The Effect of Discovery Learning on 21st Century Skills for Elementary School Students

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Article Info

Abstract

21st century need human resources that have adequate ability to face the global era. This ability can trained at education stage by using good method in learning, discovery learning can be choises to release that. This study aim is to analyze the effect of learning with discovery models on 21st century skills for elementary school students. This study uses an experimental research. Experimental research method is a research conducted on variables for which data are not yet available that it needs to be manipulated through the treatment of research subjects which the impact is measured. Results of the creative thinking skills gain test showed the average value of experimental class was 0.72 while the average value of the control class was 0,39. This shows the discovery model gives more influence on the student's skills to think creatively. Results of the critical thinking skills gain test showed the average value of experimental class was 0.78 while the average value of the control class was 0.60. This shows the discovery model gives more influence on the student's skills to think critically. The results of communication skills test showed a significance value of 0.82. This value is higher than 0.05, it's means that students communication skills with discovery model are not higher than group of students that learning with expository model. The result of collaboration skills showed a significance value of 0.91. This value is greater than 0.05, it's means that the collaboration skills of students with discovery models are not higher than those of students who learning with expository models. This research is expected to be a reference for teachers in using learning models when teaching.

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INTRODUCTION

Education is an important aspect to improve the quality of human resources in order to ensure the continued development and progress of human life. Increasing human resources in Indonesia is very urgent to be realized, especially in the era of global competition. Improving the quality of human resources from an early age is an important thing that must be seriously considered and worked on. Especially in the field of science education. Trini (2017) demonstrated in 2011 TIMSS report, the scientific achievements of Indonesian students were still very low or ranked 40 out of 53 countries. Competencies must be achieved by students of natural science material at the elementary school level include students showing scientific attitudes, asking questions, observing science objects using the five senses, and telling observations in clear language.

The 21st century learning paradigm emphasizes on the students skills, these skills including to find out from various sources, formulate problems, think analytically, collaboratively and collaborate in problems solving. The explanation of the 21st century learning framework are as follows: (a) Critical-Thinking and Problem-Solving Skills, is that the ability to think critically, laterally, and systemically, especially in the context of problem solving; (b) Communication and Collaboration Skills, is ability to communicate and collaborate effectively with various parties. Especially in the context of problem solving, educational institutions need to consider the scope of success of their graduates not only limited to academic abilities, but rather to the abilities and skills that can help graduates compete in the global and digital world. According to Anwar (2012) creative thinking is a new way of seeing and doing something that contains 4 aspects including phases, flexibility, authenticity and detail.

Discovey learning model can give more influence on the ability of students to think creatively. This is in accordance with the results of research by (Rohim, 2012) states that the discovery learning model can improve students' creative thinking sklill. In addition, the discovery learning model can have more influence on students' critical thinking skill. This is consistent with the results of research by (Mukarromah, 2018) states that the discovery learning model can improve students' critical thinking skills

This study examines the effect of learning by using discovery models on 21st century skills for elementary school students. Based on Rudyanto (2014) states that there is an average increase in the ability to think creatively for students who are learning with discovery models.

METHODS

The research was conducted at the fifth grade students of Al Madina Elementary School and the fifth grade students of Al Huda Elementary School. The total population of research in 5B grades students at Al Madina Elementary School is 20 students, while the research population in 5 grade students at Al Huda Elementary School is 20 students. Research at Al Madina Elementary School is using discovery learning models, while learning at Al Huda Elementary School using expository teaching methods.

This study uses a quasi-experimental research. According Sugiyono (2011) experimental research method is a research conducted on variables for which data are not yet available that it needs to be manipulated through the treatment of research subjects which the impact is measured. This study uses a pretest-posttest nonequivalent control group design using two classes. In the experimental class will be learning with discovery models while for Udo (2010) states that students who are taught with the discovery method have better performance to find learning concepts directly. Kusuma (2019) states in his research shows that

there is an influence of learning discovery models on students critical thinking skills. Furthermore experimental is discovery model was effective in making students critical and creative in writing. while in the control class learning will be carried out with the expository method (Nurwachid, 2018).

RESULTS AND DISCUSSION

Creative thinking skills

Discovery learning model has more influence to students' ability to think creatively in learning the content of science lessons in primary schools compared with learning using expository method. For example of improvment creative thinking skills on posttest and pretest in experiment class can be seen in Figure 1.
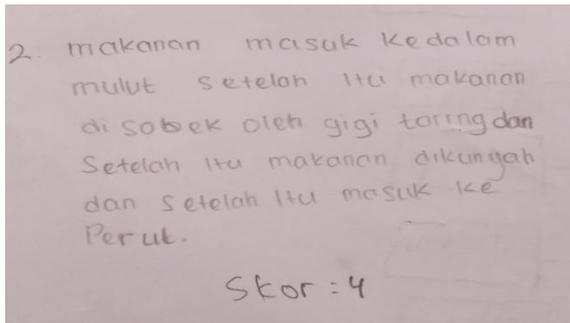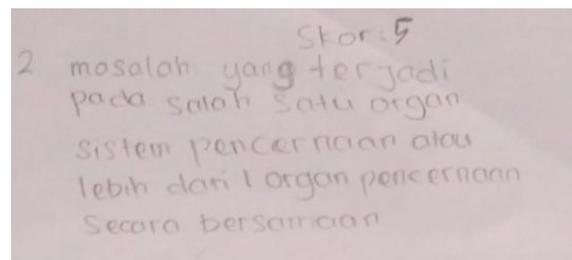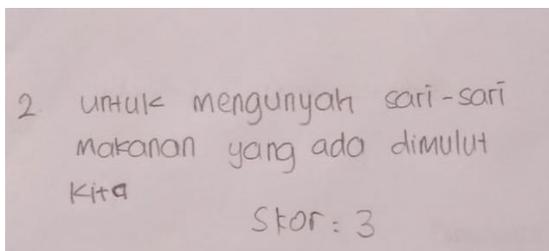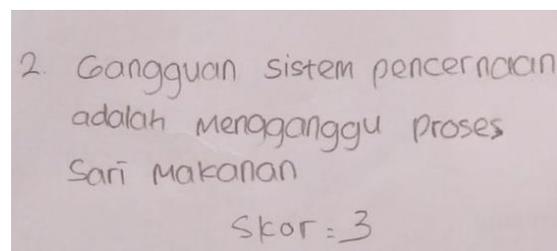

pretest

posttest

Figure 1 Result of posttest and pretest in experiment class

Based on Figure 1 we can see the result score posttest was higher than score pretest in experiment class. With the problem "Explain the digestion process that occurs in the mouth!" on pretest the student answer are "food enters the mouth then food is ripped by teeth and fangs and then food is chewed and enters the stomach" the answer is in accordance with the indicator: students are able to produce ideas by giving questions, making a detail answers, generate ideas from the student's perspective, and shows the thinking of various answers, so that it get a score 4. While for on posttest with

problem "what is meant digestive system disorders in human?" the student answer are "problems that occur in one or more digestive organs simultaneously" the answer is in accordance with the indicator: students are able to produce ideas by giving questions, using time effectively, making a detail answers, generate ideas from the student's perspective, and shows the thinking of various answers, so it get a score 5. Example of increasing creative thinking skills on posttest and pretest in control class can be seen in Figure 2.

pretest

posttest

Figure 2 Result of posttest and pretest in control class

Based on Figure 2 we can see the result of control class score. With the problem "Explain the digestion process that occurs in the mouth!" on pretest the student answer are "to chew the food juices in our mouths" the answer is in accordance with the indicator students are making a detail answers, generate ideas from the student's perspective, and shows the thinking of various answers, so that it get a score 3. While for on posttest with problem "what is meant digestive system disorders in human?" the student answer are "digestive system disorders are interfering with the process of food extraction" the answer is in accordance with the indicator using time effectively, generate ideas from the student's perspective, and shows the thinking of various answers, so that it get a score 3. Based on Figure 1 we can see improvement score of creative thinking skill from 4 to 5, and based on Figure 2 there was no increase between the pretest and posttest scores. At the last can be seen that students in the experimental class get better improvement than students in the control class

The score difference test results of the control class and the experiment class on creative thinking skills are analyzed, that could is presented in Figure 3.
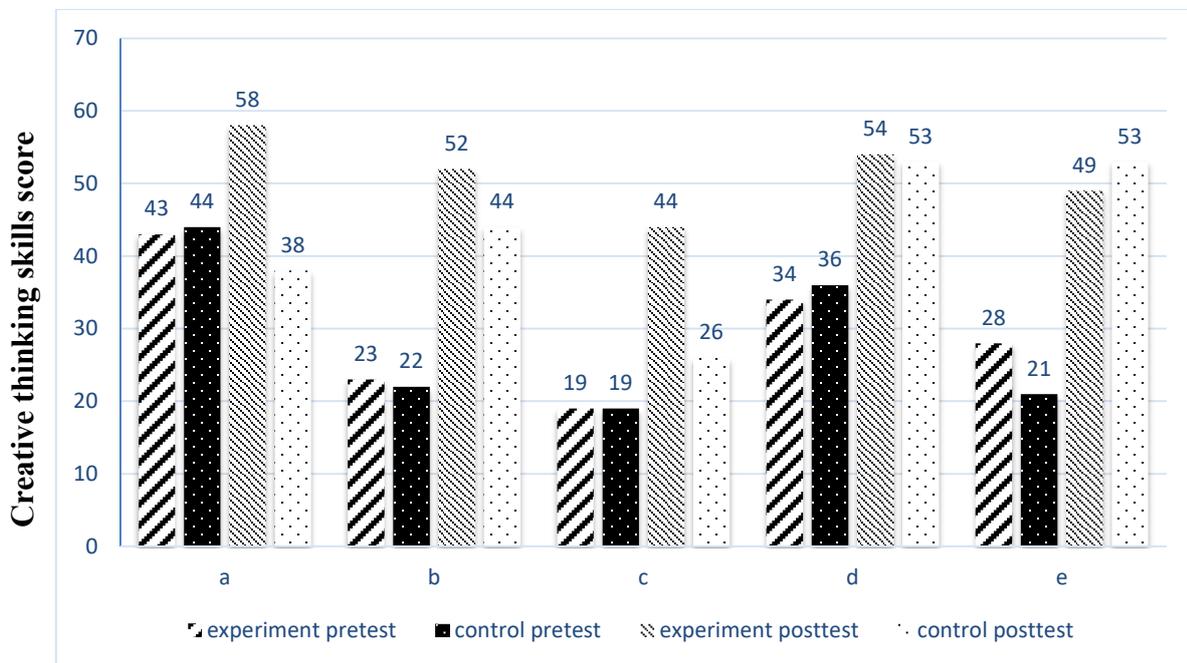

**Figure 3** Difference score in creative thinking skills

Based on Figure 3 we can see the indicators of creative thinking skills as follows: (a) Students are able to produce ideas by giving questions (b) Using time effectively (c) Making a detail answers (d) Generate ideas from the student's perspective (e) Shows the thinking of various answers. The results showed that in the experimental class the improvement of students' skills in indicators a, b, c, and d was higher than that of control class. As for the indicator e the improvement of students' skills in the control class is higher than the experimental class. It shows that the discovey model has more influence on the students ability to think creatively in learning the content of science lessons in primary schools compared with learning using the expository method. From the results above this creative thinking skills in this study is accordance with the results of research conducted by Rohim (2012) states that discovery learning model can improve students' creative thinking abilities. While for Desnia (2018) states that Discovery based on assessment applies to stimulate students' critical thinking and creativity in learning.
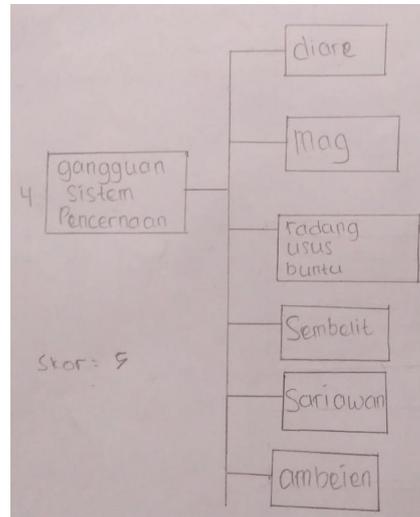
Critical thinking skills

Learning with discovery models has an influence on students' critical thinking skills.

Example of improvement critical thinking skills on posttest and pretest in experiment class can be seen in Figure 4.
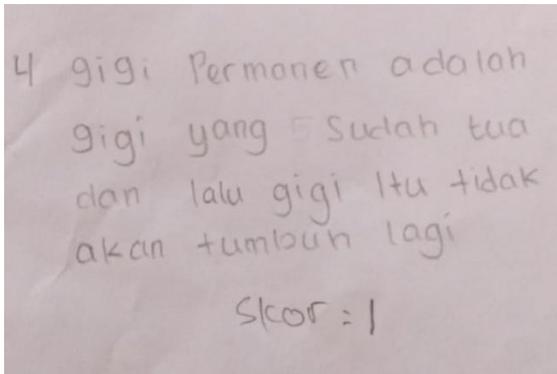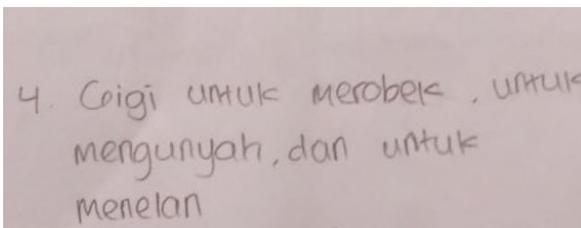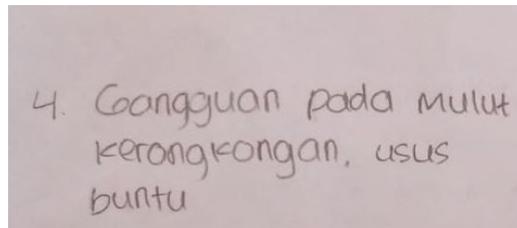

pretest

posttest

Figure 4 Result of posttest and pretest in experiment class

Based on Figure 4 we can see the result of score posttest was higher than score pretest in experiment class. With the problem "what happens if the permanent teeth in an adult fall off?" on pretest the student answer are "Permanent teeth are teeth that was old and then the teeth will not grow anymore" the answer is in accordance with the indicator "can capture information from questions clearly" so that it get a score 1 and with the problem "make concept maps of various disorders of human digestive system!" on posttest the student can give an appropriately answer and presented in the form of concept maps so that it get a score 5 because the answer is in accordance with the indicator: can capture information from questions clearly, explain the concepts using problems solving in their language, connect the relationship of each information well, can explain good solution to the problem, and use relevant information to solving the problem. Example of increasing critical thinking skills on posttest and pretest in control class can be seen in Figure 5.

pretest

posttest

Figure 5. Result of posttest and pretest in control class

Based on Figure 5 we can see the result of control class score. With the problem "what happens if the permanent teeth in an adult fall off?" On pretest, the student answer are "teeth to tear to chew and to swallow" the answer does not match the existing indicators so that it get a score 0. And with the problem "make concept maps of various disorders of the human

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digestive system!" on posttest, the student answer are "disorders of the appendix esophagus, mouth" the answer is in accordance with the indicator "can capture information from questions clearly" so that it get a score 1. Based on Figure 4 we can see improvement score of critical thinking skill from 1 to 5. And based on Figure 5 we can see the improvement

score of critical thinking skill from 0 to 1. At the last can be seen that students in the experimental class get better improvement than students in the control class.

The score difference test results of the control class and the experimental class on critical thinking skills are analyzed, that is presented in Figure 6.
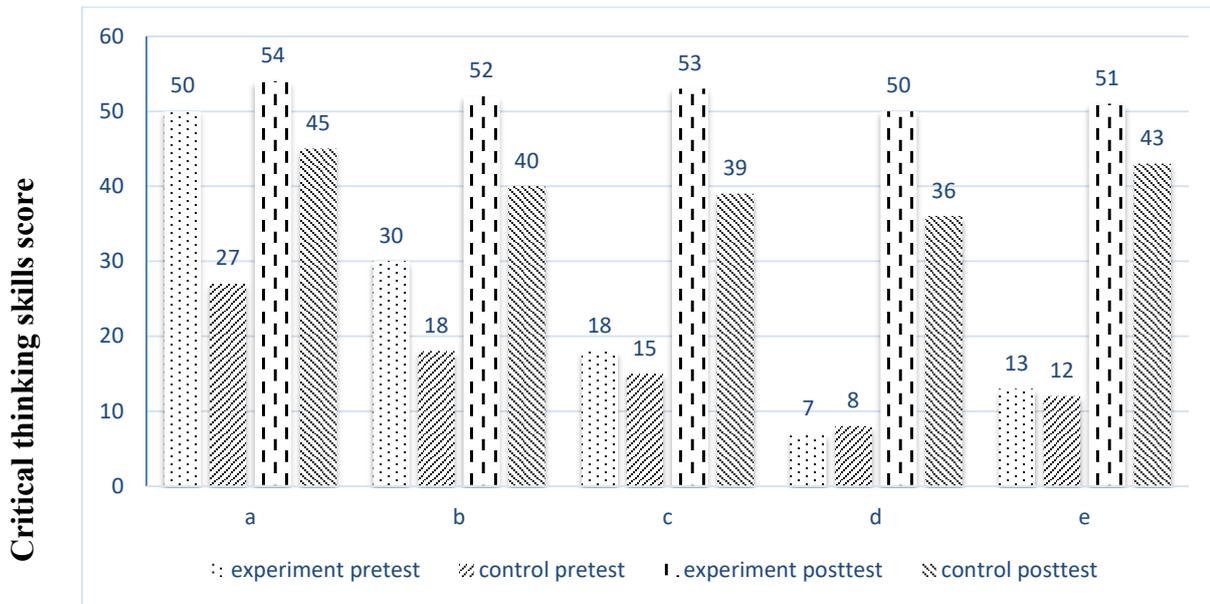

Figure 6. Difference score in critical thinking skills

In Figure 6 we can see the indicators of critical thinking skills as follows: (a) Can capture information from questions clearly (b) Explain the concepts using problems solving in their language (c) Connect the relationship of each information well (d) Can explain good solution to the problem (e) Use relevant information to solving the problem. The results showed that in the experimental class the improvement of students' skills in indicators a, b, c, d and e was higher than that of control class. It shows that the discovey model has more influence on the students ability to think critically in learning the content of science lessons in primary schools compared with learning using the expository method. This is accordance with the results of

research by Mukarromah (2018) states that the discovery learning model can improve students' critical thinking skills. While for Dhianti (2017) in his research stated that the improvement of students' critical thinking skills between was have different signifcant those who learned by using discovery learning model as a whole was higher than the students who learning in conventional method.

Communcation skills

The score difference score results of the control class and the experimental class on communication skills are analyzed, that is presented in Figure 7.
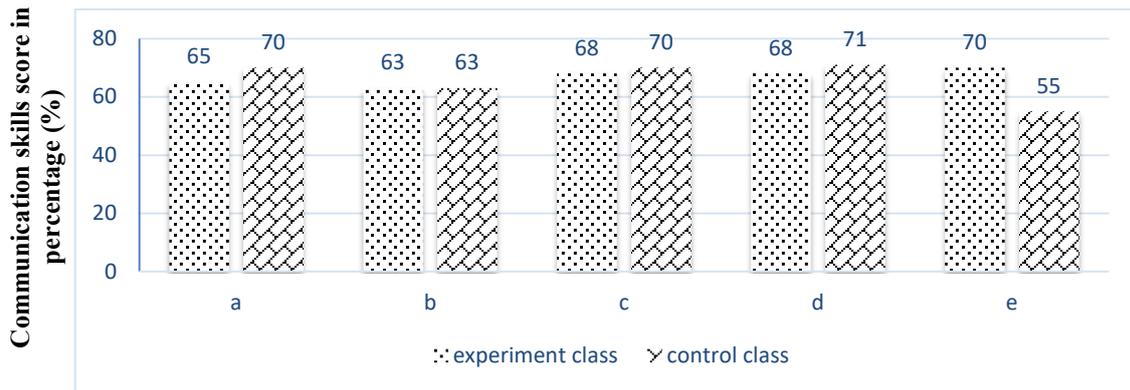
Figure 7. Difference score in communication skills

In Figure 7 we can see the indicators of communication skills as follows: (a) Including our self in discussion, (b) Giving opinion relevan with discussin topic, (c) Using good language in discussion, (d) Using language that easy to understand (e) Show the result with mapping concept, diagram, graph, symbol or picture. The results showed that in the control class the improvement of students' skills in indicators a, c, and d was higher than that of experimental class. It shows that the expository model has more influence on the students ability to communication skill in learning the content of science lessons in primary schools compared with learning using the discovey method. This is not in accordance with the results of research by Qodariyah (2015) states that the communication skills of students who get discovery learning are better than students who get conventional learning. Also with research by Yanti (2015) stated that discovery learning is able to improve communication skills.

Collaboration skills

The score difference score results of the control class and the experimental class on collaboration skills are analyzed, that is presented in Figure 8.
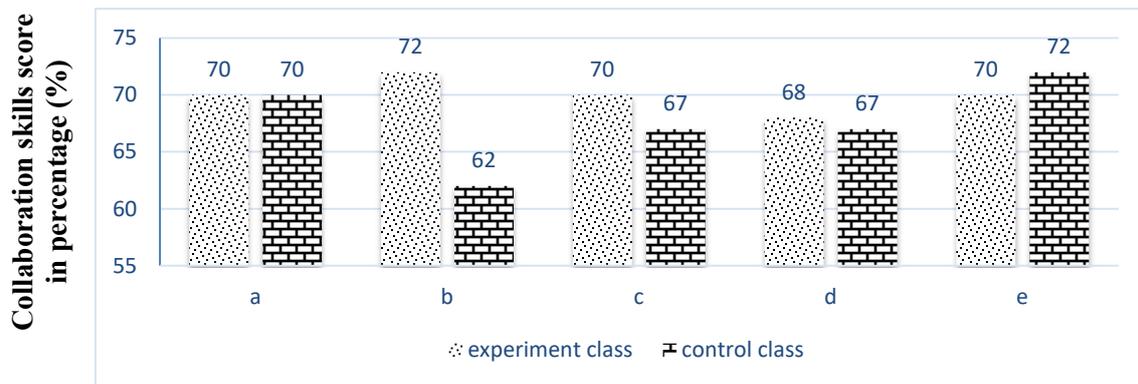

Figure 8. Difference score in collaboration skills

In Figure 8 we can see the indicators of collaboration skills as follows: (a) giving solution in group, (b) Manage asigment (c) Have responsible asigment (d) Completing the task (e) Completing the task on time. The results showed that in the experimental class the improvement of students' skills in indicators b, c, and d was higher than that of control class. It shows that the discovey model has more influence on the students ability to collaboration skill in learning the content of science lessons in primary schools compared with learning using the expository method. This is accordance with the results of research by Putri (2018) which states that there is a high ability of cooperation in students who get discovery learning.

CONCLUSION

The result of test creative thinking skill student shows that by using discovery learning method, student can improve their four aspect skill that of higher than student learning by using expository method. It shows that the discovey model has more influence on the students ability to think creativly in learning of science lessons in primary schools compared with learning using the expository method. On critical thinking skill shows that by using discovery learning method, student can improve their five aspect skill that of higher than that of student learning by using expository method. It shows that the discovey model has more influence on the students ability to think critically in learning of science lessons in primary schools compared with learning using the expository method. On communication skills shows that by using expository method, student can improve their three aspect skills that of higher than that of student learning by using discovery learning method. It shows that the expository method has more influence on the students ability to communication skills in learning of science lessons in primary schools. Aspect of collaboration skill shows that by using discovery learning method, student can improve their three aspect skills that of higher than student learning by using expository method. It shows that the discovery model has more influence on the students ability to collaboration skill in learning of science lessons in primary schools compared with learning using the expository method.

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