

Effect of Learning Model Discovery of Competence Student Subject Biology Class VIII MTsN Rambah 2014/2015 Academic Year

Dahlia, Linda Advinda, Yuni Ahda

Biology Education Studies Program, Graduate Program,
State University of Padang



Abstract – Dahlia. 2015. "The Effect of Discovery Learning Model on Student Competency in Biology at Grade VIII Subject MTsN Rambah in 2014/2015 academic year." Thesis. Postgraduate Program State University of Padang.

The play the cause of this study arose from the low of students' cognitive competence. In addition, the affective and psychomotor competences were never been assessed. This can be seen from the number of student exam scores who achieved under the Minimum Standard Criteria. The purpose of this study was to determine whether student learning using discovery learning competence is better than conventional models of learning. This study used quasi-experimental with randomized control-group posttest only design. This study was conducted from January to April 2015. The Cognitive Data were obtained by using the test, while affective and psychomotor Data were obtained by using observation sheet. The statistical tests for the first hypothesis is T-test whereas for the second and third hypotheses use Mann Whitney U tests. The results Showed discovery learning models that can improve student learning outcomes. For the first hypothesis, it was Obtained that t_{observed} is 3,206. While for the second and third hypothesis, they were Obtained aspect is 0000 that the affective and the psychomotor aspects is 0001 for sig. Based on the results of the study, it can be concluded that teaching students with learning discovery Significantly, the model is better than the conventional learning models at MTsN Rambah in 2014/2015 academic year.

Keywords – Discovery Learning Model; Student Competency.

I. INTRODUCTION

National education standards are the minimum criteria regarding the educational system in the entire territory of the Unitary Republic of Indonesia. Scope of national education standards include content standards, process standards, competency standards, the standards of educators and education personnel, facilities and infrastructure standards, management standards, financing standards, and education assessment standards (Regulation No. 32 Year 2013 Article 2, paragraph 1). In each educational unit planning the learning process, the implementation of learning, the learning outcomes assessment, and supervision of the learning process for the implementation of the learning process effective and efficient (PP No. 32 Year 2013 Article 19, Paragraph 3). The process of learning in the educational unit organized in an interactive, inspiring, fun, challenging, motivating students actively participate and provide enough space for innovation,

creativity and independence according talents, interests, and physical and psychological development of students (Regulation No. 32 Year 2013 Article 19 Paragraph 1).

Based on the observation of the 12th until May 13th, 2014 at MTsN Rambah, there is a fact that still learning. *Teacher* centered Learning only limited transfer of materials for the benefit faces a replay that apart from everyday life. As a result, students simply memorize the concepts, theories without understanding the concepts that have been studied.

The above makes students' activity is low. Seen when the teacher asked only 7% of the 36 students who answered the rest of the students chose silence. In addition, the students' book copies of the original source. Master never invite students to the neighborhood school, students only focus on learning in the classroom. Laboratories are not lengkap and rarely used. These causes the students only learn theoretically.

Based on the study the documentation on the 14th until May 15th, 2014 at MTsN Rambah, researchers found that the cognitive competence eighth grade students is still low seen from the UB. There are still a lot of value for students are under the KKM is 70. To more clearly seen in Table 1.

Table 1. Values UB eighth grade students MTsN Rambah

No .	Grade	Average Value	Classical mastery (%)
1	VIII ₁	68.75	63.88
2	VIII ₂	59.86	30.55
3	VIII ₃	62.50	41.66
4	VIII ₄	60.13	33.33
5	VIII ₅	42.36	19.44
6	VIII ₆	61.94	33.33
7	VIII ₇	46, 80	19.44

Based on interviews and observations made by biology teachers and students on the 16th until May 17th, 2014 at MTsN Rambah, teachers stated that during the learning process teachers only assess cognitive domains only. This is made clear by the results of observations in the visible class students listening to the teacher's explanation are only 62%, which asked 14% during the learning progresses, students chatted with friends about 25%, and out of the classroom 6%, sleepy in class 11%. After interviewing some students obtained the answers turn out students feel insecure and embarrassed to ask and answer the teacher's question. Low student competency skill aspect can be seen from the records of students who do not complete and does not neatly so that they themselves feel lazy to read it.

The problems described above have an impact on students' low competence. To restore the quality and reputation of the education necessary educational system of targeted and appropriate. Learning must involve students actively and directed at three aspects of competence assessment holistically. Opinion Hosnan (2014: 34) states that the learning process entirely directed at three aspects of development as a whole, meaning that one aspect of development cannot be separated from other aspects. Thus, the learning model which allows students to develop cognitive, affective and psychomotor holistically is learning *discovery* model.

Through the learning model *discovery* students are encouraged to actively seek out and cultivate the concepts and principles to find themselves, investigating itself, so that the results would be loyal and long-lasting in the memory. Through the learning model *discovery* students are also encouraged to ask questions and draw conclusions. Learning

model *Discovery* student collecting data through experiments and observations that allows students to hone psikomotornya.

Natural Sciences (IPA) is a contextual learning, i.e. learning materials are delivered in touch with events encountered and experienced in the neighborhood. IPA contains a collection of theories that require the student to work through the scientific method and scientific attitude. Learning science requires students to construct their own knowledge to play an active part in learning activities (Bieber et al., 2015: 1)

Competence can be defined as knowledge, skills, and abilities controlled by someone who has been a part of himself so that he can perform the behavior -perilaku cognitive, affective and psychomotor as well as possible (Kunandar, 2007: 52).

Excess learning model *discovery*, namely, helping learners to improve and enhance the skills and cognitive processes, improve students' ability to solve problems(*problem-solving*), the knowledge gained through this model is very personal and powerful because it strengthens the understanding, retention and transfer, causing students directing their own learning activities to engage their minds and their own motivation, the possibility of student learning using a variety of sources, students are active in teaching and learning activities, because he thinks and uses the ability to find the final result (Hosnan, 2014: 287).

II. METHODS

This type of research is a kind of *quasi-experimental* research. The design of the study is a *Randomized Control Group Posttest-Only Design*. Can be seen in Table 2.

Table 2. Study Design

Class	Treatment	Posttest
Experiment	X	T1
Control	-	T2

Notes:

X: discovery learning model

T1: Test end of the experimental class

T2: Test the end of grade control

MTsN research was conducted in the academic year 2014/2015 Rambah the second semester is January to April 2015. Samples were obtained by technique. *Random sampling* Retrieved class VIII₂ as the experimental class and VIII₆ as the control class.

Instruments used in this research are to test and non-test. The test is used to measure the cognitive competence of students while the non-test using observation sheet to measure the competence of the affective and psychomotor student.

Data Analysis Techniques

Before testing the hypotheses, test requirements analysis as follows:

1. Normality Test

Normality test using test *Kolmogorov-Smirnov* with SPSS 16. Data normal distribution if the value of *P-Value/ Sig* obtained $> \alpha = 0.05$. Statistical hypothesis as follows:

H₀ normal distribution data

:

H₁ Data not normal berdistribusi

:

2. Homogeneity Test

Test homogeneity test *Levene* using SPSS 16. The test criteria receive H₀ if sig $> \alpha = 0.05$ and reject H₀ if otherwise, Statistical hypothesis as follows:

$$H_0: \sigma_1^2 = \sigma_2^2$$

$$H_1: \sigma_1^2 \neq \sigma_2^2$$

3. Testing Hypotheses

The first hypothesis using t-test. The test criteria is when the price of $t_{arithmetic} \leq t_{table}$ then H₀ is received and H₁ rejected and vice versa, with $df = n_1 + n_2 - 2$. Furthermore, for the hypothesis 2 and 3 using the test, *Mann Whitney U* because the data included in the nominal data. The test criteria is if sig. > 0.05 then H₀ is accepted, and if sig. < 0.05 then H₁ received.

III. RESULTS AND DISCUSSION

A. The Results Of Study

The first hypothesis test used to determine whether the learning model *discovery* affect the competence of students in the cognitive domain. The results are presented in Table 3.

Table 3. Calculation Results Hypothesis First

Class	t	t _{table}	Sig
Experiment	3.206	2.001	0.002
Control			

From Table 3 note that the price t_{count} equal to 3.206 and $t_{table} = 2.001$. This means that the value of $t > t_{table}$ and has a value of Sig. > 0.05 that is 0002 then H₀ is rejected.

The second hypothesis test used to determine whether the learning model *discovery* affect the competence of students in the affective domain. The results are presented in Table 4.

Table 4. Calculation Results the second hypothesis

Class	x	Sig.	A
Experiment	77.18	0.000	0.05
Control	70.00		

From Table 4 it is known that affective competencies students have the Sig. < 0.05 ie 0000 then H₀ is rejected.

The third hypothesis test used to determine whether the learning model *discovery* affect the competence of students in *psychomotor*. The results can be seen in Table 5.

Table 5. Calculation Results the third hypothesis

Class	average	Sig.	α
Experiment	77.18	0.001	0.05
Control	70.00		

From Table 5 note that the competence of psychomotor students has the Sig. < 0.05 ie 0001 then H₀ is rejected.

B. Discussion

1. Cognitive Domains Competency

Based on the results of data analysis known that there is the influence of learning model *the discovery* to the cognitive learning. There are six steps of learning model *discovery* that stimulation, *problem* statement, *the data* collection, *the data* processing, *verification* and final *generalization*. Rismayani (2013: 7), said that by applying the learning model *discovery* will menigkat students 'cognitive abilities, as learning model that students have prior knowledge through reading, as well as retention and students' understanding of the material being studied much longer.

In step stimulation, teachers featuring images and video that contains the issues to be explored students. At the first meeting, the teacher displays anatomical images of roots and a variety of dicotyledonous and monocotyledonous plant roots that brought students. After the teacher asked a question that can cause curiosity of students, which raised the need for students to seek answers to these questions. In addition, the higher the curiosity of students, then students will be more active in learning. Widiadnyana research results et al. (2014: 6) states that the average attitude of curious students' on learning model *discovery* gained high value so that students are more motivated to learn. Besides the stimulation phase Widiadnyana et al. (2014: 10) also

revealed that the curiosity of students to appear on other syntax.

Step 2 *problem statement* in this step the students are given responsibility for identifying the various problems of the description given by the teacher in question. At the first meeting the students write "what is the difference anatomy and morphology of plants dicots and monocots roots". Before students seek answers by collecting data, teachers must first provide the opportunity for students to make hypotheses on questions that have been created. At this stage there are opportunities for students to be active expression. Of questions were identified, students make hypotheses "dicotyledonous plants rooted riding, monocot plants fibrous roots, xylem located alternately with the phloem and xylem lies inward more than the phloem, xylem whereas dicotyledonous plants located in the center of the root and the star-shaped". There are various hypotheses which they had made. Then the teacher guides the students in determining the hypothesis that conformed to the problems and prioritize which hypothesis is the subject of investigation for students. Curiosity students on the truth of the hypothesis encourage students to prove *kenenarannya*.

The curiosity that appears in step *problem statement* supported by research Arinawati et al. (2014: 6-7), which concludes one of the benefits to be gained from learning *discovery* this emergence of scholarly attitudes of students, for example, objective attitude, curiosity to solve the problem well, and critical thinking. *Terpacunya* curiosity of students, causing students to be more eager to learn and know his knowledge. Curiosity of students provides motivation for students to seek answers to questions that it faces. The greater the curiosity of students and wanted to find a solution of the problem, the greater the students' motivation.

The third step of *data collection*. In this step, students are given the opportunity to collect a variety of information to prove the truth of the hypothesis. This is done by observing the objects brought students. In addition, students can also ask other sources, and read the existing literature. This step makes the student's activity increased, thereby making more students master the concept. In this step, students observe a variety of roots that have brought members of the group, and then grouped by the type of roots. In addition, provide information on anatomical images dicots and monocots plant roots contained in the worksheets that were created by teachers to read the existing literature.

Activities of students increased in steps of *data collection* is supported by research Istiana et al. (2015: 67), which states that the increased activity makes students more learning to

master the concept. The results show that by applying the learning model *discovery* learning activities of students obtaining higher category.

Step 4 *Data processing*. The data obtained are then processed in a way students work on the problems that exist in the worksheet. In this step It makes students more easily understand the material. Answer these questions will seem meaningless because there is basically, so that students feel satisfied with the answer itself. Purwanto et al. (2012: 27) of learning *discovery* This has the advantages makes students more active in learning, students can fully understand the concepts learned, the answers obtained lead to complacency on the students.

The fifth step *verification*. In this step, students perform verification and justification of the hypothesis made by looking at the results of *the data collection* and *data processing*. Truth hypotheses are made depending on the evidence that has been obtained. For example, the first hypothesis states that "dicotyledonous plant has a taproot types" and *the data collection* showed that the "mango plant has a taproot kind". In addition, from *the data processing* students answer questions on worksheets that reads grouped the various plants are brought into dicotyledonous plants and monocots, then students answer "mango plants including dicotyledonous plants".

The results of *verification* create a feeling of satisfaction and a high understanding. Students will feel satisfied because it has managed to find the correct answer to the question problem. Purwanto et al. (2012: 27), learning *discovery* has the advantages of makes students more active in learning, students can understand the concepts learned, the answers obtained will cause a sense of satisfied students.

Step six *generalizations*. These measures improve students' skills in drawing conclusions from all the data that has been obtained. Students make conclusions using his own language; this will make the students easier to remember the material being studied. Powered by Pratama (2014: 17) states learning model *discovery* can improve students' skills in concluding mainly on phase. *Generalization* Students are trained to make the conclusion that serve the general principles and applies to all events or the same problem, with regard to the outcome of the verification.

The results of the experimental class students studying biology have increased, due to the increased activity of students. Every step of the learning model *discovery* requires activity. Results Sutiyo (2014: 7), disclose the use of learning model *discovery* with significant influence on the

improvement of concepts by students who are indicated by an increase in student learning outcomes. The increase was due to an increase in activity of student learning. This was confirmed by Harahap (2014: 43), which states that high learning results will only be obtained when done serious student activity and earnest.

Students applying conventional learning control class. Students are less active and less enthusiastic about learning; many students who are not participating in a group discussion took place, in doing LKS only two to three people from each group go to work. At the time of learning, many students are busy themselves; talk with other group members nearby.

Cognitive learning outcomes of students in the control class are low. This is because the curiosity of students did not show up and the lack of student activity. Students in the class are not given stimulus control and the opportunity to identify the problem. It is seen from the students only receive, do chores, so the curiosity of students did not show up. The responsibility of students in the control class lower than the students in the experimental class, because the control class is not assigned to make and prove a hypothesis of the issues that have been identified. Low student's sense of responsibility leads to a lack of student participation in solving worksheets.

2. Affective Domains Competency

Based on observations obtained that the learning model *discovery* influence on students' competence in the affective domain, to obtain a sufficient criterion. While the average value obtained excellent category. A student in the experimental class is more enthusiastic in taking into account the teacher's explanation. This is due to the stimulation and the opportunity for students to ask questions. Research Prihatmawan (2015: 654) states in addition to increasing the value of students' cognitive, learning model *discovery* can also be increase student affective. Research Martisari (2014: 12), states the application of learning model *discovery* makes the average value increased student learning affective.

Learning model *Discovery* that is applied to improve the student's attitude, particularly in terms of speech. This is supported by research Wahyudi (2015: 10), by applying the learning *discovery* can make students active in the opinion. This is evidenced from the observation contained 86.11% of students who actively argue when learning takes place. In addition, research Istiana et al. (2015: 69-71), summed up the learning model *discovery* can improve learning achievement affective with an average of 77.15%. This is due to the

increased activity particularly active expression during the learning takes place.

Students in the experimental class participate much to ask, because the teacher gives the material is not in its final form. Research Prihatmawan (2015: 657), states that students apply learning model *discovery* will be active to ask questions to suss out the problem. Research Wahyudi (2015: 10) that by applying the learning model *discovery* can make students active in asking. There are 94.44% of students who actively ask when learning takes place.

Learning model *Discovery* is a model of learning that requires students to learn independently. Teachers only oversee the work of the students without going too far into it, so that students hooked to ask. This is supported by research Sutiyo (2014: 7) states that apply learning *discovery* can improve student learning activities, especially in terms of asking and answering questions. According Putrayasa et al. (2014: 8) students will feel happy when he does attempt to provide results in the form of new knowledge to the students themselves. This is evidenced by the high enthusiasm of students ask when encountering difficulties and answer questions. Research Istiana et al. (2015: 69-71), summed up the learning model *discovery* can improve student learning achievement affective due to increased activity of students in asking about things that are not yet understood.

Affective competence of students in the class as a whole gained control less criteria. Many students do not listen to the teacher's explanation. Control class students have more time to tell beyond the subject matter, because students are not given something that can lead to curiosity about the material. Students are not given the information that can stimulate curiosity, as in step *stimulation*. In the control class many students are not willing to pay attention because unattractive applied learning and make students quickly feel bored.

Confident attitude of students in the control class less. It can be seen from the interest of the student asked less. Materials provided an outline can make the loss of students the opportunity to ask questions. In addition, students in the control class are not exposed to a stimulus that can generate curiosity so that students are not provoked to ask.

Many control class that they did not work together, not active expression because students are not given the opportunity to issue an opinion in the form of a hypothesis.

3. Psychomotor Domains Competency

Based on observations obtained that the learning model *discovery* effect on psychomotor competence of students with good criterion. Students in the experimental class looks

more skilled in using the tools and materials required, in addition students are also more careful in observing the results and writes the results neatly and systematically.

Indicators skills in carrying out observations in the experimental class running smoothly. Students use the tools and materials properly and in accordance with procedures. This is because students have the urge to make observations itself properly to solve existing problems. This happens because the measures *stimulation* of students faced with a problem that raises curiosity. This is in line with Widiadnyana et al. (2014: 8-9) states that by asking a question in step *stimulation* can stimulate students' thinking and to encourage exploration. In step *problem* statement, the student is responsible to formulate hypotheses on the questions that have been identified. Pratama (2014: 15) states that the learning model *discovery* can improve the skills of students. This is because such skills have been trained on the steps of *data collection* and *data processing*. This step is to train students to be able to develop the ability to apply the procedures and critical thinking in accepting or rejecting an argument.

On observing skills indicators observations the experimental class is better than the control class. This is because; the students feel the need to observe the results obtained by careful observation in order to obtain the correct result. Students need the correct result to prove the hypothesis that has been created.

The value of the indicator psychomotor skills to write neatly and systematically the results of the experimental class is better than the control class. Students will write the results neatly and systematically so that students easily grasp the concepts and make *generalization*. learning Research Widiadnyana et al. (2014: 10) states that the learning model *discovery* instep the *data collection* students are required to record all the data or information obtained through experimentation to find the concepts expected so it will show the attitude of honest, objective and open.

Psychomotor competence of students in the class as a whole gained control less criteria. Students do not have a high sense of responsibility to the group; the students are not encouraged to make observations in accordance with procedure. Earlier learning students are not given a stimulus in the form of questions to be found the answer, so students in the control class is not interested in observing the results of observations carefully. In addition, students are not given the responsibility draw a conclusion, so that students do not write their work completely and cleanly.

IV. CONCLUSIONS AND RECOMMENDATIONS

Based on the results that have been implemented is the result of that learning model *discovery* significantly affecting the competence of students in the cognitive domain. Paired t test results there are significant differences between students' learning competency in cognitive biology before and after the learning *discovery* model. Learning model *Discovery* significantly affect the competence of students in the affective and psychomotor.

Based on the conclusion, the obtained findings that can be used as suggestions as follows: for a biology teacher, in order to choose the appropriate learning model to the learning objectives. Teachers should assess the competence of three domains holistically.

ACKNOWLEDGMENTS

This study received support from various parties. Therefore, researchers would like to thank Mrs. Dr.Linda Advinda, Kes as a mentor I, Mrs. Dr.Yuni Ahda.M.Si II as a mentor for his willingness to lead in completing this thesis. Thanks also to Prof. Dr.Lufri, MS, Mr. Dr.Ramadhan S, M.Si, and Mr. Dr.Yerizon, M.Si as lecturer contributors who provide input for the perfection of this thesis.

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