Ngarai Sianok as Physics Education’s Edupark

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Abstract. Ngarai Sianok is a natural tourist destination in Bukittinggi. Ngarai Sianok tourism attraction is always crowded with visitors who enjoy the beautiful nature. The activities carried out by visitors are taking photos, running marathons, enjoying culinary, camping, and also doing low impact outbound. Physics learning activities can also be held in Ngarai Sianok. Utilizing Ngarai Sianok as one of the learning resources of physics was named "edupark". To support Ngarai Sianok as a Physics Edupark, it is necessary to study physics learning material that can be learned through the Ngarai Sianok tourism destination. The purpose of this study was to analyze the basic competencies of physics based on the 2013 revised curriculum which can be learned through the mediaw of Edupark Ngarai Sianok. The method used is descriptive analysis by integrating the Ngarai Sianok tourism destination in physics concepts using Concepts Fitting Technique so that it is known as edupark for physics learning. Data collection is done through observation and literature studies. The results showed that physics learning according to the 2016 revised curriculum in 2016 could be carried out in Edupark Ngarai Sianok. The results of this review will be used as a theoretical reference for Ngarai Sianok As Physics Education's Edupark.

1. Introduction
Ngarai Sianok As Physics Education's Edupark uses nature as a place to study. Learning innovations carried out in nature are important as a refresher and a variety of learning. Students can study physics while recreation. Results of analysis of Basic Competence Skills in Physics material will be applied directly in the environment. Research on the Sianok As Physics Education Edupark has never been done. This research has the potential to develop natural materials, learning models, evaluations, and physics-based learning devices based on edupark. Other uses aside from that are exploring every destination in Indonesia as Physics Education's Edupark.

The Indonesian government in the 2013 curriculum stipulated the Minister of Education and Culture Regulation No. 22 of 2016 concerning the Standard Process for Primary and Secondary Education that the learning process in educational units was held interactively, inspiring, fun, challenging, motivating educators to actively participate, and providing sufficient space for initiative, creativity, and independence in accordance with the talents, interests, and physical and psychological development of students. learning resources, can be in the form of books, print and electronic media, the surrounding environment or other relevant learning resources[1]. The learning process of Physics can be carried out in the surrounding environment. Surroundings can be used as a natural learning resource. learning carried out in nature will give birth to inspiration because space is free and wide for creativity compared to classes in the school building[2]. Learning will be more fun if the environment chosen as a learning resource is a tourist destination. Nature tourism that has a very attractive panorama with a soothing atmosphere of the river and a view of a green valley is a destination sought by visitors[3].
Sianok[4] as one of the natural tourist destinations can be used as a learning resource which is hereinafter referred to as edupark [5] [6] [7] [8]. The concept of edupark connects between natural tourist trips that have educational goals and a love of the environment[9] [10].

Ngarai Sianok is one of the natural attractions located on the border of the city of Bukittinggi, with the sub-district IV Koto, Agam Regency, West Sumatra Province, Indonesia. The astronomical location is in coordinates 00.22'-000.29' LS dan 990.52'-1000.33'BT[11]. The position of Ngarai Sianok is very strategic and easy to reach because the city of Bukittinggi is in the middle of West Sumatra Province, as in the map in the figure 1:

![Figure 1. Map of the Province of West Sumatra, Indonesia.](image)

The natural tourist facilities available in Ngarai Sianok is river[12] [13] Batang Sianok. The beauty of the city of Bukittinggi is a recreational destination of domestic and foreign tourists[14]. Slogan of Bukittinggi The Dreamland[15] Indonesia is proof of comfortable and good recognition of nature in the region. Bukittinggi is also famous as a city with cool air[16]. Extraordinary natural offerings in Ngarai Sianok can provide visitors with a calm mindset because tourists generally visit tourist attractions to refresh their minds or just fill their spare time[17]. The beauty of the Ngarai Sianok is shown in the figure 2:

![Figure 2. Panorama of Ngarai Sianok in Bukittinggi, Province West Sumatra, Indonesia.](image)
Unfortunately, the natural beauty of the area which is a combination of mountains, this unique valley has not been managed well [18]. Through physics learning, students are expected to be able to apply scientific concepts to everyday life and explain scientifically the natural phenomena that occur in the environment. Students should be able to study the physical concepts that exist in the Ngarai Sianok region scientifically, thus raising awareness that the physics concepts written in the book are from nature and also applied in nature[19]. The object of this paper is to analyze the 2013 revised curriculum physics material in order to be able to utilize Ngarai Sianok as Edupark for physics learning.

2. Research Methods
The method of writing this article is a descriptive analysis by integrating the Ngarai Sianok tourist destination in using physics concepts Concepts Fitting Technique[20] so that it is known as an edupark for physics learning. Data collection is done through observation and literature studies. Documentation photos of Ngarai Sianok obtained from observations were matched with the physical material in the physics curriculum. Stages of Concepts Fitting Techniques are 1) analysis of physical material that will get integration and derive concepts, 2) environmental analysis and derive concepts, 3) analysis of edupark derived from the environment. 4) Giving birth to physics material integrated with Ngarai Sianok edupark by matching relevant concepts. 5) Ngarai Sianok edupark through physics learning. The stages of Concepts Fitting Technique can be observed in figure 3:

![Figure 3](image_url)

**Figure 3.** Steps taken to analyze Edupark Ngarai Sianok through Concepts Fitting Technique.

To avoid physics learning that is out of control of time and the concept of problem solving, so that the physics material analyzed is just basic competency skills. Knowledge base competencies are still implemented in the classroom.

3. Results and Discussion
Graduates of the secondary education unit have dimensions of attitudes, knowledge and skills competencies [21]. The dimensions of attitude demanded are students who have behaviors that reflect attitudes that are in accordance with the stage of development surrounded by social funds around. Able to associate knowledge in a personal context, social and natural environment is a competence dimension of knowledge that must be mastered by students. Factual knowledge that is utilizing science and
technology and the natural environment as objects of study and observation that motivates the implementation of learning. Conceptual that must be mastered by students is knowledge in the form of principles and theories related to society and the surrounding natural environment. Procedure is a way of doing something related to the community around you. Metacognitive is the knowledge of one's own strengths and weaknesses related to society and the natural environment. The dimensions of skills require students to think and act with a scientific approach from independent learning sources. The gradation of the dimensions of knowledge, attitudes and skills is sourced from the surrounding natural environment. The selection of Ngarai Sianok as edupark is the fulfillment of the gradation requirements of the dimensions of knowledge, attitudes and skills. Characteristics of learning that encourage the ability of students to produce contextual work is solving problems in Project Based Learning[22]. Basic competency is the ability and minimal learning material that must be achieved by students for a subject in each education unit that refers to core competencies. Basic competency is the minimum knowledge, skills and attitudes that must be achieved by students to show that students have mastered the set of competency standards, therefore the basic competencies are the elaboration of competency standards[23]. Basic competency is known as KD. KD consists of 2 types, KD 3 for basic competencies about student knowledge and KD 4 for basic skills competencies (psychomotor). Skills (psychomotor) are obtained through observing, asking, trying, and reasoning and presenting and creating. The nature of learning is the process of interaction between students, between students and educators and learning resources in a learning environment [22]. Students love to learn by learning in tourist objects because the subject matter is in accordance with everyday life[24].

Table 1. Results of material analysis of physics, environmental analysis of Sianok Canyon and Integrated Physics Material of Edupark Ngarai Sianok Concepts FittingTechnique.

| KD 4 Physics SMA According to the Curriculum 2013 Revision 2016[23] | Ngarai Sianok | Integration of Physics Material at Ngarai Sianok | Edupark for Physics Education |
|---|---|---|---|
| X grade | Apply circular motion | Project Based Learning Apply the formula of circular motion on the corner of the road to the base Ngarai Sianok |
| 4.6 Conducting an experiment following the presentation of the results about circular motion, physical meaning and utilization | Circular bend on the road to Ngarai Sianok |
| 4.7 Conducting an experiment following the presentation of the results related to the style and relationship of force, mass and acceleration in the straight motion of | Weight analysis in the inclined plane | Project Based Learning sloping fields on the road to decline Ngarai Sianok |
| KD 4 Physics SMA According to the Curriculum 2013 Revision 2016[23] | Ngarai Sianok | Integration of Physics Material at Ngarai Sianok | Edupark for Physics Education |
|---------------------------------------------------------------|----------------|------------------------------------------|-----------------------------|
| objects by applying the scientific method                     | Decreasing the road straight towards the Ngarai Sianok valley | The concept of energy, business (work) and the law of conservation of energy | Project Based Learning makes a roller coaster using the materials available at Ngarai Sianok |
| 4.9 Applying the scientific method to propose the idea of solving motion problems in everyday life, which are related to the concepts of law, business (work) and the law of conservation of energy | Potential energy and kinetic energy found in buildings | | |
| 4.10 Presenting the results of testing the application of ocular momentum conservation, for example the ball falls freely to the floor and simple rocket | Simple water rocket application | Project Based Learning makes simple water rockets and holds competitions in the Valley open field Ngarai Sianok | |
| 4.11 Conduct a harmonious vibration experiment on a simple swing and / or spring vibration along with the presentation of the results of the experiment and its physical meaning | Swing is a harmonious vibration application | Project Based Learning makes pendulum hours by utilizing the ingredients that are on Ngarai Sianok | |
| | There is an application that is the application of the concept of harmonic vibration | | |
| KD 4 Physics SMA According to the Curriculum 2013 Revision 2016[23] | Ngarai Sianok | Integration of Physics Material at Ngarai Sianok | Edupark for Physics Education |
|---------------------------------------------------------------|---------------|----------------------------------------------------|-------------------------------|
| XI grade                                                      |               |                                                   |                               |
| 4.3 Designing and conducting experiments that utilize static fluid properties, along with presentations on the results of experiments and their uses. | There is a calm pool of water which can be useful to apply the concept of static fluid. | Static fluid properties | Project Based Learning capillary by utilizing used bottle waste in Ngarai Sianok. |
| 4.4 Create and test simple projects that apply the principle of fluid dynamics. | The flow of the Batang Sianok River can be useful for applying dynamic fluid concepts. | Dynamic fluid application | Project Based Learning makes a water filter as long as there is clear water available from the Batang Sianok River to the visitor's intuition. |
| XII Grade                                                     |               |                                                   |                               |
| 4.11 Presenting ideas / ideas on the impact of limited energy sources for life and solving problems with alternative energy. | The waters of the Batang Sianok river can also be used to run water turbines. | Alternative energy sources | Project Based Learning makes the Mini Hydroelectric Power Plant utilize the flow of the Batang Sianok River. |

The form of integration of basic competencies based on Concepts Fitting Technique can be continued for the compilation of learning devices because they have been integrated with the curriculum used by the school [20]. Analysis was carried out on basic skills competencies based on the curriculum issued by the Minister of Education and Culture of the Republic of Indonesia. Utilizing tourist destinations as a place and learning media in accordance with other regulations that encourage the use of the surrounding environment as a source of learning (edupark). Furthermore, the analysis of Ngarai Sianok as an edupark was obtained by Edupark for Physics Education. The Project Based Learning learning model is used to apply physics concepts in accordance with the characteristics of Ngarai Sianok edupark characteristics [26].
The optimal results of physics learning held in edupark required a variety of preparations including determining the right time to carry out these activities [25]. Making sianok canyon as a learning resource or edupark in accordance with cones of experience Edgar Dale [27] at figure 12.

![Edgar Dale's Cone of Experience](image)

**Figure 4.** Edgar Dale’s cone of experience

Learning activities that don't just read or hear. The right learning resources can increase the level of information that can be mastered by students. Physics is part of natural science. Physics learning can be done in nature or even by taking learning resources directly from nature. Physics learning can be designed in the Ngarai Sianok region for skills competency learning. In addition to being able to recreation, doing practicum and project assignments in nature will improve the ability to analyze, creative and analyze students about concepts that are available in nature.

4. Conclusions and Prospects

By using Concepts Fitting Technique, it is possible to integrate the surrounding environment as a source of physics learning based on the 2013 physics learning curriculum. Results of analysis of Concept Fitting Technique of learning physics in Ngarai Sianok has several suggestions, namely: (1) Further research is needed to develop teaching materials that utilize the natural environment of Edupark Ngarai Sianok. (2) It is necessary to develop Concept Fitting Technique for other natural tourist areas.

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