Application of experiential learning model using simple physical kit to increase attitude toward physics student senior high school in fluid

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Abstract. Experiential learning model using simple physics kit has been implemented to get a picture of improving attitude toward physics senior high school students on Fluid. This study aims to obtain a description of the increase attitudes toward physics senior high school students. The research method used was quasi experiment with non-equivalent pretest -posttest control group design. Two class of tenth grade were involved in this research 28, 26 students respectively experiment class and control class. Increased Attitude toward physics of senior high school students is calculated using an attitude scale consisting of 18 questions. Based on the experimental class test average of 86.5% with the criteria of almost all students there is an increase and in the control class of 53.75% with the criteria of half students. This result shows that the influence of experiential learning model using simple physics kit can improve attitude toward physics compared to experiential learning without using simple physics kit.

1. Introduction

Physics is one of the basic science developed based on observations of physical phenomena in nature that are often encountered in everyday life, so in principle learning physics is to learn about nature. The process of learning from nature can be obtained by someone since the person interacts with nature through experience. Much can be gained through experience and becomes an early knowledge when one enters formal education, but the initial knowledge a child possesses can be true or false. This is because the initial knowledge is derived from different experiences and inaccurate sources of information. The initial knowledge that a person possesses is very influential on the acquisition of knowledge in the school, therefore the teacher as a learning facilitator should have the ability to recognize and explore the initial knowledge of the students.

One of the learning method that is seen able to facilitate the achievement of physics toward physics attitude toward students and able to develop attitude toward physics ability of students is experiential learning model. With Experiential Learning model. This is consistent with According to [1], led to conclusions. The influence of experiential learning using experimental use of mercury can further improve the science process skills than the effect of experiential learning using traditional experiments. According to [2], which resulted in the conclusion that the use of experiential physics-based learning model on simple aircraft materials can improve the understanding of concept and skill of science process. Similarly, according [3] study, which concludes that the use of experiential physics-based learning model on the material of light refraction can improve conceptual understanding and generate
generic skills. According to the Association for Experiential Education (AEE), experiential learning is a philosophy and methodology where educators engage directly in motivating learners and reflection is focused on improving knowledge, developing skills, according [4].

Based on preliminary results in the senior high school in Bandung Regency obtained data that: 1) The average value of daily assessment for each material physics is always there almost 50% of students get a value below the KKM value of 70. Latest data for fluid biasing material, by giving about material comprehension test and student attitude, for material comprehension test, it is found that 44.20% of students (50 of 102 students) score below 70. This indicates that the ability of understanding grade X students in senior high school in Bandung Regency needs to be improved, and attitude of student to physics subject obtained 53.75%. 2) The results of observations of several class meetings as well as information on teachers and students are known, physics learning that takes place overall using lecture and discussion methods. 3) From unstructured interviews with physics teachers found, teachers find it difficult to instill concepts in students. While the interview with two students, it is known that the students find it difficult to understand the concept of physics, so that interest and motivation for learning is still lacking, 4) The tools and infrastructure of physics learning is very less support, because the lab is used only one for physics, chemistry and biology and the availability of tools that cannot be used. So the implementation is still considered less effective.

Based on the preliminary study above, this research problem focused on attitude toward physics ability of grade X students in senior high school in Bandung regency which still need to be improved, meaning that there is alternative solution that can facilitate attainment toward physics attitude. The low results of attitude toward physics cannot be separated from the learning process. Teachers must choose and apply appropriate learning and appropriate to the subject matter to be studied. The inaccuracy in choosing a learning model that matches the subject to be studied causes various problems such as students' difficulties in understanding the concepts of the subject, the low learning outcomes of students on certain subjects, and the emergence of the notion that physics learning is difficult.

In this decade, Physics learning not only focuses on students' understanding and skill but the most important thing is attitude of students to Physics lesson. In other words, in their learning process, students are not only expected to acquire scientific concepts and skills, but also develop a positive attitude towards science. However, research has shown that students' attitudes toward science often change more and more negatively, especially in high school, according [5].

Senior high school students’ attitudes toward Physics in this research are students' perceptions and beliefs on physics which is adapted from attitude aspect. Students' attitudes toward low Physics impact on students only doing routine Physics lessons not as their needs, but only as school curriculum demands. Most of them stated that the difficulties they experienced in Physics learning were due to abstract concepts and the availability of unsupportive means so that the desire to study physics was lower. Some related research states that, students who have negative attitudes toward Physics tend to be pragmatic to the subject of physics so that students cause during learning either inside or outside the class is not focused and do Physics tasks are only improvised. So this has an impact on the cognitive outcome, especially the understanding of the concept they get is low.

According [6] the development of an attitude-scale instrument on the learning of physics. Aspects developed as follows:

1.1. Attachment to physics
This aspect reveals how much interest and enthusiasm students have for physics lessons. The physics lesson is the context of physical matter and physics learning done in the classroom. The linkage to physics is closely related to whether or not students feel comfortable when learning physics.

1.2. The importance of physics in life
This aspect reveals the importance of physics learning for himself in life. This shows about whether physics is an applicable lesson in everyday life so that greater benefits from the loss, physics and technology make life more easy and comfortable.
1.3. Interest in further study in physics
This aspect reveals an interest in the study that will be continued after graduation, e.g. the relevance of studying physics in the future and in the university later.

1.4. An interest in a physics career
This aspect is to find out whether students are interested in teaching careers in the field of physics. This is related to the ideals or work expected in the future in the field of physics.

One aspect developed in science learning in schools is the attitude aspect. According [7] attitude is “a positive or negative sentiment or mental state that is learned and organized through experience of the individual, object, or event”. According to this view, attitudes are positive or negative mental states that are learned and constituted through the affective responses of a person to another, or to objects, or to events. Attitudes developed in science learning are attitudes toward science (attitude toward science) and scientific attitude (science attitude).

In order for the process of learning to teach science can be more meaningful, should the learning process is directed to lead students to learn by way of intuitive thinking and analytic thinking and foster self-belief in ability. So the concepts that have been studied can be remembered by students as a more meaningful concept, according [8]. Given its vital role, it is necessary to have an appropriate Physics learning model to guide students in order to improve students' understanding of the concept and attitude toward Physics with a fun learning model through a series of learning activities that make students active.

2. Methods

2.1. Research methodology
The method used in this research is quasi-experimental research methods (quasi experiment) and descriptive. Quasi-experimental research aimed to obtain information that is an estimate that can be obtained by actual experiment in a state that does not allow control or manipulate all relevant variables.

In descriptive research activity, researcher only photographing what happens to objects or areas studied by focusing on actual problems as in the time of the study. Research will be conducted using non-equivalent pre-test post-test control group design in two classes consist of one experimental class and the control class [9]. The populations in this study were all students of class X IPA senior high school in Ciparay in the academic year 2016/2017. Samples were students of class X IPA 2 is as the experimental class with the number 28 and the class X IPA 1 is as the control class with the number 26 whom are selected using purposive sampling technique.

2.2. Research instruments and data analysis
Instrument to measure Attitude towards physics adapted from Developing Attitude toward science Measures, according [6] An attitude-scale instrument consisting of 18 questions referring to four aspects. This scale is a Likert scale, categorized with Very Strong Agree (SS), Agree (S), Less Agree (KS), Disagree (TS), and Strongly Disagree (STS). According [10] say that Likert type items have produced a maximum of results in each test.

Attitude toward physics analysis is done by counting the number of students who respond very strong agree, agree, disagree and strongly disagree on each question aspects of the relationship to physics, the importance of physics in everyday life, interest in advanced study in the field of physics, and interest in Physics career. And the number of students who responded before and after learning experiential learning model using a simple physics kit students with students get experiential learning model learning without using a simple physics kit.

Sugiyono Said that respondents' answers are then scored by using Likert scale, as shown in table 1 [11].
| Response       | Scale value |
|---------------|-------------|
| Very agree    | 5           |
| Agree         | 4           |
| Less agree    | 3           |
| Disagree      | 2           |
| Very disagree | 1           |

Furthermore to determine the ranking in each research variable can be seen from the comparison between the actual score with the ideal score. Actual score obtained through the calculation of all opinions of respondents according to weight classification given (1, 2, 3, 4 and 5), then Range score is as follows:

Furthermore, to determine the ranking in each research variable can be seen from the comparison between an actual score with an ideal score. Source [12]:

\[ R_s = \frac{n(m-1)}{m} \]  

Where :
\( R_s \) = Score Range  
\( n \) = Number of respondents  
\( m \) = Number of alternative answers for each item

### 3. Results and Discussion

Comparison of the increase of Attitude towards physics of students on Fluid materials between experimental class and control class can be seen in Table 2.

![Figure 1](image.png)

**Figure 1.** Comparison of Increased Attitude towards physics students on Fluid materials between experimental and control class.

Result of Tests conducted on attitude toward physics students in studying Fluid Material with experiential learning model using simple physics kit can be said significant with average score 86.5% means that almost all students there is improvement in learning. The results of data processing and analysis above show that the application of experiential learning model using a simple physics kit to improve physician attitude toward physics ma on fluid material is more effective in improving attitude toward physics compared with experiential learning without using simple physics kit.
The rest According [12] that "students' attitudes toward science may have an effect on students' motivation, interest, and achievement in the sciences". Next, Glick [13] say "students' attitudes toward science appear to be the same by the factor: teacher, learning environment, self-concept, peers, and parental influence". From the views above, then the students' attitudes toward science (Physics) can affect the motivation, interest, and success of the students themselves. Attitudes toward science are a tendency toward pleasure and displeasure with science, for example, thinking science is difficult to learn, less interesting, boring, and so on. Students' attitudes toward science (Physics) are influenced by several factors, namely educators, environmental learning, self-concept, friends and parents.

4. Conclusion
Based on the data and analysis of research results that have been done on the application of experiential learning model learning using simple physics kits can be concluded that the influence of learning model experiential learning using simple physics kits can further improve the attitude toward physics than the influence of experiential learning without using a simple physics kit This evidenced by the acquisition of experimental class analysis results increased by 86.5%. While in control class equal to 53.75%. Based on the results of the research, the researcher gives suggestions as follows: 1) For other researchers need to conduct further research toward physics toward the implementation of experiential learning using a simple physics kit; 2) Expected to develop experiential learning using simple physics kits on other materials or concepts, especially material that is real to be applied in the classroom, so the attitude of students can be more increased; 3) The number of media or visual aids in accordance with the number of study groups of students in order to help smoothness in teaching and learning activities with experiential learning model learning using a simple physics kit, in addition the appropriate amount can cut the learning time becomes more effective

5. References
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