Improving Senior High School Student's Creativity Using Discovery Learning Model in Islamic Senior High School 1 Jambi City

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Abstract

The curriculum 2013 as a new curriculum offers a scientific approach as a learning approach to address the challenges of the 21st century and improve the quality of education in Indonesia. Scientific approach is considered capable of improving scientific attitude, scientific thinking and scientific skills. Scientific attitude encourages students to be able to think Creative by using scientific data found and supported by scientific activities. One of the models offered in the curriculum 2013 is discovery learning which is an active student learning model. This research is a classroom action research conducted in three cycles to apply discovery learning model as an effort to improve students' scientific attitude, especially student creativity. With the involvement of 24 students Islamic Senior High School 1 Jambi City 2014/2015 in Physics course material Rectilinier Motion. From the test of each cycle, the students' creativity results are as follows: cycle I (2.08), cycle II (2.35) and cycle III (2.66). From the data can be concluded that by using the model of learning discovery learning can improve student creativity attitude.

Keywords: Scientific attitude, discovery learning model, student creativity.

Introduction

Indonesia is faced with new challenges in the world of education with the presence of a new curriculum that is the curriculum 2013. Curriculum Changes Education Unit Level (KTSP) into the curriculum 2013 as one of the response to the quality of education Indonesia is not considered good, it was seen from the Program for International Student Assessment (PISA) of 2012 in the field of science Indonesia ranked 64th of 65 countries. The low level of students' science skills in Indonesia can also be seen from the results of The Third International Mathematics and Science Study (TIMSS) in 2007 and 2011 in science for junior high school students, showing that more than 95% of Indonesian students are only able to reach while nearly 40% of Taiwanese learners are able to reach high and advanced levels (Kemendikbud, 2013: 80). The 2013 curriculum is considered capable of responding to the challenges of the 21st century and improving students' achievements in science by using scientific shortcuts. With this scientific approach students are expected to have a scientific attitude, scientific thinking and scientific skills. Scientific Approach is used as a solution to improve teacher's method of teaching using a variety of models. The 2013 curriculum offers a variety of alternative learning models that teachers can use to improve the quality of learning. Not only increase the ability of cognitive, but also to improve affective and psychomotor ability of students, that is by applying learning model problem base learning, scientific learning and discovery learning. Various models of learning can be tailored to the material and the needs of students in understanding a field of science. Teachers as facilitators and mediators have a need to be able to implement these changes in order to achieve the expected goals.

One area of science that students learn is physics. The purpose of physics lessons is not only to develop students' cognitive abilities in knowing natural events, but also a process for improving skills that can develop themselves. To develop the

ability, physics learning should be adjusted to the physical characteristics as a part of science subject, Kemendikbud (2013) describes that physics learning should reflect the competence of scientific attitude, scientific thinking and scientific work skills. In this study researchers focused on developing students' scientific attitude. The students' scientific attitude is the tendency of students to respond to events scientifically. So hopefully the scientific attitude is able to reflect scientific thinking and scientific skills.

Damanik (2013) defines the scientific attitude is "a tendency, readiness, willingness of a person to give responses / responses / behavior in science and qualify (law) science that has been recognized truth. So it can solve problems, assess ideas and information to make decisions. "Emphasized by Hidayati (2014) that scientific attitudes is an emotional notion of a method of science and directly or indirectly related to an action. This implies the quality of the intellectual mind in truth, respect and freedom of communication in science. Sahida (2014) states that a scientific attitude can affect student learning outcomes. Therefore, by increasing the scientific attitude will also improve student learning outcomes, not only affective and psychomotor students. Harlen (Herson, 2009) detailed the dimensions of scientific attitude in the Nine attitudes of curiosity, respect for data, critical thinking, creativity, open mindedness and cooperation, and perseverance.

Islamic Senior High School 1 Jambi City is one of the favorite schools under the auspices of the religious ministry. From the result of interview and observation with physics teacher at school, it was found that attitude assessment has not focused on scientific attitude. So far the attitude aspect which is considered only for general attitude such as, students diligently do the task, the students behave and the students activeness in the class. On the other hand curiosity, discipline, honesty, want to get something new, and especially the attitude of student creativity has not become the focus of the attitude that needs to be developed. Found on the previous discussion, scientific attitude can also affect student learning outcomes. Based on the results of observations of the author to the school, obtained the value of learning results of physics subjects as follows:

Table 1. Average Grade Physics Class X5 Islamic Senior High School 1 Jambi City Academic Year 2014/2015

NO	Class	Score Average
1	X5	6,3
2	X6	7,0
3	X7	6,5
4	X8	6,0

Source: Recap the value of physics teacher Islamic Senior High School 1 Jambi City

From the data can be seen that the students have not reached the minimum cricteria of mastery learning in the specified that is 7.5. Solution to overcome the problem is by applying active learning model, where students get involved in the process of knowledge discovery. By involving students in the discovery process will also improve the ability of scientific attitudes, especially the attitude of student creativity is still low that can be seen in the table below:

Table 2. Scientific Attitudes Class X5 Islamic Senior High School 1 Jambi City School Year 2014/2015

NO	Scientific Attitude Dimension	Score 1th	Score 2th	Score Average	Category
1	Curiosity	3.12	3.13	3.12	B
2	Respect for data	3,13	3.32	3.22	B
3	Critical thingking	2.27	2.37	2.32	C+
4	Creativity	2.05	2.08	2.06	C
5	Open mindedness and cooperation	3.19	3.16	3.17	B
6	Perseverance	2.76	2.62	2.69	C+

Source: Preliminary observation

This attitude of creativity will enable students to combine, collaborate, discover many answers, new possibilities and discoveries that emphasize quantity of usability. Munandar (Apridawati, 2007) describes several definitions which are the conclusions of several definitions formulated by the experts that are, 1) creativity is the ability to create new combinations, based on data, information or elements. In this case creativity is emphasized on creative product. 2) creativity is ability based on data or information available to find many possible answers from a problem where the emphasis is on the quantity of accuracy and diversity of answers. 3) operational creativity can be formulated as an ability that reflects fluency, flexibility and originality in thinking, as well as the ability to elaborate (develop, enrich and detail) an idea.

Discovery Learning as one of the learning model applied in the 2013 curriculum that able to improve students 'scientific attitude one of them is student's credibility, this is in accordance with research conducted by Widiadnyana (2014) that there are differences of students' scientific attitude significantly between students who learn by using model discovery learning with students learning to use direct learning model (F = 11,013; p <0,05). Burner was recognized as the first person to introduce the learning of Discovery learning as a formal learning theory and publish it in a book entitled The Proces of Education in 1960. Burner in Geraldine (2008: 48) defines Discovery learning as a learning method making students as learning centers. "His (Burner's) definition of discovery learning was a method of encouraging students to ask questions and formulate their own tentative answers, and to deduce general principles from practical examples or exprerinces". Budiningsih in Kemendikbud (2013) also explained that the Discovery Learning model is to understand concepts, meanings and relationships through an intuitive process to finally come to a conclusion. So the function of the teacher is more to the facilitator and the companion so that the conclusions obtained by the students are correct.

In the learning process using Discovery Learning students will play a variety of professions. They can be mathematicians, detectives, scientists and others who can support learning activities. The role function is to make students feel they have a stake in finding the information assigned, according to the role they choose. Burner (Kemendikbud, 2013) says: Teachers should give their students a chance to become a problem solver, a scientist, a historian, or a mathematician. The learning process works well and creatively if the teacher gives the student the opportunity to discover a concept, theory, rule, or understanding through the examples he or she encounters in his life.

This kind of learning process will give students the opportunity to be able to carry out various activities of collecting information, comparing, categorizing, analyzing, integrating, reorganizing materials and making conclusions. So that the learning process becomes more active and independent. Burner in Geraldine (2008: 49) explained that, "Discovery learning; an approach to intruction through which students interact with their environment by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments. With the ideas that were more likely to remember their concepts "Discover" on they own ".

Ruseffendi (Maarif, 2016) explains that the discovery method is a method of learning that is structured to gain knowledge that they have not known before without being immediately notified by the teacher. Discovery learning requires students to find out their own knowledge with the help of teachers. In the process teachers play a role as motivators, facilitators, learning managers. Further Kosasih (2014) describes the function and role of teachers in teaching and learning process using the Discovery Learning model as a motivator, which encourages students to think and work hard to be able to learn well. The students become confident that they are able to find something important and useful. Furthermore, the teacher also acts as a Facilitator, which provides the learning resources needed by the students in realizing their findings. Learning resources in question can be a variety of reference materials or learning environment in accordance with the context of learning. Finally, the teacher also acts as a learning manager, organizing intercultural relationships and learning plans that they will play, for example by pairing, group discussions, and visiting certain places so that their activities are effective.

Syah (kemendikbud, 2013) to apply Discovery Learning in the classroom, there are several procedures that should be implemented in general teaching and learning activities as follows:

a. Stimulation (Stimulation / Giving Stimulation). The first stage that can be done by the teacher is to provide stimulations to students which are useful to cause keinginan conduct investigation. Shah (kemendikbud, 2013) stimulation serves to provide conditions of learning interaction that can develop and assist students in exploring materials. The technique that can be used at this stage is the questioning technique. Bruner in Kemendikbud (2013) provides stimulation by using questioning technique by asking questions that can expose students to internal conditions that encourage exploration.

b. Problem Statement (Statement / Problem Identification). Kosasih (2014) explains in this stage the teacher convey a problem to arouse and curiousness about certain phenomena. So students feel compelled to do more deepening. The shah (kemendikbud, 2013) also explains this stage of the teacher provides an opportunity for students to identify problems and agenda issues relevant to the subject matter, followed by hypotheses. This stage is also a useful technique in building students to get used to finding a problem and to feel involved in the discovery of a concept.

c. Data Collection (Data Collection). At this stage the student explores to find as much information as relevant and can prove the hypothesis that has been made. Kosasih (2014) describes several activities that students can do to collect data to test the hypothesis: 1) reading various documents, 2) conducting field observations, 3) laboratory research, 4) conducting

interviews, 5) distributing questionnaires. Kemendikbud (2013) also provide advice in the implementation of data collection by conducting their own trials and so forth.

Research methods

Research method in this research is classroom action research that done in three cycle. The targeted institution is formal school education. So the Action Research is called Classroom Action Research. Kunandar (2011) Classroom Action Research is a form of self-reflection activity by education actors to improve rationality and justice regarding: (a) their educational practices, (b) their understanding of such practices, (c) -the practice is implemented.

This research was conducted in X5 class in odd semester at Islamic Senior High School 1 Jambi City in academic year of 2014/2015 which amounted to 24 students, with subject teachers and recording teaching and learning process of various data sources. This study was conducted in three cycles consisting of cycle I, cycle II, and cycle III. Each cycle has certain stages in accordance with the steps in class action proposed by Kunandar (2011). The stages in question are; 1) Planning, 2) Implementation of acting, 3) Observation and evaluation, 4) Analysis and reflection.

This research involves the observer, the observer is the subject teacher, the teacher will fill the creativity observation sheet that has been available, so the data used was qualitative data. In this study the authors used three behavioral indicators presented by Herlen to measure students' attitudes of creativity that can be measured through observations ie, showing different reports with classmates, suggesting new experiments and outlining new conclusions of observations.

From the observations made, the next step is to perform the analysis and reflection, the results of the analysis and reflection will determine whether the actions taken can solve the problem, if the results have not been as expected, or the problem is not resolved then the improvement in the next cycle. At this stage, the researcher evaluates the implementation of the action in cycle I which is used as the consideration of the next learning cycle planning.

Action plan of cycle II is intended as a result of reflection and improvement on the implementation of learning in cycle I. While in cycle III is intended as a result of reflection and improvement of the implementation of learning in cycle II. Stages of cycles II and III follow the steps in cycle I.

Results and Discussion

Result of Student Creativity Attitude

Student creativity attitudinal data obtained through observation sheet assessed by the teacher on the implementation of physics material learning straight. Assessment of the attitude of creativity is done every meeting in every cycle consisting of two meetings. The results obtained are used to reflect each cycle to determine the deficiencies in each indicator of student creativity and provide solutions to improve it.

From the results of the assessment of cycles 1,2 and 3 obtained data assessment of students' creativity attitude can be seen from the table below:

Table 3. Rating Result of Student Creativity Attitude Cycle I

Indicator	Score Average	Catagory
Assessment 1		
Show different report with classmates	2.08	C
Suggest new experiments	2	C
Outlining the new conclusions of observations	2.16	C
Assessment 2		
Show different report with classmates	1.95	C-
Suggest new experiments	2	C
Outlining the new conclusions of observations	2.29	C
Score Average	2.08	C

Table 4. Rating Result of Student Creativity Attitude Cycle II

Indicator	Score Average	Catagory
Assessment 1		
Show different report with classmates	2.08	C
Suggest new experiments	2.21	C
Outlining the new conclusions of observations	2.37	C+
Assessment 2		
Show different report with classmates	2.17	C
Suggest new experiments	2.38	C+
Outlining the new conclusions of observations	2.5	C+
Score Average	2.35	C

Table 5. Rating Result of Student Creativity Attitude Cycle III

Indicator	Score Average	Catagory
Assessment 1		
Show different report with classmates	2.42	C+
Suggest new experiments	2.33	C+
Outlining the new conclusions of observations	2.41	C+
Assessment 2		
Show different report with classmates	2.67	B-
Suggest new experiments	2.63	C+
Outlining the new conclusions of observations	2.67	B-
Score Average	2.66	B-

Discussion

Cycle I

In cycle I can be seen that student creativity attitude is still relatively low by getting category C on all indicators. The obstacles found in improving students' creativity attitude are: a) Students do not have high discovery and creativity attitude. This was seen from the unmotivated students to dare to show different reports with classmates, b) Students have not dared to suggest new experiments, new ideas and new ways to solve problems. This happens because the motivation for creative thinking is still lacking, c) Students have not been able to describe the conclusions of the lessons that have been implemented. This is due to the unfamiliarity of the students describing their own conclusions, usually the teacher explaining the conclusions.

The implementation of learning by using discovery learning model in cycle I by using the method of group discussion and experiment. The teacher has created a Work Sheet (WS) that uses the syntax present in the discovery learning model. At the stage of stimulation students have provided questions regarding the materials taught that day and asked students to observe and understand the issues together and provide an understanding of their respective duties. In the problem statement stage the teacher only guides the students in the form of groups to identify and analyze the problems as much as possible, in accordance with their respective expertise and the teacher invites each group to select one of the conclusions which are then formulated in the form of questions or hypotheses. In the data collection stage the teacher invites students to collect data by doing experiments that have been listed in the WS. In the data processing stage students are welcome to fill in the data fields that have been provided. At the verification stage the teacher directs students in groups to conduct investigations, completion steps to check errors, Teacher provide an opportunity to discover concepts, theories that he encounters in life and the Teacher gives one group a chance to present and respond to by another group. In the generalization stage the teacher invites each group to draw conclusions from the experiment or discussion, and guide the students to get the appropriate conclusions.

To improve the shortcomings that exist in cycle I and to improve student's creativity attitude, it is necessary to proceed to cycle II by doing some improvements, as follows:

1. Improve student's creativity attitude. Doddington (2010: 121) explains that creative and meaningful experiences can be gained if teachers use a child-centered approach to education. Learning designed to do this provides opportunities and activities that are sense-based and involve physical activity, through collaborative movements for example.

2. Improving the attitude of creative thinking so that students dare to pour ideas is to instruct students write their ideas and read it aloud. Siberman (2014: 152) explains that teacher stimuli often get no response, so reading the text out loud will help students focus their minds and ask questions, think creatively and stimulate discussion.

3. Providing motivation for students to be diligent and willing to repeat the activities and continue to learn. Sibermen (2014: 281) in his book describes how to keep students learning is as follows:

a) Clarify the expectations of teachers so that students do not stop learning.

b) Tell students that there are many ways for them to continue to learn independently.

c) Show that one way is to create a list of their own ideas to "keep learning."

4. Astawan (2013) revealed that using the method of physics Gasing effect on improving learning activities, problem solving skill, and describing students' responses in quantum learning.

Cycle II

Implementation of action performed on cycle II consists of two meetings and one cycle exam. The first meeting discussed the sub subject of Uniform Rectilinier Motion while for the second meeting discussed the Uniform Accelerated linier Motion. The result of students' creativity attitude has improved although still in category C with learning using discovery learning model, from the average of 2.08 to 2.35. indicators show different reports / opinions with their friends are still not visible, so at the time of discussion only some students who dominate the discussion.

Implementation of learning in cycle II adopt method of learning physics gasing (easy, fun and fun) work of Prof. John Surya applied to the learning discovery learning model. By using student work sheet, the students are involved in the discovery process and make the students active in learning. At the stage of student stimulation presented questions related to everyday like what is the same between speed and velocity. At the stimulation stage students are also accustomed to express their ideas with a louder voice, followed by motivation from the teachers about the excitement of learning today. By using work sheets of physics gasing (one of kind learning method developed by Yohanes Surya) which makes the analogy of physics lesson easy, in the process of data collection and data processing, students have been able to answer the problem quickly and analyze the relationship between acceleration and time properly. at the time of data verification, students calculate events with the existing formula and display it in the presence of classmates. The generation stage of the students is asked to summarize the lesson today and the teacher invites the students to convey his or her own idea of the implementation of the lessons of the next meeting.

To improve the deficiencies that exist in cycle II and to improve student's creativity attitude, it is necessary to proceed to cycle III by doing some improvement, namely in the discussion process. There are several things that can make the discussion more flowing and improve the attitude of creativity and increased student discovery, ie the teacher's role during the discussion is to facilitate student's student traffic. Sibermen (2014: 52) outlines ten tips to facilitate discussion.

Reiterate what the student has said so that he / she feels that his or her opinion has been understood and that the other students can hear an overview of what is delivered at length.

Make sure the teacher understands the words delivered by the student or the student's instructions to clarify what is meant.

Give praise to yanng's interesting and deep opinions.

Explain the brainstorming of student suggestions on the discussion by using an example or suggest a new way.

Sparkle the discussion by speeding up the process, using humor for example.

Show a subtle disagreement with the student's opinion to trigger further discussion.

Pick up all opinions, show their connection to each other.

Pull together ideas, showing their relationship to each other.

Change the group process by altering the method for obtaining participation or moving the group to a stage of evaluating ideas that have been placed before the group.

Summarize (and record, if desired) the major views of the group.

Cycle III

Cycle III is a continuation and improvement of cycle I and II. The learning process is done based on the results of the reflection of action in cycle II, which there are some activities that have not been done well. Implementation of the action held two meetings. Meeting I discusses the sub subject of free fall motion and downward vertical motion while for the second meeting discusses the sub subject of vertical upward motion.

The result of students' creativity attitude increased in cycle III, ie from 2.35 to 3.66 from category C to B-. In the third cycle students have begun accustomed to identifying problems and discovering the meaning of the experiments they are doing. Students are also getting used to sharing ideas and opinions both in discussion forums and class forums. Although still in the low category but the students start accustomed to active in the classroom.

The discovery model used in this cycle still uses the Work Sheets that has been adapted to the more in-depth material related to straight-line material. At the stimulus stage students are asked to connect the straight motion on the plane and straight motion on the vertical plane. With prior knowledge they were asked to hypothesize the problem. At the data collection stage students have been accustomed to analyzing the events found in the experiments and cultivating them, so that they are able to attribute relationships between variables. At the time of verification data the students do calculations on more complex events with the formulas they've got. At the generation stage students are asked to report their findings for three cycles of walking.

Based on the above description, it can be seen that by using syntax in learning discovery learning model, able to increase their creativity, especially on the courage and ability of students to show different report or opinion with their classmates, students start accustomed to suggest new experiments and decompose new conclusions the observations they have made.

Conclusion

Based on the results of classroom action research that has been implemented, it can be concluded that learning by using the learning model of Discovery Learning can improve students' creativity attitude on straight motion materials in class X5 Islamic Senior High School 1 Jambi City. This can be seen from the average value of students' scientific attitudes in the first cycle of 2.08, increased in cycle II 2.35 and increased again in cycle III reached 2.66.

Based on the conclusions obtained above and to further improve the students 'scientific attitude, the authors suggest several things, namely: Physics teachers can use the Discovery Learning model to improve students' creativity, especially in straight motion materials and because this research is only done on straight motion material , it is expected that similar research can also be carried out on other materials. As well as expected teachers and schools are able to support and apply active student learning with learning models offered in the curriculum 2013.

Acknowledgments

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