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Efforts to Increase Physics Learning Activities by Applying PhET Virtual Media to Hydrostatic Pressure Material

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Abstract: This service activity is a collaboration carried out with partners namely SMAS Attohiriyah Bodak. This activity aims to assist teachers in overcoming learning problems that are often encountered, namely students who tend to be passive in the learning process. This activity was carried out through three stages, namely preparation, implementation, and reflection. The result of this activity is to create a fun learning process for students because students are actively involved in the learning process to explore and build their knowledge. Learning that is carried out is more student-centered.

Keywords: Hydrostatic Pressure; Learning; PhET media

Introduction

Education is the most important sector to enhance the development and progress of a country (Nurfatimah et al., 2022; Tambak & Lubis, 2022). Education contains elements of social learning and science. The success of the learning process can be measured from the learning outcomes obtained by students. Good learning achievements are strongly supported by student learning activities during the learning process (Subhan, 2022; Syamsudin et al., 2020).

Learning is an activity that is carried out in a planned manner to achieve a learning goal (Masfaratna, 2022). The implementation of learning that is carried out often does not work as it should. Learning that should be done provides opportunities for students to be more active (Ladarna, 2021).

Learning will be carried out well, inseparable from the teacher's ability to manage learning. Teachers are required to use various models, methods, strategies, and learning media so that students can play an active role in learning. The simplest thing for teachers to implement is to use interactive learning media (Kii & Dewa, 2020). The application of interactive learning media really helps students in identifying facts that are very closely related to science whose impact will strengthen students' concepts of a study of learning material (Putria et al., 2019).

The implementation of learning is strongly supported by supporting media in learning either in the form of visual aids or virtual media (Rizaldi et al., 2020). Learning uses virtual media as a solution to provide concrete learning experiences to students who have limited laboratory facilities. The use of virtual media is expected to create a constructivist approach to the student learning process by making students active participants and building their own knowledge. Media that is suitable for overcoming the problem of low student learning activity is interactive media that is based on PhET (Physics Education Technology) (Nurjannah et al., 2021).

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PhET media is a visual media in the form of a virtual laboratory which students can access free of charge. However, in its application in schools it is still very minimal on the grounds that the media in its application must use the internet network. This is the teacher's opinion, but in fact, one of the advantages of using PhET media is that it can be used offline by downloading it first (Arifin et al., 2022).

Based on the study of the problems at SMAS Attohiriyah Bodak and the analysis of the problem, the service team is trying to solve the problems experienced by teachers and students so that learning is carried out more dynamically so that service is carried out in the form of applying PhET virtual media to assist teachers in increasing student learning activities so that learning is centered on students.

Method

This activity is a service activity carried out at SMAS Attohiriyah Bodak. The target of this service is class XI students, totaling 28 people. The purpose of carrying out this activity is to provide simple learning examples that can be applied by SMAS Attohiriyah Bodak teachers as an effort to increase student learning activities through systematic stages.

The stages that are passed in this activity start from the results of observing problems that really need a solution. In general, the stages that have been carried out include the preparation stage, the implementation stage, and the reflection stage (Sadikin et al., 2020). The court stages carried out are represented in Figure 1.

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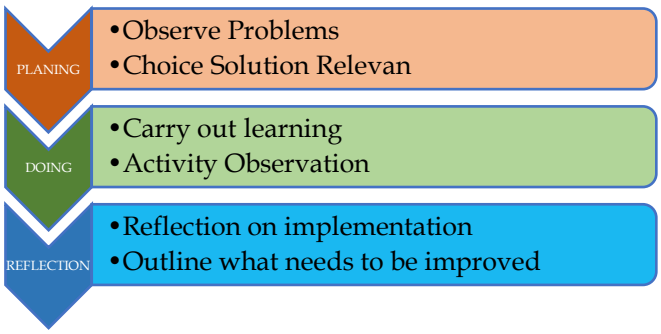

Figure 1. Framework for the implementation of community service at SMAS Attohiriyah Bodak

Preparation phase

In the initial stages carried out in this service is to prepare everything needed to support the implementation of the activity. The steps taken are observing important problems that must be resolved to improve the quality of the teacher's learning.

Implementation stage

The implementation of this service is a form of real action carried out in helping the problems faced in learning both faced by teachers and students. The implementation of this activity involves observers who directly observe the service activities carried out to assess the level of implementation of each stage in the implementation stage of the service.

Reflection Stage

Reflection on court activities is very important to do as material to find out in detail all the things that need to be improved so that subsequent activities are more effective. Effective activities are activities that are able to help students and teachers in solving the problems they face.

Result and Discussion

This community service activity is carried out at SMAS Attohiriyah Bodak. The targets of this activity are physics teachers and class XI students. The stages carried out include the preparation stage, the implementation stage, and the reflection stage.

Preparation Stage

The preparations made in the implementation of community service at SMAS Attohiriyah Bodak are the first step to assist partners in improving the quality of learning. The thing to do in the preparatory stage is to identify problems in learning physics.

The identification results found were that the learning activities of students were low because they were more dominated by teacher activities explaining learning so that learning was only one-way which made students often feel bored in learning and had an unfavorable impact on learning outcomes. The achievement of maximum learning outcomes is strongly supported by the activities of students (Ramli et al., 2019).

Implementation Stage

The implementation of community service at SMAS Attohiriyah Bodak is in the form of applying PhET learning media. Utilization of PhET media in learning has a positive impact on the learning process that is carried out. Learning activities at each stage can be seen in several pictures taken in the learning process.

Figure 2. Student Activities in Preliminary Activities

Figure 2 shows the activities of students in the preliminary activities to build apperception and motivation. Students seemed more enthusiastic and focused on paying attention to the demonstrations displayed by the teacher. The demonstration presented is in the form of a video of the difference in pressure between a blunt nail and a sharp nail. This is done to generate student motivation and apperception to recall the subject matter about pressure that was studied in junior high school.

Figure 3. Student Activities in Group Discussion Activities

Figure 3 shows that students are more active in discussing with their group members. The things discussed are related to facts in everyday life which are the application of the concept of hydrostatic pressure. Learning with PhET media helps students to identify the relationship between the material being studied and the phenomena around them that have been experienced by students (Sari, 2020).

Figure 4. Student Activities in Conducting Investigations

Figure 4 shows that students are given the oppurtinity and actively to carry out investigations. PhET media facilitates students to carry out various experiments (Ula et al., 2021) by varying the depth of the liquid, changing the type of liquid by adjusting the density of the liquid, and can help to visualize the concept of pressure in liquids.

Closing Stage

At the closing stage of learning, students are able to communicate the findings in experiments using PhET. The use of PhET media has an impact on students' mastery of concepts because students are able to present quantities that affect hydrostatic pressure.

Conclusion

Based on the findings of the researchers that learning using virtual PhET media has a positive impact on the activity, enthusiasm, and enthusiasm for learning of students at each stage. In the preliminary stage students become more motivated to carry out learning, in core activities students are more active in compiling their knowledge, and in closing activities students express their joy after learning is carried out. The reflection results show that the application of PhET media has a positive impact and increases students' learning activities on hydrostatic pressure material.

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