



The Effects of Collaborative Learning Technique on Student's Learning Outcome and Collaboration

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Abstract

Learning activities implemented in XI MIPA Class of MAN 1 Semarang tend to be Teacher Centered Learning, so students were passive during the learning process, it causes the achievement of student learning outcomes is not optimal and almost all students seem to find difficulties to collaboration with each other during the learning process. This research aims to determine the effect of the application of collaborative learning models of learning cell techniques to the learning outcomes and the students' collaboration character on cell material. This research was conducted in MAN 1 Semarang, in the Odd Semester of the 2019/2020 Academic Year. This research is a quasi experimental research design, with Posttest Only Control Group Design. The population used in this research were all students of XI MIPA Class in Odd Semester MAN 1 Semarang in Academic Year 2019/2020 which consisting of 6 classes. The research sample was determined by purposive sampling, so Class XI MIPA 6 was chosen as a control class and Class XI MIPA 4 as an experimental class. Data collection was done by documentation, test, questionnaire, and observation methods. The results of the data analysis showed the t test toward the learning outcomes (posttest scores) obtained that Sig. = 0,008. Because, Sig. (2-tailed) <0,05 then H_0 was rejected and H_a was accepted, which means that there were significant differences in student learning outcomes between the experimental class and the control class. The percentage of classical completeness of the experimental class > 80% was 83,3%, while the control class <80% was 61,1%. Based on the results of the analysis of student collaboration character questionnaire it is known that the character of student collaboration in the experimental class > 80% with good and very good criteria reaching 91,7%. Based on this description, it was concluded that the application of collaborative learning models of learning cell techniques has a positive effect on student's learning outcome and collaboration.

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INTRODUCTION

In order to prepare the 21st century, an appropriate learning models need to be applied to the people who live in the nuances of knowledgeable and competing communities. That learning model must be able to guarantee the students that they will have the skills to learn and innovate, work together, the skills of using technology and information media, and also can doing a work by mastering a number of skills (Murniayudi et al., 2018). Based on observations, interviews with the biology teachers, and the writer's experience during the implementation of Field Experience Practices in MAN 1 Semarang, it was known that the learning process that had been applied by biology teachers in XI MIPA Class disposed to be Teacher Centered Learning. This caused the lack of active student in participating the learning process. The students became passive during learning process, they only listen, take notes, and memorize the concepts explained by the teacher. The learning activities made the achievement of student learning outcomes in biology subjects was not optimal yet, especially on cell material.

Lack of student involvement during learning process made them felt difficult in understanding the material delivered by the teacher. This case made the cognitive learning outcomes of students were not optimal and there were still many students who got grades below the KKM. Based on the results of interviews with the biology teachers in XI MIPA Class it was known that the learning outcomes of cell material from 40 students in one class, there were only about 17 students who had achieved the KKM grades while around 23 students had not achieved KKM yet so that, the percentage of student learning outcomes of around 42,5% had reached KKM while 57,5% had not reached the KKM yet. The Biology Minimum Completion Criteria for XI Class in this school is 75. According to Aqib (2014: 41) stated that a class is said to have finished learning if there are 80% of students in the class who have reached KKM.

Based on the description above, it is known that there needs an improvement in the learning process. Improvements in the learning process can be done by applying the right learning model. The collaborative learning model is one of the learning models that focuses on student (Student Centered Learning) in order to learn and work together to build a knowledge (Susanti et al., 2017). Sumarli & Murdani (2015) stated that in collaborative learning, the students with multilevel ability can work together in small groups to reach a goal. One student is responsible for his own knowledge and also for the knowledge of other students in a group.

In the learning process in order to focusing only on achieving a good learning outcomes, it is also necessary to instill the soft skills aspects, one of which is collaboration character. One way that is capable in realizing a collaborative learning process is through collaborative teamwork. Collaborative learning provides opportunities for students to know each others. In addition, collaborative learning can build the students' confidence, a sense of responsibility, and an attitude of cooperation (Susanti et al., 2017).

One technique of collaborative learning models that can be applied in learning process is learning cell. Learning cell is a form of learning in pairs, in which the students ask and answer questions alternately based on the same reading material (Istarani, 2012: 228). The purpose of the learning cell is actively involve the students in thinking about the learning materials in order to encourage the students to make questions that provoke reflection and teach the students how to check their understanding about the materials (Barkley et al., 2012: 13). According to research conducted by Panontji et al. (2018) stated that there were significant differences in learning outcomes of classes that apply collaborative learning models with learning cell techniques, and classes that apply lecture learning models. Learning with the learning cell technique can also foster a sense of responsibility for mastering the materials in each student towards himself or his partner. With this learning model unconsciously requires the students to help each other and work together in solving a problem given by the teacher.

The purpose of this study is to analyze how the effect of the application of collaborative learning models with learning cell techniques to the learning process and the character of student collaboration on cell material.

RESEARCH METHODS

This research was conducted in MAN 1 Semarang. The population used in this research were all students of XI MIPA Class in odd Semester 2019/2020 which consisting of 6 classes. The sample in this research were XI MIPA 4 and XI MIPA 6 MAN 1 Semarang. The sampling technique used in this research was Purposive Sampling technique. The Purposive Sampling is a sampling technique with certain considerations (Sugiyono, 2016: 124). By using this Purposive Sampling technique obtained two classes as the sample classes, namely the control class and the experimental class. From the determination of the sample obtained, namely Class XI MIPA 4 as an experimental class and Class XI MIPA 6 as a control class.

This type of this research was quasi-experimental research, with a Posttest Only Control Group Design. According to Sugiyono (2016: 11), in this nonequivalent the experimental and control groups was not chosen randomly. This research took a group of subjects and certain populations which were grouped into two groups, namely the experimental group and the control group. The experimental group was a group in which the researcher applied certain treatment within a certain period of time.

The instrument used in this study was a test of learning outcomes in the form of multiple choice, which initially consisted of 40 questions but decreased into 25 validated multiple choice questions. The results of testing the validity of items, distinguishing features, level of difficulty, and reliability tests using ANATES software version 4.0.9. This test was used as a posttest to find out the differences of learning outcomes in the control and the experimental class after the application of learning model in the learning process. It was hoped that this tool can reveal the student mastery data on cell material that was treated through the application of collaborative learning models with learning cell techniques and lecture learning models.

Data collection techniques in this research used test and non-test methods. The test method is used to reveal data about the effect of the application of collaborative learning models of learning cell techniques on cell material to the cognitive learning outcomes of students in XI Class MAN 1 Semarang. The written tests conducted using multiple choice questions totaling 25 items with 5 answer choices (A, B, C, D, E). The test was conducted at the last meeting (fourth meeting) after the learning process (posttest). This non-test (questionnaire) method is used to reveal data about the effect of the application of collaborative learning in cell learning techniques on cell material to the collaboration character of students in XI Class MAN 1 Semarang.

The student learning outcomes then analyzed using statistical tests that include tests of normality, homogeneity, and t test. Measurement of student collaboration characters using the student collaboration character questionnaire sheet containing 15 items of statements with four answer criteria: very agree (va), agree (a), disagree (d), and very disagree (vd). The sampled in the study was 72 students (the experimental and the control class which each of it consisting of 36 students) and all of them were respondents. Data on the student collaboration character was obtained through filling out the questionnaire based on Likert scale filled out by students individually. The student collaboration character questionnaire sheet then scaled and analyzed based on predetermined criteria.

RESULTS AND DISCUSSION

After giving the treatment, at the last meeting (the fourth meeting) both in the experimental class and in the control class was conducted a posttest to find out the student learning outcomes. The learning outcomes and classical completeness of the students in experimental class and control class can be seen in Table 1.

Table 1 Learning outcomes and classical completeness of the students in experimental class and control class

Information	Experimental Class	Control Class
Top score	96,00	92,00
Lowest score	64,00	60,00
Average score	80,22	75,56
Number of students completed	30	22
Number of students not completed	6	14
Classical completeness (%)	83,3	61,6

Based on Table 1 it is known that the average of student learning outcomes in experimental class reached 80,22, while the control class reached 75,56. Classical completeness of student learning outcomes in the experimental class was higher (reaching 83,3%) than the control class (61,1%). These learning outcomes were then analyzed statistically by tests of normality, homogeneity, t tests (for student learning outcomes) and analysis of student collaboration character questionnaires.

Normality test is conducted to determine whether the student learning outcomes data (based on posttest scores) are normally distributed or not, and to determine the next test whether use parametric or nonparametric statistics. This normality test helped by SPSS 21 software. If Sig > 0,05, then the data is normally distributed. Based on the results of the normality test student learning outcomes using SPSS 21 software note that in the experimental class obtained Sig. = 1,57 > 0,05, while the control class obtained Sig. = 0,200 > 0,05. This showed that the learning outcomes of the experimental class and the control class were normally distributed.

Homogeneity test is used to determine whether the population in this study is homogeneous or not. The data used in this homogeneity test was the posttest score of the experimental class and the control class. SPSS 21 software was used to test the population homogeneity. The data was categorized as homogeneous population if the sig value > 0,05. Based on the test results using SPSS 21 software, the homogeneity of learning outcomes in the experimental class and the control class showed that Sig = 0,661 > 0,05. This showed that the learning outcomes in the experimental class and the control class come from homogeneous populations.

T test was conducted to determine the effect of applying the collaborative learning model of learning cell techniques. Posttest data were analyzed using the Independent Sample t-test.

Hypothesis:

H_0 : There is no significant difference in student learning outcomes between the experimental class and the control class.

H_a : There is a significant difference in student learning outcomes between the experimental class and the control class.

Basic decision making:

1. If the Sig. (2-tailed) > 0,05 then H_0 is accepted and H_a is rejected, which means there is no significant difference in student learning outcomes between the experimental class and the control class.

2. If the Sig. (2-tailed) < 0,05 then H_0 is rejected and H_a is accepted, which means there is a significant difference in student learning outcomes between the experimental class and the control class.

Based on the Independent Sample t-test, it was found that Sig. = 0,008. Because, Sig. (2-tailed) <0,05 then H_0 was rejected and H_a was accepted, which means that there were significant differences in student learning outcomes between the experimental class and the control class. The difference in learning outcomes is due to the provision of different treatments in the implementation of learning. In the experimental class the teacher applied the collaborative learning model of learning cell techniques, while in the control class the teacher adopted the conventional learning model with the lecture method. In the experimental class, learning activities were centered on students, the teacher only a facilitator. In learning activities, the teachers no longer delivered material, so students were required to prepare material by collecting various information from relevant learning sources before learning.

By applying the collaborative learning model of this cell learning technique, the students will understand the material being studied easily because the students learned it from one another and easily understand what was conveyed by their peers, if one student had difficulties or did not understand the material being studied they were not ashamed to ask their friends. This is in line with the opinion of Adduri et al. (2017) that through learning using the learning cell method can lead students to interact with and collaborate with other students in building knowledge. This method can raise questions which are then processed by the students themselves to find out the answers to these questions.

The learning activities carried out in pairs motivated the students in learning and following learning activities, especially in completing assignments given by the teacher. This is in line with the opinion of Susanti et al. (2011) that the collaborative learning model of Learning Cell technique makes it easier for the students to understand and solve problems that are difficult to solve individually by discussion. This learning model also encourages students to be more active during the learning activities taking place, as well as foster a sense of courage towards students to mutually argue and ask questions.

The application of collaborative learning models of learning cell techniques can attract students' attention, because the students are required to be active, careful, and thorough. In addition, it can also foster the students' confidence to have their own opinion in answering the questions raised by their partners. The students will also be more motivated to always dig up information about the material being studied, so that the students' understanding of the material will boarder. This is the reason why almost all students get good learning outcomes and have reached the minimum completeness criteria. This is in line with the results of research conducted by Bi (2015) states that with learning cell techniques can create a cognitive environment in students where students can jointly build knowledge, carry out learning independently, can collaborate during the learning process, can improve the role teachers and students in active and student-centered learning, realizing an active and enjoyable learning process.

Unlike the students in the control class. Learning activities in the control class were carried out conventionally by the lecture method. During the learning activities the students only listen, and record information conveyed by the teacher, the learning activities tended to be teacher-centered so, the students were not active during the learning activities. The students also did not dare to express their opinions when the teacher asked a question. As a result, the students were less motivated to learn, less enthusiastic during learning, and tend to be passive in learning. This causing the student learning outcomes were still relatively low. This was caused by the large number of students whose level of mastery of the material was still low so that the learning outcomes obtained were less than optimal and almost most students had not reached the minimum completeness criteria.

Based on the description above, it can be concluded that the application of collaborative learning models of learning cell techniques has a positive effect on student learning outcomes. The results of this study are relevant to research conducted by Jumiati and Fenita (2016) showing that there is an influence on the application of active learning cell learning strategies to

the learning outcomes of VIII students of SMPN 5 in Rokan Hulu Regency on the material of human respiratory system. Research conducted by Aula and Purwadi (2015) also showed the results that the application of the learning cell cooperative learning model with a scientific approach to surveying subjects affects the learning outcomes of XI Geomatics students at SMK Negeri 2 Bojonegoro.

The distribution of questionnaires in this study aimed to find out how the student collaboration character using the collaborative learning model of learning cell techniques in cell material. Questionnaires were distributed to the experimental and control classes at the end of the lesson (at the fourth meeting after the posttest). The results of the questionnaire analysis of the collaboration character of the experimental and control class students can be seen in Table 2.

Table 2 The results of the questionnaire analysis of the students collaboration character in experimental and control class

Criteria	Experimental Class (%)	Control Class (%)
Not Good	-	13,9
Enough	8,3	19,4
Good	61,1	55,6
Very Good	30,6	11,1

Based on the analysis of the questionnaire showed that the character of student collaboration in the experimental class with good and very good criteria reached 91,7%, while the character of student collaboration in the control class with good and very good criteria reached 66,7%. Based on these data, it can be seen that the character of student collaboration in the experimental class is higher than the character of student collaboration in the control class. This happens because, the learning activities in the experimental class are carried out in groups. It aims to build collaboration between students. The group formed is a small group with two students in each group. These paired learning activities can affect cooperative attitudes, learn together, build and share knowledge, make changes together, and experience the addition of shared knowledge in learning. This is in line with the opinion of Adduri et al. (2017) that through learning using the learning cell method can lead students to interact with and collaborate with other students in building knowledge.

The learning activities conducted in the experimental class focused on the student activities, so the teacher acted as a facilitator who facilitates and directs students to carry out collaborative learning so as to lead to the achievement of collaboration between students. The application of collaborative learning models of learning cell techniques is able to create mutual collaboration between students because learning activities are carried out by exchanging knowledge, ideas, and learning with each other so that students' understanding and knowledge on cell material becomes wider. Thus, learning with friends has a better impact than learning alone. Learning activities in the control class are carried out conventionally. In this learning students passively receive information from the teacher so that, learning activities are centered on the teacher and students are less actively involved in the learning activities. The lack of student involvement in learning has resulted in the lack of collaboration between students during learning.

Therefore collaboration character in the experimental class with good and very good criteria reached 91,7%, while the character of student collaboration in the control class with good and very good criteria reached 66,7%, the results showed that the collaboration character $\geq 80\%$ of class students experiments have reached good and very good criteria, it can be concluded that the application of cooperation learning models with learning cell techniques affect the character of student collaboration. The results of this study are relevant to the research conducted by Susanti et al. (2017) which states that the application of collaborative learning

models can foster self-confidence, responsibility, and collaboration attitude towards students. Research conducted by Laal and Ghodsi (2012) states that collaborative learning is collaborating, learning together, building shared knowledge and experiencing improvement together. This learning has many benefits and results in higher achievements and greater productivity, more caring, supportive and committed, and social competence.

CONCLUSION

Based on these data, it can be concluded that the application of collaborative learning models of learning cell techniques has an effect on student's learning outcome and collaboration.

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