

# Effectiveness of Cooperative Learning Approach (Snowball Throwing) in Logics Instruction at AMIKOM Mataram

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**Abstract**—This study aimed to describe effectiveness of instruction approaches (the snowball throwing's type of cooperative learning and conventional) and compare effectiveness of the snowball throwing's type of cooperative learning approach with conventional approaches in logics instruction seen from the aspect of student mathematics achievement in the academic year 2014/2015 at AMIKOM Mataram. The research is a quasi-experiment with nonequivalent comparison-group design. Its population is all of the student of informatics management (MI) with sample used are students of MI A and MI C+Exe. To test the effectiveness of instruction approaches (the snowball throwing's type of cooperative learning and conventional), data were analyzed using one sample t-test. To test that the snowball's throwing type of cooperative learning approach is more effective than conventional approach, the data were analyzed using ANOVA followed by Benferroni's t-test. The results showed that the instruction approaches (the snowball throwing's type of cooperative learning and conventional) is effective and the snowball throwing's type of cooperative learning approach is more effective than conventional approaches in logics instruction seen from the aspect of student mathematics achievement in the academic year 2014/2015 at AMIKOM Mataram.

**Keywords:** *the snowball throwing's type of cooperative learning approach, student mathematics achievement*

## I. INTRODUCTION

Mathematics is the mother of science. The sentence is appropriate to represent the existence of mathematics to other sciences, including computer science. A person will not be clever in computer science when they are not clever in math. That is, if students of AMIKOM Mataram want to be clever or to obtain good result in the computer class, then they must have solid and good foundation.

Logic of math is one of the object of studied in mathematics. Logic of math is the basic in mathematics. Therefore, studying logic of math is compulsory for all students in AMIKOM Mataram. However, studying logic of math well, is not easy, but experienced some problems in instruction. One example of the problem is the low of student mathematics achievement in logic of math. After analyzed, one cause of the problem is an instruction approach that lecturer apply is less precise. Lecturer tend to apply a lecturer oriented learning approach (conventional approach). Therefore, implement, a student oriented learning approach is the right solution to solve the problem about the low of student mathematics achievement. One of the example of a student oriented learning approach is the snowball throwing's type of cooperative learning approach.

Furthermore, academic achievement is defined as the results obtained by the students during the learning activities take place. The results are poured in the form of a numerical rating [1]. In addition, academic achievement is also interpreted as a person's competencies that acquired after learning activities. Competence is then related to the domain of knowledge [2]. In line with this, academic achievement is also interpreted as the results obtained after the student learning process. Usually, the results are set forth in the form of numbers or values that represent them in the learning ability [3]. Based on the explanation above, in this study, student mathematics achievement is the result that be obtained after the student learning activities take place and expressed in the value form.

Simply put, cooperative learning approach is defined as an instruction approach that focuses on learning activities in small group in order that the students be able to learn and work together, giving rise to

an optimal learning experience. However, not all group instruction belong to the group of cooperative learning, but must have five criteria, that is: positive interdependence, face-to-face interaction, individual responsibility, social skills, and evaluation of the group process [4].

In addition, also disclosed that the cooperative learning approach divide students into small groups with a number of membership about 4-5 people who heterogeneous [5]. Heterogeneous in the sense, heterogeneous in academic ability and gender. Furthermore, another opinion reveals that the cooperative learning approach should be based on "creation, analysis, and systematic application of structures, or content-free ways of organizing social interaction in the classroom [6]."

Cooperative learning approach consists of various types, among others: jigsaw, student-teams-achievement-divisions (STAD), think-pair-share (TPS), group-investigation (GI), and snowball throwing. In this study, the type used is the snowball throwing's type. The steps are as follows: (a) lecturers divide students in small groups (4-5 people) are heterogeneous with one member of the group as the group leader; (b) lecturers calling every group leader to get together and then given an explanation of the subject matter (the members of the group read the subject matter); (c) lecturers ask the group leader to return to their groups and then give explanations and discussion with the others member of the group about the subject matter; (d) lecturers ask each students group to create a question relating to the material on a piece of paper and then rolled into a snowball shape; (e) lecturers ask to throw a snowball that has been made to the others of student group; (F) lecturers ask each students group to answer the questions that they receive; (g) lecturers ask some groups to present and discuss the subject matter and some questions received in front of the class; and (h) together with the others student, lecturers evaluate answers and learning activities that have been performed [7].

Based on the explanation above, the purpose of this study is to describe effectiveness of instruction approaches (the snowball throwing's type of cooperative learning and conventional) and compare effectiveness of the snowball throwing's type of cooperative learning approach with conventional approach in logics instruction seen from the aspect of student mathematics achievement in the academic year 2014/2015 at AMIKOM Mataram. In addition, the presence of this study are expected to provide a contribution to learning in AMIKOM Mataram, particularly with regard to the snowball throwing's type of cooperative learning approach. As reinforcement in this study, with regard to the effectiveness of the snowball throwing's type of cooperative learning approach seen from the aspect of student learning achievement is supported by Agustina research conducted in 2013 which revealed that the approach is effective in terms of aspects of student learning achievement [8].

## II. RESEARCH METHOD

The kind of this research is a quasi-experiment that designed use nonequivalent comparison-group design. This research was conducted at AMIKOM Mataram from October 2014 to January 2015. The population is all students of Management Information (MI) in the academic year 2014/2015, while the sample is a student of MI A and MI C+Exe (random sampling). In this study, the independent variable is the instruction approach (the snowball throwing's type of cooperative learning and conventional) and the dependent variable is student mathematics achievement. The instruments that used to measure student mathematics achievement is mathematics achievement test.

In this study, data collection techniques done by starting giving tests before treatment to graders MI A and MI C+Exe, continued with give the treatment (application of the snowball throwing's type of cooperative learning approach as experimental group and conventional approaches as control group), and ends with the provision of tests after treatment of the students in both classes. The technique of data analysis done by describing the data and inferential statistical analyzes of data obtained. Description of data is done by finding average, standard of deviation, variance, minimum score, and maximum score, both for the data before and after treatment.

*One sample t-test* was used to test whether the instruction approaches (the snowball throwing's type of cooperative learning and conventional approach) is effective in logic instruction seen from the aspect of student mathematics achievement. Its criteria:  $H_0$  (instruction approach is not effective seen from the aspect of student mathematics achievement) was rejected when the significance of  $t$  is less than 0,05. Furthermore, *ANOVA* test was used to test whether there are differences of beginning knowledge between two classes sample in logics instruction seen from the aspect of student mathematics achievement. Its criteria:  $H_{01}$  (there are not differences of beginning knowledge between two classes sample) was rejected when the significance of  $F$  is less than 0,05. The same test using ANOVA was performed to test data after treatment. It is intended to see whether there are differences of effectiveness of instruction approaches (the snowball throwing's type of cooperative learning and conventional approach) in logics instruction seen from the aspect of student mathematics achievement. Furthermore, *Benferroni's t-test* was used to see whether the snowball throwing's type of cooperative learning approach is more effective than conventional approaches seen from the aspect of student mathematics achievement. Its criteria:  $H_{02}$  (the snowball throwing's type of cooperative learning approach less effective than conventional approaches) was rejected when the significance of  $t$  is less than 0,05.

### III. RESULT AND DISCUSSION

In this study, the implementation of instruction approaches (the snowball throwing's type of cooperative learning and conventional approach) has been going as well as the instruction implementation plan. However, there are some things that must be get attention in the implementation of the snowball throwing's type of cooperative learning approach, as students asked more serious during the process of snowball throwing and ask the leader of group to learn more about the subject matter than his/her members.

Data description of student mathematics achievement for both snowball throwing class (STC) and conventional class (CC) can be seen in Tab. 1. According of Tab. 1 obtained information that the average value both before treatment is below 75 and after treatment is above 75. In addition, also obtained information that there are students who earn a perfect score (100) in class of snowball throwing. To test normality and homogeneity of data, for both STC and CC (before and after treatment) can be seen in both Tab. 2 and Tab. 3. Tab. 2 below show that the data of student mathematics achievement is normal (the significance value is more than 0,05). From Tab. 3 obtained information that the data of student mathematics achievement meets the homogeneity test because the significance value is more than 0,05.

TABLE 1. DATA DESCRIPTION OF STUDENT MATHEMATICS ACHIEVEMENT

Description	STC		CC	
	Before	After	Before	After
Average	32,44	91,79	34,72	81,67
Theoretical Maximum Value	100	100	100	100
Theoretical Minimum Value	0	0	0	0
Maximum Value	85	100	50	95
Minimum value	5	70	15	70
Standard of Deviation	16,29	8,62	12,87	8,7
Variance	265,62	74,32	165,66	75,71

TABLE 2. THE RESULTS OF NORMALITY TEST

Class	Sig.	
	Before Treatment	After Treatment
Snowball Throwing	0,184	0,056
Conventional	0,07	0,487

TABLE 3. THE RESULTS OF HOMOGENEITY TEST

	Before Treatment	After Treatment
Sig.	0,311	0,915

TABLE 4. THE RESULTS OF ONE SAMPLE T-TEST

Aspect	Sig.	
	STC	CC
Student Mathematics Achievement	0,000	0,000

TABLE 5. THE RESULTS OF ANOVA

Treatment	Sig.
Before	0,505
After	0,000

TABLE 6. THE RESULT OF BENFERRONY T-TEST

Aspect	Sig.
Students Mathematics Achievement	0,000

Furthermore, the effectiveness of instruction approaches (the snowball throwing's type of cooperative learning and conventional approach) can be seen in Tab. 4. Table 4 shows that the implementation of the snowball throwing's type of cooperative learning approach is effective seen from student mathematics

achievement. Besides that, the implementation of conventional approach is effective too. Those are because the significance value of  $t$  less than 0,05.

Test about the differences of the beginning knowledge and the effectiveness of two classes sample can be seen in Tab. 5. This table show that there are no difference of the beginning knowledge between STC and CC (the significance value is more than 0,05) and there are differences in effectiveness between STC and CC because the significance value is less than 0.05. Therefore, *Benferroni's t-test* was used to see the differences of effectiveness between the two instruction approaches. The results of *Benferroni's t-test* can be seen in Tab. 6. Based on Tab. 6, there was information that the snowball throwing's type of cooperative learning approach is more effective than conventional approach because the significance value is less than 0,05.

The results of the above study then in line with the study of relevant theory and research which reveals that the snowball throwing's type of cooperative learning approach is effective seen from the aspect of student mathematics achievement. This is because, in instruction by using the snowball throwing type of cooperative learning approach, students are given more opportunities to interact with other students. In addition, the implementation of this approach, students felt more understand about the subject matter. This is because when students are having difficulty in learning, they tend to not be shy to ask to the leader of their respective groups. Furthermore, the snowball throwing's process is the most favorable instruction process. Although, impressed by the messing around, this process makes it look more students enjoy learning and do not feel pressured in class. The process to create questions and then answer himself was another reason why the type snowball throwing's type of cooperative learning approach is effective and more effective than conventional approach. With them create questions, they will automatically learn how to answer that question and how to correct the working of other groups.

In addition, the discussion was not only done within the scope of the group, but the scope is larger, that is class. This was apparent when the lessons that all seven do. Group of students who have problems will tend to respond in case questions were answered by another group of students who are less precise. In addition, another group of students who had come to give a response at the time of implementation of these activities. One thing that became added value in the implementation of the snowball throwing's type of cooperative learning approach is this instruction approach at least there will be some students who will be an expert student in the class, that is the leader of the group. It is seen from the results of the analysis of student mathematics achievement test that the scores of the leader of the group tend to be higher than the group members.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

The instruction approaches (the snowball throwing's type of cooperative learning and conventional) is effective and the snowball throwing's type of cooperative learning is more effective than conventional approaches seen from the aspect of student mathematics achievement in the academic year 2014/2015 at AMIKOM Mataram. Some things that are suggestions and needs to be follow-up of this study are: (a) although both instruction approaches (the snowball throwing's type of cooperative learning and conventional) is effective but lecturer should ask students to more serious and more encourage in order to get better output or result of the instruction, (b) a snowball throwing form can be modified to the others form, such as aircraft and plane, and (c) conduct more analysis about student's enthusiasm towards instruction approach is preferred.

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