The Influence of Concept Attainment Models on Science Processes Skills

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Abstract: Science process skills are very important in the learning process. Because science process skills impact learning effectiveness. The purpose of this study was to determine the effect of the Concept Attainment Model on the science process skills of students of class XI Science on fluid material in Adiluwih I State High School. The instrument used to collect data is using an observation sheet with LKPD assistance. This type of research is quasi-experimental with the Pretest-Posttest Control Group design and uses saturated sampling techniques. Hypothesis testing was carried out using t-test statistical techniques to test the difference in mean scores of students' scientific process skills with significance (α = 0.05), the testing criteria that is if $t_{\text{count}} < t_{\text{table}}$ then $H_0$ is accepted, and if $t_{\text{count}} \geq t_{\text{table}}$ $H_0$ is rejected. Based on the results of the hypothesis testing it appears that $t_{\text{count}} > t_{\text{table}}$, namely 4.183 > 2.015 so that the null hypothesis ($H_0$) is rejected and the alternative hypothesis ($H_1$) is accepted. With the acceptance of $H_1$ in testing the hypothesis, it can be concluded that this study can test the validity of the hypothesis.

1. Introduction

Education is a systematic, planned and sustainable effort to achieve educational goals that can play a role in the development of the nation and the State [1]. In order to improve the education system, the government strives to renew the curriculum by developing a new curriculum, namely the 2013 Curriculum (K13). 2013 curriculum emphasizes on improving the mindset of students from what was originally learning centered on educating staff to turn centered on learners, learning that was originally one direction became more interactive and learning that was originally virtual or abstract was encouraged to follow the real world context [2]. The curriculum is a set of plans and arrangements regarding the purpose, content, and learning materials as well as the methods used as guidelines for the implementation of learning activities to achieve certain educational goals [3].

The above description, we can conclude that an effort made to support the progress of the nation's future is education. Therefore, we as educators are required to be able to carry out duties as educators well. From the results of research conducted at SMAN 1 Adiluwih, that when teaching and learning take place students are less actively involved in the teaching and learning process, so the teaching and learning process has not been carried out well. Even though educators have tried as much as possible to design teaching and learning...
activities in a variety of ways so that students can be active, only a few students can be active, while others are only passive to take lessons and receive material delivered by educators. This happened because the students lacked the courage to ask questions and express their opinions and the lack of enthusiasm of students in following the learning process. This can be seen when educators provide questions related to the material that has been submitted. From the questions given, only a few students responded. When educators ask students to ask for material that has not been understood, the response of students is just silent. From the above events, of course, this can lead to not achieving a goal of the teaching and learning process.

We need to know that we as social beings cannot live and stand alone, will definitely need the help of others, and building interactions in a relationship are very necessary and maintaining good interaction in a relationship is very important [4].

Similar to science process skills that have not been taught in the process of teaching and learning activities, it creates a passive tendency and the process of learning activities is only centered on educators. Therefore, Science Process Skills (KPS) must be owned by each creature as a provision for future use. The hope of developing other sciences is to acquire new knowledge or develop knowledge that has been possessed because science process skills (KPS) are the basis for the formation of a logical thinking foundation [5].

In addition, science process skills can also be a form of learning that is considered effective in helping students develop their skills and discover the facts and concepts they receive in classroom learning. The science process skills cover various aspects of skills that can support learning science, especially physics. Physics is one part of science (IPA) which is essentially a collection of knowledge, ways of thinking, and inquiry [6].

The research conducted by Martina Hodosyopa regarding the development of science process skills in physics education has gotten the result that science process skills can enhance activities involving students to be able to design their own experiments to investigate something [7].

The research conducted by Hesbon which states that science process skills can facilitate students in learning [8].

The ability of science process skills is the overall directed skills (both cognitive and psychomotor) that can be used to find a concept, principle or theory to develop concepts that already existed before, or to deny the existence of findings, so science process skills are needed [9].

Based on the lack of teaching and learning activities in improving science process skills, and based on research conducted by Sunyono which states that science process skills in students in Lampung are still in the low category [10]. Therefore researchers are interested in conducting research on these science process skills. The increase in physics learning is, of course, much that must be considered, one of which is when determining the learning model. The researcher chose the Concept Attainment model as the model chosen to improve science process skills.

The application of the Concept Attainment model to this science process skill can be used as a way to get the concepts that will and are being learned through the questions presented by educators when the teaching and learning process is taking place with LKPD assisting which includes 10 indicators of the science process skills. The hope of this model is how the goals of teaching and learning can run well. Based on the explanation above, the purpose of this study was to determine the effect of the Concept Attainment Model on Students’ Science Process Skills.

2. Research and Methods
The population in this study were all students of class XI Science at SMA Negeri 1 Adiluwih Pringsewu in the odd semester of 2018/2019 Academic Year consisting of two classes totaling 46 students. The sampling technique in this study uses Saturated Sampling techniques. And the two classes were sampled in this study with class XI IPA¹ as the control class using Discovery Learning model and XI IPA² as an experimental
class using Concept Attainment learning model. This study included quasi-experimental research. The analysis prerequisite test in this study is a normality test, homogeneous test and hypothesis test.

The instrument used to measure science process skills is using observation sheets, this assessment is carried out when the teaching and learning process takes place and during practicum activities. The aspects observed in this science process skill are as follows: skill in observing, classifying, interpreting, predicting, asking questions, hypothesizing, planning experiments, using tools and materials, applying concepts and communicating [11].

Data analysis of the assessment results of observation sheets of science process skills of students using a Likert scale with the following equation [12]:

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\%KPS = \frac{Score\ Obtained}{Maximum\ Score} \times 100
\]

Categorizing Science Process Skills (KPS) are as follows [13]:

| Percentage | Description     |
|------------|-----------------|
| 80 ≥≤ 100  | Very good       |
| 60 ≥≤ 80   | Good            |
| 40 ≥≤ 60   | Enough          |
| 20 ≥≤ 40   | Less            |
| < 20       | Very less       |

3. Results and Discussion

Research on science process skills is carried out through observation. The following are percentage results data based on student observation sheets:

![Graph 1 Percentage of Science Process Skills Data Based on Observation](image)
Graph 2 Percentage of Science Process Skills Data from Each Indicator

Normality test

This normality test is the goal so that we can see the data is normal or not. The normality test in this study is by using the liliefors test ($\alpha = 0.05$).

Graph 3 Normality test

Can be seen in the table above that $L_{\text{count}}$ experimental class shows the result of 0.0931 with the value of $L_{\text{table}}$ is 0.180. Then according to the criteria that if large $L_{\text{count}} \leq L_{\text{table}}$ shows that the experimental class data is normally distributed. Whereas the $L_{\text{count}}$ control class shows the results of 0.1184 and the $L_{\text{table}}$ value is 0.176. Then according to the criteria that if the large $L_{\text{count}} \leq L_{\text{table}}$ shows that the control class data is normally distributed. We can conclude that all data is normally distributed.
Homogeneity Test

This homogeneous test is carried out after the normality test is carried out. Homogeneous test in this study is using the Fisher test ($\alpha = 0.05$).

Graph 4 Homogeneous Test Results of Science Process Skills

We can see in table 6 above that the $F_{count}$ value of the experimental class and the control class shows the results of 1.0544 with the $F_{table}$ value is 2.0283. Then according to the criteria that if large $F_{count}$ $\leq F_{table}$ shows that all data from both classes are homogeneous.

Hypothesis testing

After the prerequisite test is completed and all data regarding the understanding of science process concepts and skills are normally distributed and homogeneous. Then the next test is the t-test.

Table 2 Data on Science Process Skills Test Results

| Class    | N   | Mean   | SD    | $T_{table}$ | $T_{count}$ | Conclusion     |
|----------|-----|--------|-------|-------------|-------------|----------------|
| Control  | 24  | 30.833 | 3.5098| 2.015       | 4.183       | There is influence |
| Experiment | 22  | 35.2272| 3.6112|             |             |                 |

We can see in the data above shows the value of $T_{count}$ of 4.183 and the value of $T_{table}$ is 2.015. Then according to the criteria that if the value of $T_{p} > T_{i}$, then reject $H_0$ and $H_1$ are accepted. So we can draw conclusions on the results of the t-test that there is an effect of the CA model on the science process skills of students.

Discussion of the Concept Model for Attainment of Science Process Skills

The research was conducted to see how the influence of the use of the Concept Attainment model on the science process skills of fluid material students. The implementation of this model researchers do during the teaching and learning process and when practicum activities are carried out.

This Concept Attainment model can help improve the science process skills of students through practicum activities in practicum activities students will be required to conduct independent observing and thinking activities. This is consistent with the observation data which shows that the indicators of observing and communicating in practicum activities and seen from the results of the
observation sheet show very good categories with a percentage of 83.68% and 83%. This happens because it is supported by the Concept Attainment learning model which has 3 syntaxes in its learning activities, namely presenting data and concept identification, testing concept achievement and thinking strategy analysis.[14] Based on the 3 Concept Attainment syntax models above, the syntax can affect the science process skills of students. The following are the activities of the 3 syntaxes, including:

The first syntax is presenting data and concept identification. The activity of educators is to present data that has to do with the material being studied in this study, namely in the form of images, and students are asked to compare the characteristics and characteristics associated with the material being studied. Then students are asked to explain the nature and characteristics.

The second syntax is testing concept achievement. The activities of educators are to distribute LKPD to students so that students can immediately observe the examples available in LKPD. The purpose of this activity is to educate staff to test the knowledge and skills of students.

The third syntax is the analysis of thought strategies. The activity of students is to describe or conclude the material that has been studied. The purpose of this activity is that the teaching staff test the knowledge and skills of students after students conclude according to LKPD procedures. Then the teaching staff asks students for presentations, and there are some questions and answer process, the last activity is the teaching staff explain and conclude again the learning that has been carried out.

Observation data obtained from hypocretin testing using the t-test of science process skills in both classes, namely control and experiment shows the calculation of t-count of 4.183 and the value of t-table is 2.053. Then according to the criteria that if t-count> t-table then H0 is accepted. With this (4.183> 2.053), which means that there is an influence of the Concept Attainment model on the science process skills of fluid material students.

The first observation shows that the results obtained by students are students who use the Concept Attainment model of science process skills better than students who use the Discovery Learning model. We need to know that by using the Concept model Attainment learners can be more structured in taking steps of all indicators of science process skills because the Concept Attainment syntax is suitable for improving science process skills.

When the Concept Attainment model is applied to students, the result is that the development of science process skills can run well. The reason why science process skills are better because in this case students can be directly involved in the three syntax activities that exist in the model. So that students can be active in developing science process skills in the teaching and learning process as well as in practical activities. In accordance with research conducted by Nazar Muhammad which states that the effectiveness of the Concept Attainment model can be used to develop all aspects of science process skills as one of the activities that support success in the teaching and learning process.[15] Then the research carried out by Shaikh Kashefa Anjum which stated that the Concept Attainment Model encouraged students to learn theory and apply the newly acquired knowledge by applying it simultaneously [16-18].

4. Conclusion
Based on the results of the study it can be concluded that the Concept Attainment Model can improve students' science process skills in the fluid material. This is shown from the results of the independent sample t-test post-test test that t-count = 2.053 and t-table = 2.015 so that t-count> t-table (2.053 > 2.015) then H0 is accepted, thus it can be concluded that there is an influence of Concept Attainment model on science process skills of students.

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