Kabupaten Malang* (Issue October 2018). CV. Komojoyo Press.
- Silviariza, W. Y., Sumarmi, Handoyo, B. (2021), *Improving critical thinking skills of geography students with spatial-problem based learning (SPBL)*. International Journal of Instruction, **14**(3), pp. 133–152. <https://doi.org/10.29333/iji.2021.1438a>.
- Stoltman, J. P., Fraser, R. (2000), *Geography Fieldwork: Tradition and technology meet*. In G. K. GERBER, ROD; CHUAN (Ed.), *Fieldwork in Geography: Reflections, Perspectives and Actions*, pp. 37–54.
- Su'ud, M. M., Bisri, H. M. (2019), *Studi kapasitas masyarakat sebagai mekanisme bertahan menghadapi bencana banjir di Desa Sitiarjo, Kecamatan Sumbermanjing Wetan, Kabupaten Malang*. Jurnal Teori Dan Praksis Pembelajaran IPS, **4**(2), pp. 82–89. <https://doi.org/10.17977/um022v4i22019p082>.
- Sugiharyanto, S. (2017), *Kelayakan Wilayah Perbukitan Jiwo Sebagai Laboratorium Alam Untuk Praktik Kerja Lapangan Geografi Fisik Mahasiswa Jurusan Pendidikan Geografi*. Geomedia: Majalah Ilmiah Dan Informasi Kegeografian, **5**(1). <https://doi.org/10.21831/gm.v5i1.14198>.
- Sumarmi, S., Arinta, D., Suprianto, A., Aliman, M. (2021), *The development of ecotourism with Community-Based Tourism (CBT) in Clungup Mangrove Conservation (CMC) of tiga warna beach for sustainable conservation*. Folia Geographica, **63**(1), pp. 123–142.
- Suprianto, A., Prasetyono, D., Hardianto, A. S., Labib, M. A., Efendi, S., Hidayat, K., Triyono, J. A., Ahmad, A. A. (2017), *Identifikasi Hubungan Kelurusan dan Pola Lorong Gua Karst di Kecamatan Sumbermanjing Weta Kabupaten Malang [Identification of Straightness Relationship and Passage Pattern of Karst Cave in Sumbermanjing Wetan District, Malang Regency]*. Prosiding Seminar Nasional Geotik, pp. 20–30.
- Syam, A. (2017), *Arahan Pengembangan Pembelajaran Geografi Berbasis Kuliah Kerja Lapangan Mahasiswa Program Studi Pendidikan Geografi Stkip Pesisir Selatan*. Jurnal Manajemen Pendidikan, **02**(03), pp. 535–544.
- van den Bogerd, N., Coosje Dijkstra, S., Koole, S. L., Seidell, J. C., de Vries, R., Maas, J. (2020), *Nature in the indoor and outdoor study environment and secondary and tertiary education students' well-being, academic outcomes, and possible mediating pathways: A systematic review with recommendations for science and practice*. Health and Place, **66**(July), 102403. <https://doi.org/10.1016/j.healthplace.2020.102403>.
- Wilson, H., Leydon, J., Wincentak, J. (2017), *Fieldwork in geography education: defining or declining? The state of fieldwork in Canadian undergraduate geography programs*. Journal of Geography in Higher Education, **41**(1), pp. 94–105. <https://doi.org/10.1080/03098265.2016.1260098>.
- Withuda, F. A., Sahrina, A., Sukoco, G. F., Gabriele, M. T., Ma'asika, N. M., Fitriani, D. (2023), *Eksplorasi Sumberdaya Air Di Kawasan Karst Desa Tambakrejo Kabupaten Malang [Exploration of Water Resources in the Karst Area of Tambakrejo Village, Malang Regency]*. J. GEOGRAPHY: Jurnal Kajian, Penelitian Dan Pengembangan Pendidikan, **11**(2), pp. 310–321.
- Yu, C. P., Chang, W. C., Ramanpong, J. (2019), *Assessing visitors' memorable tourism experiences (MTEs) in forest recreation destination: A case study in Xitou Nature Education Area*. Forests, **10**(8), pp. 1–15. <https://doi.org/10.3390/f10080636>.

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