European Journal of Education Studies
ISSN: 2501 - 1111
ISSN-L: 2501 - 1111
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.3555387 Volume 6 | Issue 8 | 2019

# STUDENT LEARNING INTERACTION IN CONSTRUCTING THE UNDERSTANDING OF CONCEPT IN COOPERATIVE LEARNING

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**Abstract:**
Students can obtain an understanding of concepts through learning interactions in class. However, the interaction that occurs in the majority of classes is done between teachers and students who have a high ability. This causes students who have moderate and low ability to be reluctant to interact so the understanding of the material being studied is low. Learning that can facilitate interaction is cooperative learning. Cooperative learning is carried out in heterogeneous groups so as to enable cooperation and interaction between students who have high, medium or low ability. For such reason, this research aims to find out the characteristics of student learning interactions in constructing an understanding of concepts in cooperative learning. The method used in this study there has three stages. The first stage is field observation, determining the place of research. The second stage is determining the research subject, arranging the instrument, testing the instrument, validating the instrument. The third stage is data collection, data validity testing, data analysis, and conclusion drawing. The instruments used were camcorders, observation sheets, comprehension tests, and interview guidelines. The results showed that the characteristics of student learning interactions in constructing dominant concept understanding are the types of interaction asking and answering questions.

**Keywords:** interaction, understanding, constructivist

## 1. Introduction

Understanding is one of the cognitive domains in Bloom's taxonomy (Dewi, 2015). For this reason, understanding is an important thing that will be achieved in learning in

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class, in this case in a particular understanding of concepts. Based on the results of observations in class, learning is dominated by students who have high abilities so that students who have medium and low abilities become passive. As a result, understanding of the material being studied is also low. Students' understanding of social studies learning is still low, so students do not meet the minimum completeness limit, they are less active during learning (Febriyanti, 2014).

The description above shows that the understanding of students who have moderate and low ability to learn the material is still lacking, caused by students who have high abilities and teachers dominate learning in the classroom. One effort to improve students' understanding of concepts is to pay attention to interactions that occur in class because with interactions there will be a reciprocal relationship both from teacher to student, student to teacher and students with students. Piaget explained that students must actively interact with their learning environment in order to gain a better understanding and knowledge of mathematics (Piaget, 2008).

One learning model that can facilitate the occurrence of student learning interactions is cooperative learning. The cooperative learning model can increase the interaction of students learning in groups because students work together to solve a given problem (Afifah, 2012). During this time, the interaction that occurs in cooperative learning is less attention (Cobb, Wood, & Yackel, 2011). This can be seen from the many who have done research in applying cooperative learning models but it is still rare to examine how the characteristics of interactions that occur in cooperative learning.

The importance of student interaction in learning mathematics because the class can be seen as a social context in understanding material that is learned constructivist (Cobb et al., 2011). However, student interactions in learning in the classroom, especially the characteristics or models of student learning interactions in groups still receive less attention. In fact, interactions in learning that occur as stated above have great potential to improve student achievement. In addition, by knowing the characteristics of student learning interactions in constructing an understanding of concepts, teachers can facilitate learning in the classroom to be improved. Therefore, there needs to be an effort on how to foster student interaction in learning so that it can be utilized to improve learning achievement.

Some research on interactions and cooperative learning including (R. Gillies, 2017) explained that cooperative learning can stimulate student interest because students are more interested when learning through the involvement of peers. When students interact in groups they will learn to listen, give and receive information, discuss things from different perspectives so as to complement each other's understanding of the topics discussed. Afifah further explained that the types of interactions conducted by students who have high abilities tend to provide information, students who have medium abilities tend to approve ideas submitted by other students, and students who have low abilities tend to ask questions (Afifah, 2012).

For this reason, it is necessary to examine how the characteristics of student learning interactions in constructing concept understanding through cooperative

learning models. Because, the interaction of students with other students in learning is very important so that it can be utilized when constructing an understanding of concepts in classroom learning (Febriyanti, 2014). In addition, cooperative learning has great potential to make capable students interact with each other because in cooperative learning one student is required to interact with other students in the group to achieve learning goals. Thus the teacher can utilize the characteristics of student learning interactions in constructing understanding to achieve learning goals.

## 2. Literature Review

### 2.1. Interaction in Cooperative Learning

In general, interaction can be interpreted as communication or reciprocal relationship between two or more people for a particular purpose (Roestiyah, 2014). Interactions that occur during the learning process take place to achieve educational goals are called learning interactions. Learning interaction is an interactive activity from various components to realize the learning objectives that have been set when planning to learn (Kuhn, Shaw, & Felton, 2017).

The main elements directly involved in the learning interaction process are the teacher, students, and subject matter (Leikin & Zaslavsky, 2015). The teacher acts as a facilitator who facilitates the learning process by creating conditions that encourage students to learn actively in learning activities. While students are subjects who learn to achieve learning objectives. The subject material is an intermediary between the interaction between teachers and students and students and students. For this reason, teachers must be able to choose and design appropriate learning interactions in accordance with the learning objectives, in accordance with the material to be delivered and in accordance with the characteristics of students who will learn (R. M. Gillies, 2015).

Six models of learning interactions that occur between students, teachers, and mathematics (Masson, 2014). If the initiative comes from the teacher, the interaction that occurs can be divided into two types, namely: (1) expanding, and (2) explaining. Expanding is the same as lecturing, and directed to all students, whether asked or not. Explaining is only done to respond to questions. If the initiative comes from students, the interaction that occurs can be divided into two types, namely: (1) exploring, and (2) examining. Exploring occurs when students face an open-ended problem, try to produce their own generalizations, and do what people call research. The teacher's role here is only to direct students, encourage independent thinking. Projects and investigations are one example. Examining occurs when students volunteered to be tested. He felt he was ready based on the criteria he admitted. If the initiative comes from mathematics, the interaction that occurs can also be divided into two types, namely: (1) exercising, and (2) expressing. Exercising occurs when there is pressure from the material to master certain techniques or there are concepts that need to be trained more steadily. Exercising will succeed if there is encouragement from within the

child to do it. If not, this exercise will only produce memorization. Expressing is an activity carried out by presenting it to others.

Gillies (R. Gillies, 2017 distinguish between types of verbal interactions are (1) declaration statements, i.e. clear expressions of facts or opinions that can be accepted as reasonable; (2) rebuttal, namely the previous position contest with alternative logical explanations; (3) outlining or explaining i.e. providing further details about terms, information links and relationships; (4) open-ended questions that are designed to stimulate discussion or providing further information; (5) closed questions, which are designed to get short and unscheduled responses; and (6) the reason for providing evidence to support a proposition or position.

Based on the description above, the type of interaction in cooperative learning used in this study is based on opinion (Masson, 2014); namely the interaction of students with students, students, and teachers. While the form of interaction used is in accordance with (Dreyfus, Hershkowitz, & Schwarz, 2016; R. M. Gillies, 2015) that is, giving explanations, asking questions, answering, refuting, agreeing, asking for help and observing.

Based on the learning objectives that students of moderate ability should not only be able to solve problems, but also be confident and communicate them effectively and create relationships between concepts and other aspects of their lives. To achieve that goal, we need a learning strategy that can accommodate student interaction with the learning environment. One learning strategy according to (Leikin & Zaslavsky, 2015) which supports this is a teaching strategy that uses cooperative groups, providing opportunities for interaction between students.

In the learning process (Slavin, Lake, & Groff, 2009) suggests that teachers create conditions conducive to the learning environment, encourage students to be creative, solve problems and encourage students to discuss differences of opinion by reducing pressure on students' inappropriate responses. This is applied in mathematics learning as a process of construction and abstraction of mathematical concepts by maximizing mathematical problem solving; it can be achieved through cooperative learning. As stated (Leikin & Zaslavsky, 2015) that problem-solving performance will be achieved at a higher level if children work in cooperative groups, especially heterogeneously (Martin & Rimm-Kaufman, 2015).

Cooperative learning students work together in small groups helping each other to learn the material (Slavin et al., 2009). The same thing was expressed (Nur, 2008) that cooperative learning refers to a teaching method where students work together in small groups that help each other in learning. Cooperative learning utilizes students' tendencies to interact. Numerous studies show that in a classroom setting, students learn more from one friend to another among fellow students compared to learning from their teacher. Steps in cooperative learning (Ibrahim, 2010) includes conveying goals and motivating students, conveying information, teachers conveying information, organizing students into study groups, guiding groups to work and study, evaluating, giving awards.

### 2.2. Understanding

Understanding is an issue that extends beyond the boundaries of mathematics education. Many general theories about learning, including about the initial schematic differences students have, relate to students' efforts to reach understanding. Understanding is one aspect of learning that is used as a basis for developing learning models by taking into account indicators of understanding (Jung, 2002).

Understanding into three general categories which include: (1) understanding as structural progress, (2) understanding as a form of knowing, (3) understanding as a process (Murdock, 2015). Student understanding can be seen from how students know the problem, how students do the process and the progress of the structure. Piaget described understanding as to the ability to have multiple relationships in the mind and to allow further abstraction (Piaget, 2008). In this case, students are said to understand something if they are able to connect ideas in the mind and make it possible to carry out abstractions for the next step. So understanding is an organizational process that involves cognitive activities to solve problems.

Understanding the concept can be checked whether the student is able to give their own examples or not (Hudojo, 2008). While opinions from Marpaung (Marpaung, 2009) states that knowledge can be divided into three types: (a) knowledge of understanding as the ability to recognize and re-manifest instructions, symbols and definitions, (b) knowledge of mathematical expressions in a general sense, (c) knowledge of how to work as an ability to re-realize mathematical algorithms and other schematic problem-solving processes. Understanding is the level of ability that requires students to be able to understand the meaning or concept, situation and known facts (Stinson, 2009).

Based on the opinions above, it can be stated that in understanding something a person is required to have knowledge that causes them to be able to identify and reproduce instructions, symbols, definitions and have the skills to solve problems related to something intended schematically. In this study, understanding is defined as the ability to express the meaning of a problem by identifying what is known, what is asked and the correct form of resolution.

## 3. Material and Methods

### 3.1 Method

This research is a descriptive study with a qualitative approach. The data obtained is a clear and detailed description of the characteristics of student learning interactions in constructing an understanding of concepts in cooperative learning. This research was conducted at SMPQu Al Bahjah Tulungagung with 38 students. Thus, it was formed into four groups with details in Table 1.

**Table 1:** The division of students into four groups

| Team 1 | Team 2 | Team 3 | Team 4 |
|---|---|---|---|
| T1 | S1 | T1 | S1 |
| T2 | S2 | T2 | S2 |
| S1 | T1 | S1 | T2 |
| R1 | R1 | S2 | R1 |
| R2 | R2 | R2 | R2 |

The learning tool used is the Learning Implementation Plan and Student Worksheets in social studies learning. The research instrument was an observation sheet and a test. Learning devices and research instruments before use are tested and validated. Data collection techniques are started from the application of cooperative learning based on lesson plans and using worksheets, observing student learning interactions using observation sheets, and conducting tests at the end of learning to find out students' understanding of the material being studied. Next test the validity of the data using time triangulation. Data analysis is performed by data reduction, data presentation, and conclusion drawing.

## 4. Results and Discussion

From the lesson plans and worksheets that have been given to the participant, the results of student learning interactions are obtained namely the giving of explanations, questions, answers, rebuttal, approval and the process of requesting assistance. The learning interactions are explained in Table 2 and Figure 1.

**Table 2:** Directions for student interaction

| Form of interaction | Symbol |
|---|---|
| Giving explanation | |
| Asking | |
| Answering | |
| Refute | |
| Approving | |
| Ask for help | |

In Figure 1 (a) it is explained that in group 1 there are 8 student learning interactions namely interaction 1 T1 provides an explanation to T2, S1, R2, and R1. The second interaction, T2, answers the explanation from T1. The third interaction S1 approves the opinion of T2. The fourth interaction R2 gives questions to S1 about the opinion. The fifth interaction of S1 provides answers to questions R2. In the sixth interaction, T2 agreed with the answer from S1. The seventh interaction of R2 asks T2 for help so that in the eighth interaction T2 gives an answer to R2.

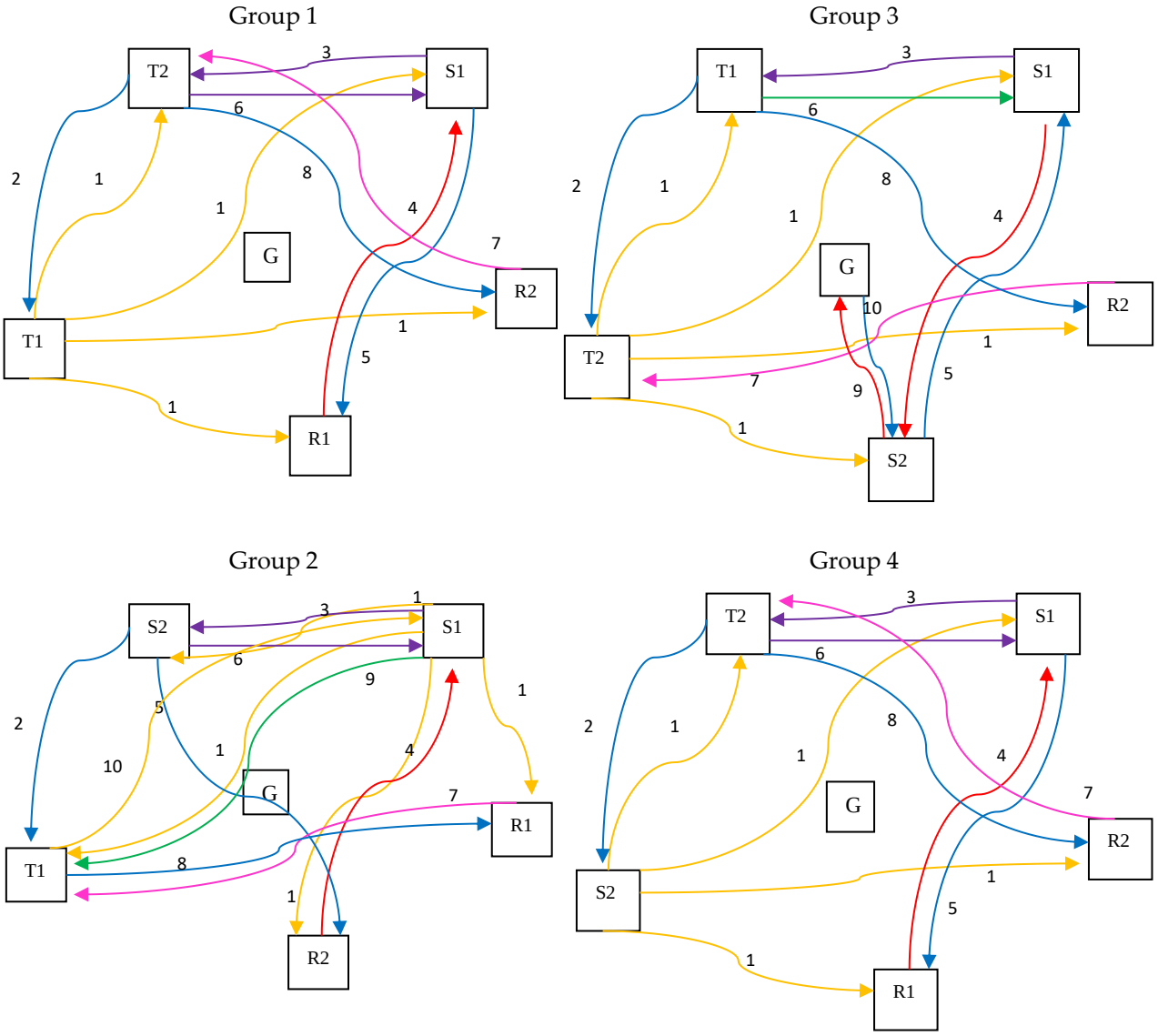


**Figure 1:** Student learning interactions in 4 groups

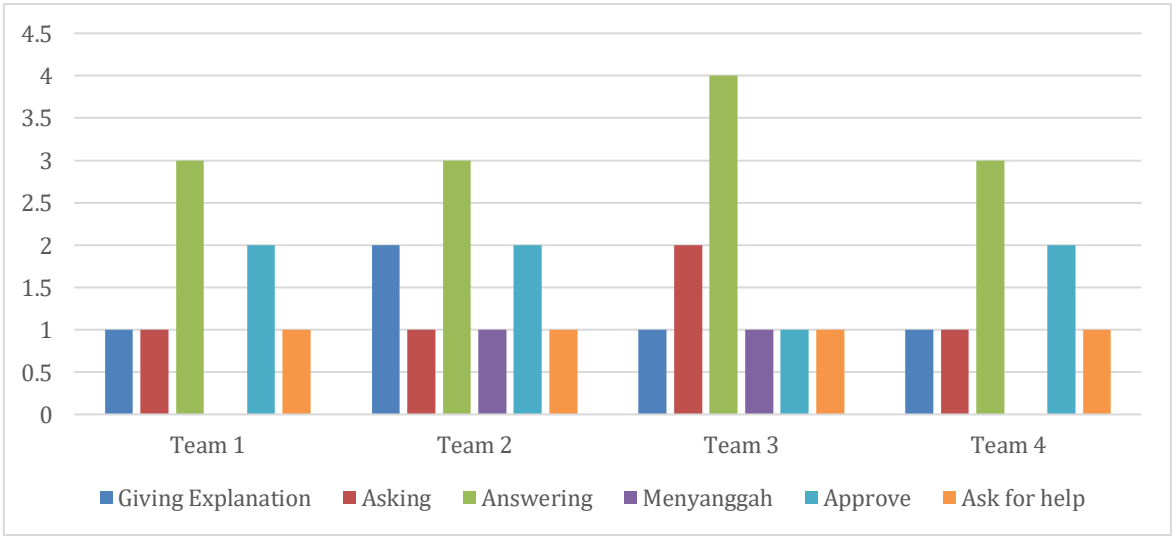


**Figure 2:** Activities in student learning interactions

In group 2 there were 10 student learning interactions described in Figure 1 (b), namely the first interaction S1 gave an explanation to R1, R2, S2, T1. The second interaction of the S2 gives an answer to T1. The third interaction of S1 approves the answer to S2. The fourth interaction R2 gives questions to S1. The fifth interaction of S2 gives an answer to R2. The sixth interaction S2 agrees with S1 explanation. The seventh interaction of R1 asks T1 for an explanation. The eighth interaction of T1 gives the answer to the request to R1. The ninth interaction S1 refutes the answer from T1. So that the tenth interaction of T1 provides an explanation to S1.

In group 3 there are 10 interactions illustrated in Figure 1 (c), the first interaction is T2 explained to T1, S1, R2, and R1. The second interaction T2 answers S2. The third interaction is an S1 interaction that agrees with the T2 answer. The fourth interaction, S2, asks S1. The fifth interaction is the S1 interaction answering the S2 question. The sixth interaction is the T1 interaction refuting the answer from S1. The seventh interaction is R2 interaction asking T2 for help. So the eighth interaction is T1 interaction answering question R2. The ninth interaction is the interaction S2 asks G. So the interaction G answers S2 is the tenth interaction.

In group 4 there are 8 interactions described in Figure 1 (d), namely interaction 1 S2 gives an explanation to T2, S1, R2, and R1. The second interaction, T2, answers the explanation from T1. The third interaction S1 approves the opinion of T2. The fourth interaction of R1 gives questions to S1 about the opinion. The interaction of the five S1 provides the answer to question R1. In the sixth interaction, T2 agreed with the answer from S1. The seventh interaction of R2 asks T2 for help so that in the eighth interaction T2 gives an answer to R2.

From these explanations from the 4 groups, it can be seen that group 2 and group 3 are the groups with the most interactions namely 10 student learning interactions. And groups 1 and 4 are the groups with the lowest interaction of 8 student learning interactions. It is important to note that group 3 raises the role of the teacher in their learning interactions.

Students and teachers need to be given measurable and achievable goals to create experiences and exposure to success (Nugent, 2009). Accountability in learning interactions is very important for teachers and students. Teaching strategies or learning models such as cooperative learning need to be applied to prevent students from falling into mistakes. The development of an effective professional learning community will help teachers plan strategies to differentiate instruction and provide resources for creating gender and culturally relevant lessons.

Research states that positive relationships affect student learning interactions positively; the problem at hand is how to utilize this relationship and student motivation, cooperative learning to act as a learning model for achievement. Educators need to help and challenge students to determine their personal success, which can affect their performance.

There is a tendency for schools to focus on the lowest 25% of the student population. The need to meet state and national progress standards can result in some schools focusing on low-achieving students so that high-achieving students can begin to

decline. High-achieving students can experience a lack of academic challenges and/or lack of recognition because teachers take time to build relationships with low-achieving students.

## 5. Conclusion

On the worksheet, students experience the highest value of differentiation significance, namely in mathematics subject which is carried out with cooperative learning models, so it can be mentioned that the interaction of student learning in cooperative learning can improve understanding of student learning concepts, especially mathematics. However, in social studies material, there is a decrease in the understanding of student learning concepts. Research states that positive relationships affect student learning interactions positively; the problem at hand is how to utilize this relationship and student motivation, cooperative learning to act as a learning model for achievement.

**Acknowledgments**
The author thanks Ristekdikti for funding this research in 2019.

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