



The Effectiveness of Student Facilitator and Explaining Learning Model Assisted by Edmodo to Enhanced Students' Problem Solving Ability

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Article Info

Received 4 Mei 2021

Accepted 10 Agustus 2021

Published 30 September 2021

Keywords:

**Student Facilitator and Explaining,
Edmodo,
Problem Solving Ability**

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Abstract

This study aims to determine the effect and effectiveness of the Student Facilitator and Explaining (SFAE) learning model assisted by Edmodo to enhanced students' problem solving abilities. This study uses a quasi-experimental research method. The sample in this study was taken by cluster random sampling technique. Data collection techniques in this study used interviews, tests, and questionnaires. Analysis of the influence and effectiveness of the Student Facilitator and Explaining (SFAE) learning model assisted by Edmodo using N-gain analysis and comparative t-test related analysis. The results of the N-gain analysis showed that there was an increase in problem solving ability in the experimental class by 0,45 and in the control class by 0,20. The results of the comparative t-test related showed that there was a significant difference between the problem solving abilities of the control class and the experimental class with t count $(3.97) > t$ tabel $(2,0003)$. The results of the student response questionnaire after carrying out learning with the Student Facilitator and Explaining (SFAE) learning model assisted by Edmodo showed a very good response of 88.4%. The results showed that the Student Facilitator and Explaining (SFAE) learning model assisted by Edmodo was effective in enhanced students' problem solving abilities.

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p-ISSN 2797-0175

e-ISSN 2775-2518

INTRODUCTION

Learning in the 21st century helps students to be able to develop their abilities (Prihatmojo et al., 2019). One of the 21st century skills that students must have is problem solving ability. Problem solving ability is an ability that originates and grows from the human cognitive system, that is a process consisting of four interrelated gradual activities namely: identifying problems, understanding problems, solving problems, and evaluating problems (Zunanda & Sinulingga, 2015). Indicators of problem solving ability consist of: (1) Identification the problem, (2) Planning a solution, (3) Resolving the problem according to plan, (4) Re-checking all steps (Jayadiningrat & Ati, 2018). Based on the results of interviews conducted with the seventh grade science teacher at SMP Negeri 32 Semarang, it was found that the level of problem solving ability of seventh grade students in science was on a scale of two out of a total of five scales. Students with good problem solving ability only amount to 35% of 31 students in one class, it can conclude that only 10 to 11 students has good problem solving ability.

Previous research on efforts to improve students' problem solving skills have been carried out by Sumiantari et al. (2019), with applying a problem based learning model to improve students' problem solving abilities and showing that there is an increase in students' problem solving abilities at a moderate level and weaknesses are found in research, that learning has not maximum to increased student activity and learning interest, as well as students still have difficulty in carrying out learning using problem based learning. Based on that, this study will apply other learning models to improve students' problem solving skills. The learning model that will be applied must be able to increase the interest, active learning of students, and be easy to apply. This study will apply Student Facilitator and Explaining learning model to improve the problem solving abilities of students.

This study aims to determine the effect and effectiveness of the Student Facilitator and Explaining learning model assisted by Edmodo on the problem solving abilities of students regarding environmental pollution material. The Student Facilitator and Explaining learning model is a learning model to make students easier to understand the learning material because in this learning model students allowed to present and share with other students about a subject matter or an idea. Students Ideas and opinions can make students active in learning. In the learning process with the Student Facilitator

and Explaining learning model, students will act as facilitators or peer tutors with the task of providing explanations or explaining to other students (Widiasih et al., 2019). This study combines the Student Facilitator and Explaining learning model with Edmodo. Edmodo is an interesting application for teachers and students that functions to share ideas, files, activity agendas, and assignments that can create teacher and student interactions. Another function of Edmodo is to help make it easier for students and teachers to communicate outside of learning done in class (Aulia et al., 2019).

METHOD

The study was conducted at SMP Negeri 32 Semarang which is located at Jl. Ki Mangunsarkoro No.1, Karangkidul, Kec. Central Semarang, Semarang City, Central Java 50241. The study was conducted in class VII of the 2020/2021 academic year. The sample in this study was taken by using cluster random sampling technique. The sample used in this study was class VII-H as the control class and class VII-I as the experimental class. Data collection techniques used interviews, tests, and student responses questionnaire.

The research method used in this study is a quasi-experimental design in the form of a nonequivalent control group design. This study consisted of two groups: a control group and the experimental group were treated differently in each group. Tabel 1 is a design study conducted at SMPN 32 Semarang:

Table 1. Design of study

Group	Pretest	Treatment
Experiment	O ₁	X
Control	O ₃	Y

Information:

- O₁ : Pretest experiment class
- O₂ : Posttest experiment class
- O₃ : Pretest control class
- O₄ : Posttest control class
- X : Learning with SFAE assisted by Edmodo
- Y : Learning with direct learning

Before analyzing the problem solving abilities of students, a pretest and posttest data normality test is carried out first to determine the statistical test to be used. Based on the results of the normality test on the pretest and posttest scores of students in the control class and experimental

class, it was found that the pretest and posttest scores in both classes were normally distributed, so this study used a parametric test in the form of normalized gain (g) analysis to analyze the effect of the SFAE learning model assisted by Edmodo on students' problem solving abilities and comparative t-test related analysis to analyze the effectiveness of the SFAE model assisted by Edmodo in improving students' problem solving abilities when compared to the control class.

RESULT AND DISCUSSION

Increasing students' problem solving abilities can be analyzed using the normalized gain (N-Gain) test. The normalized gain (N-Gain) test of the pretest and posttest data for experimental and control class can be seen in table 2.

Table 2. Results of N-Gain Problem Solving Ability

Class	Data	Average	N-gain	Criteria
Experiment	Pretest	57,1	0,45	Moderate
	Posttest	76,6		
Control	Pretest	53,1	0,20	Low
	Posttest	62,5		

The N-Gain value in Table 2. shows that the experimental class is higher than the control class. The experimental class got an N-gain value of 0.45 in the medium category while the control class was 0.20 in the low category. This category is in accordance with Meltzer (2002) showing that N-gain $g > 0.7$ is in the high category, N-gain $0.3 \leq g \leq 0.7$ is in the medium category, and N-gain $g < 0.3$ are in the low category. Based on the results of the increase from table 4.2, it can be seen clearly in Figure 1.

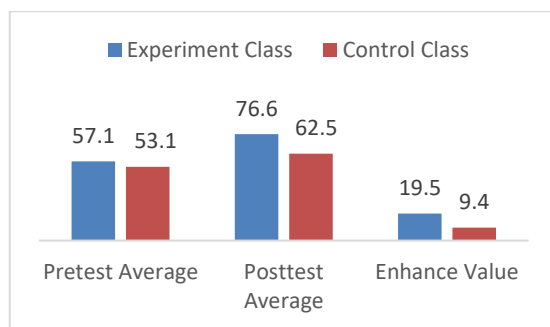


Figure 1. N-Gain problem solving ability

The results of the N-gain analysis showed that there was an increase in problem solving

abilities from the treatment given, both in the control class and the experimental class. The increase in problem solving ability in the control class is 0.20 with an increase in problem solving ability in the low category. The increase in the problem solving ability of the experimental class was 0.45 with an increase in the problem solving ability of the medium category. This happened because there were two different treatments between the experimental class and the control class. The experimental class carried out learning about environmental pollution using the Student Facilitator and Explaining learning model assisted by Edmodo, and the experimental class carried out learning about environmental pollution using direct learning assisted by WhatsApp.

The increase in the problem solving ability of students in the experimental class has increased by 0.45 with a moderate increase category. This is because learning using Student Facilitator and Explaining assisted by Edmodo helps students to be active in learning and helps students improve problem solving skills. Learning using the Student Facilitator and Explaining model provides opportunities for students to become a facilitator who provides explanations to other students. This can train students to be active in giving their opinions on environmental pollution problems and solutions to environmental pollution so that students will be more creative and open in giving opinions on environmental pollution solutions and students will find it easier to remember learning materials because learning is carried out actively in involve students.

This is in accordance with research conducted by Mulyani (2016), namely: the Student Facilitator and Explaining learning model is a learning model that provides opportunities for students to participate in solving the problems given. The increase in problem solving abilities of experimental class students who are in the moderate improvement category is also influenced by several problems that exist during the implementation of learning, such as: not yet maximal participation of students in learning, some students still do not dare to give their opinions in learning, students who are not active since the beginning of learning will be inactive until the end of learning, the use of the new learning media, namely Edmodo, causes some students to have difficulty in using it, then technical problems such as signals and internet quotas. While the increase in problem solving

abilities of control class students increased by 0.20 with a low increase category. This is because the implementation of learning is still centered on the teacher so that students entirely depend on the teacher's explanation, the level of participation of students in learning is also still lacking, and learning is carried out through whatsapp groups which have not been able to attract the attention of students in learning.

The participation of students in carrying out learning using the Student Facilitator and Explaining model can be said to be good. Students begin to show active participation in learning during group discussions, class discussions, and learning through zoom meetings. Learning using the Student Facilitator and Explaining model is a new learning for students, especially during online learning, so teachers must always motivate students so that students are enthusiastic and active in the implementation of learning. Although not all students in the experimental class showed active participation in every meeting, most of the students showed their participation in learning.

Student can't maximum to participate in learning can also be caused by learning carried out using Edmodo, some students have difficulty using Edmodo because Edmodo is a new learning platform for students then student participation is also influenced by obstacles such as signals, internet access and independent learning learners. Researchers always coordinate with students such as providing directions and tutorials on how to use Edmodo so that students begin to understand how to use it in learning. After the implementation of learning at the first meeting which discussed the definition of environmental pollution, students began to dare to give opinions, suggestions, and questions to other students or teachers. The participation of students always increases in every meeting, along with the higher motivation given by the teacher and increasing student interest in learning using Student Facilitator and Explaining. The participation of students in learning is one of the efforts that can help students in improving their problem solving abilities. Based on this, in every meeting the researcher always starts learning by motivating students to participate actively in learning.

The learning carried out in the control class using the direct learning model assisted by Whatsapp showed the results of increasing problem solving abilities were lower when compared to increasing problem solving abilities

in the experimental class. This happens because during the implementation of learning, students only wait for the material delivered by the teacher, and there is no discussion between students so that the learning that is carried out is less interactive. Students only depend on the teacher's explanation. This causes students to be less active and creative in giving opinions on the problems given by the teacher, so that some students do not know correctly how to solve problems.

Based on the results of the comparative t-test related to the pretest data of students in the control class and the experimental class, it shows that there is no significant difference in the pretest data of students between the control class and the experimental class with t count (1.02) < t table (2,0003) so that H₀ is accepted. it can be seen clearly in table 3.

Table 3. Result of comparative t-test related for pretest data

Data	Class	t _{count}	t _{table}	Criteria
Pretest	Experiment Control	1,02	2,0003	There is no significant different

This results can happen because each student in each control class and experimental class has not carried out science learning on environmental pollution material and has not applied treatment to the experimental class or control class, so the results of the pretest students in the control class and experimental class show no difference. significant or it can be concluded that the students in the control class and the experimental class were homogeneous samples before the treatment was carried out.

The results of the comparative t-test related data posttest of students in the control class and experimental class show t count (3.97) > t table (2,0003) so that H₀ is rejected and it can be concluded that there is a significant difference between the results of the posttest of students and learning using Student Facilitator and Explaining assisted by Edmodo (experimental class) with students in direct learning assisted by WhatsApp (control class). it can be seen clearly in table 4.

Table 4. Result of comparative t-test related for posttest data

Data	Class	t_{count}	t_{table}	Criteria
Posttest	Experiment Control	3,97	2,0003	There is significant different

These results occurred after the implementation of two different treatments between the control class and the experimental class. Learning that has been carried out in the control class using direct learning assisted by WhatsApp runs like online learning which is usually carried out in class. Students in the control class have not shown activeness in learning and activeness in solving environmental pollution problems given by the teacher. Students tend to wait for the teacher to explain and provide learning materials. Students are less active in giving their opinions when the teacher gives students the opportunity to give opinions on solutions to environmental pollution problems, if there are students who have given opinions on solutions to environmental pollution, other students only listen to their friends' opinions without giving advice or giving his own opinion.

This creates less interactive learning between students so that learning is still centered on the teacher or teacher centered learning so that students' problem solving abilities have not increased optimally, considering that there are four indicators of students' problem solving abilities based on Jayadiningrat & Ati (2018), namely: (1) Understanding the problem, (2) Planning a solution, (3) Solving the problem according to plan, (4) Checking back on all steps. Each indicator of problem solving ability can be improved if students are actively involved in solving problems and students understand each step in problem solving.

The learning that has been carried out in the experimental class using the Student Facilitator and Explaining model assisted by Edmodo shows the results where there is an increase in problem solving abilities with moderate improvement criteria, namely the n-gain value of 0.45. This is supported by the results of the comparative t-test related test which shows a significant difference between the improvement of problem solving abilities in the experimental class and the control class with t_{count} (3.97) > t_{table} (2,0003). The significant difference between the increase in problem solving ability of the experimental class and the control class occurred

because of the different treatment in each class. The treatment in the experimental class is that learning is carried out with a Student Facilitator and Explaining model assisted by Edmodo to create more interactive learning.

Edmodo media was chosen because Edmodo media is a learning tool that provides facilities that can support the SFAE learning process. Edmodo is equipped with several facilities that can support learning activities, such as quizzes, assignments, polls, grade books, libraries, award badges, and parent codes (Ekayati R., 2018). Edmodo media is a new learning media used by students in the experimental class, so that students are more active in participating in learning. Students have the opportunity to discuss with each other about solutions to environmental pollution problems, in addition to this learning model students can explain each other and help other students to be able to understand the material being studied. Learning carried out in the experimental class is also assisted by using the zoom meeting platform. The use of the zoom meeting platform is because students have not maximally understood learning through discussion activities between students. So that researchers must re-explain the learning material so that students better understand the material. The use of the zoom platform aims to allow virtual face-to-face interaction so that the explanations given by the teacher to students are more acceptable because students are more accustomed to getting explanations orally.

Learning in the experimental class is carried out according to the syntax of the Student Facilitator and Explaining learning model which is assisted by using Edmodo media. The syntax of SFAE learning consists of six steps, namely: a. The teacher conveys the competencies and learning objectives to be achieved, b. The teacher demonstrates or presents the material, c. Provide opportunities for students to explain, d. The teacher concludes ideas or opinions from students, e. The teacher explains all the material presented at that time, f. The teacher closes the lesson (Setiawan et al., 2017). The steps in SFAE learning help students to improve their problem solving skills. Based on Ni'mah (2020) the steps in the Student Facilitator and Explaining learning model help students understand and solve problems given by the teacher, so that students' problem solving abilities increase. The increase in the problem solving ability of students in this study was seen from the results

of the pretest and posttest scores, then after being analyzed it was found that the problem solving abilities of the experimental class students experienced an increase and the increase experienced was higher when compared to the control class.

These results are supported by poster assignments given to students. After carrying out learning with Student Facilitator and Explaining, students are asked to make posters about environmental pollution and how to overcome environmental pollution problems. The poster assignment given can help researchers find out whether there is an increase in the problem solving ability of students in addition to using test instruments. There are 15 students who have collected poster assignments, the results show that the average student poster score is 87.5 with a very good category. The poster assignment is supporting data that there is indeed an increase in the problem solving ability of students. The problem solving ability of students can not only be seen from the results of students' cognitive test scores, but can be seen from the creativity of students in conveying ideas and opinions about solutions to environmental pollution through posters made. The creativity of students in making posters for solutions to environmental pollution is part of an indicator of problem solving abilities, namely planning for problem solving. Posters made by students show that students have good problem solving skills, students make posters with attractive designs and solutions to environmental pollution are also conveyed in good sentences and messages about environmental pollution solutions can be accepted by readers in this case, namely researcher.

The effectiveness of the Student Facilitator and Explaining model assisted by Edmodo is supported by the results of the student response questionnaire after carrying out learning with the Edmodo-assisted Student Facilitator and Explaining model. The student response questionnaire consists of 10 questions with positive aspects questions and negative aspects questions with the same assessment weight for each criterion. The results of the student response questionnaire can be seen in Table 4.7 which shows that the student response questionnaire shows an average percentage of 88.4%. Based on the results of the questionnaire analysis of student responses regarding learning

with the Student Facilitator and Explaining model assisted by Edmodo on environmental pollution material, students gave very good responses to the learning that had been carried out, students felt learning was more interesting, made students more active in learning, the learning carried out is not difficult to understand, and learning uses interesting media and helps in the implementation of learning. It can be concluded that the learning carried out using the Student Facilitator and Explaining model assisted by Edmodo provides a very good response for students in an effort to improve students' problem solving abilities.

CONCLUSION

Based on the results of this study regarding the effectiveness of the Edmodo-assisted Student Facilitator and Explaining learning model, it can be concluded:

The Student Facilitator and Explaining learning model assisted by Edmodo has an effect on increasing the problem solving ability of class VII students regarding environmental pollution material. The Student Facilitator and Explaining learning model assisted by Edmodo is effective in improving students' problem solving abilities, because learning with Student Facilitator and Explaining learning model assisted by Edmodo showed a positive effect with an increase in the moderate criteria of the results of problem solving ability of students and showed a significant difference to the problem solving ability results of students in control classes that learning with direct learning.

Based on the results of this study regarding the effectiveness of the Edmodo-assisted Student Facilitator and Explaining learning model. Suggestions for the future are:

The results of this study can be used as a reference for teachers to be able to develop innovative online learning by innovating the learning model, and the learning media. It is necessary to do other research that can improve the problem solving ability of students by using other learning models and do other research on integrating learning models with appropriate learning media to improve students' problem solving abilities.

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