Preliminary analysis learning media based on edupark physics with scientific methods on Padang beach

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Abstract. West Sumatra is one of the provinces surrounded by oceans that have long beaches that have physical concepts that can be directly observed. The beach is a tourist destination for domestic and foreign tourists who can be used as edupark in the process of learning physics. Edupark is an educational park that educators should be able to use as a learning resource for students. However, educators rarely use coastal tourism as a learning resource. The use of local tourist destinations can be used in learning Physics by implementing the development of science and technology that is developing now. According to the needs of students, so that information technology-based learning media can be used. The use of instructional media aims to help students understand the physical concepts found on the coast of Padang Indonesia, especially in light material and optical instruments. The data used in the study were obtained through interviews and questionnaires with educators and students. Based on this preliminary research conducted, it is known that students are interested in using learning media in the process of learning physics.

1. Introduction

Physics is a branch of natural science which basically aims to learn and understand quantitative understanding of various natural phenomena or processes and their nature and application. Besides that, all physical processes can be understood through a number of basic natural phenomena. Natural law itself can be studied with various learning methods, one of which is environment-based learning, one of which is through tourism potential (edupark). Edupark is an education park that can provide value to targets learners for students. Methods of utilizing work tours and effective tour methods of local models used in the study of Social Sciences[1]. The city of Padang has tourism potential that is able to contribute to the learning process. The potential includes natural tourism consisting of beaches, sea and other natural beauty.

Learning through tourism potential is a procedure used to achieve the goals of Science learning the is the achievement of basic competencies expected by using the environment as a source learning. Science is the study of events that occur in nature by observing in accordance with procedures [2]. According to the Ministry of National Education, in learning using the environment students are invited to understand the concept of science to improve their thinking skills by using the environment as a source of learning[3]. Physics is needed to study natural phenomena that require thinking skills so that physics experiments in important schools are carried out by students to be able to understand the principles and concepts of physics.
Learning physics is also closely related to the scientific process approach. To be able to facilitate the scientific learning process, educators must provide learning media that are smart and can bridge the achievement of learning objectives[4]. In learning, the media plays an important role in achieving a learning goal. The communication relationship between educators and students will be better and more efficient if using media. Through learning media students are expected not only to learn about concepts, theories, and scientific facts in class discussions but also to understand the concepts of physics in the natural environment especially on coastal tourism.

Padang city is located on the island of Sumatera, with a total area of 694.96 km², equivalent to 1.65% of the area of West Sumatera province[5]. Padang city is one of the coastal cities in Indonesia that has tourism and recreational activities on the beach. Padang Beach is one of the west coast of Sumatera which has a long coastline. Padang Beach is one of the tourist destinations for the people and tourists who come to the Padang city because of the location this beach which is right near the center of the city. Padang Beach is in the West direction of the City of Padang, precisely in the Rear Tangsi area at coordinates 00 ° 57 ° 37.82 ”S and 100 ° 21’ 11.34”T and is 3 Km from the center of Padang City or 23 Km from Minang Kabau International Airport and 11 Km from Tabing Train Station. The location of the Padang coast when viewed from a satellite can be seen in Figure 1.

![Map of the location on the Padang beach edupark](image)

**Figure 1.** Map of the location on the Padang beach edupark

Pantai Padang has a land area of ± 2000 M² with a Beach Length of 1 Km. Padang Beach has activities to enjoy the beauty of the sea and culinary as well as playgrounds, bicycle rental to go around the beach, and tents on the beach. The facilities include gazebos, sidewalks, parking lots, trade places, children's playgrounds, toilets, mushalla. Other supporting facilities available are restaurants, hotels, food courts located on the side of the road around the beach[6]. Padang Beach itself has a small name along the coast, such as Hangtuah Beach, Purus Beach, Cimpago Beach, and Muaro Lasak Beach. The beauty of the coast of Padang can be seen in Figure 2.
This beach edupark has not been applied frequently in learning science. Learning that uses nature can be a source of learning to understand scientific concepts, because learning through a series of scientific processes that are built on scientific attitudes and results in the form of artificial and natural scientific products [7]. If learning natural science does not directly interact with nature, then learning is not perfect. The researchers analyzed the process of learning physics at SMP N 3 Padang and SMP Baiturrahmah Padang and a description of the potential of edupark on tourist objects that support learning material in coastal tourism destinations. This research is limited to destinations such as beaches. In general, the concepts of natural sciences found in these destinations include waves, light and optical devices, sounds, vibrations, pressure, and fluid in life.

2. Method
The research used is the Research and Development of the Plomp model. Plomp development models direct research to work systematically so that it can solve the problem under study. This research was conducted at SMP N 3 and SMP Baiturrahmah Padang with research subjects of class VIII and Science Teachers. While the research object is Padang beach. This research is only at the Preliminary Investigation stage, which is the stage of collecting and analyzing information, defining problems and project continuation[8].

The data used in this study were obtained from interviews and questionnaires that were developed based on learning parameters, learning tools, student characteristics and environmental characteristics, and descriptions of the potential of edupark on the coast of Padang, especially those that support physics subject matter. Observations were made on the coast of padang beach to determine the potensial of the beach and then, analyze objects related to physics concepts by analyzing the basic competencies of physics subjects.

Questionnaires were distributed to educators for the performance aspect using alternative "yes or no" answer choices while weighting student development aspect questionnaires and questionnaires for students using the Likert scale. The Likert Scale was developed by Rensis Likert, a series of items (items). Respondents only gave their consent or disagreement to the items[9].

Table 1. Weight of Educator Questionnaire and Student Statement

| Statement           | Statement weight |
|---------------------|------------------|
| Always              | 4                |
| Often               | 3                |
| Sometimes           | 2                |
| Never               | 1                |

Figure 2. The shape of the coastland and the relation to the concept of physics
Data analysis technique used in the form of quantitative and qualitative descriptive statistical analysis. Quantitative descriptive technique calculate the percentage of the total score of the answer based on scoring of each answer from the respondent, using the formula\([10]\):

\[
\text{Index } \% = \frac{\text{total score}}{\text{maksimum score}} \times 100
\]  

The percentages obtained quantitatively are then categorized qualitatively as in Table 2.

| Percentage (%) | Category         |
|----------------|------------------|
| 76-100         | Good             |
| 56-75          | Good Enough      |
| 40-55          | Not Bad          |
| < 40           | Bad              |

3. Results and Discussion
The results and discussion carried out in this preliminary analysis consisted of analysis of students, curriculum analysis, material analysis and analysis of potential areas obtained based on learning process parameters, learning tools, student characteristics and environmental characteristics, and descriptions of the potential of padang beach edupark cultivation, especially those support physics subject matter. Questionnaire analysis of educators consisted of performance analysis and analysis of the learning process. Performance analysis includes 7 aspects as shown in Table 3.

| No | Aspect                             | (\%) Results |
|----|------------------------------------|--------------|
| 1  | Learning Media                     | 100          |
| 2  | Learning steps                      | 92.07        |
| 3  | Use of printed teaching materials  | 93.35        |
|    | Use of non-printed teaching materials | 66.7        |
| 4  | Making printed teaching materials  | 55.5         |
| 5  | Making non-print teaching materials | 83.38       |
| 6  | Supporting facilities and facilities | 100          |
| 7  |                                    | 0            |

Based on this results of the educator's analysis on the performance aspect, it was found that the educator had prepared learning tools according to the needs of the students. It was seen from the percentage obtained 100\%, in the aspects of use learning steps the percentage obtained was 92.07\% which meant that the educator had used the learning step is good, for the aspects of the use of printed teaching materials obtained a percentage of 93.35\% while the aspects of the use of non-printed teaching materials obtained a lower percentage of 66.7\%, which means that educators more often use printed teaching materials than non-printed teaching materials. In the aspect of making printed teaching materials obtained a percentage of 55.5\% and musty making non-print teaching materials obtained a percentage of 83.38\%. The means and completeness of supporting learning in schools are already owned, this is indicated by the percentage of 100\%.

From the elaboration of the results of the percentage of educator's analysis on the aspect of performance, in broad outline it can be concluded that educators have not been able to make both printed and non-printed teaching materials, because so far educators have only used teaching materials that have been provided. So that learning can take place well and in accordance with the scientific process, the components involved in learning must work together [12]. Educators can design or design
learning so that learning can take place towards achieving the expected competencies. Students must actively carry out activities directed by educators so that the learning process in the education unit can be held interactively, inspiring, fun, challenging, actively participating, creative, and independent according to the talents of interests and physical and psychological development of students [13].

Furthermore, the learning process questionnaire for educators consisted of 5 aspects, namely the interest of students in printed teaching materials, the interest of students in non-print teaching materials, visits to edupark (educational parks) in physics learning, the relevance of facts with physics material, the application of physics learning with edupark (educational park) in Table 4.

| No  | Aspect                                                   | Percentage | Category        |
|-----|----------------------------------------------------------|------------|-----------------|
| 1.  | The interest of students utilizes printed teaching materials | 72         | Good Enough     |
| 2.  | The interest of students utilizes non-print teaching materials | 86         | Good           |
| 3.  | Relation of facts to physics                            | 90         | Good           |
| 4.  | Visit to edupark (educational park) in physics learning  | 25         | Bad            |
| 5.  | Application of physics learning with edupark             | 25         | Bad            |

Based on Table 4 above, it was found that students' interest in print materials was 72% with sufficient categories good enough and non-print teaching materials 86% with good categories, from the results of the average percentage indicating that students were more interested in using non-print teaching materials, however, the average percentage the eyes are not much different. Furthermore, in the related aspects of facts with physics material shows the value of 90% with a good category means that educators and students have linked physical material with the facts in the environment. Then for aspects of the visit to the edupark in physics learning and the application of physics learning with edupark (educational park) showed a value of 35% with an unfavorable category bad. From the results, the average percentage shows that educators and students have never visited and applied physics learning with edupark (educational park), so that the use of edupark in physics learning is needed. Edupark is used from the natural environment as a means to study natural phenomena or symptoms related to physical concepts and principles and can be used to study the application of concepts or principles of physics that are directly or indirectly used by the community in their activities.

Analysis of student response data which includes 6 aspects, namely knowledge, skills, initial abilities, learning styles, learning resources, and motivation, in general, students give sufficient responses. With an average percentage of assessment in the category 56-75.

| No  | Aspect         | Percentage (%) | Category       |
|-----|----------------|----------------|----------------|
| 1   | Knowledge      | 60.06          | Good Enough    |
| 2   | Skills         | 73.05          | Good Enough    |
| 3   | Initial ability| 71.67          | Good Enough    |
| 4   | Learning style | 72.13          | Good Enough    |
| 5   | Learning Resources | 59.63   | Good Enough    |
| 6   | Motivation     | 66.37          | Good Enough    |

Based on the tabel 5, it can be known the average percentage of aspect knowledge gained 60.06% with an adequate category good enough. Based on observations, the availability of Padang beach tourism destinations can be used to increase students knowledge, but based on interviews with
educators so far there has not been utilizing the Padang beach destination. Aspect of skills obtained on average 73.04\% with sufficient categories good enough, from the results of the percentage of aspects of the skills to get the highest score it means that the skills of students are sufficient but still lack of applying these skills in learning. In the initial capability aspect, the average percentage was 71.67\% with sufficient categories good enough. Initial ability is very useful for educators to know the intelligence of students so they can use methods and models of learning that are suitable for implementing learning so as to minimize the problems that occur in the field.

In the aspect of learning style the average percentage is obtained with a value of 72.13\% with sufficient categories good enough. Then in the aspect of learning resources obtained an average percentage of 59.63\% with sufficient categories good enough. Learning resources that are still oriented towards the textbooks of teachers and students make the percentage still low. And in the motivation aspect, the average percentage was 66.37\% with sufficient category, because of the lack of utilization of the environment as a learning resource and monotonous only in the classroom. To make students more motivated in learning, then making physics learning as close as possible to the real life of students can make them enthusiastic in learning.

In addition, the results of observations that have been made on the coast of Padang, on this tourist attraction offers many destinations for visitors. The destinations offered include the stunning atmosphere of blue sea water, the beautiful panoramic views of the sunrise and sunset, surfing, cycling on the shore. However, not all destinations are always available or only available at certain times, such as surfing. Destinations that are the object of this research are coastal tourism destinations. Many scientific concepts can be found by students in this destination. On the beach can be observed the application of wave material, light, and sound. As well, many more scientific concepts that can be felt and seen directly in real conditions by students. Some scientific concepts that can be disclosed from these destinations in Table 6.

### Table 6. The concept of science in the Padang beach destination

| No. | Destination Name          | Science Concept                        | Indicator of Achieving Competency                                      |
|-----|---------------------------|----------------------------------------|------------------------------------------------------------------------|
| 1   | Padang Beach              | Vibration, Waves and Sounds             | 1. Understanding the concepts of vibration, waves, sounds, and hearing, and their application in sonar systems in animals and in everyday life |
|     |                           | - Vibration                            |                                                                        |
|     |                           | - Transverse wave                      |                                                                        |
|     |                           | - Longitudinal waves                   |                                                                        |
| 2   | Padang beach (surfing sport) | Light and Optical Instruments          | 1. Understanding the concepts of vibration, waves, sounds, and hearing, and their application in sonar systems in animals and in everyday life |
|     |                           | - Light properties                     |                                                                        |
|     |                           | - Mirror and lens                      |                                                                        |
|     |                           | - Optical devices                      |                                                                        |
|     |                           | Pressure                               | 2. Make observations or experiments about vibrations, waves, and sounds |

Padang beach destinations can be used as edupark because from Table 6 can be seen, so many concepts of science concepts can be revealed and useful in the process of learning Physics. As
demanded in graduate competency standards which cover aspects of attitudes, knowledge and skills, this edupark can be integrated in learning Physics to understand scientific concepts. From the integration of edupark it can shape the character of students such as saving energy, responsibility, discipline, social and environmental care [14]. From the description above, the Padang beach destination as Edupark has the potential to be used in science learning, and a textbook needs to be developed.

4. Conclusion
Based on the results of the preliminary analysis consisting of analysis of educators and students conducted by interviews and questionnaires as well as material analysis and regional analysis conducted at SMP N 3 Padang and SMP Baiturrahmah Padang, it can be concluded that the development of beach edupark learning media is needed in the school. The development of learning media includes the development of teaching books so that they can carry out learning in accordance with the demands of the 2013 curriculum.

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