Small Groups: Student Productive Interactions in Learning Cooperative (Case Study of Mathematics Learning at Junior High School in Pakis, Malang)

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Abstract

The purpose of this study is to describe the process of student interaction in solving problems through cooperative learning. The subject of this research are 7th grade students of a junior high school in Malang, Indonesia. Data were collected by recording directly when learning takes place especially when pairing or forming small groups. This interaction is built with heterogeneous student skills. The results showed that the interaction that occurs in students provides an understanding of the concept of opportunity. Consequently, the students solved the problem correctly. This interaction is known as productive interaction.

Keywords: small group, student interaction, cooperative learning, productive interaction.

Introduction

The learning process occurs from primary education right through to higher education and requires communication between educators and students known as "interaction". Interaction is a type of action that occurs when two or more objects influence or have an effect on each other. In other words, learning must have interactions that occur in the classroom, the interaction occurs between the teacher and their students, or students with students. Research on interaction in learning has been studied by several researchers, such as Howe and Mercer (2007), who revealed that interaction with friends is helpful in stimulating learning in the classroom; and Kaisari and Patronis (2010) investigated student interactions to create elliptical geometry models based on (1) representation of experience, (2) concrete objects, and (3) mathematical geometry. Student interactions in the classroom need to be noted. The interaction will impact on students' understanding in exploring the understanding of mathematical concepts. If students have different understandings of mathematical concepts, then students need to interact with their peers. As a result, students can develop their ability to communicate mathematically and negotiate against different understandings in obtaining mathematical concepts.

In the opinion of Roestiyah (2008), the interactions that occur during learning include (1) one-way interaction (teacher-student), (2) two-way interaction (teacher-student, student-teacher), (3) multi-direction interaction, students-teachers, and students-students). These three types of interaction can be seen through the interaction of students in the classroom when learning takes place. Such interactions can occur in cooperative learning. Johnson and Johnson (2000) and Slavin (2005) explain that cooperative learning can lead students to learn by communicating together. Cooperative learning allows for the interaction of teaching and learning, but it does not tend to one way, and is usually more varied. The learning-teaching interaction that occurs can be a two-way (teacher-students, and students-teacher), as well as multi-direction with teachers to students, students to teachers, and students to students.

In other forms of interaction, Sardiman (2008) explains that the interaction of students in the classroom is an explanation, discussion, question, reflection or agreement used to achieve a result in problem solving. Usually a sub-group of students who are more academically competent dominate the activities undertaken in the group. This results in students who are less accomplished feeling reluctant to ask for help if they encounter difficulties in learning. However, because in cooperative learning all members are required to understand or understand all about what is being learned in the group, there is likely to be interaction between students to ask/provide assistance, maybe with or without an explanation, and many interactions may occur. It was revealed by Goodlad and Hirst (1989) and also Topping and Ehly (1998) that learning students can help other students with the emphasis on *"sharing"* rather than on content.

Interactions undertaken by students in learning can be productive, semi-productive, or non-productive. This, of course, can be seen as *"how effective"* communications are for students in the study group. As explained by Howe and Mercer (2007), group learning is the best method and will likely achieve productive interaction. However, sometimes these interactions are unproductive, as reported by Blatchford and Kutnick (2003), Alexander (2006), and Kumpulainen and Wray (2002) – with student interaction unproductive when

students are given a task to be performed together. This suggests that interactions can be productive, semi-productive and unproductive. Productive interaction can be demonstrated by behaviors that can describe the problems facing students; while semi-productive interaction is indicated by interactions that can describe but not resolve a problem. Unproductive interaction is an interaction that occurs with students outside the context of the problem. This current study will observe the process of student interaction in a group discussion with cooperative learning. Therefore, the purpose of this study is to describe the process of student interaction in solving problems through cooperative learning.

Methodology

This research is to describe the process of interaction of 7th grade Junior High School students in the Malang Regency, Indonesia. Therefore, this type of research is a qualitative research. In this study, the data will be obtained in the form of qualitative data, i.e. data obtained from the results of learning recorded directly by the researchers. The source of data will be to record one group in a cooperative *Think-Pair-Share* learning model. As described by Slavin (2005), the learning model of *Think-Pair-Share* (TPS) is a model that allows each student to demonstrate the participation of others.

This study is a preliminary study to obtain information on the presence or absence of student productive interaction in cooperative learning. Preliminary study results are then used as a basis for tracking the process of student interaction in cooperative learning. The research stages are as follows:

- *Preparation phase:* Researchers design and prepare recording devices (audio-visual cameras), and duty sheets. The tools used to record with full HD capacity consist of one (1) *handycam,* 1 (one) digital camera, and 1 (one) *android smartphone*. Also provided are a *tripod* and a *light stand* (pillar recorder).

- *Data collection stage:* Researchers conduct data collection in the schools. Learning activities are recorded using audio-visual devices. Researchers work in pre-agreed teams (involving three student peers) to assist in the recording process. Each team takes pictures of each member of the study group. Once the data is collected (recording process completed), each video is put assimilated into one full impression for each subject to be analyzed.

- *Data Analysis Stage:* Researchers analyze the data collected by performing qualitative data analysis steps developed by Creswell (2012).

- *Conclusions:* This occurs after all stages are complete. The conclusion contains information on the results of the research on the process of student productive interaction during cooperative learning.

Results

Initial Meeting

Group discussion learning activities at this initial meeting begin with students divided into groups, working together and interacting to solve problems they have been set. Learning in the groups being observed for this study is learning by *Think, Pair,* and *Share.*

Think stage – In these sessions, students only work on the problems set for them by the researchers. There is no interaction between students. Students are motivated by the teachers independently and checked to ensure no peer cheating takes place. At this initial first meeting, the students were given seven questions to solve after the teacher gave the probability material at the start of the lesson. The problem given is to determine the sample space only. In this session, the teacher allowed the students 20 minutes.

Pair stage – In the next stage, the teacher instructed students to form paired groups of two. The selection of the paired groups was random. At this stage there is a great deal of student interaction, and that is when low-ability students ask high-ability students to explain the material or teach how to approach a given problem. A sample of the interaction conversation is as follows:

Student 1: What does this mean?

Student 2: Suppose you have coin, and the possibility of that coming out is definitely a 'number' or an 'image', because money has two sides if you have money, then the chances or probability are 'AA, AG, GA, and GG'; understand?

Student 1: No, what does that mean?

Student 2: That means, possibly, suppose you toss a coin, chances are you do not understand what the outcome was .

Student 1: Oh the outcome would be the image on the coin, and also the number value?

Student 2: So if two coins are thrown, the possibility could be 'GG, AG, AA, or GA' (while writing). Now do you understand?

Student 1: Oh yeah, I understand.

In the above conversation, it can be seen that there has been interaction between the students. First, Student 1 could only do two of the problems after pairing with his friend. Student 1 asked Student 2 how to determine the sample space from the tossing of two coins; to which Student 2 explains how to determine the sample space from throwing two coins by using language that is more easily understood by Student 1. After receiving the explanation from Student 2, Student 1 could then determine the sample space.

Judging from the conversation between the students and the student's first two can be seen from the results of the students' work 1 *pair* session, one student can work properly and understanding in finding the sample chamber in question number 3 and then the students first try to work on the next number. But in this group still cannot do the problem number 6 and 7, because the problem is already related to determine the odds.

In this session student 1 can continue the next problem after being guided by his friend and in this session, the teacher gives 25 minutes. At this stage, the teacher also finds some important notes that most low-ability students will easily understand the material when their own friends are re-explaining the material that has not been understood, and it can be concluded that interactions that occur in this session can be categorized as productive interactions.

Share stage – In the next stage is *to share* that students presented the results of which have been done in the previous session. Master combines several small groups into several more groups, After that they discussed with the group to equalize the answers that have been done then the teacher summon students at random to present the answers that have been completed before to the front of the class.

Looks seen many students who are active when his friend presented the results of the answer is to ask how to get the results of the answer. But in this session, there are some students who are still wrong in giving the results of the answer so that it will be replaced by other groups to give the results of the answer and presented to all students until a class friend understands what the student said.

Second Meeting

At the second meeting, the students immediately worked on a different matter from the first meeting. *Think* this session the same as in the first meeting of students and teachers only work only provide motivation and at this stage there is no interaction that occurs, the teacher also gives 20 minutes of this session.

In the next stage is here *Pair* session students from small groups like the first meeting, but the students are determined by the teacher to pair-mate after the teacher asked the teachers of students who are highly skilled and low-ability. interactions that occur in this *pair* session when students who do not attend the first meeting will be asked how to do it, but there are some students who are still difficulties in working on it. Such as the number 2 of a dice and a coin determines the probability of a number factor from 15.

Student 1:   How is this number 2?

Student 2:   This is from factor 15, so the factor tree is made so it can be 3 numbers, that is 1.3 and 5 than seen in the sample space table on a number and a dice, then put in this operation and given curly brackets so the result.

Student 1:   How come?

Student 2:   Because it's 2 figures and pictures then all 12 are included in the formula or the same as

Student 1:   Oh .. so ..

From the conversation above 1 do not understand the way students in search of a factor 15 in a die, and then the students 2 give the sense to use trees factor and a factor of 15 on a dice i.e. 1,3 and 5, after the second student to enter the formula determines how opportunities are *so then the results are* results of such work just as in the picture below. The next session is *Share,* students come forward to present the results of the answer and would be considered by her class, in this session students have started a lot of understanding of understanding of the opportunities and how to determine the chances of an incident this statement in accordance with the results of interviews with students at The end of learning takes place.

It can be concluded that many of the interaction of the students in this study, especially at the session *Pair* and session *Think,* in this session interaction productive that interactions between students that one of these students do not understand the material so that students can understand once described by his own.

Conclusion

Based on data analysis obtained, it can be concluded that student interaction can occur when cooperative learning. This, of course, students are required to be active and productive in solving problems and students will tend to more quickly be able to understand the material when friends re-explain. Researchers also describe some of the interactions that occur in the learning takes place, and it can be concluded that the interaction that occurs including the productive interaction as less capable students who can understand and be able to work on the problems after repeated by a friend described her partner on *Pair* session.

Notes

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