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The Implementation Of **Problem Based Learning Model** Toward Conceptual Understanding At Senior High School Indri Eka Putri¹, Herman², Bunga Dara Amin³, Pariabti Palloan⁴ 1,2,3,4 Physics Department, Universitas Negeri Makassar 1Ekaputri.indri139@gmail.com Abstract. This research was experiment using posttest-only **control group design**. The study **was conducted at SMA** Negeri 3 Makassar with students of X MIA 3 as experiment class and X MIA 8 as control class.

The implementation **problem based learning model** of this research was used at experiment class and conventional model at the control class. After finishing this learning, the students was given posttest based on conceptual understanding test with form of multiple choice. The **result showed that the average score of** conceptual understanding **experiment class and control class** are relatively 10,25 and 4,81.

Based on inferential statistic using t-test, it is clearly shown that that means H₀ rejected and H₁ accepted. **Therefore, it was concluded that** there are significant differences on **variables of conceptual understanding** between students who studied through **problem based learning model** and their counterparts model who studied through conventional model at **class X MIA SMA Negeri** 3 Makassar in 2016/2017 academic year.

Keywords: conceptual understanding, problem based learning 1. Introduction The development of educational system maintains the balance of global flow and human learning quality. Based on the improvement of technology students should become more communicative, mastery of high material with an adequate of information access.

This is in according with 21st century education that focuses on developing of integrated intelligence in the real world. Therefore, learning requires not only

understanding skills and being able to practice, but also emphasizing how students produce findings from the process of adaptation to the environment [1]. In order to support 21st century learning, transformation of learning method is necessary, from teacher-centered to student-centered learning.

Students have an opportunity to build concepts during learning activities actively. Teachers also should create a learning environment, provide creative surrounding, and build their students' talents. This learning can be done by scientific approach. This approach includes of systematic scientific steps that are suitable to apply in science learning.

Physics is part of science, that requires **the ability to think** and investigate with certain methods. Hence, the information or explanations that can be tested and verifiable. Based on observations **in class X MIA SMA Negeri 3 Makassar 2016/2017** academic year the researcher obtained information as follows: 1) the standard of mastery learning can not be achieved by students, 2) learning was still using conventional method.

The completeness of learning can **not be completed due to** of a low understanding of physics concepts. Therefore, to improve **the quality of physics** learning, it requires learning model using a scientific approach. **The problem based learning model** provides a forum that allows students to do inquiry activities for developing essential skills in problem solving.

Problem given should be increased students' curiosity, self-directed learning, and inquiry [1,2]. Problem based learning has a several characteristic as follows: 1) learning starts with unstructured real world problems, 2) team work in small groups, 3) critical thinking in solving complex problem, 4) learning issues [2]. Therefore, pbl can be improve thinking ability and mastery of matter.

The results showed that **applying problem based learning model** can improve conceptual understanding [3,4,5,6,7]. Based on these facts the researcher believes that by applying **the problem based learning model** correctly, the understanding of the physics concept can be better. Thus, the title **of this research is** "The Implementation of **Problem Based Learning Model** Toward Conceptual Understanding at Senior High School" 2.

Method This research was true experiment research based on **posttest only control group design**. It was implemented in SMA Negeri 3 Makassar. **This research was conducted in even semester of academic year** of 2016/2017. The population was all **of class X MIA** with total 314 students. The sampling technique was selected randomly **and**

class X MIA 3 selected as the experimental class and class X MIA 8 was selected as the control class.

The independent variables were problem-based learning and conventional model, while the dependent variable was conceptual understanding of physics. The research instrument used a test of the physics conceptual understanding with a set of multiple choice which has been tested for its validity and reliability. Furthermore, the data obtained were analyzed through descriptive statistics and inferential statistics.

Inferential analysis includes normality test, homogeneity test, two tail test, and average estimates. t-test formula to test the hypothesis is: 3. Result and Discussion The description of physics conceptual understanding of control class and experiment class can be shown in table 1 as follows: Table 1. Physics Conceptual Understanding Description Based on the table 1, it was clearly seen that the experiment class has an average score of 10.67 higher which was then control class of 4,87.

Furthermore, physics conceptual understanding scores were categorized by frequency distribution in the following table: Table 2. Score Frequency Distribution of Physics Conceptual Understanding Interval Category control class experiment class Frequency percentage(%) Frequency percentage(%)

0 - 4 very low	0	0.0	16	50.0
5 - 8 Low	3	9.1	14	43.8
9 - 12 Medium	23	69.7	2	6.3
13 - 16 High	7	21.2	0	0.0
17 - 20 very high	0	0.0	0	0.0
Total	33	100.0	32	100.0

Table 3. Physics Conceptual Understanding for Each Indicators Indicators control class Kelas Kontrol Mean Percentage % mean Percentage % Comparing

Interpreting	5.0	55.56	2.22	24.65
Summarizing	1.48	37.12	0.44	10.94
Classifying	1.06	53.03	0.91	45.31
Exemplifying	1.33	66.67	0.16	7.81

Figure 1. Percentage Of Students' Score Based On Physics Conceptual Understanding Scores of physics conceptual understanding in the experimental class was in the high category (21.1%) while the control class was in medium category (69.7%) Based on table 3, it is found that, the average score relatively increase for each indicator of physics conceptual understanding in experimental class rather than in control class. There was a significant increase in indicators starting exemplifying, interpreting, and summarizing.

It was cause by pbl model that trained students for identifying, analyzing, solving, communicating problems [9]. Learning using the pbl model encourages students to find much information related to the issues studied. students become active and be able to self-direction learning in accordance with the demands of the 21st century. Students solved the problems presented in the worksheet.

The following steps are firstly, students were given an authentic problem to enhance their curiosity and to motivate. Furthermore, students conduct investigations process through experimental activities or literature review. After that, students should answer the questions available in worksheet. These questions led them to resolve the issues presented at the beginning of the assessment.

This activity can improve the ability of critical thinking and mastery of the content of knowledge. In addition, cooperatively students do inquiry to solve problems so that learning becomes more meaningful. The result of inferential analysis indicate that the sample from normally distribution and homogeneous population so that requirements for t test were met.

The results of hypothesis testing using t-test is t calculation = 9.52967 and t table = 1.999, due to so H1 was accepted and H0 was rejected. H1 hypothesis is there was a difference understanding of physics concepts between learners who were taught by using a model of problem-based learning with the control class which has taught by conventional model in students of class X MIA SMA Negeri 3 Makassar. Furthermore, the average estimated value was estimated value of 9.78 < 11.21 It means that if the problem based learning model applied to the population will get a score that is in the range of 9.78 to 11.21. 4. Conclusion 4.1

The average score of physics conceptual understanding students of X class MIA SMA Negeri 3 Makassar taught using the problem based learning model was 10.67 which was higher than the students in the control class which was shown as 4.87. 4.2 There was difference of physics conceptual understanding between students' who were taught using problem-based learning model with the conventionally taught students in class X MIA SMA Negeri 3 Makassar 2016/2017 academic year

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