Journal of Innovative Science Education

Students Critical Thinking Skills in Project-Based Learning Assisted by Edmodo Social Networking Site

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Article Info	Abstract
	The project-based learning model developed by collaborating with the social networking site Edmodo is expected to be able to change the educational paradigm which once embraced teacher-centered learning into student-centered learning. This study aims to determine the effectiveness of project-based learning model assisted by Edmodo's social networking site on critical thinking skills and student learning outcomes. This research was conducted in class VIII SMP Negeri 6 Jepara in even semester of Lesson 2018/2019 year on substance pressure. The research design used was pre-test and post-test control group design. The data were collected by questionnaire, observation, documentation and test method. The results showed that the value of t_{count} critical thinking skills and student learning outcomes > t_{table} value (2.042). The value of t_{count} critical thinking skills and learning outcomes respectively is 12.714 and 2.757. The results of this study conclude that the project-based learning model assisted by Edmodo's social networking site is effective to improve critical thinking skills and student learning outcomes. © 2019 Universitas Negeri Semarang

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INTRODUCTION

Permendikbud number 65 of 2013 stated the learning process is on education unit should be held interactively, inspirational, fun, challenge, motivate students to participate actively, and provide space which is sufficient for initiative, creativity, and independence according to talents, interests, and physical and psychological development of participants student. Model learning that recommended by 2013 Curriculum is project-based learning, problem-based learning, discovery learning, and guided inquiry (Kemendikbud, 2014). Wrong one learning model applied in learning is project-based learning model expected capable develop the skills of students especially critical thinking skills and creativity of students (Anazifa & Djukri, 2017).

Project-based learning model which is applied in the learning process, associating material with problems real in everyday life, like social, economic, cultural and environmental so as to be able to develop the environment better learning for development of metacognition learners, as has been done in research Sart (2014) and Garcia (2016).

Application project-based learning model could improve critical thinking skills, creativity, learning motivation and student learning outcomes as in the study of Insyasiska et al. (2015), Sasson et al. (2018), and Mutakinati et al. (2018). Similarly with Putra (2016), Asri et al. (2017), and Ismuwardani et al. (2018) who have done research using project-based learning model, from results the research uses models capable project-based learning increase independence, creativity, and results learn participants student. In implementation of project-based learning model can collaborated with social networking sites.

Social networking sites are services web-based that allows individuals to (1) build a public or semi-profile public in a limited system, (2) making list of other users in the group, and (3) see and interact with other people in social networking sites (Boyd & Ellison, 2008). With social networking sites, users can easily participate, share, and create something with easy and fast. Latest developments from social networking sites like Facebook and Twitter bringing new opportunities not only for socializing and marketing, but also for sharing knowledge and learning (Eid & Al-Jabri, 2016). On the other hand, it changes the educational paradigm that used to be adhering to teacher-centered learning becomes student-centered learning, bringing about change very significant for methods learning developed at this time (Basori, 2013). One of the social networking sites which can be used in learning is Edmodo.

Edmodo is a social networking site based on the school based environment. Edmodo was created using the concept of social networking, which refers to Facebook social network so this system has features similar to Facebook (Basori, 2013). In addition to social networking sites Edmodo also supports the learning process online. Use of social networking sites Edmodo on online learning could improve learning effectiveness and student learning outcomes, this is in accordance with research Nee (2014), and Al-Said (2015). Similarly, Monalisa & Ardi (2013), Kurniawati & Djuniadi (2015), and Daulay et al. (2016) who have conducted research using Blended Learning based Edmodo social networking site, from the research has been done, the results are increasing interest and learning outcomes of students.

Similar research by Enriques (2014) use Edmodo social networking site in online learning obtained that Edmodo social networking site is well used as additional tools for classroom learning because make it possible participants student for improve their learning through participation active in online discussions. Social networking site can be collaborated with existing learning models, such as project-based learning model.

Based on the results of initial observations conducted by researchers on October 4 2018 and midterm assessment results odd school year 2018/2019, learning process teach in class VIII of SMPN 6 Jepara The results are: (1) the

learning process of students only focused on what was delivered teacher; (2) teaching and learning activities occur one direction from teacher to student; (3) participants students tend to be passive and less critical; (4) the independence of students in learning science at class is still lacking; (5) participant learning outcomes students are not optimal; (6) teacher only using conventional media; (8) influence from the social network used by students make students often ignore lesson.

There are problems inside science learning from initial observations the researcher has done and the results of the assessment semester odd year of study year 2018/2019 in SMPN 6 Jepara, in particular still low critical thinking skills, independence, and learning outcomes of students, need a learning model that can minimize problem that is. Based on the above explanation, it is seen need to do research on effectiveness project-based learning model assisted by Edmodo social networking site to critical thinking skills, and learning outcomes of students for class VIII SMPN 6 Jepara.

Based on the background that has been described above, then the formulation of the problem inside this research is (1) how is effectiveness project-based learning model assisted by Edmodo social networking site to students' critical thinking skills? (2) How is effectiveness project-based learning model assisted by Edmodo social networking site to the learning outcomes of students?

The goals to be achieved in this research is analyzing effectiveness project-based learning model assisted by Edmodo social networking site to critical thinking skills, and learning outcomes learners.

The results of this study provide benefits include: (1) improving critical thinking skills, and learning outcomes cognitive learners towards learning Science, (2) broadening teachers' insights regarding existing science learning models, (3) can made as consideration for choose the science learning model interactive, (4) motivating teachers to utilizing learning models assisted by Edmodo social networkin site on learning another material

subject of science, (5) can used as a reference in the use of the model learning assisted by Edmodo social networking sites on material and other subjects.

METHODS

The research method ussed in this study is the experimental method with True Experimental research design. Design with the pretest-posttest control group type design Sugiyono (2012) as shown in Picture 1.
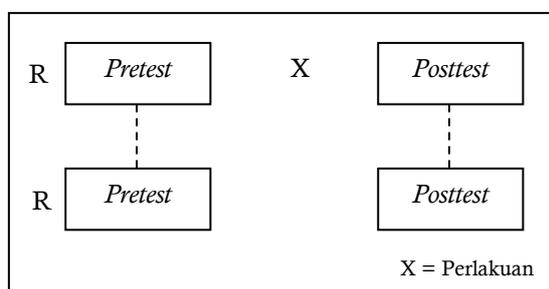

Figure 1. Pretest-Posttest Control Group Design

The population of this study were participants students in class VIII A, VIII B, VIII C, VIII D, VIII E, VIII F and class VIII G SMPN 6 Jepara 2018/2019 Academic Year with total 224 learners. The sample in this study are class VIII G students with a number 32 students as a control class, and class VIII F as an experimental class with a number 32 students.

Variables used in this research is an independent variable covering project-based learning model assisted by Edmodo social networking site, the dependent variable include: critical thinking skills, and results learning, and control variables include: curriculum, teacher, learning material, and the same number of lesson hours.

The instrument will be used first tested the validity (construct validity, content validity, and item validity), reliability of questions, distinguishing items, and the level of difficulty of the item. Item about that used for the pretest and posttest inside this research is the item that fulfills valid criteria. Based on trial data analysis questionnaire and questions

obtained 20 multiple choice questions who meet valid criteria.

Data collection technique used to collect data on this research is arranged based on variables the variables studied were as follows: test used to get data about critical thinking skills, and learning outcomes learners. This test method is a test question shaped description for thinking skills critical students and multiple choice tests for improvement in learning outcomes.

Increase average scores in pretest and postest is calculated using the average gain formula normalized average, is gain ratio actual average with average gain maximum (Wiyanto, 2008). The gain formula used as follows:

$$\rule{3cm}{0.4pt}$$

The t-test analysis versus hypo- thesis testing critical thinking skills, and learning outcomes with using the *SPSS* program. Price is the obtained then consulted with price of t table with an error rate of 5%.

RESULTS AND DISCUSSION

The results of the analysis of the initial data normality test (Valuation data for midterm assessment results odd school year 2018/2019 Science Study) presented in Table 1.

Table 1. Normality Test Result

Class	Kolmogorof-Smirnov Z score	Information
Control	1,280	Normal distributed
Experiment	2,892	Normal distributed

The results of the initial homogeneity test data were obtained p-value 0.126 p-value > 0.05 indicates that the sample is homogeneous.

Data on participants' critical thinking skills students are obtained from test methods in the form of test questions description given to students. Test sheet description of thinking skills critical arranged based on indicator critical thinking skills. Based on the research that has been done has been obtained the average score of the pretest-posttest skill critical thinking control class experiences the increase from 19.81 to 34.94, accordingly also the average score of the pretest-posttest skill critical thinking experimental class also experiences increase from 27.28 to 70.63. Data average pretest-posttest thinking skills critically use description based test questions aspects of critical thinking skills at control class and experimental class are presented in Figure 2.
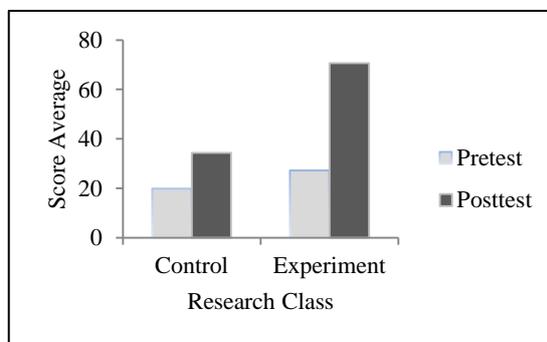

Figure 2. Average Score Pretest-Posttest Learners' Critical Thinking Skills

Score Average Pretest-Posttest critical thinking skill control class and experiment class based on skill indicators critical thinking in a row is presented in Figure 3 and Figure 4.
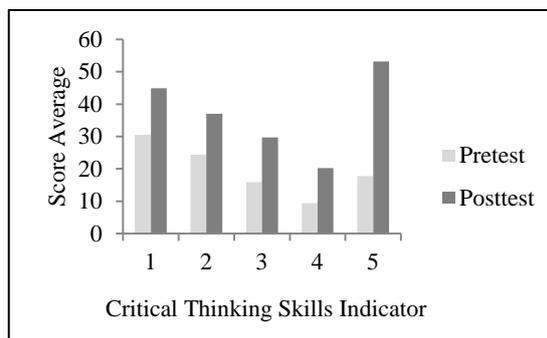

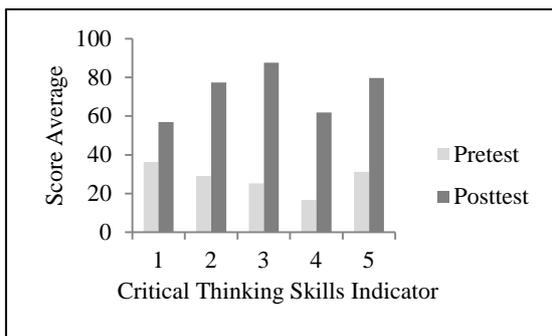**Figure 3.** Score Average Pretest-Posttest Control Class Critical Thinking Skills

Figure 4. Score Average Pretest-Posttest Experimental Class Critical Thinking Skills

Increased participants critical thinking skills students in the control class and experiment class on every aspect of critical thinking skills presented in Figure 5. Description of indicators of thinking skills critical in figure 5 are as follows:

1 = focus the question
2 = analyze the question
3 = ask and answer questions about an explanation or challenge
4 = induces and considers results induction
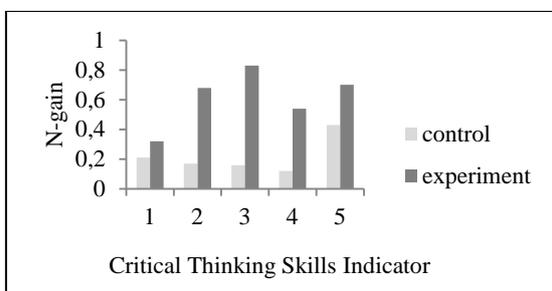5 = making and determining values consideration.

Figure 5. Increased Critical Thinking Skills Students

Data from the research shows that science learning with a project-based learning model assisted by Edmodo social network site can improve aspects of participants' critical thinking skills student. Figure 5 show that aspect focus question, analyze questions, ask questions and answer questions about an explanation or challenge, induce and consider, make and determine the value of consideration the experimental class has increased higher than the control class. This is in line with the research

that has been done conducted by Pratama et al. (2016) which using a project-based learning model for first semester students of the program Electrical Engineering Education studies take Basic Physics courses, in his research to show existence improvement of participants' critical thinking skills educated with normalized *N-gain* of 0.45 (medium category).

Increased focus skills is the question of the experimental class students amounting to 0.32 with the medium category. Enhancement skills focus the question of the control class is 0.21 with low category. Skill t-test results focus on students' questions obtained t_{count} 2.085 > t_{table} 2.042 which means that increased focusing skills more experimental class student questions good compared to skills focus control class questions.

Skills for analyzing questions experimental class students experience an increase of 0.68 by category is being improved analysis skills the control class question is 0.17 with low category. Skill t-test results analyzing student questions is obtained t_{count} 8.639 > t_{table} 2.042 which means that enhancement skills analyze more experimental class student questions good compared to skills analyzing control class questions.

Improved questioning skills answer questions about an explanation or challenge the experimental class students amounting to 0.83 with a high category. Enhancement skills asking and answer questions about an explanation or the challenge of the control class students is 0.16 with a low category. Skill t-test results ask and answer questions about an explanation or challenge for students obtained t_{count} 12.168 > t_{table} 2.042 which means that increase in asking and skills answer questions about an explanation experimental class students better compared to asking skills and answer questions about a explanation of the control class.

Skills induce and consider the results of student induction the experimental class has increased amounting to 0.54 with the medium category. Increased induction and skill consider the results of the induction of the control class is 0.12 with a low category. T-test results skills

induce and consider the results of student induction obtained t_{count} 10.613 > t_{table} 2.042 which means that increase induction skills and consider the results of participant induction the experimental class students are better compared with inducing skills and consider the results of student induction control class.

Improving making skills and determine the value of consideration of participants the experimental class students are 0.70 with high category, so is the increase skills to make and determine values consideration of the control class 0.43 by category is being T-test results for skills making and determine the value of consideration of student obtained t_{count} 2.610 > t_{table} 2.042 which means that increase making and skills determine the value of consideration of students the experimental class is better compared with making and skills determine the value of consideration of students control class.

Project-based learning inside this research is effective to improve critical thinking skills and learning outcomes of students. This is similar with research that has been done by Desinta et al. (2017) that gets results that students' critical thinking skills which is taught with project-based learning is better than thinking skills critical students who are taught with conventional learning.

Data on skills assessment results critical thinking is strengthened by observation through observation sheets based on aspects of critical thinking skills. Based on the research that has been done has been obtained the results of the average skill observation score critical thinking control class experiences an increase from 34.13 to 55.25, accordingly also the average score for skills assessment critical thinking experimental class also experiences increase from 32.38 to 70.13. Data improvement of critical thinking skills through the observation sheet is presented in Figure 6.
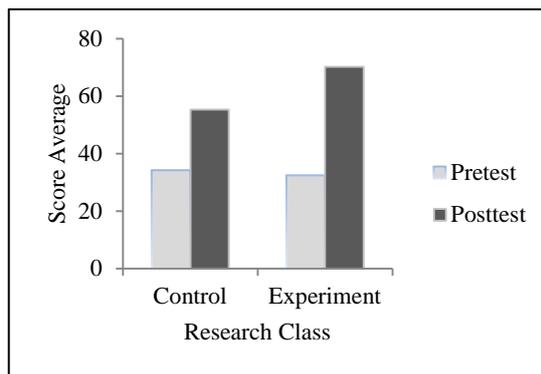

Figure 6. Increased thinking skills critical through the observation sheet

Data on assessment of learning outcomes is obtained from the learning outcomes test. Learning outcomes test questions the item validation test was previously carried out questions, difficulty level tests, different power tests, and test reliability by testing it on other groups outside the sample group. As the thinking skill observation sheet critical and independence, test learning outcomes too given to the control group and experimental group at the beginning and at the en material pressure meeting. Average score of results learning control class has increased from 43.59 to 62.66, so too at the experimental class increased from 45.00 to 71.88. Improving student learning outcomes in the control class and the experimental class can seen in Figure 7.
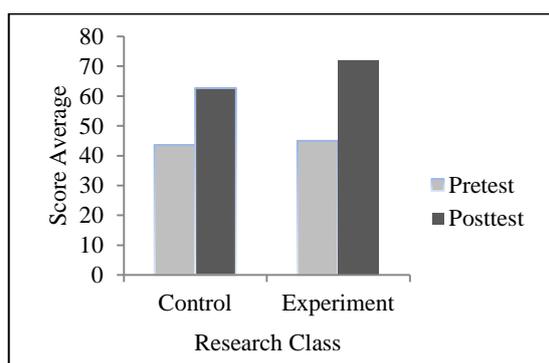

Figure 7. Increased Participant Learning Outcomes Educate

Learning in this study using a based learning model project on the control class, and use project-based learning model assisted by Edmodo social networking site in class

experiment. The material taught in the second class is the same, namely the subject matter of pressure and its application in everyday life. Project-based learning is considered as a learning model that can applied in the learning process, because centered project-based learning model on the activities of students during the process learning that will produce products at the end of learning (Damayanti et al., 2014). Project-based learning consists of 6 the main step (Kemendikbud, 2014), namely: (1) determine the basic question (start with the essential question); (2) designing the implementation project (design a plan for the project); (3) compile a schedule (create a schedule); (4) monitor students and project progress (monitor the students and the progress of the project); (5) test the results (assessing the outcome): and (6) evaluate experience (evaluate the experience).

At the stage of determining the question basically, the teacher starts learning with essential questions that direct participants students in working on a project that related to project material, namely pressure and its application in everyday life. The second stage is designing project planning, each group of students analyzed work steps, tools and materials needed in making the project well sourced from books or internet. The third stage composes schedule to complete the project, students with the guidance of innovating teachers and determine the schedule of learning activities related to making projects. Stage fourth monitor students and project progress, the teacher is responsible guide participants student for complete the project. The fifth stage is testing results, the teacher provides feedback on level of achievement students and testing the final result of the project. Last stage evaluating experiences, students explain the initial steps to the end making projects, related to material learning and uploaded through Edmodo social network site.

CONCLUSION

The conclusion of this study is as the following: project-based learning model assisted by Edmodo social networking site effective to improve critical thinking skills, and student learning outcomes with differences significant among students who are taught by using project-based learning model with students who are taught by using project-based learning model assisted by Edmodo social networking sites.

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