

Influence of Model Problem Based Learning and Entry Behaviour Competence Learning Biology Students Class VII SMP Negeri 7 Kerinci

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Abstract - The observations made in class VII of SMP Negeri 7 Kerinci indicate that the learning process still emphasizes the knowledge and understanding aspects of the material. Active role of learners is still very lacking, early ability and learning competence of learners is still low. One of the efforts that can be done to overcome these problems is by applying the model of *Problem Based Learning* as one of the learning models suggested in Curriculum 2013. The purpose of this study is to determine the effect of model of learning *Problem Based Learning* and early ability to learn biology learner's competence. This research is *quasi experiment* research; this research population is class VII students of SMP Negeri 7 Kerinci year lesson 2017/2018. Sampling was done by using *purposive sampling technique* and obtained class VII_c as experimental class treated with *Problem Based Learning* and initial ability and class VII_d as a control class treated by *Direct Instruction*. Instrument used in the form of objective test, observation sheet for attitude aspect and assessment sheet for skill aspect. The data analysis in this study uses t-test for knowledge competence, and test *Mann Whitney U* for attitude and skill competence. The results showed that the value of learning competence of science of students experiment class better than control class students.

Keywords - Influence; Problem Based Learning; Initial Ability; Learning Competencies.

I. INTRODUCTION

Education is a human effort to humanize human beings. As a creature of God, man has the ability to speak and have a mind, so as to develop himself into a civilized being. Various efforts have been made by the government to improve the quality of education, among others in the renewal of Education Unit Level Curriculum is enhanced to Curriculum 2013. Through the development of curriculum 2013 based on character and based on competence will produce students who are productive, creative, innovative, active through knowledge attitudes, skills, and integrated knowledge (Hosnan, 2014).

Implementation of the scientific approach in the classroom can be done with three instructional models that have been recommended that are project-based learning model, discovery learning model, and problem-based learning model. Ideal demands The 2013 curriculum for the competence of learners is contained in the competency standards of graduates covering attitude, knowledge, and skills aspects (Permendikbud, 2016)

One of the subjects in Junior High School (SMP) is biology subjects incorporated into the subjects Natural Science. Science education is one aspect of science education that is expected to help learners to meet the skills needed in the 21st century. The ability according to Kemendikbud (2016: 1) that is learning and innovation skills and able to solve problems, creative and innovative, and able to communicate and collaborate. Science learning includes Chemistry, Physics and Biology.

Biology as a science process involves observing, questioning, classifying and interpreting data, and communicating the findings orally or in writing, exploring, and sorting out relevant factual information to test ideas or solve everyday problems. Based on observations and interviews conducted on science teachers in grade VII SMP Negeri 7 Kerinci, it is known that the learning process still emphasizes the aspects of knowledge and understanding of the material. During this process of learning that takes place is still a *teacher center*, teachers deliver more subject matter through lectures and provide practice to do the problems contained in the LKS. As a result, learners become poorly trained in developing thinking skills and

solving problems and applying the concepts learned in school into the real world.

Through observations that have been done also can be seen that the active role of learners in the learning process is still very less, only a few people learners who show the activity in asking and answering questions. Questions and answers are still limited to questions and answers at the level of knowledge alone.

Data of knowledge competence of learners obtained from science teacher of SMP Negeri 7 Kerinci also shows learners competency of knowledge aspect is still under minimum criterion which has been determined that is 75. Average daily test value can be seen in Table 1.

Table 1. percentage of mastery Learning Outcomes of Students Class VIII SMP Negeri 21 Padang in the school year 2016/2017

No.	Grade	Number of Students	Average Rating UH
1	VIIa	20	68.70
2	VIIb	19	68.50
3	VIIc	20	67.75
4	VIIId	20	68.00

Source: Science Teachers of SMP Negeri 7 Kerinci

The low learning outcomes of learners is also determined by the initial knowledge of learners, because the initial knowledge is the foundation in forming a new learning concept. That knowledge can not be transferred intact from teacher's mind to learners, but actively built by the learners themselves.

Data of early knowledge competence of learners obtained from science teacher of SMP Negeri 7 Kerinci also show competence learners knowledge aspect still be under criterion of completeness can be seen at least in Table 2.

Table 2. Value of average early ability Biology Students SMPN 7 Kerinci Lesson Year 2017/2018 on Aspect Knowledge

No.	Class	Number of Learners	Value of initial ability
1	VII _a	20	60,70
2	VII _b	19	65,50
3	VII _c	20	63,75
4	VII _d	20	63,50

Source: Teacher at SMPN 7 Kerinci

Table 2 shows that the initial knowledge value of the learners is low. Initial knowledge is the knowledge possessed by the learner before the learning activity takes place. The initial ability of these learners is derived from the value of daily re-examination of learners on the previous material. In the process of teaching and learning

teachers are faced with learners with different abilities, there are high-ability and low-ability students. The diversity of existing learners' abilities will affect the mastery of the subject matter taught by teachers in the classroom (Ennike, 2017: 180).

Based on the problems described above, the way that can be done to improve the learning competence of learners is to start the lesson with a problem or question (Synder and Synder, 2008). Learning that begins with problems can be done through the implementation of model *Problem Based Learning* (PBL). Problems in the PBL model, presented at the beginning of learning and serve as a stimulus for learning activities (Chin and Chia, 2005). Through the PBL, learners can gain experience in dealing with real-life problems, and emphasize the use of communication, cooperation, and the resources available to formulate ideas and develop reasoning skills.

Learning with the PBL model presents the real life situation of learners so that learners are not confused and can directly understand and find for themselves what is learned in everyday life. This learning model also involves many learners actively in the learning process. Learners are given the freedom to think more in developing his reasoning in solving the problems it faces. PBL learning model is expected to be suitable to apply to environmental pollution material in everyday life so that learners more easily understand the material, If connected with material characteristic used, then PBL model can be applied. The use of this model is expected to make learners actively involved in learning activities so as to improve the competence of learning. This is in line with the results of Liliani's research (2014) that the application of model *problem-based learning* can increase the activity, motivation and learning outcomes of learners compared with using direct instruction model.

II. LITERATURE REVIEW

A. Learning Model

According to Lufri (2007: 50) models means that the pattern (eg, reference, range and so on). The model referred to in the lesson is the same or almost the same as stated in the Great Indonesian Dictionary. According Suprihatiningrum (2013: 142-143) learning model is a conceptual framework that describes the procedures in organizing learning experiences to achieve learning objectives.

B. Model Problem Based Learning (PBL)

According to Abanikannda (2016) using model learners *Problem Based Learning* make learners become more experienced in collecting, organizing and storing information that can be used for the future and also can solve complex and real problems.

Syntax of *Problem Based Learning* and Teacher Activity Relevant

Stage	Activation Teacher Student
1. Orientation to	The teacher explains the learning objectives, explains the necessary tools, motivates the learners to engage in the problem solving activity they choose.
2. Organizing learners to learn	s help learners define and organize learning tasks related to the problem.
3. Guiding individual and group inquiry	s encourage learners to gather appropriate information, conduct experiments for explanations and solving problems.
4. Developing and presenting work	s help students learn in planning and preparing appropriate works such as reports, videos, models, and helping them share the task with their friends.
5. Analyzing and evaluating the problem-solving process	s help learners to reflect on or reflect on their investigations and the processes they use.

(source: Ibrahim and Nur in Lufri, 2010: 69)

C. Initial Ability Learners

Early ability of learners is the ability that has been possessed by the learner before following the lesson to be given. *Entry behavior* describes the readiness of learners in receiving lessons to be conveyed by the teacher. According Septiadi (2018) Early ability of learners is the ability that has been possessed by learners before following the lesson to be given.

D. Competence Learners

In essence, competence is a change in behavior shown by learners after following the lesson. Changes in behavior can be a domain of knowledge, attitude and skills. Competence is the ability obtained by learners after through learning activities (Sudjana, 2005: 112).

III. RESEARCH METHOD

The method used in this study is *quasi experiment*. In the experimental class using model of *Problem Based Learning* science and control class using learning model *Direct Instruction*. The research design uses factorial design 2 x 2 for knowledge domain competence and for *Posttest Only Control Design* for the competence of attitude and skill aspects.

A. Data Analysis Technique

B. Test Normality Normality

The test used is *Kolmogorov-Smirnov test*. Normality test aims to see whether the population is normally distributed or not. The data is normally distributed if the value obtained is greater than the real level $\alpha = 0.05$ with the statistical hypothesis as follows:

H_0 = the data follows a normal distribution

H_1 = the data does not follow the normal distribution

The test criterion is accept H_0 if the value of Sig > real ($\alpha = 0.05$) means normal distribution and if otherwise.

C. Homogeneity

Test The homogeneity test of variance was performed by test Levene's. The homogeneity test of variance is conducted to find out whether the population has a homogeneous variance. the homogeneity test of variance is done with the help of *software* SPSS 17. The test criterion is accept H_0 if the value of Sig. > real level ($\alpha = 0.05$) and rejected if otherwise.

D. Hypothesis Testing Hypothesis

test aims to determine whether there is influence of model *Problem Based Learning* and initial ability to learners' learning competencies. The test criterion is if the value of Sig. > 0.05 then H_0 is accepted and H_1 is rejected, otherwise the value of Sig. < 0.05 then H_1 is accepted and H_0 is rejected.

E. Testing of First, Second and Third Hypotheses

The statistical tests used for the second hypothesis are t test because the data are normally distributed and have homogeneous variance. Criteria testing is if the price $\leq$ then H_0 accepted and H_1 rejected, otherwise if price $>$ then H_1 accepted and H_0 rejected. With SD = $n_1 + n_2 - 2$.

F. Third and Fourth Hypothesis Testing

Statistical tests were carried out for the third and fourth hypothesis is the *Mann-Whitney Utest*. In this research hypothesis test is done with the help of *software* SPSS 17 Criteria testing this hypothesis that if the value of significance obtained greater than 0.05 then H_0 accepted and if the significance value obtained is smaller than 0.05 then H_1 is rejected.

IV. RESULT AND DISCUSSION

A. Research Results

1. Competence Data Description Knowledge

Data Competence learning knowledge domain in this research is obtained through the final test in the form of written test in the form of multiple choice questions given to experimental class students and control classes conducted at the end of each Basic Competence meeting. The result of knowledge domain competence can be seen that the average of students' learning competence in

experiment class is higher than control class, that is 83,63 experiment class and 74,63 control class. The maximum and minimum scores of the learning competence of the experimental cognitive domain are higher than the control class.

2. Description Data Attitude Competence

Research data on aspects of attitudes obtained through observations made by the observer by using the observation sheet assessment of the attitude of learners at the time of the learning process takes place. The result of the competence of the attitude domain can be seen that the total average score of students' attitude spaces filled by the observer in the experimental class gets higher average than the control class.

3. Description of Data Competence in the Skills Sphere

Research data on skill aspect is obtained through the assessment of products made by learners. The result of the competence of skills skill can be seen that the total score of skill of learners in the experimental class is higher than the control class.

4. Data Analysis

The test of the analysis requirements was performed before proceeding to the hypothesis test, the first test performed was a normality test using *Kolmogorov-Smirnov* and homogeneity test of variance using test *Levene's* with the help of *software* SPSS 17. If the data were normal and homogeneous distribution then hypothesis testing using *t* test, if not normally distributed will not proceed with the homogeneity test of variance and hypothesis testing using test *Mann Whitney U*.

a. Test Normality

test is performed on the value of critical thinking skills and the competence of experimental class knowledge and control class. Normality test was performed using *Kolmogorov-Smirnov test* with the help of *software* SPSS. The test criterion is accept H_0 if the value of Sig. > real level ($\alpha = 0.05$).

The results show that critical thinking skills for experimental class have Sig value. 0.200 While the control class has a Sig value. 0,200 so it can be concluded the data is normally distributed. The value of knowledge competence for the experimental class has a Sig value. 0.118 While the control class has a Sig value. 0.067 so it can be concluded the data is normally distributed.

b. Homogeneity

Test homogeneity of variance of critical thinking skill value as well as knowledge competence value of experimental class and control class learners using test *Levene* with aid *software* SPSS 17. Test criterion is accept H_0 If value of Sig > yata level ($\alpha = 0,05$) and reject H_0 otherwise.

From the calculation result shows that critical thinking skill of experiment class and control class have homogeneous variance with significance value 0,798 whereas knowledge competence value of experimental class learners and control class also has homogeneous variance with significance value 0,229.

c. The first Hypothesis

This hypothesis test is used to determine the learning competence of the learner knowledge that follows the learning model of Problem Based Learning is better than the learning competence of the learner knowledge area that follows the Direct Instruction learning, because the data is normally distributed and has homogeneous variance, used is the *t*-test. The results of this hypothesis test calculation can be seen in Table 3

Table 3. Results Calculation Hypothesis First

Class	Sig	A	Conclusion
Experiments	0.003	0.05	H_1 received H_0 rejected
Control			

Results Calculation Table 3 shows that the competence of the cognitive domain of learners has a value of Sig. < 0 , 05 means H_0 is rejected. This means that the competency value of the learners of the experimental classroom has a significant difference with the control class. Thus it can be concluded that the competence of teach learners who follow the learning model of the type of Problem Based Learning is better than the learning competence of the knowledge of learners who follow the Direct Instructions learning.

d. Second Hypothesis

Test is used to know the competence of learning domain knowledge of high-ability early learners who follow the model of learning Problem Based Learning is better than the competence of learning the realm of knowledge of high-ability early learners who follow the Direct Instruction learning, because the data is normally distributed and has a variance which is homogeneous, then the test used is a *t*-test. The results of this hypothesis test calculation can be seen in Table 4

Table 4. Results Calculation Hypothesis Second

Class	Ability	Sig	A	Conclusion
Experiments	High	0,000	0.05	H_1 received H_0 rejected
Control				

Results calculation Table 4 shows that the competence of the cognitive domain of learners have Sig value. <0.05 means H_0 is rejected. This means that the competency value of the learners of the experimental classroom has a

significant difference with the control class. Thus it can be concluded that the competence of learning knowledge of high-ability learners who follow the model of learning Problem Based Learning is better than the competence of learning the realm of knowledge of high-ability students who follow the Direct Instruction learning.

e. Third Hypothesis Hypothesis

Test is used to know the competence of learning domain knowledge of low-skilled early learners who follow the model of Problem Based Learning learning is better than the competence of learning the realm of knowledge of low-skilled learners who follow Direct Instruction learning, because the data is normally distributed and has a variance which is homogeneous, then the test used is a t-test. the results of this hypothesis test calculation can be seen in Table 5

Table 5. Results Calculation Hypothesis Third

Class	Ability	Sig	A	Conclusion
Experiments	Low	0.002	0.05	Received H_0 rejected
Control				

Results calculation Table 5 shows that the competence of the cognitive domain of learners have Sig value. <0.05 means H_0 is rejected. This means that the competency value of the learners of the experimental classroom has a significant difference with the control class. Thus it can be concluded that the competence of learning knowledge of low-skilled early learners who follow the model of learning Problem Based Learning is better than the competence of learning the realm of knowledge low learner early learners who follow the learning direct instruction.

f. Fourth Hypothesis

Test is used to determine the learning competence of the learner attitude that follows the model of learning Problem Based Learning is better than the learning competence of the learner attitude aspect that follows the Direct Instruction learning.

Data of competence aspect domain has characteristic that is count result not found fraction number (nominal data), hence directly analyzed using nonparametric statistic. The test used istest *Mann Whitney U*. This hypothesis test calculation results can be seen in Table 6.

Table 6. Results of a calculated Hypothesis Fourth

Class	Sig.	A	Conclusion
Experiments	0,000	0.05	H_1 Accepted H_0 rejected
Control			

Results calculation Table 6 shows that Sig. <0.05 ie 0,000 obtained from the analysis using SPSS. Thus it can be concluded that the learning competence of the affective aspect of learners who follow the model of learning Problem Based Learning is better than the learners' learning competencies that follow the direct instruction learning.

g. Fifth Hypothesis Hypothesis

Test is used to determine the competence of learning skill area of learners who follow the model of learning Problem Based Learning is better than the competence of learning skill area of learners who follow Direct Instruction learning.

Competence skill competence data have characteristic that is count result not found fraction number (nominal data), hence directly analyzed using statistic non parametrik. The test used istest *Mann Whitney U*. The results of this hypothesis test calculation can be seen in Table 7.

Table 7. Result of Hypothesis Fifth

Class	Sig.	A	Conclusion
Experiments	0.004	0.05	H_1 accepted H_0 rejected
Control			

Results calculation Table 7 shows that Sig. <0.05 ie 0.004 obtained from the analysis using SPSS. Thus it can be concluded that the competence of learning skill area of learners who follow the model of learning Problem Based Learning is better than the competence learners learn skills that follow Direct Instruction learning.

B. Discussion

1. Achievement of Knowledge Competence

The results showed that the competence of learners knowledge field of learners can be increased by using learning model problem based learning. Based on the description of the data presented previously, the average score of learning competence of biology of experimental students following learning model of based learning problem as a whole is significantly better than control class following Direct Instruction learning model. The high average score of learning competence of the experimental class students compared with the control class is caused by the treatment given in the experimental class that is the learning problem based learning model.

Based on the data analysis that experimental class students treated with modeled problem based learning based on initial ability better learning outcomes compared with control classes treated using direct Instruction model. This is because the model of Based Learning is a learning approach that presents a contextual problem, thus attracting

students' attention to learn in a classroom that implements problem based learning. According to Uno and Mohammad (2012: 112) the model of Problem Based Learning is a learning model that guides students to do authentic problems with the intention to develop their own knowledge, develop inquiry and critical thinking skills, develop self-reliance and self-confidence of learners. According to Erda (2018) model problem based learning is a learning model that requires students to participate actively in the learning process. According to Yunanda (2018) early ability is the basic ability or ability possessed students before following the learning.

The learning process on the Problem Based Learning model and initial capability is assisted by LKPD which is one of the self-administered exercises that can be used to attract the attention of learners to be more critical and understand the concept. LKPD is given to each group, adapted to the learning model used. LKPD that is distributed to each group contains problems and questions related to learning materials. This facilitates learners in group discussions and cooperation with each group, and makes them more active in learning.

Learning activities with Problem Based Learning model has five major steps that begin by introducing learners to the problem and end with the presentation of the work of learners. The five steps are: student's orientation to the problem, organizing learners for learning, guiding individual and group investigations, developing and presenting the work, and analyzing and evaluating the problem-solving process.

In the orientation stage of learners on the problem, learners are asked to understand the problems that have been provided on the issue discourse sheet. Activities undertaken by learners is to find the problems contained in the sheet of the problem. Then learners solve problems together and dare to express opinions that fit with his experience so far through the explanation given by the teacher. Students dare to give a complete explanation for the answer that is less precise. Giving real problems will stimulate the curiosity, the desire to observe, and the desire to engage in a problem will be greater.

At the stage of guiding individual and group investigations at this stage can improve students' thinking skill skills, this is because at this stage the teacher invites learners to discuss the most appropriate strategy to solve the problem given, then seek information about the causes and consequences of the problem which exists.

After learners find alternative solutions used to solve problems, learners conduct group investigations to find the right solution to the problem. At this stage, learners are also asked to make a conclusion of the problem-solving activities undertaken. The next stage is the learners are asked to develop and present the work. The teacher asks

several groups to present the results of their work in front of the class, while the other group is asked to respond.

Based on these steps, it appears that the involvement of learners in the learning process is to participate actively in every learning process, collaborative, and centered on the learners. This shows that the model of Problem Based Learning can spur the learner to think in solving the problem. This is in accordance with the opinion of Masek and Yamin (2011: 219) states that the steps contained in the model of Problem Based Learning is able to support the development of thinking skills of learners.

In the competency control class the knowledge is lower than the experimental class because in the control class using Direct Instruction learning model and initial capability. This is seen from the results of student tests, students are difficult to solve the problem because the teacher did not give the task home, just ask students to read the material learned later school. But not all students have the willingness to read the material, so the student's learning capital is low.

This resulted in the students taking a long time to solve the problem given by the teacher, the students had to leaf through the book first, read the material first according to the problem. Then understand the problem, and note if the problem has been found the answer, so much time is used in the orientation of the problem and investigation of the problem, while the development and presentation of the work and evaluate the problem-solving process is not achieved optimally.

Teachers solve the problem by giving students time limits in the orientation of the problem and investigation of the problem, but the time given is not enough to solve the problem given the teacher. There are some groups that are solved in the problem solving of some other groups are not finished in solving the problem, so in the process of developing and presenting the work and evaluating the problem solving process more extra teachers to direct students in the process of solving the problem. This resulted in not all students being active in the discussion, only smart students dominate the learning process.

In other words, the learning process in the two sample classes that is the experimental class and the control class there are significant differences. The experimental class using the application of the problem based learning model has the average value of the competency of knowledge aspect is better than the average value of competency knowledge of the control class using the Direct Instruction learning model.

2. Competence Sphere Attitude

In the learning process learners solve the problems given by teachers in the form of LKPD so that when the process of orientation of learners on the problem focused on the problem given, confident learners convey the

problem solving encountered. Learners sit quietly and carefully following the course of the discussion. In discussing the students also looks responsible and serious in solving the problem, learners mutually socialize and enthusiastically donate their opinion to complete LKPD in discussion. During discussions where teachers guide group investigations, the teacher only directs a little to solve the problems found, because learners work together in conveying the understanding gained in the learning process. According to Anas (2018) cooperative learning requires students to cooperate maximally in accordance with the situation of the group, whereas according to Imron (2018) cooperative learning encourages learners to work together and learn in groups.

In the learning process, when learners develop and present the results of their work, learners more confidently convey the problem solving contained in LKPD and other learners also listen. This shows the curiosity of learners to the problems gained in the learning process. Active learners in asking questions that fit the problem. When learners are less understanding about the problem solving that exist, then the other students who add. Problem Based Learning Learning can develop thinking skills in giving a more detailed and clear explanation in accordance with their knowledge so they can understand a meaning behind an event, especially in learning.

The above shows that the application of Problem Based Learning model of learning can maximize the competence of the student attitude aspect. This learning model provides a different atmosphere in the learning process, because each student has a responsibility so as to foster a sense of confidence to ask or respond to the opinions of friends.

Based on the above explanation, it can be concluded that the learning competence of the attitude aspect of students who follow the learning model of Problem Based Learning is better significantly than the learning competence of the students attitude aspect following the direct instruction instruction.

3. Skill Competence Skill

Result of competence assessment of skill field of student that done, obtained skill competence data of experiment class student better than control class. The competence of the skill of learners in the experimental class as a whole has good criteria.

The high acquisition of students' skill competence in the experimental class is a positive influence of learning using PBL model where in problem solving activities, learners are required to develop and present the work that demands creativity of learners. Not much different from the opinion expressed by Dewi and Jatningsih (2015: 937) that the PBL model has a special feature of producing products or works and exhibiting the product. When learners have creativity, the competence of learning skill domains will

increase because the skills competence assessment of learners is done through product assessment. In making the product in the form of posters, students are required to have high creativity in order to produce a creative product as well.

The learning process in the two sample classes, namely experimental class and control class there are significant differences. The experimental class using the PBL model has an average competency skill higher than the average score of the competency of the control class skills using the direct instruction instruction model. Savery and Dufy (2001: 59) explain that in the PBL environment, learners are actively involved in learning to construct knowledge and apply it in skills.

V.CONCLUSION

Based on the results of research and the results of data analysis, it can be concluded that there is influence model of *problem based learning* and early ability to science knowledge competence domain of knowledge, attitude and skill.

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Biography



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