



Performance of History of Physics Course Through a Local Wisdom: "Wayang"

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Article Info

Article history:

Received May 20, 2020

Revised March 05, 2021

Accepted May March 10, 2021

Available Online March 15, 2021

Keywords:

Physics learning

Wayang

Scientist puppet

History

ABSTRACT

Physics is a very difficult subject according to students' experiences. So that the teacher must design an approach for physics learning that is interesting and fun for students so the teaching and learning process can run well and fun for students. And this paper offers a solution by using wayang (traditional puppet) with the shape of the scientist puppet as a media in physics learning. Wayang stories always talk about the history or journey of the character of wayang, and in this paper, it will tell the story of the scientist puppets. The teacher uses the scientist puppet to explain the chronology, history, and discovery of concepts in physics. According to the results and discussion, using wayang (traditional puppet) in physics learning gave a solution to the problem of difficulties in physics learning and gave information to students about the history of the discoveries and the discoverer (scientists).



<https://doi.org/10.46627/sipose>

INTRODUCTION

Physics is one of the oldest academic disciplines that studies natural phenomena (Pratama et al, 2014). Physics is considered as a very difficult subject for students because the subject is more about theoretical and mathematical science. Students find it difficult to study physics because they do not see the application. Students do not bring physics learning into everyday life. This issue has made many students confused, monotonous, and less enthusiastic in learning. Several factors that cause students' difficulty in learning physics are the lack of reasoning and problem-solving skills (Adhitama et al, 2015). The teacher must design and guide students to make them better at solving problems. And in this study, we offer an alternative solution to make students easier to learn physics.

We need an approach for learning physics that is interesting and fun for students so the teaching and learning process can run well and fun for students. The learning process should not waste time on inappropriate things but should be interactive so that students will be more enthusiastic in learning. The solution is using the help of learning media. There are a lot of learning media that can support the learning process and also make it fun. Learning media are effective media for carrying out well-planned teaching processes. One of the learning media that can support physics learning is by using wayang (traditional puppet). Wayang is one of the legacies of art that must be maintained in the current generation because in the wayang stories always teach about the journey and example of life for the audience (Khayati, 2016). So that in this paper, we make wayang with the shape of scientist puppet as media and we associate it with physics learning.

Scientist puppets are the development of shadow puppets in the form of puppets from physics scientists made from images of figures of scientists who have contributed to the discoveries in physics. The storyline in this scientist puppet will be packaged according to the needs of the physics learning material to be taught. Scenes in the story will be made according to the daily life of the leading scientists until the scientists find a research service in the field of physics. This scientist puppet can also train students to learn to dialogue in a precise and directed manner according to the characters played in the scientist puppet.

Because of its uniqueness, the puppet can be an interesting learning medium for students. Teachers can present these puppets as learning history in the formation of physics formulas so students can be better at understanding material and on the other hand, make the learning process interesting and enjoyable.

RESEARCH METHOD

This research uses descriptive qualitative research type to interpret and describe the concept of acculturation culture used for teaching physics, implementation, and implication of scientist puppets as a learning method for teaching physics. There are several steps to write in this type of descriptive qualitative research, which consists of (1) selecting the problem we want to discuss; (2) choosing a topic to discuss in the paper; (3) conducting preliminary research; (4) collecting and analyzing supporting evidence; (5) outline what will be discussed in the paper; and (6) make conclusions and suggestions.

Implementation

The scientist puppets used in the implementation of physics learning were Joseph Black and James Prescott Joule. In this case, the teacher acted as a puppeteer. The teacher used the scientist puppet as a visual aid to present physics material through a pre-packed story. The teacher would explain the black principle. One of the famous scientists in the discovery of the principle of black is Joseph Black. The teacher took the puppet scientist Joseph Black and began to tell the story of how Joseph Black obtained the principle of black principle which reads "*On mixing two substances, the amount of heat released by a substance whose temperature is higher is equal to the amount of heat received by a substance whose temperature is lower*". In the middle of the lesson, the teacher gave an intermezzo and presented information about Joseph Black's family, conditions, and culture in the residence of Joseph Black, and also told scientists who helped him in discovering the black principle.



Figure 1. James Watt

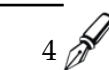


Figure 2. Joseph Black



Figure 3. James Precott Joule

For the next story, the teacher would tell about the story of the scientist James Prescott Joule. The teacher took the puppet scientist James Prescott Joule and begins to tell the story of



how James Prescott Joule got the Law of conservation of energy that reads "*energy cannot be created & destroyed, but can only change from one form to another*". In the middle of the lesson, the teacher gave an interview and presented information about the family of James Prescott Joule, conditions and culture in the residence of James Prescott Joule, told the scientists who also contributed to James Prescott Joule in discovering the discovery of the law of conservation of energy, and told how James Prescott Joule lived poor and spent his old masses in remorse because in the end these findings were only used as a basis for making weapons of war.



Figure 4. The Atmosphere of scientist puppets screening process

RESULTS AND DISCUSSION

Scientist puppets are puppets that feature a scientist with a true picture of the scientist but are shaped in such a way that they are shaped like puppets. This scientist puppet can be used as a solution to the problem of difficulties in learning physics. The teacher uses the scientist puppet to explain the chronology, history, and discovery of concepts in physics. In addition, during the learning process, students not only learn physics but at the same time they also learn about culture or history when scientists discover their discoveries.

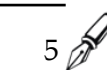
The implications of implementing wayang in physics learning are interesting and impressive, making the material more easily understood by students and also gaining knowledge about history or culture in the mass struggle of scientists to create their discoveries. And physics learning can also be conveyed to students well so that students' understanding of physics becomes better.

CONCLUSION

According to the results and discussion, using wayang (traditional puppet) in physics learning not only gave a solution to the problem of difficulties but also gave knowledge and information to students about the history of the discoveries and the discoverer (scientists).

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