

# The Influence of Problem Based Learning Model For Student Competence In Computer System Learning Eyes Reviewed From Class X Multimedia Achievement Motivation In Vocational School 10 Surabaya

Hendra Agusvianto<sup>1,a\*</sup>, Ismet Basuki<sup>1,b</sup>, & Euis Ismayati<sup>1,c</sup>

<sup>1</sup>Department of Technology and Vocational Education, Postgraduate, Universitas Negeri Surabaya, Surabaya, Indonesia

<sup>a</sup>[hendraagusvianto16070895011@mhs.unesa.ac.id](mailto:hendraagusvianto16070895011@mhs.unesa.ac.id); <sup>b</sup>[bismetbasuki@unesa.ac.id](mailto:bismetbasuki@unesa.ac.id); <sup>c</sup>[euisismayati@unesa.ac.id](mailto:euisismayati@unesa.ac.id)

Whatsapp Number <sup>a</sup>[hendraagusvianto16070895011@mhs.unesa.ac.id](tel:085606472152) [085606472152]

\*Corresponding Author: [hendraagusvianto16070895011@mhs.unesa.ac.id](mailto:hendraagusvianto16070895011@mhs.unesa.ac.id) | Phone : 085606472152

Received: 21 July 2020

Revised: 3 August 2020

Accepted: 8 September 2020

## Abstract

The process of teaching and learning activities uses problems in daily life as a form of improving thinking skills and problem solving, as well as gaining important concept knowledge by using student achievement motivation on computer systems subjects on computer system attitude competencies, computer system knowledge competencies, and competency skills computer system. Teachers at SMKN 10 Surabaya on average use the STAD cooperative model and students' competencies are taught low while researchers use the Problem Based Learning model and make student competencies increase. The design of this study uses 2 x 2 factorial analysis design with independent variables Problem Based Learning models and STAD cooperative models, moderating variables of high achievers motivation and low achievers motivation, and dependent variables competency in computer system attitudes, computer knowledge of computer systems, and computer system skills competencies. The results of this study in Multimedia 10 class students who were taught using PBL learning models were very significant competency compared to STAD cooperatives.

**Keywords:** problem based learning; cooperative; achievement; motivation;

## 1. Introduction

Learning models are various components that are interconnected with one another and are a system so that the components of the learning model include the objectives, material, methods, and evaluation. Learning models are usually arranged as a foothold in its development based on principles or theories so that the learning model consists of educational principles, sociological theories, psychology, psychiatry, systems analysis or other theories. Researchers also aim at students being able to solve problems like students are able to make a number system program on material number systems which is one of the strategies in problem-based learning on computer system subjects.

According to Heriyanto (2013), concluded that the subjects of computer systems with the aim to help students of class X Multimedia in learning and understanding the basic concepts in computer system subjects in terms of hardware and software as well as its supporting components. This computer system subject was designed for the 2013 Vocational School curriculum to strengthen student competencies from computer system subject knowledge competency (KP-SK), computer system subject attitude competency (KS-SK), and computer system subject skill competency (KK-SK).

In subject computer systems PBL learning model (Problem Based Learning) is needed which functions as an authentic problem solving and meaningful problems as well as to arouse student achievement motivation which is the most important element of effective teaching or successful teaching on high achievement motivation (MBT) and motivation low achievers (MBR). Vocational School 10 Surabaya requires PBL learning model because the teachers at the school use the STAD cooperative learning model, the researchers took the initiative to introduce the PBL model in Vocational School 10 Surabaya on the subject of a computer system.

## 2. Methods

This type of study is research with an experimental form that supports the proposed research on the learning model of Problem Based Learning (PBL) and students' achievement ability to improve student competencies in computer system lessons on number system material. The research sample was divided into an experimental group consisting of 10 MM 1 class students and the control group was 10 MM 2 class students at SMKN 10 Surabaya on a computer system maple. Each group from this class has students with high achievement abilities and low achievement motivation. The experimental class in this class will provide a learning class using the PBL learning model and the control class using the STAD cooperative learning model on a computer system maple. The research design used in this field of research is the factorial design shown in Figure 1.

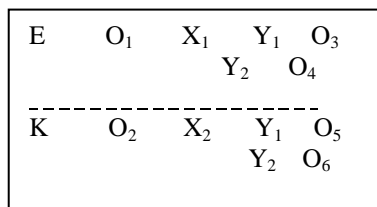


Figure 1. Factorial Design 2 X 2

The control variable is the dependent variable that is not affected by external factors than those studied so that a constant variable occurs (Sugiyono, 2016, p. 63). As for the control variables are teachers who teach Multimedia teachers, students who are taught Multimedia majors, subjects taught by computer system subjects, and time allocation taught equally. Pretest and posttests data are only used in the competence of computer systems knowledge, and for competencies the attitude of a computer system only uses posstest not using pretest so the measurement process is not too long. The data used pretest and posttest are multiple choice questions with the competency test instrument of computer system knowledge, while the posstest data on the competence of the computer system attitude uses observation observation with the teacher using the observation sheet of the attitude of the computer system, and the posstest data on the competence of the computer system skills makes the number system program with instrument of competency performance test of computer system skills which in the control variable above is controlled or made constant, so there is no occurrence affecting the dependent variable. The operational definition of a variable is an indication of how a variable is measured in research so that in this study the research variable is determined by the theoretical basis of each variable. There are two independent variables that are told in this study, namely the learning model as the independent variable one and student achievement motivation as the independent variable two. In this study there are two learning models namely PBL learning models on computer system subjects and STAD cooperative learning models called independent variables. In the two independent variables in an area of this research are achievement motivation which is high achievement motivation and low achievement motivation on computer system subjects.

In this study, the population of subjects in the computer system of material number system is vocational students at the Department of Multimedia at SMK Negeri 10 Surabaya, having their address at Jalan Keputih Tegal Sukolilo, Surabaya. According to Sugiyono (2013), a population that has certain characteristics and qualities is a region of generalisasi on an object or subject determined by researchers to study so that it draws conclusions on the subject matter computer system of number system material. The research in this target population is class X students of Multimedia Department of SMKN 10 Surabaya on the subject computer system of number system material. According to Sugiyono (2013), the sample is part of the number and characteristics possessed by the population so that based on the observations of researchers at SMK Negeri 10 Surabaya in determining the class classification is not based on the level of student learning outcomes in the subject computer system number material system but rather using the alphabet system. So that in taking samples, researchers used random sampling techniques. Sampling of members of the population is carried out in a draw regardless of the strata in the population.

In this study, SMK Negeri 10 Surabaya students who are members of an affordable population, namely class X MM 1 and X MM 2. Students of class X MM are given lessons with Problem Based Learning learning models on computer systems maps of 35 students while students of 10 MM 2 classes are given lessons with the STAD cooperative learning model on the subject computer system number system material in 35 students. The following formula is used in determining the sample size as follows.

$$(R-1) \geq 15/1$$

$$R \geq 15 + 1$$

$$R \geq 16$$

Place and research will be carried out at SMKN 10 Surabaya Department of Multimedia which will be conducted in odd semester 2019-2020 with consideration at the school that researchers have never undertaken the learning process with the application of PBL models and achievement motivation on student competencies and according to the schedule of subject matter material computer systems number system, namely: (1) general description of the number system, (2) types of numbers (decimal, binary, octal, hexadecimal), (3) number conversion, (4) decimal binary code (BCD) and hexadecimal binary code (BCH) ), and ASCII Code. Data collection technique is a systematic and standard procedure for obtaining the required data, there is always a relationship between the data collection method and the research problem to be solved so that many research results are inaccurate and the research problem is not solved, because the data collection methods used are not appropriate with research problems (Siregar, 2012, p. 39). In this study the data collection techniques used are: (1) validation; (2) observation; (3) student competency tests. The research instrument is a tool used as data collection in a study so that the measurement scale of the instrument is to determine the units obtained, as well as the type of data or level of data, whether the data is of nominal, ordinal, interval, or ratio type (Siregar, 2012, p. 50) . The following research instruments used in this study are computer system knowledge competencies using computer system knowledge competency tests, computer system attitude competencies using computer system observation sheets, and computer system skills competencies using computer system performance tests.

### 3. Results and Discussions

The data collected was obtained through computer system attitude attitude competency tests, computer system knowledge competency tests, and computer system skills competency tests, which were used in this study. The results of data collection from classes taught by using the Problem Based Learning learning model and STAD cooperative learning models are still in the form of raw scores. For the purposes of statistical tests on research data, the raw score is converted into a standard score.

Description of the data is done to explain the data, namely: (1) achievement motivation level data and (2) student competency data consisting of computer system attitude competencies, computer system knowledge competencies, and computer system skills competencies. The student competency data itself consists of student competencies using PBL learning models and student competency data using STAD cooperative learning models. This competency data was obtained from (1) the results of observations of students' attitudes while attending five meetings for computer system attitude competencies, (2) the results of the pretest scores to determine the students' initial abilities and the results of the posttest scores for the competency values of computer system knowledge, (3) the results of the average performance observation test during five meetings for computer system skills competency.

Testing the value of the hypothesis is the final step used to decide whether the temporary answers to the formulation of the problem mentioned in the research hypothesis are true or false. In other words, the statistical hypothesis test is also meaningful if the null hypothesis is accepted or rejected. The statistical hypothesis test used is Anava 2 path. In this study a statistical hypothesis test was separated between the competence of computer system attitudes, computer system knowledge competencies, and computer system skills competencies to the level of achievement motivation.

The competence of computer system attitudes on the competence of understanding number systems (decimal, binary, octal, decimal) in this research data shows that the hypothesis testing results of the Fcount ratio = 8.07. By using  $dbA = 1$  and  $dbD = 31$ , the Ftable price was 4.45 at the 5% level and 5.20 at the 1% level. Based on this, it can be proven that the value of Fcount is greater than the price of F table both at the 5% level and at the 1% level is very significant. The conclusion drawn is that there are significant differences in the competence of computer system attitudes between students taught on the PBL model and students taught with the STAD cooperative model on computer system subjects in SMK Negeri 10 Surabaya, then  $H_1$  is accepted and  $H_0$  is rejected, meaning that the competency of the computer system attitude of students is taught using the PBL learning model there are significant differences between students who are taught using the STAD cooperative learning model on a computer system maple at SMK Negeri 10 Surabaya. Furthermore, to support the research hypothesis, further testing of the mean is used, as shown in Table 1

**Table 1.** Test Results Meaning Competence of Computer System Attitudes on the Effect of Learning Models  
Competency Value of Computer System Attitude

	N	Mean	Std
Learning Model of Problem Based Learning	36	90.53	5.639
STAD Cooperative Learning Model	36	71.44	2.557
Valid N (Listwise)	36		

Table 1 Test Results Mean Competency of Computer System Attitudes Over the Effect of PBL Learning Model is 90.53 with a standard deviation of 5.639 with the number of students 32 while those using the STAD cooperative learning model have a mean test result of 71.44 with a standard deviation of 2,557 with a number of students 36 This proves that there is a significant difference between the competence of computer system attitudes among students taught using the PBL learning model compared to students taught with the STAD cooperative learning model at SMK Negeri 10 Surabaya.

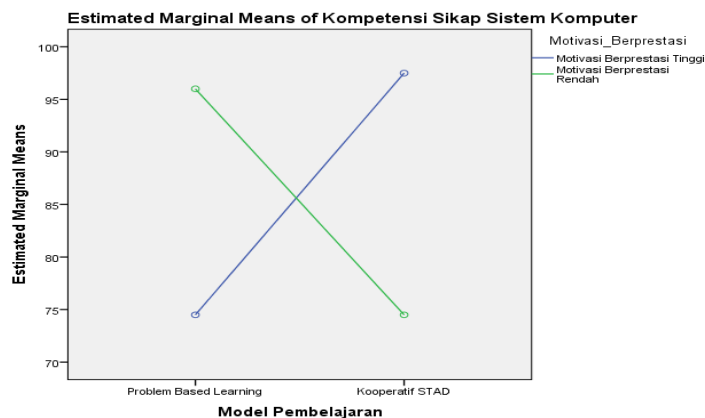
In Table 2, the hypothesis testing results obtained  $F_{count} = 8.25$  using  $dbAB = 2$  and  $dbD = 31$  obtained  $F_{table} = 3.52$  at 5% and 5.01 at 1%. Based on this, it can be proven that the  $F_{count}$  value is greater than the  $F_{table}$  value at the 5% or 1% level is very significant.

Conclusions that can be drawn about what is meant by a significant interaction with the competence of computer systems in the learning model and achievement motivation used in research,  $H_1$  is accepted and  $H_0$  denies, what is meant by interactions between students who use PBL learning models that have MBT that show significance with students who use the STAD cooperative model that has an MBR in a computer system map at SMK Negeri 10 Surabaya in the table 2.

**Table 2.** Test Results Meaning Competence of Computer System Attitudes on the Effect of Learning Models

Competency Value of Computer System Attitude			
	N	Mean	Std.
Learning Model of Problem Based Learning	36	86.28	7.905
High Achievement Motivation	36	86.28	7.905
Low Achievement Motivation	36	83.4444	1.99205
STAD Cooperative Learning Model	36	71.4444	2.55728
High Achievement Motivation	36	73.4167	4.66216
Low Achievement Motivation	36	71.4444	2.55728
Valid N (listwise)	36		

So in this study there is an interaction between the use of learning models and student MB on the competence of computer system attitudes. The interaction of the use of learning models and student MB to the attitudes of computer system attitudes can be seen in Figure 2.



**Figure 2.** Histogram Graph of Interaction Line Patterns between the Use of Learning Models and MB Students towards Computer System Attitude Competence

#### 4. Conclusion

Achievement motivation is very influential on student competence. The teacher as a facilitator must be able to develop these abilities as potentials in order to increase maximum competency. The use of learning models, especially in the Department of Multimedia (MM) is absolutely necessary. An example is the Problem Based Learning model that is implemented in MM classrooms, proven to be able to have a positive impact on student competence. So that more similar learning models need to be made so that students can understand productive material both in theory and practice.

#### References

Anderson, L. W. & Krathwohl, D. R. (2001). *A taxonomy for learning teaching, and assessing*. New York: Addison Wesley Longman, Inc.  
 Arends, R. (1997). *Classroom instructional management*. New York: The McGraw- Hill, Company.  
 Arends, R. (2008). *Learning to teach*. Yogyakarta: Pustaka Belajar.

- Arikunto, S. (2015). *Dasar-dasar evaluasi pendidikan*. Jakarta: PT. Bumi Aksara.
- Arikunto (2008). *Prosedur penelitian*. Jakarta: Rineka Cipta.
- Basuki, I. & Hariyanto. (2014). *Asesmen pembelajaran*. Bandung: PT. Remaja Rosdakarya Offset.
- Blakely, R. J. (1996). *Potential theory in gravity and magnetic Applications*. Cambridge: Harvard University Press.
- Brookhart, S. M. (2010). *How to assess higher-order thinking skill in your classroom*. United States of Amerik: ASCD Member Book.
- Brunner, J. (1962). *On knowing essays for the left hand*. Cambridge: Harvard University Press.
- Chen, Y. T. (2012). *The effect of thematic video based instruction on learning and motivation in e-learning*. *International Journal of Physical Sciences* 7(6), 957-965.
- Damayanti. (2010). *Teori-teori belajar dan pembelajaran*. Jakarta: Pustaka Kencana.