



Implementation of Lesson Study Based Collaborative Learning: Analysis of Improving Science Learning Achievement of Elementary School Students during Pandemic Covid-19

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ABSTRACT

Keywords:

Collaborative Learning;
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Science.

The purpose of this study was to analyze data related to the application of collaborative learning based on lesson study on science learning achievement of elementary school students during the implementation of PPKM Level 3 in the Pandemic Covid-19 situation. The research method used was True Experiment Design which was analyzed with a quantitative approach. Based on the sampling technique used, namely simple random sampling, 30 students were assigned as research samples which were then divided into two small classes, namely class A (experimental class) and class B (control class). To assist the smooth running of the research, an observation sheet instrument was used (Plan, Do, and See). The results showed that the implementation of lesson study based learning was carried out with a very good assessment. As presented in the Plan Phase, Do Phase and See Phase, respectively from Meeting I (73.48%), Meeting II (75.83%), Meeting III (85.42%), and Meeting IV (92.55 %). From these findings, it also affects the increase in science learning achievement with a significant level of influence, namely 94%.



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A. INTRODUCTION

Along with the development and progress of science and technology and the demands of globalization together, it has led to increasingly fierce and competitive competition regarding the need for the provision of quality human resources. The strategy for providing human resources needs to be carefully prepared as well, so that it can produce outputs that are able to compete at the global level (Cintamulya, 2012). This is where quality education is needed, which can support the achievement of the nation's ideals of having quality resources and it is very appropriate to say that education is a conscious effort in presenting quality human resources or the process of civilizing humans to become better individuals. And through education can lead humans to intellectual, social, moral maturity, in accordance with their abilities and dignity as human beings. It is even believed to be the key to the success of future competitions (Suwartini, 2017).

The most tangible form of education is through the learning process in schools, including learning at the elementary school level. This proves the presence of schools as formal educational institutions that have a fairly heavy burden in carrying out the educational mission,

especially in providing access to quality learning services (Hamna & BK, 2020). Learning is an educator or teacher activity programmed through instructional design so that students can learn actively by utilizing the learning resources provided, so that it is said by Fatimah & Kartikasari (2018) that learning that is not well structured allows for results that are not achieved according to the target.

On the other hand, the achievement of good learning achievement can be realized through learning that supports increasing student achievement. Through its achievement efforts, the teacher's role as a facilitator has an influence in ensuring the effectiveness of student learning (Rahmawati & Suryadi, 2019). The teacher's role as a facilitator can certainly design learning that prioritizes cooperative relationships between students, so that a dynamic class can be realized and jointly achieve learning goals.

One of the lessons in elementary school that needs attention is science learning. Science is a science that discusses natural phenomena that are arranged systematically based on empirical facts on the results of experiments and observations made by humans. According to Supriyati (2015) science lessons in learning content in elementary schools are one of the learning programs that are useful for fostering students to be ready to respond and have sensitivity in dealing with their environment. Science education in elementary schools is beneficial for students to study for themselves the systematic and orderly natural phenomena and objects that exist in the natural environment. Therefore, the provision of science lessons in elementary schools aims to make students able to master science concepts and their interrelationships and be able to develop a scientific attitude to solve the problems they face so that they are more aware of the greatness and power of their Creator. Based on this, the most important thing in learning science in elementary schools is how to explore new knowledge in students, especially in developing cognitive, affective, psychomotor and creative abilities.

It's just that science teaching activities in all school activities, especially at the elementary school level in Indonesia from early 2020 to mid-2021, since being hit by the Covid-19 pandemic, seem to diminish the achievement of science teaching goals in elementary schools that must be taught properly. Optimizing access to online learning, even though science teaching should be better if it is taught in a face-to-face learning atmosphere. However, along with the issuance of the Minister of Home Affairs Instruction No. 32 of 2021 concerning the Implementation of Level 3, Level 2 and Level 1 Community Activities and Optimizing the 2019 Corona Virus Disease Handling Posts at the Village and Sub-District Levels to Control the Spread of Corona Virus Disease 2019 (Inmendagri, 2021). The contents of this ministerial regulation are essentially the basis for the application of all forms of learning activities, especially in areas with categories level 1, 2, and 3 to carry out Face-to-face Learning (PTM) with permission from the local government.

As the location of this research was carried out in one of the schools located in the Tolitoli Regency, Central Sulawesi Province which if referring to the Decree of the Minister of Home Affairs No. 32 of 2021, the Tolitoli Regency area is included in the level 3 category of Covid-19 spread. This means that the Tolitoli Regency can carry out limited PTM while still carrying out strict health protocols according to the permission of the local government (Inmendagri, 2021).

The results of the initial observations carried out in connection with the research carried out, in the science learning process found in the learning of fourth grade students at SDN 5 Tolitoli had not fully developed students' cognitive, affective, psychomotor and creativity. Learning that takes place in the classroom is still in the form of one-way communication, the

teacher talks more and students listen. Teachers assume that their task is only to transfer their knowledge to students with the target of conveying the topics contained in the curriculum.

Learning science is said to be successful if in the learning process there is an interaction between the existing factors, namely students, teachers and places of learning. Not only students who learn but teachers also have to learn how to teach and teach a subject with the right steps so that they can affirm some of these factors. This learning is called collaborative learning.

Collaborative learning in the teaching of science reflects how the actions that must be taken so that the expected skills and abilities can be achieved in students (Tursinawati, 2013). According to Sato (2012), organizing collaborative learning in accordance with 21st century education targets the principles of quality and equality with the following characteristics: (1) based on science and technology; (2) multicultural; and (3) the risk of inequality. The three things above should be responded to immediately by implementing collaborative learning.

Collaborative learning is also related to Vygotsky's theory which explains that human development cannot be separated from social and cultural activities. There is a role for tools and the environment including other humans outside of themselves that affect its development. Thus, humans always need other people in developing themselves into human beings in accordance with expectations. Therefore, one of the educational topics related to collaborative learning that has recently been interesting to discuss is Lesson Study.

Lesson Study emerged as an alternative to overcome the problem of learning practices that have been seen as less effective. As is understood, it has been a long time since the practice of learning in Indonesia in general tends to be done conventionally, namely through oral communication techniques. Such conventional learning practices tend to emphasize more on how teachers teach (teacher-centered) than on how students learn (student-centered), and overall the results are understandable which in fact do not contribute much to improving the quality of student learning processes and outcomes.

Even though viewed from the principle of usefulness, the application of lesson study in learning activities is a model for fostering the teaching profession through collaborative learning studies and can be applied continuously according to the principles of collegiality and mutual learning in creating a good learning community (Widiadi, A.N. & Utami, 2016).

The concept and practice of lesson study was developed with the aim of developing the professionalism of educators in the field of learning which was first developed by basic education teachers in Japan (Saputri et al., 2019), which in Japanese is called "*Kenkyuu Jugyo*", and Makoto Yoshida is people who are considered to be instrumental in developing "*Kenkyuu Jugyo*" in Japan.

Japan's success in developing Lesson Study seems to be starting to be followed by several other countries, including in the United States which has been persistently developed and popularized by Catherine Lewis who has conducted research on Lesson Study in Japan since 1993 which at that time was gradually implemented in elementary schools. Lesson study as an activity to improve the quality of learning and professional development of educators certainly has three learning principles inherent in its application, namely Planning (Plan), Implementation (Do), and Reflection (See) (Murtisal, 2016). Then the focus to be observed in its implementation, both by teachers and observers, is how students learn and their learning outcomes can affect student achievement in class (Ratnawati, 2017).

The basic emphasis of lesson study is for students to have a high quality of learning. For this reason, it is hoped that through Lesson Study-based learning, teachers can improve their competence as educators in order to present learning that spurs student achievement, especially

in the field of science studies in elementary schools. And the reason for the Covid-19 pandemic, is not a barrier to the implementation of quality learning (Utamajaya et al., 2020), which can improve students' science learning achievement in elementary schools (Marwanto, 2021).

B. METHODS

The research method used is True Experiment Design which is analyzed with a quantitative approach. This research is called True Experiment Design because the experimental group and control group were taken through a random technique (Sugiyono, 2011). The experimental group will be treated with lesson study-based learning and the control group will apply a learning model that is generally applied by teachers in science learning such as the lecture method. The research design used was the pretest-posttest control group design as Table 1 below.

Table 1. Research Design

	Sample	Before Treatment	Treatment	After Treatment
R	Experiment (A)	O ₁	X	O ₂
	Control (B)	O ₃	-	O ₄

With:

- X : Lesson Study based Learning Treatment in the Experiment Class
- O₁ and O₃ : Science Learning Achievement of Experiment Class and Control Class before being Given Treatment
- O₂ : Experiment Class Science Learning Achievement after being Treated Through Collaborative Learning based on Lesson Study
- O₄ : Learning Achievement of Control Class Science after Applying Learning with Other Method such as the Talk Method

The research population involved all fourth grade students of SDN 5 Tolitoli. Meanwhile, for the determination of the class sample using simple random sampling technique, so that 30 students were determined as the research sample, each of which placed a sample of students in class A and class B as Table 2 below.

Table 2. Reseacher Samples

Class	Amount of Sample Students
Experiment (A)	15
Control (B)	15

The research instrument used was observation sheets (Plan, Do and See) which had been tested for level validity by the expert validators of this research instrument. The criteria used to measure the implementation of learning are based on the categorization in Table 3 below.

Table 3. Standards for Successful Implementation of Lesson Study on Science Learning Outcomes

Action Success Percentage	Level of Success
81 - 100	Very Good
61 - 80	Good
41 - 60	Enough
21 - 40	Less
0 - 20	Very Less

The data analysis techniques used in this research are descriptive statistical analysis and inferential statistical analysis. The data analyzed is the implementation of learning methods. The results of science learning obtained from learning outcomes through pretest and posttest are seen based on the results of increasing scores before and after being given treatment.

Hypothesis testing was conducted to determine the effect of the implementation of the Lesson Plan on students' science learning outcomes in elementary schools. The formula for calculating inferential statistical analysis was carried out using the t-test through SPSS version 26. The t-test was carried out with the following conditions: if the value of sign. (2-tailed) $> (0.05)$ then H_0 is accepted (there is no effect of implementing the Lesson Plan on students' science learning outcomes) and if the value of sign. (2-tailed) (0.05) then H_0 is rejected with the condition that the mean value of the experimental class is higher than the mean value of the control class, meaning that there is an effect of implementing the Lesson Plan on students' science learning outcomes.

C. RESULT AND DISCUSSION

1. Description of the Implementation of Lesson Study Based Collaborative Learning

The application of collaborative learning based on lesson study is very helpful for teachers to develop their competencies. Based on the results of research observations, it can be stated that collaborative learning based on lesson study which is applied in science learning for students of SDN 5 Tolitoli is very well done. This fact shows that the teacher is more open in accepting input, the teacher has a desire to learn and continues to strive to be better in teaching which is seen through the discussion and reflection activities he does. In this regard, it is further disclosed through the following presentation.

a. Stage Plan

In the first stage, namely the Plan stage, related to planning, planning begins with analyzing the needs and problems faced in learning, such as: basic competencies, how to teach students, determining teacher models, and so on, so that they can know various real conditions that can be used to learning interests. Furthermore, together also look for solutions to solve all the problems found. The conclusion from the results of the analysis of needs and problems becomes a part that must be considered in the preparation of the Learning Implementation Plan (RPP), so that the RPP becomes a really very mature plan, in which it is able to anticipate all possibilities that will occur during the implementation of learning takes place, both at the initial stage, the core stage to the final stage of learning.

Based on the results of observations at the plan stage, of the 13 indicators for observing participant activities at the first meeting of the lesson study, there were 9 indicators that were implemented with a percentage of 74.77%. While the results of the observation of the plan stage at the second meeting of the implementation of lesson study there were 10 indicators implemented with a percentage of 76.03% and at the third meeting there were 11 indicators with a percentage of 86.67%. While at the fourth meeting, all indicators were implemented with several notes of improvement with an observation indicator of 91.54%.

Starting from the first meeting, the involvement of the model teacher and team members began to appear, although there were still a few small things that were missed but did not reduce the essence of this planning stage, the model teacher made and prepared learning tools which were then discussed by team members, and will

then be brought down to the next meeting. next stage. At this stage the teachers and team members have started to learn and explore the knowledge they have. As explained by (Hasan, 2015), detecting possible obstacles faced by teachers in the learning planning stage is very good to do and every teacher must be aware of it because it will be able to help teachers anticipate various other obstacles that are predicted to be found at the implementation stage of the learning process.

b. Step Do

The second stage is the Do stage (implementing), at this stage the model teacher carries out what has been planned related to the learning process, all learning devices that have been prepared are used to deliver the material that has been determined. This process is observed by three observers, one observer acts as an observer of the research lesson study which is related to the lesson study process and two observers act as observers in the learning process, namely the suitability between what has been planned and what happened to both the teacher and the students. In the Do Stage, recording is also carried out, the aim is to be brought to the reflection stage as material to evaluate and support the observer's observations.

In the implementation of the Do in Meeting I, the teacher did not do apperception when the learning process began, there were no material misconceptions that occurred in the core activities, and the teacher seemed less daring to change the lesson plan that was not in accordance with the situation that occurred in the process, the teacher did not provide opportunities for several students to work on questions on the blackboard, the use of time is not in accordance with the time allocation plan, the number of students who escape the teacher's attention is 3 out of 15 students in the class, there are 2 groups whose discussions are not smooth out of 3 groups as a whole, and the number of students who escaped the teacher's attention were 4 out of 15 students in the class or with an assessment percentage of 71.75%.

In the implementation of the Do at Meeting II, the teacher did not do apperception when the learning process began, there were no material misconceptions that occurred in the core activities, and the teacher did not seem to dare to change the learning plan that was not in accordance with the situation that occurred in the process, the teacher did not provide opportunities for several students. students to work on questions on the blackboard, the use of time was in accordance with the time allocation plan, the number of students who escaped the teacher's attention was 3 out of 15 students in the class, there was 1 group whose discussion was not smooth out of 3 groups as a whole, and the number of The students who escaped the teacher's attention were 3 out of 15 students in the class. At the Do stage at the Second Meeting, it has also shown an increase in the percentage of the implementation of the student learning process or with an assessment percentage of 76.23%.

In the implementation of the Do at Meeting III, the teacher teaches the material according to the new basic competencies determined in the previous stage. There were no material misconceptions that occurred in the core activities, the use of time was in accordance with the time allocation plan, the observer's activities did not interfere with the implementation of learning, the number of students who escaped the teacher's attention was 1 person out of 15 students in the class, there was no group whose discussion was not smoothly from 3 groups as a whole, and the number of students

who escaped the teacher's attention was 2 out of 15 students in the class or with an assessment percentage of 85.05%.

In the implementation of the Do in Meeting IV, the teacher teaches the material according to the new basic competencies determined in the previous stage. There are no material misconceptions that occur in the core activities, the use of time is in accordance with the time allocation plan, the observer's activities do not interfere with the implementation of learning, but the reason is that the teacher is afraid that the time allocation is not in accordance with the implementation and the RPP used at this stage is the RPP that has undergone improvements. The teacher does not dare to change the lesson plan because the implementation of learning has been going well. The number of students who escaped the teacher's attention were 3 out of 15 students in the class, there were 2 groups whose discussions were not smooth out of 3 groups as a whole, and the number of students who escaped the teacher's attention was 4 out of 15 students in that class. At the Do stage, Meeting IV also showed an increase in the percentage of implementation, namely in the very good category or with an assessment percentage of 93.71%. This finding is in line with Setyosari's (2014) statement that the creation of effective learning cannot be separated from quality learning outcomes because the quality of a learning outcome is highly dependent on the effectiveness of the implementation of the learning process.

c. Stage See

In the last stage, namely the See (reflection) stage, all documentation carried out in the do stage is evaluated at this stage. Based on the results of observations at the See (reflection) stage, from the 16 indicators for observing participant activities at the first meeting of the lesson study there were 11 indicators that were implemented with a percentage of 73.93%, at the second meeting there were 12 indicators that were implemented with a percentage of 75.22% and at the third meeting there were 14 indicators implemented with a percentage of 84.55%. While the results of the observation stage at the fourth meeting of lesson study there were 14 indicators that were implemented with a percentage of 87.5% accompanied by several important notes in the comments column, the percentage of implementation of the observation indicators was 92.39%.

At the See implementation stage at Meeting I, the moderator in this case the lesson study coordinator did not give the model teacher the first opportunity to do self-reflection, the first opportunity was instead given to the expert to provide an introduction to the evaluation of activities in the previous stage, no observer shared the same experience. According to the findings on the implementation experienced by the model teacher, the comments given by the observer were not all positive, and the reflection discussion was not only dominated by one person. Based on the results of the evaluation at the see stage at Meeting I, the process of implementing learning at the previous stage still had many shortcomings.

At the stage of implementing See in Meeting II, the moderator in this case the lesson study coordinator gave the model teacher the first opportunity to do self-reflection, there were no observers who told the same experience according to the findings on the implementation experienced by the model teacher, the comments given by the observer did not all positive, and reflection discussions are not dominated by

just one person. Thus, at Meeting II, the percentage of the implementation of the See Phase increased.

In the See Phase in Meeting III, the moderator in this case the lesson study coordinator gave the model teacher the first opportunity to do self-reflection and the reflection discussion was not only dominated by one person. The percentage of See Phase implementation at Meeting III has increased with a very good assessment category.

At the implementation stage of See in Meeting IV, it is the same as in Stage See at Meeting III, namely the moderator, in this case the coordinator of lesson study, gives the model teacher the first opportunity to do self-reflection and the reflection discussion is not only dominated by one person. The percentage of the implementation of the See Phase at Meeting IV remains in the very good assessment category.

Based on the data obtained during the research, the classification of the implementation of collaborative learning based on lesson study can be seen in table 4 below. The classification of this assessment refers to the determination of the measure of the assessment in the previous Table 4.

Table 4. Classification of Data Result of Lesson Study Implementation Observation Sheet

Meeting	Stage	Percentage (%)	Qualification
I	<i>Plan</i>	74,77	Good
	<i>Do</i>	71,75	Good
	<i>See</i>	73,93	Good
Average (%)		73,48	Good
II	<i>Plan</i>	76,03	Good
	<i>Do</i>	76,23	Good
	<i>See</i>	75,22	Good
Average (%)		75,83	Good
III	<i>Plan</i>	86,67	Very Good
	<i>Do</i>	85,05	Very Good
	<i>See</i>	84,55	Very Good
Average (%)		85,42	Very Good
IV	<i>Plan</i>	91,54	Very Good
	<i>Do</i>	93,71	Very Good
	<i>See</i>	92,39	Very Good
Average (%)		92,55	Very Good

According to the results of the analysis of the application of lesson study-based collaborative learning by teachers, it can be seen that there is an increase at each stage of its implementation from Meeting I to Meeting IV. At Meetings I and II each with a good assessment category and the results of the assessment continued to increase at Meetings III and IV with a very good assessment category. Therefore, the success of the application of lesson study-based collaborative learning conducted by the teacher has an impact on the students' science learning process in the observation class, namely in the experimental class.

This is in accordance with what Riyati (2007) stated that Lesson Study is a model of coaching (training) the teaching profession through collaborative and sustainable learning assessments based on the principles of collegiality and mutual learning to build a learning community.

2. Description of Students Science Learning Achievement

Students' Science Learning Outcomes Before and After Being Treatment can be seen in the Table 5 below.

Table 5. Students' Science Learning Outcomes Before and After Being Treatment

Experiment Class				Classification of Values		Control Class			
Before		After				Before		After	
F	%	F	%	F	%	F	%		
0	0,00	11	73,33	81 – 100	Very Good	0	0,00	3	20,00
3	20,00	4	26,67	61 – 80	Good	4	26,67	3	20,00
10	66,67	0	0,00	41 – 60	Enough	9	60,00	7	46,67
2	13,33	0	0,00	21 – 40	Less	2	13,33	2	13,33
0	0,00	0	0,00	0 – 20	Very Less	0	0,00	0	0,00
15	100	15	100	Amount		15	100	15	100

Source: Data Research Result in 2021

As shown in table 5, it can be seen that there are a number of improvements in student science learning outcomes after the lesson study-based learning process is implemented. This shows that lesson study-based learning affects student achievement at SDN 5 Tolitoli which can be seen based on the data obtained.

According to Setiawati & Sudira (2015) that learning achievement is a result achieved by a person in carrying out learning activities. Therefore, in looking at the picture of learning achievement, we measure the achievement of student learning outcomes in terms of cognitive before and after the treatment of collaborative learning based on lesson study. This is in accordance with what Witarsa (2018) states that learning achievement is a change in behavior which includes the cognitive, affective and psychomotor domains which are a measure of student success. As has been explained, based on the data, the average value of student learning outcomes before and after treatment in the control class and experimental class is different. The collaborative learning treatment based on lesson study in this study had a positive impact on student learning outcomes in the experimental class.

Lesson Study can provide opportunities for teachers to develop pedagogical knowledge optimally. This is because through Lesson Study, teachers continuously strive to develop and improve learning strategies that can be applied to translate the curriculum. Teachers can continuously think about how the quality of questions that are able to be solved by students in learning. Thus it can be seen that the teacher holds the main key to the success or failure of learning in schools. Therefore, lesson study-based learning can have an impact on students' science learning achievement in elementary schools.

3. The Effect of Lesson Study based Collaborative Learning Implementation on Science Learning Achievement

The results of the research data analysis show that the application of collaborative learning based on lesson study has a significant effect on students' science learning achievement. Testing of learning achievement test scores using statistical analysis with t-test (independent samples test) with proof that the collaborative learning process based on lesson study results in better implementation than without going through the process.

Applying collaborative learning based on lesson study can improve the quality of better teacher learning and encourage the formation of a learning society that consistently and systematically guides teachers to make self-improvement, both at the individual and

managerial levels related to learning. In lesson study activities teachers can gain: (1) a better understanding of how students learn and teachers teach, (2) certain outcomes that other teachers can benefit from, such as how to systematically improve learning through collaborative inquiry and encourage the emergence of knowledge. new pedagogical from other teachers.

Table 6. Statistical Hypothesis Test Result (*Independent Samples t-Test*)

Test Result After Giving Treatment to the Experiment and Control Classes	<i>Independen Sample test</i>			
	<i>Sig (2-tailed)</i>	<i>t</i>	<i>Mean Difference</i>	<i>Keterangan</i>
	0,000	-4,09	4,06	Significant (0,00< 0,05)

Thus, the results of statistical data analysis, especially in the experimental class, it is known the impact of the application of learning on science learning achievement of fourth grade students at SDN 5 Tolitoli, namely the significance value < 0.001 so that it can be interpreted that the value after giving treatment to the experimental class with the value after giving treatment to the control class is different. Significantly with a significance level < 0.001 . These data indicate that the application of collaborative learning based on lesson study in learning has a positive and significant effect on students' science learning achievement.

D. CONCLUSION AND SUGGESTIONS

Based on the results of the research and discussion described previously, it can be concluded that an overview of the application of collaborative learning based on Lesson study in grade IV students of SDN 5 Tolitoli gradually increased from the Plan, Do and See stages starting from meetings I and II with good assessment categories, and continued to increase at Meetings III and IV with very good assessment categories. The description of students' science learning achievement before being treated in the experimental class was lower than the control class. After applying the results of the Lesson Study which showed learning achievement after being treated in the experimental class the results were better than the control class. The implementation of collaborative learning based on Lesson study has a positive and significant impact on improving science learning achievement for fourth grade students of SDN 5 Tolitoli. This can be seen from the learning achievement score of the experimental class which is higher than the average score of students in the control class. As the results of this study, it is further suggested to other researchers to be able to conduct similar research and examine more deeply about lesson study-based learning, especially in its application to other subjects and applied to different research locations.

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