PHYSICS CULTURE: ANIMATION APPLICATION OF PHYSICS CONCEPTS IN CIRCULAR MOTION MATERIALS

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ABSTRACT

The Covid-19 pandemic affects almost all aspects of life, including the education aspect. To break the chain of the spread of the Covid-19 pandemic, the learning system that was originally offline switched to online learning. Online learning makes students bored quickly and students perceive physics as a difficult subject. In addition, the current swift currents of globalization have caused the erosion of cultural values. Therefore, there is a need for media that can restore cultural values, especially Minangkabau culture in students' lives. This study aims to produce an android-based supporting learning media about circular motion material for high school students in class X. This application is contextual and integrated with Minangkabau culture so that students will be more interested in studying physics. The method used in this study is the Four D research and development (RND) method which consists of Define, Design, Develop, and Disseminate. The resulting application is one of the contributions in the development of learning media, which is expected to be one of the appropriate Physics learning solutions in the current pandemic era.

Keywords: Android Application, Culture, Animation, Physics, Physics Culture

1. INTRODUCTION

1.1 Background

The high Covid-19 transmission levels are making the world restless, including Indonesia. The Covid-19 pandemic affects almost all aspects of life, not the least of which is education. To break the chain of transmission of Covid-19 where students can act as carriers and spreaders of disease without symptoms almost all countries abolish school activities and replace them with online learning. As of April 2020, more than 400 million students worldwide are required to study at home (UNESCO, 2020). In Indonesia, learning is also transferred to the online system in accordance with the Circular Letter of the Minister of Education of the Republic of Indonesia number 3 of 2020 on the Prevention of Corona Virus Disease (Covid-19) in the Education Unit.

Online learning makes students bored quickly, because they can not study together with their peers and can not face the teacher directly. Aulia Luqman Aziz, an Education Specialist at Universitas Brawijaya (Kasih, 2020) argues that good learning is learning that is done face to face with teachers and friends. Data obtained from a quick assessment survey conducted by the COVID-19 (BNPB 2020) task force showed that 47 percent of Indonesian children feel bored at home. Meanwhile, 35 percent are worried about missing school, 15 percent of children feel insecure, 20 percent of children miss their friends and 10 percent of children are worried about the economic condition of the family (Kompas, 2020).

Physics studies have become one of the subjects that are most affected by the pandemic because of its nature that requires an understanding of systematic processes and their application in real life. Coupled with online learning in the era of pandemic that makes quickly bored and the...
perception of learners consider Physics as a difficult subject (Guido, 2013). Physics subjects require strong logic and some basic knowledge of mathematics, based on content, analysis and synthesis (Guzel, 2004).

On the other hand, in the current new normal era, the current of globalization has led to the erosion of cultural values. Students are more proud of a foreign culture than the culture of their own nation. This is evidenced by the presence of more pride in oneself when using foreign products, than when using the products of one's own nation. This needs to be a concern, especially since the school is a formal institution that lays the foundation for education for higher levels (Adnyana, 2014).

Indonesia is a country rich in local culture. One of them is the Minangkabau culture. The Minang tribe is a tribe that originates from Ranah Minang whose kinship system is based on maternal lineage. The main philosophy of Minangkabau culture is *Alam Takambang Jadi Guru*. Meaning, nature is the true teacher for human beings, because through nature wisdom is obtained. One of them is through local wisdom. However, the development of global technology began to erode the values of local Minangkabau cultural wisdom. Therefore, there is a need for media that can restore the values of Minangkabau culture in the lives of students.

Based on these problems, the author is interested in developing interactive and communicative learning media in the form of ethnoscience-based Physics learning applications. This application can help students in understanding the concept of Physics in the midst of the Covid-19 pandemic and also introduce the local wisdom of Minangkabau. This application is named *Physics Culture*: Android-Based Physics Concept Animation Application on Circular Motion Material. This android-based application aims to make it easier for students to understand the concept of physics with a cultural approach. The final phase of this application is the implementation phase, the application will be practiced to students directly. This application *Physics Culture* has the potential to be an applicative product that can be used by physics subject teachers and high school students class X. The product's contribution in the field of SCIENCE is as an IT-based learning medium needed by the millennial generation in the 4.0 industrial revolution.

1.2 Problem Summary

Based on the problems found in the background, we summarize the problems that arise as in the description below. a. How to make *Physics Culture*: Android-Based Physics Concept Animation Application on Circular Motion Material?

b. How to use *Physics Culture*: Android-Based Physics Concept Animation Application on Circular Motion Material?

1.3 Special Purpose

a. To develop *Physics Culture*: Android-Based Physics Concept Animation Application on Circular Motion Material

b. To know the application of *Physics Culture*: Android-Based Physics Concept Animation Application on Circular Motion Material.

1.4 Exterior

Externals expected from this activity are:

1.4.1 Progress report,

1.4.2 Final report,

1.4.3 Functional Application of *Physics Culture*: Application of Animation of Android -
Based Physics Concepts on Circular Motion Material made by its HKI,

1.4.4 Articles scientific on the initial analysis and validation of the products that have been developed.

1.5 Benefits

This application is useful for high school students class X in understanding the material of circular motion. For teachers it is very useful to convey the concept of physics so that it is easily understood by students. In the future, IT-based learning is essential to support the capabilities of the millennial generation in facing the era of industrial revolution 4.0.

2. LITERATURE REVIEW

2.1 Animation

Animation is the images that form movement. The existence of software animations such as Adobe Flash, Adobe Director, Swift 3D, 3D Studio MX, etc., making animation as a learning tool no longer requires special skills and high costs. However, compared to creating media that only uses static images or text, it will require special skills and more time. Utami (2011) says that animation is used in learning media for two reasons. First, to attract students' attention and strengthen motivation. This type of animation is usually in the form of writing or moving pictures, funny, strange animations that will attract the attention of students. This animation usually has nothing to do with the material that will be given to the student. The second function is as a means to give students an understanding of the material to be given.

Utami (2011) also explained that in designing animation there are several things to consider, among them are: a) information effectiveness, If in one frame the animation presented contains too much information, students will have difficulty digesting the information provided; b) initial knowledge of students, make sure students have prior knowledge of the information presented. If students do not already have prior knowledge, students will tend to pay more attention to perceptually interesting changes in animation than the information presented. Andriana Johari (2014) revealed the advantages of animation media is to attract the attention of students so as to increase their motivation to learn and the lack of animation media is to require a considerable cost. From the above explanation it can be concluded that animation media is useful to create the interest of students or students in learning, especially learning Physics that requires an understanding of concepts.

2.2 Circular Motion

Circular motion is one of the learning materials of Physics class X semester 1 that emphasizes on knowledge, skills and attitudes, which must be learned by learners in order to achieve the competency standards that have been determined.

2.3 Ethnoscience

Ethnoscience is an activity of transforming the original sciences which consists of all the knowledge of the facts of society that comes from hereditary beliefs and still contains myths. The scope of ethnoscience includes the fields of science, agriculture, ecology, medicine, even including from flora and fauna (Rahayu & Sudarmin, 2015). The birth of ethnoscience is inseparable from the knowledge discovered experimentally and the lack of ability to translate its findings into scientific knowledge. This is because the starting point of ethnoscience is at the local to regional level as a form of trial and error knowledge (Rist & Dahdouh-Guebas, 2006).

Excavation and understanding of the potential of science that yields a logical understanding is necessary to avoid misinterpretation of the local wisdom of the culture developing in its territory. In
this case, there needs to be an effort to excavate and profile the ethnoscience contained in the culture.

One of the aspects that are prospective to be studied as content material for science learning with an ethnoscience approach is culture. This is in accordance with the nature of culture as a social heritage that is only owned by citizens by learning it (Purwadi, 2005). Given that culture is a reflection of society's life in the form of belief in science that is such as the findings of trial and error. The close relationship between culture as a reflection of community life with the original science of the community. Ethnoscience-based learning expects learners to conduct direct research on a culture, including observations, interviews, and even literature analysis on the indigenous culture of the surrounding community (Indrawati & Qosyim, 2017).

2.4 Randai

Randai is an art form that uses a multi-dual art medium, because it is supported by several branches of art, including dance, music, theater, literature, and fine arts. Randai is supported by a number of players between 15 to 25 people. The players are a group of Randai wave players, the unity of the Randai wave players group does not bind players to one another, because the players are free to follow the Randai wave circle.

The Randai wave movement which is a movement that is characteristic of Pencak Silat is always done in a single floor pattern, namely a circle from the beginning to the end of the Randai show. The shape of this circle is clearly seen which is always done in the movement of pencak with steps forward or backward, into the smaller circle, or vice versa outward making this circle, each player feels the similarity and togetherness in the group without any boundaries between one player and another.

Randai wave movements are not memorized like dance movements in general, but the movements of a player will mimic the movements performed by people who are considered crooks (leaders). The player who imitates this is the player who is on the side of the circle, and this will also be imitated by other players without having to look at the crook, as a result they tend to be able to do the same move. The wave Randai movement is performed by Randai's child by always making a circular motion.

2.5 Adobe Flash CS3

Adobe Flash CS3 is software designed to create vector-based animations with results that have a small size. Initially, this software was directed to create animations or internet-based applications. But in its development it is widely used to create animations or applications that are not internet-based. With Antionscript 3.0 that it brings, Adobe Flash CS3 Professional can be used to develop games or teaching materials such as quizzes or simulations.

Using Adobe Flash CS3 Professional for animation or creating interactive teaching materials is not difficult, the tools available are quite easy to use, several templates and components are also provided and ready to use. Assuming that Adobe Flash CS3 has been installed on the computer used.
3. IMPLEMENTATION STAGES

3.1 The Implementation Stage

Stage of making this product can be explained through the flowchart following.

![Flowchart Application of Physics Concepts](image)

Figure 2. Flowchart Application of Physics Concepts
3.2 Conducting Observations and Literature Study

Observations are conducted to see the problems experienced by students in learning circular motion material and the extent to which the application is applied to high school Physics learning class X. Then conduct a literature study, looking for references through books, local as well as international journals, relating to the tools required for application development.

3.3 Application Design

Application design stage, which is the creation of the application background using the application Corel Draw, creates several animations consisting of character objects dressed in traditional Minangkabau and randai animation. As well as prototyping using the site https://www.figma.com/.

3.4 Application Development

Development stage, which is coding using programming language actionscript from Adobe Flash CS6 application. Next, make the application into apk format so that it can be run on Android/Smartphone.

3.5 Testing

After creating the application, we then test the application to see if the application can work well or not.

3.6 Application Revision

Revision is done to correct application concept errors after the application is tested.

3.7 Application Socialization

If the test is successful, then the application will be socialized to high school students class X. Application socialization is done by practicing the application of Physics Culture in the classroom of Physics subjects.

3.8 Evaluation

The evaluation stage is conducted to see the level of success of program implementation from beginning to end.

3.9 Final Report

Preparation of the final report is done after all stages have been completed so that the results obtained from the making of the application can be explained in detail.

REFERENCES


