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Analysis of the use of learning models in physics subjects at SMAN 9 Kota Tangerang Selatan Banten

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ABSTRACT

The learning model is a frame in a learning process that can support the achievement of learning objectives. This study aims to determine, 1) the learning model used in physics subjects in schools, 2) the obstacles faced by the teacher in applying the learning model, and 3) efforts to overcome the obstacles in applying the learning model to achieve learning objectives. This research method is qualitative research. The survey was conducted on one physics teacher and three students determined by random sampling—observation data collection using interviews and documentation systems. While the data analysis technique used is descriptive qualitative analysis technique. From the research results obtained that: 1) the learning model carried out in the learning process at SMAN 9 Kota Tangerang Selatan Banten is CL (Cooperative Learning) and CTL (Contextual Teaching and Learning), 2) the constraints faced by the teacher when implementing the learning model are the ability students who are lacking in understanding the concepts of physics so that the difficulty in solving problems and challenges in choosing the equations used, 3) efforts to overcome the obstacles in using learning models are needed to develop appropriate learning models such as STEM-based CTL models that make students construct their knowledge.

Keywords: learning models, learning process, physics lessons

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INTRODUCTION

In the physics learning process, there are often obstacles or problems found by every physics teacher, even though physics is a very fundamental science to be understood by every student. Students must have good skills in mastering physics concepts so that they can be applied to solve daily problems in the environment. Giancoli (2001) defines physics as the most basic science because it deals with objects' behavior and structure. It is fundamental knowledge because there are so many related sciences, such as citizen science, architectural science, electrical science, engineering science, and medical science. Therefore, students must understand physics concepts to apply them to other sciences and develop physics itself.

Of course, good student understanding cannot be separated from the teacher's role in making the learning process meaningful. One way of teaching that a teacher must plan is to

determine the right learning model. The learning model is a teacher's planning that is used to achieve the expected learning objectives. According to Joyce in Trianto (2007), the learning model is a plan or pattern used as a guide in planning classroom learning or learning in tutorials and determining learning tools, including books, films, computers, and others. Choosing the right learning model can bring the learning process to its goal. If the learning process is carried out without a proper learning model plan, learning will run flat and without clear objectives to achieve.

The learning model is a set of strategies based on specific theoretical and research foundations that contain background, learning procedures, support systems, and learning evaluations shown for teachers and students to achieve measurable learning objectives (Sundari, 2015). so that a series of learning activities become the foundation of learning. Based on research results (Suhendri, Anawati, & Nurhayati, 2014), the lecture and discussion method are more dominant in the learning process. Two things that need to be improved are teacher preparation in teaching and teaching methods. The selection of learning models and methods must be carefully planned, not spontaneously in the classroom, because the learning model guides classroom learning (Rusman, 2010).

The choice of learning model is based on many factors, including subject matter and students' condition. The learning model used is ideally student-oriented and pays attention to students' problems during the learning process to be able to train students' problem-solving skills (Iklima, Marzal, & Darmis, 2016). It is because the conditions for each class are different and must be well recognized by teachers. The learning model is a teacher's way of delivering material during class to create a pleasant learning atmosphere and motivate students to be enthusiastic (Ni'mah, Lutfiatun; Astutik, 2018). With high enthusiasm and motivation to learn, students will be able to achieve maximum learning outcomes.

Hardyanti's research (2017) found the obstacles teachers face in applying the scientific approach, namely time, material load, students' learning abilities and readiness, students' willingness to ask questions, laboratory support, and students' ability to process data. Meanwhile, Nurmalita Sari's research (2017) shows that the motivation to learn the physics of high school students is moderate and low due to students' lack of interest in learning physics. Both studies resulted in obstacles faced by the teacher in the physics learning process but had not found a solution for every problem.

Based on the results of observations of online interviews with physics teachers at SMAN 9 Kota Tangerang Selatan, two models are often used in conducting physics learning in schools. These learning models include CL (Cooperative Learning) and CTL (Contextual Teaching and Learning). These learning models are the results of interview observations obtained from physics teachers, which affect the learning solutions to problems in learning physics. There are several obstacles experienced by the teacher, namely the ability of students who are lacking in understanding the concept of physics so that it is challenging to solve problems and difficulties in selecting the equations used. Based on this problem, researchers are looking for the best solution to develop existing learning models to overcome the obstacles faced at the school.

RESEARCH METHODS

This type of research is qualitative research, namely, with a qualitative descriptive analysis method approach. The research was conducted with a preliminary study of the learning model commonly applied in schools and the obstacles faced during its application. The research was conducted at SMAN 9 Kota Tangerang Selatan, Banten Province. Data collection techniques used in this study were online interviews and student grade data. The respondents involved were one physics teacher and three students.

The method used in this observation is a qualitative method with data collection techniques in the form of online interviews via WhatsApp chat and email.

RESULTS AND DISCUSSION

The learning model used by the teacher in physics subjects at SMAN 9 Kota Tangerang Selatan, Banten

Teachers in this school realize the importance of applying learning models to student learning outcomes. Therefore, several meetings were designed to apply the learning model. The learning models commonly used by these teachers are CL (Cooperative Learning) and CTL (Contextual Teaching and Learning) because these two models are easy

to apply and can stimulate student motivation in learning physics according to the teacher. The following is a table of applying the learning model commonly used in SMAN 9 Kota Tangerang Selatan.

Table 1. Implementation of CL (Cooperative Learning)

Learning model stage (Slavin, 2010)	Application
Stage 1—convey learning objectives and motivate students	The teacher mentions the title of the material to be delivered and explains the related phenomena.
Stage 2—present information	The teacher provides problems to be solved in groups. The problem can be a form of searching for definitions or explanation of the material or in the way of practice questions
Stage 3—organize students into several study groups	The teacher divides students into groups to complete stage 2
Stage 4—guide students to study groups	The teacher supervises the work of student groups and guides those who have difficulties
Stage 5—do an evaluation	Students are asked to present the results of their group work and the teacher corrects them if there are errors
Stage 6—give awards	The teacher asks students to applaud the best group

Table 2. Implementation of CTL (Contextual Teaching and Learning)

Learning model stage (Trianto, 2007)	Application
Stage 1—modelling	The teacher mentions the title of the material to be delivered and explains the related surrounding phenomena.
Stage 2—questioning	The teacher gives problems in everyday life to be solved in groups. The problem can be in the form of searching for definitions or explanation of the material or in the form of practice questions
Stage 3—learning community	The teacher divides students into groups to complete stage 2
Stage 4—inquiry	Students are guided to find the variables needed to solve problems
Stage 5—constructivism	Students are guided to solve the problem themselves
Stage 6—reflection	Teachers and students together conclude learning
Stage 7—authentic assesment	Teachers provide assessments to groups and individuals

Based on the results of interviews with students, they feel motivated to learn physics by teaching physics. It means that students favor the CL and CTL models. Because in cooperative learning, they can study with their friends to find answers. Cooperative learning helps students learn together; students achieve more and increase individual self-confidence, develop communication skills, and participate actively (Akcay & Doymus, 2014). Likewise, the CTL model can motivate student learning because it connects the real world that is close to them. Following Aris Shoimin's research (2014), "Contextual teaching and learning" is a learning process that aims to motivate students to understand the material being studied by relating it to the context of everyday life so that students have other abilities to apply it to other problems.

Constraints faced by teachers in using learning models in physics subjects at SMAN 9 Kota Tangerang Selatan, Banten

Based on the results of interviews with the physics teacher, there were several obstacles in applying the learning model, namely: (1) Learners have difficulty when they have to adjust the concepts that have been mastered with formulas in problem-solving. (2) Students who are too scared when facing the actu-

al procedure according to the concepts being learned.

The two obstacles expressed by the physics teacher were by the results of interviews with students who said that the difficulty in solving new questions was different from those exemplified by the teacher, feeling confused in determining the formula to be used. So it can be concluded that the obstacles experienced are the students' lack of understanding of the concept, so they cannot do the practice questions that use new problems. The barriers that have been mentioned can occur due to the lack of understanding of physics concepts by students. So they find it challenging to apply this concept in problem-solving problems and consider many physics formulas. It is in line with Rusilowati's (2006) research, which found that the internal factors that make it difficult for students to learn physics are the low mastery of concepts. Poor knowledge of material also causes students not to be motivated to learn the next material.

Efforts to overcome obstacles in the use of learning models in physics subjects at SMAN 9 Kota Tangerang Selatan, Banten

Based on the constraints expressed by the teachers and students along with the explanation of the teacher's habits of using CL and CTL learning models, an effort to overcome these obstacles is the development of a CTL learning model by integrating it with the STEM (science, technology, engineering, and math) approach. Because the STEM approach combines the four clusters of knowledge into one, thus helping students understand the concept in a contextual and applicable manner because it emphasizes the principles of technology as a learning medium (Sugi, 2017). Directly applying students' conceptions to the manufacture of technology products is an excellent first step to maintain useful basic concepts and to develop technology that can benefit life. So STEM approach should be able to improve students' conceptual understanding. Many teachers understand that STEM integration is useful in improving student academic achievement (Becker & Park, 2011).

Therefore, the STEM-based CTL learning model can be a solution to the problem. The CTL model often used by teachers is not challenging to reapply with the addition of STEM. So that making STEM-based technology by presenting issues from real-life close to students can make students construct their knowledge, which makes students understand the basic concepts of the material being studied.

CONCLUSION

Based on the results concluded that: 1) The learning model used in physics subjects at SMAN 9 Kota Tangerang Selatan Banten is CL (Cooperative Learning) and CTL (Contextual Teaching and Learning) learning models. 2) Difficulties in the learning model application are students' ability to choose the equations used, 3) The teacher's efforts to overcome obstacles in the use of learning models are needed to develop appropriate learning models such as the CTL model. STEM-based, which allows students to construct their knowledge.

For teachers, especially physics subject teachers, they should increase their knowledge about various learning models that can solve every problem in their respective classes. Besides that, it is also essential to increase student motivation in learning physics so that they are not bored, which will impact students' difficulties in understanding physics material.

For teachers in general, designing a learning model requires a lot of practice so that the learning model used in the classroom can have a maximum impact on learning objectives. Teachers must also design learning properly according to time, material, student conditions, and available tools and materials.

School administrators should facilitate teachers to participate in activities and training (workshops) related to learning models so that teachers' understanding of old and recent learning models is better understood so that teachers can create creative, active, innovative learning. And fun for the students.

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