Development of Discovery Learning Model Using Scientific Approach to Increase Student's Comprehension and Communication Skills

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Article Info

Abstract

To day National curriculum submit to the basic oppinion that the knowlege can't translet just at the momment from the teacher to the stuent. It's because the students are the subject who have ability to active loding for, processing, constructing and using the knowledge, so that learning that have facilities of the teacher, the teacher need to giving opportunity to the students for constructing the knowledgein kognitive process. The ones that influential in learning process is act of determining from learning models by the teacher. Learning models that can be using is discovery learning. The purpose of this riset to know the characteristic learning models discovery learning, to know the comunicative skills that develop and to know the efectively learning models discovery learning to increase science concept capability. Design of study is research and development are described in step follows: 1) preliminary studies, 2) initial product development, 3) product trial to a small group, 4) field product trials, 5) product revision, 6) Final product have been revision. Results from the research show that: 1) The characteristic Discovery Learning Model can looked of learning syntax which of; stimulation, problem statement, data collecting, data processing, verification, and generalization. 2) Discovery Learning Model emphasizes the discovery of a concepts whose problems are engineered by the teacher. 3) Result obtained using t – test on pre-test and post – test is significant visible from the calculation t is on 8.889 while t table 2.028. This shows t count is greater than t table. 4) The development of communication skills of students has increased this is indicated from discovery I 33% and discovery II 75%. Written communication skills of the highest on the indicator of translation of goals and the lowest on the indicator material mastery. Based on the results can be concluded that: development of Discovery Learning Model should be based sintax of discovery learning, development of Discovery Learning Model using scienstific can be increase student's comprehension and communication skills.

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INTRODUCTION

Curiculum orientation of 2013 is occurs of insreasing and balancing among attitude, skills, and knowledge competences. This matter in line with Indonesian constitution no. 20 on 2003 in line by provision no. 35: Graduates competence is skills qualification that including attitude, knowledge, and skills realated by national standard agreed .

In competence standard for basic and middle education unit (Depdiknas, 2006: 377) mentioned by science lessons should be done by inquiry scientific to growth up the thinking, working, science attitude skills, and ability to communicate the soft skills as students important aspect. Based on Berthal (by Wati, 2010), Soft skills is personal and interpersonal behaviour that can be developed and maximized the human performance. Based on O'Brien (1997) soft skills categories divided into 7: (a) communication skills (b) organizasional skills (c) leadership (d) logic and creative (e) effort (f) group skills (g) ethics.

By this 7 skills, researcher will developing about communication skills. Based on Handoko (1986) communication is understanding transfer in form of ideas or informations by someone to another people around. Communication skills is one of most important skills to developed because if the information is can not transfered effectively so will occur the miss communication or misunderstanding. By this backgrounds, writer proposed this research design through the title: "Developing of Discovery Learning Model by Scientific Approach to Increase the Concept Understanding and Student Communication Skills".

METHODS

This research is used Research and Development by steps are: 1) preface study, 2) first research product, 3) small group experiment, 4) observational experiment product, 5) product revision , 6) finished product after revision. Research process and development begins by preface study including literature study and observational experiment. The researcher do literature study by material research and bibliography about learning models that used in curiculum of 2013, study some books about density material and study about communication skills, to do observational experiment the researcher observed school condition, student, the tools and learning process analysis, and then the reasearcher made learning tools and support instruments to validated by validator. After the experiment got some revisions and then testing to small group, Small group experiment is used One-Shot Case Study because just to do the last observation from treatment given (Sugiyono, 2008). After that fixed and tested to the big group in learning process. After did the research and get some datas, the researcher analyze every instruments, to do mastering concepts testing the researcher is used gain testing. To do communication skills testing the researcher is used observational method (observation sheets). In percentil calculation of communication skills assesment is used the formula below:

$$Np = \frac{n}{N} \times 100\%$$

Information:
P = Percentil score reached
n = Score amount reached
N = Minimum score reached

To analyze every communication skills indicators compared by succesful criteria student ranges like below:

76 – 100% = Good
56 – 75% = Enough
40 – 55% = Dissatisfactory
<40%   = Bad
(Arikunto, 2002: 24)

The instruments that used to take communication skills datas like below:
a. Pre-test problems and pst-test problems.
b. Communication skills observational sheets.
c. Teacher scoring performance questionnaire sheets form.

Attitude assesment score observational sheets form.

RESULTS AND DISCUSSION

Development Discovery Learning tools model begins to identifying the characteristics first, to knowing the characteristics of Discovery Learning model the researcher do bibliography study. The researcher compared Discovery Learning model with Problem Based Learning model and Project Based Learning. By comparing the definition, syllabus, Tools of Learning Plans (TLP), Student Worksheets (SW) and evaluation tool so we can knowing the characteristic of Discovery Learning model. The comparison learning be able to see on Table 1.

Table 1. Learning Model Comparison DL, PBL, and PJBL

Discovery Learning	Problem Based Learning	Project Based Learning
Underlined by found of concepts	Underlined by problem solving	The results is a product
The problems is just made by teacher	The problem is just made by teacher	The problems is come from the teacher or found by them self
The agenda is prepared by teacher	The agenda is prepared by taecher	Basically the agenda is made by own self
Student oriented	Student oriented	Student oriented
Collecting the structured information	Collecting the structured information	Collecting the collaborative information
Problem solving design is guided by teacher	Problem solving design is guided by teacher	Problem solving is made by own self
Evaluation process do not have to be continue Shorter time	Evaluation process do not have to be continue Shorter time	Evaluation process is continue and periodically Longer time
DL syntax model involved: Stimulation (Give the stimulation), Problem Statement (Question Problem identification), Data Collection (Collecting the data), Data Processing, Verification (Proof), Generalization (Make the conclution).	PBL syntax model involved : Student orientation by problem solving, Organized the student in learning process, Guiding the student investigation independenly or in group, Developing and presenting the creation, Analyzed and evaluated the problem solving process.	PjBL syntax model involved : Determination of basic questions, Arrange the project plan, Arrange the schedule, Monitoring, Examine the results, Experience evaluation.
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data),	investigation independenly or	Monitoring,
Data Processing,	in group,	Examine the results,
Verification (Proof),	Developing and presenting the	Experience evaluation.
Generalization (Make the	creation,	
conclution).	Analyzed and evaluated the	
	problem solving process.	

In developing of Discovery Learning tools model which approach the scientific is more underlined to the inductive reasoning that is inductive reasoning that placing the specific evidence inside the larger idea relation (Demi: 2017, 17-27; Wiyanto et al., 2017).

The datas which used while analyzed average difference of student learning scores is the student pre-test score and student post-test score after the usage of Discovery Learning. The results of pre and post test is be able to see on Figure1.
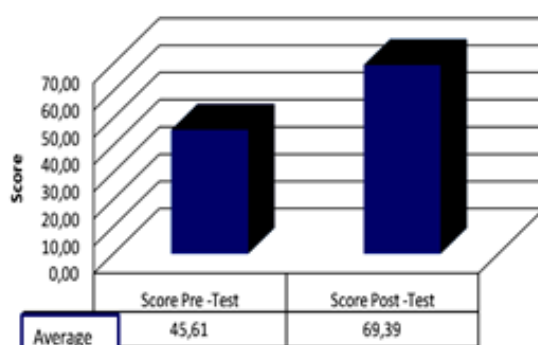

Figure 1. Analyzed of Pre-Test and Post-Test Results

Analyzed of pre and post-test results is used the excel calculation, student learning result is be able to calculated by softwar SPSS series 20, analyzed the difference of student learning result is calculated by paired sample t-test beacuse all of datas in normal distribution and homogen variances. The result that come from significance of 2-tailed is 0.000. If that score is compared by a score= 0,05% (5%) so the significance of 2-tailed <a. The second examination aimed to knowing exist or not the significance different among pre-test and post-test score. The different test is be able to see on Table2.

Table 2. The Average of Different Test of Student Learning Scores

Calculation	Score	Discussion	Conclusion
T count	8.889	T count >	H0 rejected
T table	2.028	T table	H1 accepted
Sig.2-Tailed	0.000	Sig.2-Tailed< A	H0 rejected H1 accepted

On calculation experiment t count is existed on 8.889 and then the t table is 2.028. This case is shown t count is bigger than t table, so can conclude that there is the significance different on learning results before and after used Discovery Learning model.

According to Trowbridge & Bybee (1990), the inquiry learning level is divided into 3 are:

the first level is discovery learning, the second level is guide inquiry, the most complex is open inquiry. Research that did by Mayer (2004) is conclude that guided discovery learning is more effective than pure discovery while helped the transfer process and student learning. As same as Mayer, the research of Aini (2011) is proven that applied the guided discovery can increase the learning results and student scientific communication skill.

The communication skill are divided into 2, oral and written. Communication skill development on oral is can observed through group discussion, presentation or interview. And then written communication is can observed when answearing the question by written and when make the Discovery activity report.
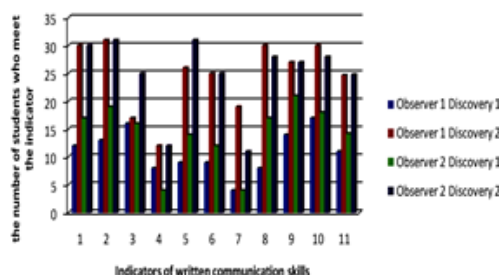

Figure 2. Scoring Graphic of Written Communication Skill

Based on Figure 2 is seen the second experiment is have the higher score. Predominate Communication skill is the clear main objective, the preface is good enough, and then answearing the question clearly. Whereas communication skill which not yet many to mastered is well done the material and sistematically material, so that increasing both of 2 the student is asked to even more in learning process.

Based on Figure 3 is seen that the second experiment have the higher score than before. Predominate communication skill is listen carefully about what people said, eye contact, and give the answear. Whereas communication skill that still need improvement is when explaining something in presentation many students are still reading the text.

The usage of Discovery Learning model with scientific approach is be able to give the chance to student to express their statements that can increase student communication skill. Usage open inquiry method is effective to developing the scientific communication skill by writing test scores (Sarwi: 2013).
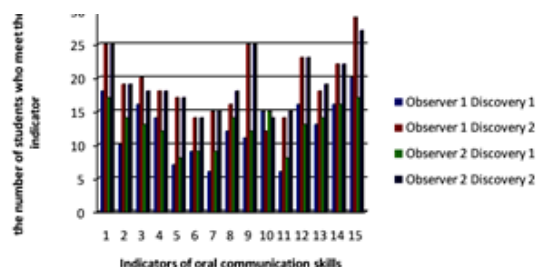

Figure 3. Scoring Graphic of Oral Communication Skill

Discovery Learning model is be able to change the teaching way before that still use teacher center method is become student center method, the student is be able to explore their ability and get a lot of more real learning experience so the student is able to get better knowledges, this case can increase the understasnding of student. The Discovery Learning model applied is be able to increase the learning activities and increase the student learning results (Wahjudi: 2015, 1-15).

CONCLUSION

Based on researched results be able to conluded as below. Characteristics learning model of Discovery Learning model as below. Discovery Learning model is underlined on concepts discovery which not yet known before by student. The student is do the practical learning in group that supervised by the teacher to find the answer through problem solving that created by teachers. Discovery Learning model be able to see by learning syntax including stimulation, problem identifying, datas collection, datas processing, proof, and making conclusion.

Discovery learning model that developed is be able to increasing the student understanding concepts, this case is seen from increasing post-test score and getting results is used t-test by pre-test and post-test was reached

significant results is seen by t counts on 8.889 and then the t table on 2.028. This case shown if t counts ias bigger than t table.

The student communication skills development is increasing. Communication skills that wrote is the highest one by objectives description and the lowest one is on material well done.

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