The validity of multimedia edupark physics learning with a scientific approach based on the beach destination of Painan Beach

Nudiya Rahmadhani* and Hamdi Rifai
Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang, Jl. Prof Hamka, Padang 25131, Indonesia

*nudiya.nuril@gmail.com

Abstract. The background of developing edupark multimedia is a following-up to the preliminary research. Based on preliminary research that carried out to reveal several facts: the first principle, the concept of physics related to the tourist attraction of Carocok Painan Beach, Indonesia. Efforts to overcome every problem, especially in learning physics as the times evolve, in the 21st century the world of education is in a time of knowledge that requires the world community to be able to understand and utilize information and communication technology. The purpose of this research is to develop a physics edupark multimedia using a scientific approach to the Carocok Painan Beach tourist destination that is valid. This type of research is Educational design research (EDR) using the Plomp model, starting from the preliminary research stage (preliminary research), development or prototyping phase (development and design), and assessment phase (assessment). Edupark Physics multimedia validity tests were conducted by several experts. Its validation was carried out on the instrument sheet and learning multimedia by three validated materials, languages, and constructions from the lecturers. This research produces multimedia learning that belongs to a valid category. The conclusion of the results of this study is multimedia learning could make a best-matched platform for a user in physics learning activities as a source of learning physics at high school.

1. Introduction
Now the world is facing a Covid-19 pandemic that attacks all lines of life, including education. This situation gave birth to new habits that brought extraordinary changes in all sectors, economies and industries including the education sector. Schools, especially high school level, must prepare new literacy to face the current situation that forces educators and students to carry out the learning process from a distance. The rapid development of technology can be used to facilitate this distance learning process. The application of technology and technology-based product processing to get maximum results, supported by human literacy related to communication, collaboration, critical thinking, creative and innovative skills. Digital age literacy is one part of 21st century skills to improve information skills of students in varying contexts. Therefore, education in schools needs to produce graduates not only possesses relevant knowledge but also interpersonal relations and communication skills, ability to work in various contexts, and literacy skills in their daily life [1]. Digital age is a term used in the emergence of digital, internet network, especially computer information technology [2].
Guided by the 2013 Curriculum as stated in the 2016 Ministry of Education and Culture's SMA / MA Subject Syllabus which states that physics learning can use existing resources in the area by observing objects and phenomena that occur in the surrounding environment. Learning by utilizing the environment in this case is an activity that invites students to see the real world around school and outside of school. Various phenomena that exist inside can be used as a source of learning physics, as well as natural tourist objects which contain many phenomena and physics concepts can be used as a learning resource. Several tourist objects that can be used as learning resources such as in tourist areas such as Minang Fantasi Tourism Object (MiFan), Padang Panjang Water Park, Indonesia [4], Geopark Canyon Sianok, Indonesia [5], Janjang Siribu and Gunung Merah Putih, Difficult Water, Indonesia [6], Geopark Harau, Fifty Cities District, Indonesia [7] Panas Semurup, Kerinci [8] and school parks [9].

One of the learning innovations that teachers can do in realizing the curriculum and changing old literacy into new literacy is innovation [10].

Teaching materials are an important part of the implementation of education in schools. Teaching materials are all forms of material used to assist educators in carrying out the learning process in the classroom [11]. This material, delivered by students for teaching purposes [12]. The use of teaching materials will be easier in carrying out learning and students will be more assisted and easier in learning. Teaching materials are basically the content of subjects or fields of study given to students according to the curriculum used. Teaching materials can be made in various forms according to the needs and characteristics of the teaching materials to be presented and of course the teaching materials used refer to the 2013 curriculum.

One form of teaching material is multimedia learning which is a tool that allows students to learn a basic competency or competency so that they are able to master all competencies as a whole. The material in multimedia is a realization of the material listed in the curriculum [13]. Moving on from these problems, a multimedia is needed. One form of teaching is multimedia physics education Carocok Painan Beach. This multimedia makes Carocok Painan Beach attractions as an educational park or park. At the Carocok Painan Beach edupark, students are expected to be able to dig up as much information as possible and carry out activities related to the basic competencies that must be mastered.

The purpose of this research is to produce the design and manufacture of educational multimedia learning for Carocok Painan Beach in Indonesia with a scientific method that is feasible in terms of language, content and media (presentation and graphics). It is hoped that the development of this textbook can realize hopes in facing this era of disruption and realize the learning process required in the standard education process which is characterized by the 2013 curriculum as well as foster interest from related parties to continue to develop. innovating in making multimedia that suits your needs and can be accessed anytime and anywhere, so that the Covid-19 pandemic does not interfere with the learning process.

2. Research Methods
The research was carried out with the Plomp research design development model in the development and prototyping stages. This stage is carried out after the preliminary research stage is complete. Physics edupark multimedia is designed according to the results of the analysis. This stage, the prototype is developed, evaluated and revised repeatedly (in cycles). This phase has a microcycle that helps in developing and improving to produce a valid product. This phase uses formative evaluation which is an evaluation aimed at improvement, contained in all phases and cycles that repeat in design research. At this stage more attention is paid to formative evaluation for valid criteria. This activity is divided into two, namely design and formative evaluation.

Researchers consult and discuss multimedia edupark physics that have been designed with experts. This stage uses a validation sheet. Expert reviews are carried out by providing product validation instruments to the validators. The instrument given is a valid instrument. The validation instrument contains 4 main aspects that are assessed regarding the accuracy of the product being developed, including the material aspects, presentation, appearance and language. In the product evaluation
process, researchers asked for validation assistance (assessment) by a team of experts who were language lecturers, physics lecturers and mathematics lecturers at Padang State University.

Validation completed with stuffing checklist later on if the s when Likert with the criteria of assessment; Strongly agree (4), agree (3), disagree (2), and strongly disagree (1). The total score of each validator for all indicators is summarized and its validity value by using the formula Aiken’s [14]:

$$V = \frac{\sum s}{n(c - 1)}$$

Where:
- $s = r - lo$
- $lo$ = Lowest validity score (in this case = 1)
- $c$ = Highest validity score (in this case = 4)
- $r$ = The number given by the validator

Categories of validity for textbook development can be seen in Table 1.

| Value       | Criteria       |
|-------------|----------------|
| $\geq 0.6$  | Valid          |
| $< 0.6$     | Not Valid      |

3. Research Result

Physics edupark multimedia Carocok Painan Beach is designed as a learning resource for high school Physics consists of four rides, namely Banana Boat, Snorkeling, Flying fox and Jet Ski as in Table 2.

| No | Rides Available | Science concept |
|----|-----------------|-----------------|
| 1. | Banana Boat     | a. Rope Tension |
|    |                  | b. Sentripetal Style |
|    |                  | c. Archimedes Law |
|    |                  | d. Dynamic fluid |
|    |                  | e. Wave |
| 2. | Snorkeling      | a. Hydrostatic Pressure |
|    |                  | b. Optics |
|    |                  | c. Light |
|    |                  | d. Buoyancy Style |
| 3. | Flying Fox      | a. Rope tension |
|    |                  | b. Newton's Law |
|    |                  | c. Elasticity |
| 4. | Jet Ski         | a. Newton's Law |
|    |                  | b. Sentripetal style |
|    |                  | c. Push Style |
|    |                  | d. Momentum |
|    |                  | e. Wave |

Table 2 shows some of the physics material found in various kinds of rides on Carocok Painan Beach, including banana boat, snorkeling, flying fox and jet ski. Of the four existing vehicles, physics materials that are suitable for these vehicles have been presented.

The design stage was carried out by making a multimedia edupark design for physics and the instruments used such as the validation sheet and the practicality sheet. The first step in designing a
physics edupark multimedia is making an instructional design from a preliminary study. Edupark multimedia begins with designing using the VideoScribe application, then converting it into mp4 format using the Camtasia Studio application.

Edupark multimedia which is designed consists of a start page, body section and end section. The start page contains information about the author, material to be developed and other related illustrations. The body / body section consists of the chapter title, steps for the scientific approach and the explanation of the material content. While the final section contains sample questions, practice questions and closings. The multimedia start page District as shown in Figure 1.

Figure 1. Multimedia Star Page

The suggestions given by the validator on the cover did not significantly improve, only adding the UNP logo, adding a title to the author's name, changing classes and semesters. A multimedia product of the Carocok Painan Beach Edupark Physics has been designed, a self-evaluation is carried out on the textbook. Textbooks are reviewed again if there are errors in typing, writing, spelling, material, illustrations or pictures by asking for feedback from colleagues. The next step is the validation of the Carocok Painan Beach Physics multimedia product. Validation is carried out on two things, namely the validation of the validation assessment instruments and the validation of textbook products. Validation was carried out by a team of experts from three lecturers who functioned as language validators, content validators and media validators.

The results of product validation provided by the expert testing team regarding the feasibility of language, content / media, media (presentation feasibility and graphic feasibility), can be seen in Table 3 below:

| No. | Validation Component            | Value |
|-----|---------------------------------|-------|
| 1.  | Language                        | 0.81  |
| 2.  | Contents /materials physics     | 0.83  |
| 3.  | Serving Feasibility             | 0.82  |
| 4.  | Display Eligibility             | 0.85  |
|     | Average                         | 0.83  |
Based on Table 3, it is known that the average value of the assessment of the feasibility of multimedia is 0.83 including the valid category so that multimedia can be continued at the next stage, namely the Plomp development model stage.

There is criticism and input from the expert team related to multimedia, in order to produce better multimedia. The revision has no effect on multimedia content as a whole, the revision is more directed at (1) sharpening material analysis by adding images related to the material presented, (2) there are still some concepts that have not been revealed when discussing an activity that is used as a learning resource in the object tours; (3) there is no video explaining the selected edupark; (4) there is no video explaining the rides; Identification and analysis of the results of product design validation provided by the expert team in the checklist and suggestion column and corrective input will be used as a basis for researchers to make improvements to the deficiencies that still exist in multimedia products. Revisions to the multimedia design that have been carried out are as follows: (1) adjusting the supporting image with the material presented; (2) improving the time to review an object or activity in the use of the object if there is more than one concept in the object or event at the same time; (3) has added a video informing about the selected edupark; (4) have added videos related to the rides discussed.

4. Discussion
The resulting physics edupark multimedia has met the valid criteria of four components consisting of material substance, presentation feasibility, appearance feasibility, and language. The validity of the material substance component can be seen from the material accuracy indicators, the characteristics of the scientific approach and the supporting material for learning. The accuracy indicator of the material has met the valid criteria because the material presented in the physics education multimedia has been integrated with the vehicles found in Carocok Painan Beach tourist destinations, one of which is the flying fox vehicle which has physics concepts such as elasticity so that students are interested in learning concepts -physics concept. Students are more interested in learning physics concepts and learning feels more fun, especially elasticity material. Stress and strain material can be seen when a person riding a flying fox vehicle holding a rope causes the rope to be pulled down and there will be tension and strain. While the concept of Newton's law can be seen from the speed and speed of people who ride the flying fox rides on Carocok Painan Beach, so that students are able to understand the potential of the area around where they live. Subjects in educational units should contain content and learning processes about local potential and uniqueness which aims to shape students' understanding of the potential in the area where they live [15].

The indicator of the accuracy of the material in multimedia edupark physics is also in accordance with the physics facts, concepts, principles and procedures of physics which are part of the nature of physics as the most important component in the physics learning process. One of the physics facts contained in the physics edupark multimedia can be seen from someone hanging on a flying fox vehicle with a certain height, then the physics concept contained in the physics edupark multimedia is a structured explanation of physics materials, one of which is about elasticity, while the principles of physics can be seen from the relationship between the body mass of the person riding the flying fox vehicle with the resulting rope tension. Furthermore, the physics procedures contained in the physics edupark multimedia can be seen from the experiments conducted by students to understand physics material, one of which is the elasticity material by experimenting with the flying fox vehicle. Learning using edupark can help educators and students in finding facts, formulating principles or concepts in a physics learning.

In addition, the material presented in the physics edupark multimedia includes writing of correct physics symbols, terms and equations so that students and readers do not have multiple interpretations and are easy to understand physics material. The validity contained in the characteristic indicators of the scientific approach in multimedia educational physics is fulfilled because it contains every step of the scientific approach such as observing, asking, trying, reasoning, and communicating which aims to improve and shape the abilities of students and develop the character of students. The stages of the scientific approach can improve the ability of students to observe, ask, try, reason, and communicate.
their findings, so that they have a positive impact on their soft skills [16]. The activity of observing by
displaying videos in the form of rides on Carocok Painan Beach is like a video of a man riding a
flaying fox game, so that it raises the curiosity of students because of the loading of attention to an
object.

The scientific stage is an activity of loading attention to an object by using all sensory organs and is
very useful for fulfilling the curiosity of students, so that the learning process has high meaning. After
the observing stage, questions from students arise regarding the physics concepts contained in the
video. Then, to answer all questions from students, experiments related to Edupark were carried out
and students were asked to reason and communicate answers to questions from the experiments that
had been carried out. The learning objectives of the scientific approach are to improve intellectual
abilities, shape students' abilities, create learning conditions where students solve problems
systematically, obtain high learning outcomes, to train students in communicating ideas, and to
develop students' character[17].

The validity of the supporting indicators for learning material meets the valid criteria because the
images and videos contained in multimedia edupark physics are relevant to everyday life and the
integrated edupark material can bring up new things and are in accordance with the development of
science. This aims to attract attention and arouse the enthusiasm of students and also functions so that
learning is not monotonous. The availability of video and audio in interesting multimedia can make
learning less monotonous.

Furthermore, the validity of the presentation feasibility component is categorized as valid because it
has met several indicators of the validity of a product including title suitability, material suitability,
presentation support, and presentation completeness. This can be seen from the multimedia edupark
physics that has met the criteria of a suitable media for use by the Education Unit, including having
multimedia components such as text, images, animation, video, and audio.

The validity of the display feasibility component has met the valid criteria because the start page
design and multimedia content design of Edupark Physics already has a layout, fonts, colors, material
illustrations, pictures, and videos that are consistent, interesting, and in accordance with the context.
The display of attractive pictures and videos can increase students' learning knowledge. In addition to
interesting pictures and videos, multimedia edupark physics also has material illustrations that are in
accordance with the physics concepts found in Carocok Painan Beach tourist destinations so that
students easily understand an abstract concept to become real. One of the functions of illustration in
learning media is to show and express an abstract idea, feeling, intention, situation or concept into a
real one. The validity of the language component is categorized as valid because the use of terms,
symbols and language is in accordance with the General Guidelines for Indonesian Spelling (PUEBI).
Then, the delivery of messages on multimedia edupark physics already reflects a logical and
interrelated relationship, and the language used in multimedia edupark physics is in accordance with
the level of development of students so that learning can be done well. The development of students'
knowledge in adolescence comes more from changing words and mathematical symbols [1]. So that
students are able to formulate their ideas in a solid manner, understand and interpret symbols well if
the learning is meaningful and relevant to the child's life.

5. Conclusion
The conclusion of this research is the design of multimedia physics edupark Carocok Painan Beach
which consists of a start page, body section and end section. The start page contains information about
the author, material to be developed and other related illustrations. The body / body section consists of
the chapter title, steps for the scientific approach and the explanation of the material content. While the
final section contains sample questions, practice questions and closings. Validation of the multimedia
results from the expert team to become a prototype 1 stage prototype in the Plomp development model
which is ready to be continued for the next stage.
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