

The Effects of the Use of Jire Collaborative Learning Model on Student Learning Outcomes

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Received: 8 August 2022; **Accepted:** 27 September 2022; **Published:** 12 November 2022

DOI: <http://dx.doi.org/10.29303/jpft.v8i2.3850>

Abstract- This study aims to determine the effect of the use of collaborative learning models on student learning outcomes. This research is true experimental research. The design used is Pretest-Posttest Control Group Design. The sampling technique in this study uses cluster random sampling. This design involves two groups: the experimental group, namely class XI MIPA I, and the control group, namely class XI MIPA II. The instrument used in data collection is an objective learning outcome test. The results of the analysis of hypothesis testing for the experimental and control class show that the experimental and control class t count is $> t$ table for level = 0.05. The average obtained in the experimental class is 91.61 and in the control class, 83.17. It is also supported by the N -gain value obtained for the experimental class which is 0.84 (high) while that obtained for the control class is 0.59 (medium). This concludes that there is an effect of the Jire collaborative learning model on student learning outcomes.

Keywords: Effect of Learning Model; Jire Collaborative; Learning outcomes

INTRODUCTION

Physics is one of the subjects that are associated with the intelligence of the nation, with a major role in supporting science and technology. This therefore inspires educators to be able to design and implement an education that focus more on the mastery of the concepts of physics that can support everyday life. However, in reality, many students have problems in mastering the concepts of physics. Therefore, a problem solving on each physics material is required.

Learning is a relatively permanent change of an individual that occurs due to meaningful experience and training as well as interaction with the environment that involves the process of knowledge, values, attitudes and skills (Abdjul, 2019). According to Ahriana (in Najwa et al, 2022: 32) learning outcomes are patterns of actions, values, understandings, attitudes, appreciation and skills that students acquire after learning had occurred.

According to Dahar (1988) concept learning is the main learning outcome of

education. Concepts are the building blocks of thinking. Concepts are the basis for higher mental processes to decide principles and generalizations.

According to Azhar (in Imam et al, 2022: 58) learning and teaching are two inseparable matters. Learning refers to the activities of students, while teaching refers to the activities of the teachers as managers of the teaching and learning activities. These learning activities will take place if there exists interaction between students and teachers or students with students. Here, in order that the interaction process is in accordance with the desired goals, a learning model that is in accordance with the material being taught is needed.

From the results of observations and interviews at SMA Negeri 1 Telaga Biru, it was discovered that presently, teachers are still using direct learning and lecturing (conventional method). Cognitive learning outcomes were based on daily test scores of 73.50 and 74.88. In this kind of learning, teachers are more active than the students

and the students seem to only accept the material and are not actively involved in the learning process. The impact of this kind of learning is that students' conceptual understanding of physics is still very low. Students' activity is also lacking during the learning process, so that the cognitive learning outcomes obtained from the daily test scores are only 73.50 and 74.88, which are below the KKM (minimum score required). Therefore, teacher efforts in managing the learning process in the classroom are needed in order that maximum learning outcomes can be obtained.

According to Gunawan (in Widiawati et al, 2018: 41) problems in learning can be overcome by the use of the right learning model by the teacher. The use of an unsuitable model could lead to a less than optimal result.

One solution to this problem is using a collaborative model. Jire collaborative learning is a learning method with the potential to solve that problem, and that which can offer a way of solving how these problems can be solved. That is, by involving the students collectively in a group. The learning groups then conduct collaborative learning according to their respective competencies (Ntobuo, 2018:2).

According to Wiersema (2002), in collaborative learning, each group member can learn from each other and even the teachers can learn from their students. Meanwhile, according to Panitz (1996), collaborative learning is a learning method that places cooperation as the key to the success of a group in achieving common goals. Working, building, learning, advancing, and succeeding together are the key ideas in collaborative learning.

Jire collaborative learning model is a learning model developed from a collaborative learning model that is integrated with a jigsaw learning model

whose syntax has been revised. Jire collaborative learning model can be defined as the collaborative process gone through by individuals and groups, both in their "home" groups and "expert" groups, which emphasizes the importance of developing meaningful and intellectual learning by developing social aspects in order to achieve common goals (Ntobuo, 2018: 48-49).

The syntax of the learning using the revised jigsaw-integrated collaborative learning model is as shown in Table 1.

Table 1. Jire Collaborative Learning Syntax

No	Jire collaborative learning syntax phase
1	Providing orientation to the students/ delivering motivation and learning objectives.
2	Forming groups
3	Reading
4	Group discussion
5	Facilitating students' collaboration: Each expert group discusses their findings with the teacher to confirm the correctness of their findings
6	Assessing and evaluating
7	Team report. The experts return to their respective groups to teach their topics to their home teammates
8	Quiz
9	Review
10	Provision of reward
11	Re Teaching

(Ntobuo, 2018)

It is expected that the use of appropriate learning models can provide an effective learning process for students who have relatively short memories. Collaborative learning is not only useful in finding comprehensive problem-solving methods, but it can also reveal new knowledge about problem-solution maps that materialize Collaborative learning does not only take place among classmates, but can be built between participants from various schools, universities, and even countries. More than that, this learning can reduce the dominance of a partial thinking in viewing the problems and offering the solutions, which is then replaced with a

holistic thinking that offers a comprehensive solution. Thus, the new knowledge it generates can reduce complexity and offer a map of linkages and traceability in both the problem and solution domains. (Ntobuo, 2018:2,3).

Given the importance of using such learning model for students at state high school level, the researchers are therefore interested in examining the effect of the use of Jire Collaborative Learning Model on Student Learning Outcomes and will thus test its quality at the high school level. The Jire collaborative learning model can be used at high school education level because students are trained to work together. Therefore, the title of this study is "The Effect of Using Jire Collaborative Physics Learning Model on Student Learning Outcomes."

RESEARCH METHODS

The research method used is the experimental method, that is, the research method used to find the effect of a certain treatment on a certain variable under a controlled condition (Sugiyono, 2012). The experimental method used in this research is true-experimental with pre-test and post-test designs. Here, the design used is Pretest-Posttest Control Group Design involving two different groups, namely experimental and control group.

The subjects of this study were students of class XI MIA I and XI MIA II with a total of 59 students who were selected using cluster random sampling. This research took place at SMA Negeri 1 Telaga Biru from May, June, and July of the 2021 academic year. Students were given a pretest and posttest in the form of 29 multiple choice questions. Data collection technique used in this study is test. The research instrument to determine the students' conceptual mastery takes the form of an objective (multiple

choice) test with 29 concept mastery indicators. The instrument was then validated using expert judgment. The instrument was then tested on students of class XI MIPA SMA N 1 Telaga Biru. The results of the validity test of the 29 items were used in the study. The instrument was given to students in class XI MIPA I and XI MIPA II before the learning process (pretest) and after the learning process (posttest). Based on the results of the data analysis, the students' concept mastery scores for both the experimental and control class are categorized as having normal and homogeneous distribution, with a p value of > 0.05. Therefore, the hypothesis test used is the related sample t-test.

RESULTS AND DISCUSSION

Results

Analisis perbandingan hasil belajar peserta didik pada kelas Kontrol dan kelas eksperimen digambarkan sebagai berikut.

The analysis of the comparison between students of the control and experimental classes' learning outcomes is described as follows.

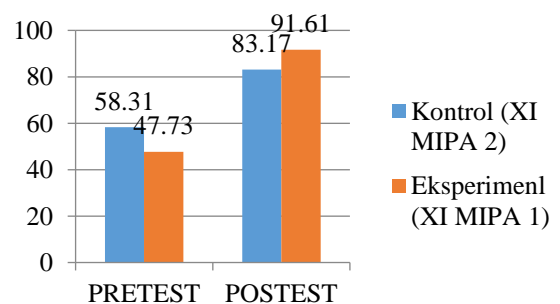


Figure 1. Average pretest and posttest scores for the experimental and control classes

Figure 1 shows that the average pre-test score of the control class is 56.86, while its average post-test score is 83.17. Meanwhile, for the experimental class, the average pre-test score is 47.73 and the average post-test score is 91.61, meaning that the average pre-test and post-test scores for the experimental

class are higher than those of the control class. This shows that learning using Jire collaborative learning model is able to improve student learning outcomes in the experimental class for the post-test with a value of 91.61. This is in line with the research conducted by Ntobuo (2018: 48-49) which concludes that there is an increase in the learning outcomes of physics students who are taught using the developed jigsaw learning model that is Revised Collaborative Jigsaw (Jire).

The results of the normality test on the data for both control and experimental classes show that the data is normally distributed, the results of which can be seen in Table 2.

Table 1. Data Normality Test Results

Class	I _{count}	I _{table}	Status
Experimental	0.17	0.26	Normally distributed
Control	0.12	0.26	Normally distributed

Based on Table 2 above, the two classes, the experimental and control class, both have I count < I table with $\alpha = 0.05$. Thus, it can be concluded that the data are normally distributed.

Table 2. Data Homogeneity Test Results

Class	F _{count}	F _{table}	Status
Experimental	1.09	1.98	Homogeneous
Control			

Based on Table 3, the comparison of the variance for experimental and control class obtained $F_{count} < F_{table}$ with a significance level of $= 0.05$. Therefore, H₁ is accepted in the sense that the data is homogeneous. In other words, the data are not so different in terms of diversity.

The results of the hypothesis testing for experimental and control classes can be seen in Table 4.

Table 3. Hypothesis Testing Results

Class	T _{count}	T _{table}	Status
Experimental	12.93	2.06	H ₁ accepted
Control			

Based on Table 4, the results of the hypothesis testing analysis for the experimental and control class show that the experimental and control classes' t_{count} is $> t_{table}$ for $\alpha = 0.05$. Therefore, H₀ is rejected and H₁ is accepted, with the conclusion that there is a difference in student learning outcomes on temperature and heat transfer material before and after using the jire collaborative learning model at SMAN 1 Telaga Biru.

Tabel 5. N-gain Test Results

Class	N-gain	Criteria
Experimental	0.84	High
Control	0.59	Moderate

Based on Table 5, the N-gain obtained for the experimental class, which is 0.84, is included in the high criteria. Meanwhile, for the control class, the n-gain, which is 0.59, is included in the moderate criteria. Thus, it can be concluded that the increase in student learning outcomes for the experimental class is high while for the control class, moderate.

Discussion

The data for the learning outcomes in this study were obtained through a multiple-choice learning outcomes test totaling 29 (twenty-nine) items, from a total of 59 students as respondents. The tests were given to students before and after the use of the Jire collaborative learning model.

Figure 1, which obtains students in the control and experimental class learning outcomes, shows that the experimental class has higher average post-test score than the control class. This shows that learning using Jire collaborative learning model is able to improve the learning outcomes of students in

the experimental class in the posttest (with a score of 91.61). This is in line with the research conducted by Ntobuo (2018: 48-49) which concluded that there is an increase in the learning outcomes of physics students who are taught using the developed jigsaw learning model that is Revised Collaborative Jigsaw (Jire).

The hypothesis testing concluded that there were differences in student learning outcomes after using the Jire collaborative learning model. This was due to the treatment given to the experimental class, which made the learning not only focused on one-way, teacher-centered learning, but also on the students being actively involved in the learning of the concepts of temperature and heat transfer with Jire collaborative learning model. As stated by Ntobuo (2018: 48-49) Jire collaborative learning model is a learning model developed from the collaborative learning model which is integrated with a jigsaw learning model whose syntax has been revised.

In online learning, in order that student learning outcomes can be maximized, an appropriate learning model is needed. One of the learning models that is deemed appropriate is Jire collaborative learning model, whose process encourages the students to be active during the in-class learning process and under teacher guidance. Teachers are required to present a more effective learning process in order to replace teacher-centered learning process to student-centered learning process. Here, as stated by Gokhale (1995), collaborative learning model is one of the many learning models who makes students actively participate in the learning process.

Nevertheless, several complications emerged in the learning process that uses Jire collaborative learning model. One of which is that students must first adjust themselves to the learning model. This is because Jire

collaborative learning model is relatively new. When the learning process takes place, there are some students who had problems with their internet signal, and hence are forced to leave the Zoom application. As a solution, the researcher then provided a more detailed explanation about the Jire collaborative learning model through WhatsApp. The same goes for when there occurred other complications in the learning process; students can communicate with the researchers through the groups provided.

Jire Collaborative Learning Model Advantages

The advantages of Jire collaborative learning model are as follows: (1) it increases students' self-confidence; (2) students become more active; (3) it improves students' learning motivation; (4) students can understand the material more quickly and effectively; (5) the expert group mastered the topic correctly; (6) students in the same group will have the same perception on the correct answer; (7) the students get to learn about how to teach their peers; (8) it improves social relations between students within the same groups.

Jire Collaborative Learning Model Drawback

One drawback of implementing Jire collaborative learning model is related to the distribution of materials to the students. If the number of members in every home group is not identical, what usually happens is that the group will have more than one students discussing the same material.

Another drawback is regarding the students' working pace. Here, the students all have different working pace within their home groups. Therefore, there will be a period in which some students have completed their assignments while the others haven't.

CONCLUSIONS

Based on the results of the research and analysis of the data obtained, it can be concluded that there is indeed an effect of the use of collaborative model on student learning outcomes. This is shown through the hypothesis testing criteria where $t_{count} > t_{table}$. As for the average score of the students, the experimental class obtained a score of 91.61 while the control class obtained 83.17. This result is also supported by the N-gain value obtained for the experimental class being 0.84 (high) while for the control class, 0.59 (medium).

Suggestion

Based on the research conducted, the researchers thus put forward several suggestions for future considerations:

1. The implementation of online learning should be more coordinated (between researchers and students).
2. The use of Jire collaborative learning model can serve as an additional reference for the learning model to be implemented in the teaching and learning process in schools.
3. It is hoped that JIRE collaborative learning model can be improved by further researchers.

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