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An experiment of reciprocal teaching model in higher education

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Abstract. This study aims to determine the effectiveness of reciprocal teaching model in higher education. The result shows that the participants taught by reciprocal teaching model have higher average score of post-test than the participants taught by traditional learning model. Statistical significance was analysed using analysis of covariance as appropriate. Further, the result of observation and interview show that the teaching model has positive effect in making a good understanding and more participation during the classroom learning process.

1. Introduction

Effective and efficient instructional process defines as an instructional process that achieves the instructional aims using minimal time and source. Efficient instructional process needs a good interaction between students and lecturer. The students must have high learning motivation to achieve the expected learning objectives. Besides, the students also need to make a good learning atmosphere in classroom to keep good interaction among the class participants.

Traditional instructional model is always use in higher education learning process. The lecturer explains about the learning material in front of the class until the class is over. After that, the lecturer gives tasks to the students. This learning model causes less students' participation in classroom learning process. The lecturer only explains the material in front of the class without students' participation. The students get sleepy, less concentration, and bored with the lecturer's explanation.

Reciprocal teaching model provides a solution to solve this problem. Reciprocal teaching model is a teaching model where students are given learning material for each meeting by the lecturer to study at home. When the instructional process is taking place, the lecturer answers all students' problems and gives some excercises while observing the students way in doing the excercise. The lecturer also provides the solution of the excercise after the students done with their work. In other words, reciprocal teaching model makes the students learn the material at home and do the tasks or excercise in the classroom

Previous studies shows that reciprocal teaching model makes a good students' participation in classroom, improves students' cooperation, provides students' to get the solution of their difficulty in doing their tasks. This is caused by the situation where students do the tasks with their lecturer in the classroom. The lecturer can identify the students' problem based on the observation when the students are doing their tasks [5]. Olankami [6] showed that the instructional model improved junior high school students' performance in learning chemistry. Lo & Hew [4] made review to 15 articles about the application of this instructional model in junior high school, the results is this instructional model give a positive effect in students achievements rather than traditional instructional model.

Based on the problem, it is important to make an experiment in learning process in higher education using reciprocal teaching model. Hopefully the model can improve the students' learning motivation and give deep understanding of students to the learning material. Capital market of mathematics is a subject that explains many kinds of technical analysis method. The lecturer can guarantee that all students can have deep understanding of that subject by applying reciprocal teaching model well.

2. Study Literature

2.1. Definition of Reciprocal Teaching Model

Reciprocal teaching model is a new instructional model. The model is the inverse of traditional instructional model where the students learn the learning materials at home and do the task at classroom [3].

In traditional instructional model, the students are given learning material by the lecturer through lecturer presentation and group discussion, then the lecturer give tasks to do at home. While in reciprocal teaching model, the students learn the material at home by watching video, reading, summarizing, listing the important point, and making question for the next lecturing, after that they do some excercises to complete their understanding in classroom [2]. In classroom, the students not only do some tasks, but also discuss and listen to the lecturer explanation of their problem in learning the material [8].

2.2. Aim of Reciprocal Teaching Model

Reciprocal teaching model is made to improve students' participation in classroom, provide students to master theirselves, improve students' reading motivation, provides students' interaction in learning, and provides deep understanding of the learning material. Therefore, this instructional model can be applied in higher education [5].

2.3. Classroom Management of Reciprocal Teaching Model

Classroom management of reciprocal teaching model consists of implementation phases and some important things that need to be noticed in every phase. The instructional model consists of two phase, the first is learning activity at home and classroom activity.

Pre-classroom activity or learning activity at home needs students' participation in learning the next classroom lecturing material by watching video, reading, summarizing, listing some important points and making questions of their problem that will be asked to the lecturer in the classroom while, the classroom activity consists of four learning steps; preliminary activity, main activity, evaluation and closing activity. The preliminary activity takes place in 10 minutes. It starts from lecturer's greeting to the class participants, checking the students' attendance, and making sure that the class is ready to study. The main activity takes place in 30 minutes. The lecturer explains the material briefly, discuss the important things of the learning material, and give students chance to ask their problem during learning at home. The evaluation takes place in 60 minutes. The lecturer gives tasks to the class participants while observing students' tasks in the classroom. The last, all class participants are given the next lecturing materials by the lecturer to be studied at home. The lecturer also gives the conclusion of the current learning material and closes the lecturing.

Some important things that must be noticed in the implementation process of reciprocal teaching model according to Lo & Hew [4] are:

- Before implementing the instructional model, the lecturer must inform the students about the instructional model.
- The lecturer has to demonstrate to the students about how to study in reciprocal teaching model.
- The lecturer has to prepare the learning material well in order the students get deep understanding about the learning material when studying at home.
- All class participants cold not get too many learning materials to be studied at home. They need minimal 90 minutes of learning at home.

- When the students learning at home, the lecturer can also provides online communication about the learning material with the students.
- Learning material that need to be studied at home must be distributed well to all class participants. Besides, the lecturer also needs to tell students about the instructional aim that must be achieved to focus the learning process.

2.4. Advantages of Reciprocal Teaching Model

Based on the previous research of Long T et al [5] and Olankami [6] about the implementation of reciprocal teaching model, the advantages of the instructional model is follows:

- Reciprocal teaching model improves the students' participants in classroom, because students' have more knowledge before learning in the class. When classroom activity is taking place, the students can asks their problem about learning material that they study at home to their lecturer or the other class participants. Therefore, a good communication happened among the entire class participant.
- Reciprocal teaching model improves the instruction's quality. The model strict the students to learn before entering the classroom. After they are entering the classroom, the lecturer not only gives them deep understanding through some tasks and solution of the tasks but also answers their problem about the learning material. This is different with traditional instructional model where the lecturer just explain the material in front of the class and make the students get bored and sleepy.
- The lecturer can identify the materials that have not been understood by the students easily.
- Doing homework in classroom is better than doing homework at home, because the entire class participants can help each other to do the tasks.
- The instructional model gives the students chance to master the subject by themselves. It will leaves long memory impression to the students than just making note in classroom.
- The instructional model is designed as appropriate with the students' feedbacks.

2.5. Disadvantages of Reciprocal Teaching Model

Based on research conducted by Long et al [5] and Tomory & Watson [8] about the instructional model, we obtain some disadvantages of the model:

- It is hard to guarantee the students study at home. But, this problem can be handled by giving structured tasks that is appropriate with the instructional aim that has to be achieved. The structured tasks may be in essay or fill in the blank formed and ask about the definition, usefulness, application and example of the learning material. Furthermore, doing the structured tasks make the students have note about the important thing of the learning material. It is also helps the lecturer determines the students difficulties.
- Not all of the class participants enjoy the reciprocal teaching model. Sometimes, there are some passive students in learning process that are not familiar with the instructional model. This problem can be solved by giving extra attention to the students and providing consultation out of the classroom.
- The instructional model needs complex learning instrument. The learning material must be detailed well to make good understanding to the students. This means that the lecturer have to make complete preparation before teaching.

2.6. Learning Motivation

Motivation defines as effort to create a certain condition in order a person want to do some activity to achieve his aim [7]. Learning motivation is very important to all students because it can discipline theirselves in learning. Learning motivation can be define as internal or external encouragement to students to obtain good achievement in learning. Learning motivation is influenced by intrinsic factor and extrinsic factor. The intrinsic factors consist of eagerness of success, needs of study, and feeling to achieve aspiration, while the extrinsic factor consist of eagerness to get appreciation, good environment to study, and fun educational process [1].

2.7. Learning Achievement

Learning achievement is a target measured by learning competency of students in instructional process. It is described in a score. Learning achievement can be defined as the rate of students' success in learning in school that is described in a learning result score [9].

Learning achievement is hard to be separated from the learning process because learning is a process while learning achievement is the result from the learning process. Learning is a must for students. The success of the learning is depending on the students' learning process.

As learning motivation, the learning achievement is also influenced by intrinsic factor and extrinsic factor. The intrinsic factors consist of intelligence factor, students' interest, and students' physically condition, while the extrinsic factors consist of the lecturer, family and learning source. Thus, the learning achievement not only influenced by the students but also the outerside factors.

3. Research Method

This is a quasi experiment research using non-equivalent control group design. The research design use available classes that have existed. We choose classes with resemble condition.

Population of this research is all of students in Mathematics Department in State University of Makassar (UNM). The main characteristic of quasi experiment is no random tasking and use the available group. There is no individual sampling; the sample is taken in classes. The samples are 12 students from Mathematics Department of UNM in mathematics of capital market class.

There are 4 research procedures in this experiment, they are:

3.1. Planning

- Preparing and designing the research instrument.
- Validating the research instrument.
- Analysing the result of research instrument validation.
- Revising the research instrument.

3.2. Implementation

- Preparing 2 equal or resemble classes that study about mathematics of capital market.
- The first class is control class where it students taught using traditional instructional model, in this case cooperative learning with discussion method.
- The second class is experiment class where it students taught using reciprocal teaching model.
- Doing pre-test to get knowledge about students' ability before conducting the experiment.
- Conducting the experiment by doing the reciprocal teaching model process while observing during 3 weeks.
- Doing post-test to get knowledge about students' ability after the experiment is conducted.
- Observing the experiment class when the process of reciprocal teaching is taking place.
- Interviewing students in experiment class to get knowledge about their impression learning with reciprocal teaching model.

3.3. Data Analysis

There are 4 steps in data analysis:

3.3.1. Prerequisite test Before doing the covariance analysis, we need to do the prerequisite test. This test consists of normality test, variance homogeneity test, linearity test, and homogeneity of line slope test. All prerequisite tests were carried out using SPSS. Significance level was set at the 5% level using the F-test.

3.3.2. Covariance analysis The research hypothesis of the research use covariance analysis. It is also carried out using SPSS where the significance level was set at 5%.

3.3.3. Processing of observation and interview result The result of interview and observation analysed to get deep understanding of the research problem. Then, we made a summary to get some fact from the sample.

3.3.4. Making conclusion Making conclusion is a process to get the main information of the obtained data in sentenced form. Conclusion is a compact sentence formulation but it has wide meaning. The conclusion of this research aims know the effectivity of reciprocal teaching model to Mathematics Department students' in State University of Makassar (UNM).

3.4. Making Report

The researcher made a report of research result about the effectivity of reciprocal teaching model to Mathematics Department students' in State University of Makassar (UNM).

4. Discussion

Based on the normality test result, the data of dependent variable is obtained from normal distributed population. Thus, we can do further analysis; covariance analysis. Based on the homogeneity test result, we obtained that the variance among the classes is equal. Therefore, we can conclude that all the classes are homogeneous. The linearity test result shows that the independent variable (pre-test score) toward dependent variable (post-test score) has fulfill the linearity assumption. Thus, the data distribution appropriate with the linear line.

Result of hypothesis testing shows there is a significance difference between experiment class (class taught using reciprocal teaching model) and control class (class taught using traditional instructional model). The average post-test score of experiment class (93,67) is higher than the average post-test score of control class (68,58). This is caused by the students' understanding is deeper when learning using reciprocal teaching model than the students' understanding when learning in traditional instructional model.

In reciprocal teaching model, the lecturer not only provides learning material for the next meeting to the students to be learned at home but also provides online discussion for sudents' problem in learning. The existence of online discussion facilitates the students to discuss their difficulty or problem about the learning material with the lecturer. This is also helps the students who can not study alone at home.

In the next lecturing, the lecturer explains the learning material briefly, gives the students chance to ask about their problem and gives the students tasks. Discussing, doing tasks, and explaining the tasks solution have more time allocation than traditional instructional model. All tasks are done in the classroom when the reciprocal teaching model taken place, while lerning the material is doing at home. Therefore, the students have deep understanding with the learning material and have more participation in the classroom. This is the difference between reciprocal teaching model and traditional instructional model.

Reciprocal teaching model is very compatible to be applied in higher education because university students are assumed that they can study by theirselves. The lecturer just gives the learning material to be studied at home, answers students' questions, and guides the students in doing their tasks. Giving quiz at the end of the lecturing is an effective way to guarantee the students studied at home.

Control class that is taught using traditional instructional model can not give the students' optimal participation. Eventhought the students got tasks before the class is taken place, but it can not guarantee the students studied at home. In cooperative learning using class discussion method, the students got the learning material and studied the material with their group. But this can not guarantee all group members' participation. Besides, there is no lecturer guidance when the students doing homework. This condition becomes the reason why the students like to cheat. Giving tasks without explanation just make the students do their tasks without deep understanding.

There is a statistically significance effect or relation between pre-test and post-test of Mathematics Department students of State University of Makassar by controlling the pre-test score. In other words, the bigger pre-test score, the bigger post-test score is. It shows that difference of students' learning result

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is not only caused by the treatment's difference but also the difference of students' ability in classroom. Student with good intelegence will get good pre-test score and it will be better after treatment done.

Besides the quantitative data, there is also qualitative data; observation and interview result. The observation result shows that students had a big interest in learning material during reciprocal teaching model taken place. The students also more active in discussion, had harder effort in answering the quiz, and had good interaction among the entire class participants.

The interview result shows that the students had good preparation before entering the classroom, because they have studied at home. They also had good understanding because they got enough guidance from their lecturer. Besides, quiz in the end of each lecturing improve the students' spirit in learning. Therefore, the students enjoy with the reciprocal teaching model.

There are some constrains in implementing the reciprocal teaching model. The students still do not understand about the importance of studying at home. Besides, the situation is a little bit irregular when the students asking question. This problem can be solved by giving extra allocation of quiz point for the final score. The irregular situation can be solved by discipline the students in discussion session for the effective and efficient learning situation.

5. Conclusion

Based on the research result and discussion, we conclude some important point as follows:

- There is a significance difference between experiment class (class taught using reciprocal teaching model) and control class (class taught using traditional instructional model). The average post-test score of experiment class (93,67) is higher than the average post-test score of control class (68,58). This is caused by the students' understanding is deeper when learning using reciprocal teaching model than the students' understanding when learning in traditional instructional model.
- There is a statistically significance effect or relation between pre-test and post-test of Mathematics Department students of State University of Makassar by controlling the pre-test score. In other words, the bigger pre-test score, the bigger post-test score is. It shows that difference of students' learning result is not only caused by the treatment's difference but also the difference of students' ability in classroom. Student with good intelligence will get good pre-test score and it will be better after treatment done.
- Reciprocal teaching model is very compatible to be applied in higher education because university students are assumed that they can study by theirselves. The lecturer just gives the learning material to be studied at home, answers students' questions, and guides the students in doing their tasks. Giving quiz at the end of the lecturing is an effective way to guarantee the students studied at home.

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