Improving Students’ Creativity Through Sharing and Jumping Task in Mathematics Lesson Study Activity

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Abstract. The sharing and jumping task in the learning process are unfamiliar to use in schools in Indonesia. Almost, all schools in Indonesia use student worksheets as sharing tasks without using jumping tasks. Even though jumping task can provide opportunities for students to think higher. This study aims to describe the increase in junior high school students’ creativity in solving mathematical problems through sharing and jumping task. This research is a case study conducted collaboratively among teachers and lecturers in lesson study activities. The results of this study indicate that students can improve their abilities including: (1) communication, (2) collaboration, and (3) critical thinking through sharing task activities. Besides that, students can increase their creativity in solving mathematical problems through jumping task activities. Each student produces different answers. The different answers produced by them in solving problems include three creative indicators, namely (1) fluency, (2) flexibility, and (3) novelty.

1. Introduction
Mathematics is one of knowledge that has an important role in various other fields of knowledge. Mathematics is also a knowledge that is able to develop cognition effectively, this is because the object of mathematics is abstract and only exist in mind. Therefore, mathematics learning needs to be given starting from elementary school as stated in standard of content for elementary and middle education of mathematics subject, that mathematics subjects are given to all students starting from elementary schools to equip learners with logical, analytical, systematic, critical and creative thinking and collaborative skills [1]

In fact there are still many learners who are reluctant to learn mathematics, they are less motivated or less interested in learning mathematics. Students are less interested to learn mathematics because they view mathematics full of calculations, so they become lazy to learn mathematics. The lessons learned have not been able to arouse students' interest because they still use the lecture model. Learning is still passive or one-way, that is only active teachers explain while students just listen and after the teacher finished explaining they are asked to do the problem individually. In the learning has not been using group discussion so that does not awaken the culture of asking each other among learners, there is no culture of cooperation among learners, so that learning becomes dull for learners. In learning only a few active learners, which is about 30% of the number of learners in one class. This can affect students' attitudes towards learning mathematics [2].
The use of media in learning is also still not effective only on certain materials and not yet on the use of media to find formulas or concepts. The amount of media used is also limited so that not all learners can use the media. As for student worksheet, teachers do not compose themselves only using in the books. Whereas in the finished students worksheet only in the form of questions. Thus all concepts or formulas in mathematics are not constructed by the students themselves. This is one of the causes of learning objectives mathematics is not achieved. Students' understanding of mathematical concepts is memorized so that mathematics learning is not able to provide a meaningful impact for students. Learning becomes boring and students are less motivated to learn mathematics.

Thus is needed to solve this problem, it is necessary a learning method that can enable learners to think in rebuilding or reconstructing the concept through media to discuss among learners. Furthermore, to increase their courage, they are asked to present their concept findings in front of the class. The media used is also a medium that helps learners to reconstruct concepts. While the students worksheet is used to direct learners in the process of reconstructing the concept as well. The teacher only acts as a facilitator. This kind of learning is very different from the previous learning. So that with different learning and carefully planned will be able to give positive impact to the students, good understanding of matter, courage express opinion in front of class, cooperation in discussion, motivation learn and especially activeness in learning [3].

Based on the above problems, a solution is needed to overcome them. For this reason lecturers and teachers collaboratively think about this. Lecturers and teachers discuss together to arrange learning plans that are able to increase student interest and of course to improve students' ability to communicate, collaborate and think critically. Collaborative activities between lecturers and teachers are not only in developing learning tools, but during the learning process lecturers and teachers share the assignment as instructors and as observers. The Observer has the duty to observe the learning process and record all the findings in the learning. The findings of this observation activity will be discussed again in the form of reflection activities. Such activities are called lesson study activities [4]. This activity is carried out continuously so that the quality of learning is continually improved.

In this study the teacher and lecturer collaboratively develop a learning plan that can provide maximum opportunities for students to discuss with each other. Students who are less able will ask their friends and vice versa, for students who are able to help their friends who still lack understanding. Collaboration like this will create a fun learning atmosphere and foster a learning community. The media used to create a learning situation like this is to provide questions in the form of sharing tasks to students. Furthermore, to accommodate students who have high abilities, media is also needed. The media given to students is giving questions in the form of jumping assignments. The question on jumping task levels is higher than the matter of sharing tasks.

Thus in this study there are two research questions, namely (1) whether learning through sharing tasks and jumping tasks can improve students' communication, collaboration and critical thinking skills?, and (2) is there a significant difference between the creative thinking abilities of students who follow learning through sharing tasks and jumping tasks with students who take direct learning?.

1.1 Lesson study

Lesson study is an activity carried out by the teachers collaboratively in an effort to improve the quality of learning. This activity is able to provide a significant increase in teacher competencies in both professional and pedagogical competencies [5]. The results of reflection in the lesson study activity are used to improve the quality of the next learning process [6].

Lesson Study is a model of educator professional development through the study of collaborative and sustainable learning based on collegiality principles that help each other in learning to build learning communities. Lesson Study comes from Japan (from the word: jugyokenkyu), which is a systematic process used by Japanese teachers to test the effectiveness of teaching in order to improve learning outcomes. The systematic process in question is the collaborative work of teachers to develop learning plans and tools, make observations, reflect and revise cycles of learning plans continuously and continuously. According to Lewis [7] the ideas contained in Lesson Study are actually short and simple,
namely if a teacher wants to improve learning, one of the most obvious ways is to collaborate with other teachers to design, observe and reflect on the learning done.

If we look at the definition of Lesson Study, we find seven key words, namely professional development, learning study, collaborative, sustainable, collegiality, mutual learning, and learning communities. Lesson Study aims to carry out professional training for educators in a sustainable manner so that there is an ever-increasing professionalism of educators. How to build it, that is through studying continuous learning and collaborating. Learning studies must be conducted regularly, for example once a week or once every two weeks because building a learning community is building a culture that facilitates its members to learn from each other, mutual correction, mutual respect, mutual help, mutual restraint of ego. Building culture is not short, it takes a long time. How long it takes to build a learning community culture has no limits. With regard to learning, there is no perfect learning, there is always a gap to improve it, because learning must be studied continuously so that it is better and better. Learning assessment is intended to find solutions to learning problems in order to improve the quality of learning. The object of learning study can include: teaching material, methods / strategies / learning approaches, student worksheets, learning media, class settings, and assessment. Why is learning assessment done collaboratively? Because more input improvements will improve the quality of learning itself. According to myself, it seems that learning preparation is good, but when getting input from other people there are still things that can improve the quality of learning preparation.

The principle of collegiality and mutual learning is applied in collaborating when carrying out Lesson Study activities. In other words, participants in Lesson Study activities may not feel superior (feeling the smartest) or inferior (feeling inferior) but all participants of Lesson Study activities must be intended to learn from each other. Participants who already understand or have more knowledge must be willing to share with participants who do not understand, whereas participants who do not understand must want to ask participants who already understand. Speakers in the Lesson Study forum must act as facilitators, not instructors [8]. The facilitator must be able to motivate participants to develop their potential so that participants can progress together.

Lecturers and teachers in compiling collaborative learning materials to increase creativity in working on mathematical problems given. In this effort the teacher can provide questions that are packaged in the form of sharing task and jumping tasks. Sharing tasks are series of questions that are made with a moderate level. Sharing tasks which aim to make students discuss collaboratively must be done by them. Students provide mutual assistance to create a learning community among students. In discussions working which is given on sharing tasks will create good communication among students. Jumping tasks are series of questions that are made with a higher level. The purpose of giving jumping tasks is to provide opportunities for students to think higher and find their creativity in solving a problem. The ability to think creatively for students is an ability that must be developed in a classroom learning. 1.2 Creativity

Thinking is a mental activity that is manifested in the form of behavior that can be used by someone to build an idea or ideas that occur through a particular problem or situation that must be solved. Rawlingson [9] states that patterns or types of thinking can be divided into two categories, namely analytic thinking and creative thinking. Both of these patterns have different processes and orientations. Analytic thinking patterns are logical and lead to the small number of answers that can be implemented. Anderson [10] states that the process of creative thinking consists of three stages, namely building ideas, planning, and producing. The process of creative thinking in this study consists of two stages: the first is generating ideas and the second is problem solving actions to produce creative products that meet aspects of fluency, flexibility and novelty.

Solving mathematical problems that meet the indicators of fluency in the process if students solve mathematical problems that allow more than one way to construct ideas correctly. Solving mathematical problems that meet the Dexterity indicator in a process if students in Generating ideas can use more than one approach correctly. Solving mathematical problems that meet the novelty indicator if students can solve mathematical problems correctly and are not usually done or solved by students at the stage of development or level of knowledge.
1.3 Sharing task and jumping task
Sharing tasks are in the form of questions with a moderate level. They are given to students which aim to make students discuss collaboratively. Students provide mutual assistance to create a learning community among them. Discussions on sharing tasks will create good communication between students. Students who are less able to understand concepts well can ask students who are able to understand concepts well, or students who are able will provide assistance to students who are still less able. Communication skills are one of the abilities recommended by NCTM in learning mathematics [11]. Collaboration in working on sharing tasks will have a good impact on the ability of students in the learning process. Thus no students feel alone in class and no students feel left out in class. Another impact is also to minimize the spirit of competition in students, but the spirit of collaboration will grow.

Jumping task is a question that is made with a higher level. The purpose of giving jumping tasks is to provide opportunities for students to think higher and find their creativity in solving a problem. The ability to think creatively for students is an ability that must be developed in a classroom learning [12]. Math problems in jumping tasks do not have to be all students can do it. In fact, if the problem of jumping tasks can be done by many students, the problem is not a mathematical problem of the level of the jumping task but it is still a level of questions such as the sharing task.

2. Methodology
2.1 Participant of the research
This study examines how to increase students' creativity in the learning process designed by several teachers and lecturers in the form of lesson study activities by using sharing and jumping tasks given to students. This research is a case study with the subjects of students junior high school. A total of 8 treatments were in the form of providing worksheets designed in the form of sharing and jumping tasks. In this study the posttest is given. The purpose of giving it is to measure the students’ creativity in solving mathematics problems. Besides that, another class was used as a control class to find out the difference between the class being treated through sharing tasks and jumping tasks with direct instruction class. Each class consists of 20 students.

2.2 Ethics/permissions
The researchers obtained permission from the Ministry of Education and Culture and relevant schools. This research was conducted in collaboration between lecturers and teachers in the research schools.

2.3 Setting and design of the research
This research is a type of quantitative research that illustrates the ability of students to communicate, collaborate and think critically in class that use learning with the sharing task and jumping task approaches. It also illustrated the difference in students' ability to think creatively between class using the approach of sharing tasks and jumping tasks with direct instruction class. This research was conducted at a private school located in the city center. The initial ability of students from the two classes is the same, this is because in this school there are no superior classes. The teacher is the researcher himself, while the class teacher becomes an observer who observes students activities during the learning process.

2.4 Data collection and analysis procedures
The research data was collected from each treatment given. Data is obtained from the results of students' work in solving the problem of sharing tasks and jumping tasks. The following is one example of the task sharing and jumping task given to students.
3. Results

The results of this study indicate that students can improve their abilities including: (1) communication, (2) collaboration, and (3) critical thinking through sharing task activities. Besides that, students can increase their creativity in solving mathematical problems through jumping task activities. Each student produces different answers. The different answers produced by them in solving problems include three creative indicators, namely (1) fluency, (2) flexibility, and (3) novelty. The following are data from the results of this study.

| Table 1. Abilities of students in communication, collaboration, and critical thinking |
|-----------------------------|----------------|----------------|----------------|----------------|
| Group | Abilities            | Treatment 1 | Treatment 2 | Treatment 3 | Treatment 4   |
|------|---------------------|------------|------------|------------|---------------|
| 1    | communication       | 1.33       | 2.67       | 3.33       | 3.67          |
|      | collaboration       | 2.33       | 3.00       | 3.67       | 3.67          |
|      | critical thinking   | 2.67       | 2.33       | 3.00       | 3.33          |
| 2    | communication       | 1.67       | 2.33       | 3.33       | 3.33          |
|      | collaboration       | 1.43       | 2.37       | 3.23       | 3.17          |
|      | critical thinking   | 2.33       | 3.00       | 3.67       | 3.67          |
| 3    | communication       | 2.67       | 2.33       | 3.20       | 3.33          |
|      | collaboration       | 2.67       | 2.33       | 3.23       | 3.53          |
|      | critical thinking   | 1.23       | 2.67       | 3.33       | 3.67          |
| 4    | communication       | 2.33       | 3.10       | 3.87       | 3.97          |
|      | collaboration       | 2.47       | 2.53       | 3.20       | 3.53          |
|      | critical thinking   | 1.67       | 2.43       | 3.13       | 3.73          |
In this study also compared the ability to think creatively between classes using the approach of sharing tasks and jumping tasks with conventional class. Learning in conventional class uses direct instructions. The teacher gives an explanation of the material, provides examples of solving problems and then students work on the problems as an exercise. In this class, learning is more centered on the teacher and students are less given the opportunity to think and discuss with friends. Classes are arranged classically and only occasionally students are given the opportunity to ask questions. In this class students work individually and tend to compete not collaborate. In the following table 2 are the results of differences in students' ability to think creatively between the experimental class and the control class, especially on the fluency indicator.

### Table 2. Mean and standard deviation of fluency indicator

| Class   | N   | Mean  | Std. Deviation | Std. Error Mean |
|---------|-----|-------|----------------|-----------------|
| Experiment | 20  | 79.8500 | 2.92494        | .65404          |
| Control   | 20  | 72.4000 | 6.26099        | 1.40000         |

### Table 3. Independent-sample t test of fluency indicator

| Fluency | F   | Sig. t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |
|---------|-----|--------|----|----------------|-----------------|----------------------|------------------------------------------|
| Equal variance assumed | 9.82 | .00 | 4.82 | 38 | .000 | 7.45000 | 1.54524 | 4.3218 to 10.5781 |
| Equal variance not assumed | 4.82 | 26.91 | .000 | 7.45000 | 1.54524 | 4.2789 | 10.6210 |

From the table 3 it can be seen that sig 0.000 so that it can be concluded that there is a significant difference in the fluency indicator between the experimental class and the control class at the 0.05 significance level.

### Table 4. Mean and standard deviation of flexibility indicator

| Class     | N   | Mean   | Std. Deviation | Std. Error Mean |
|-----------|-----|--------|----------------|-----------------|
| Experiment | 20  | 80.8500 | 3.61685        | .80875          |
| Control   | 20  | 66.2500 | 2.22131        | .49670          |
Table 5. Independent-sample t test of flexibility indicator

|            | t-test for Equality of Means |
|------------|-----------------------------|
|            | F   | Sig. | t     | Df  | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidens Interval of the Difference |
| flexibility| Equal variance assumed       | 5.56 | .02   | 15.38 | 38 | .000 | 14.60000 | .94910 | Lower 12.6786  | Upper 16.5213 |
|           | Equal variance not assumed  | 15.38 | 31.54 | 3  | .000 | 14.60000 | .94910 | Lower 12.6656  | Upper 16.5343 |

From the table 5 it can be seen that sig 0.000 so that it can be concluded that there is a significant difference in the flexibility indicator between the experimental class and the control class at the 0.05 significance level.

Table 6. Mean and standard deviation of novelty indicator

| Class      | N  | Mean    | Std. Deviation | Std. Error Mean |
|------------|----|---------|----------------|-----------------|
| Experiment | 20 | 81.4000 | 2.01050        | .44956          |
| Control    | 20 | 76.1000 | .96791         | .21643          |

Table 7. Independent-sample t test of novelty indicator

|            | t-test for Equality of Means |
|------------|-----------------------------|
|            | F   | Sig. | t     | df  | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidens Interval of the Difference |
| novelty    | Equal variance assumed       | 18.01 | .00   | 10.62 | 38 | .000 | 5.30000 | .49895 | Lower 4.2899  | Upper 6.3100 |
|           | Equal variance not assumed  | 10.62 | 27.35 | 2  | .000 | 5.30000 | .49895 | Lower 4.2768  | Upper 6.3231 |

From the table 7 it can be seen that sig 0.000 so that it can be concluded that there is a significant difference in the novelty indicator between the experimental class and the control class at the 0.05 significance level.

Table 8. Mean and standard deviation of students creative thinking skills

| Class      | N  | Mean    | Std. Deviation | Std. Error Mean |
|------------|----|---------|----------------|-----------------|
| Experiment | 20 | 80.8000 | 2.39737        | .53607          |
| Control    | 20 | 71.5500 | 2.50210        | .55949          |

Table 9. Independent-sample t test of students creative thinking skills

|            | t-test for Equality of Means |
|------------|-----------------------------|
|            | F   | Sig. | t     | df  | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidens Interval of the Difference |
|            |     |      |      |     |                 |                  |                          | Lower | Upper         |

7
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.036 .000 10.622 38 .000 5.30000 .49895 4.28994 6.3 1006
10.622 27.358 .000 5.30000 .49895 4.27687 6.32313

From the table 9 it can be seen that sig 0.000 so that it can be concluded that there is a significant difference in students creative thinking skills between the experimental class and the control class at the 0.05 significance level.

4. Discussion and conclusion
The results of this study indicate that students can improve their abilities including (1) communication, (2) collaboration, and (3) critical thinking through sharing task. On one treatment given to students by using jumping task, students can think high-level to find different patterns of given objects. Through the pattern, students think to find the formula for the nth term. Learning like this has never been done by the teacher. Usually, the teacher has provided several patterns and students only determine the formula for the nth term, but by using the jumping task, students determine the pattern and they will try to find the formula for the nth term easily because students already understand the patterns that have been arranged themselves.

![Figure 3](image)

Figure 3. One product of solving problems produced by several students

The products produced in solving problems meet three creative indicators, namely (1) fluency, (2) flexibility, and (3) novelty. The results of this study are relevant to the research conducted by Asari [13]. Jumping task activities also presents its own challenges for students who have high-level abilities, this is consistent with the research conducted by Fatimah [14].

In addition, this study also shows that the ability of students to think creatively in the experimental class is different from students in the control class. Students in the experimental class followed the learning by using the assignment sharing and the jump assignment. While students in the learning control class are done by the direct learning method. It is seen that sharing tasks and jumping tasks in the learning process gives a good impact for students. The question of sharing tasks that are open ended can provide opportunities for students to foster creativity and develop higher levels of thinking. The impact is not only on students, teachers will also become more skilled in making questions both open ended and questions with high order thinking. This is in accordance with research conducted by Kwon, O. N. et al [15].

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