

PROCEEDING

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University of North Carolina–Greensboro, USA**

**Dr. Jay Lennartson
University of North Carolina–Greensboro, USA**

**Dr. Ian Singleton
PanEco Foundation, Switzerland**

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14. Application of Learning Model of Social Inquiry to Improve Student's Activity and Learning Outcome on Non Parametric Statistics at Mathematic Study Program at Unib

Nurul Astuty Yensy, B^{1*}

¹Mathematic Study Program, Department of MIPA Education
Faculty of Teacher Training and Education University of Bengkulu
Kandang Limun street at Bengkulu

*Email : nurulastutyensy@yahoo.com

ABSTRACT

The purpose of this research was to know how to apply Social Inquiry Learning Model so that it could improve Student's Activity and learning outcome on Non parametric Statistics Course in Mathematics Study Program at UNIB. The subjects of the study were the students of mathematics education JPMIPA FKIP UNIB who took non parametric statistics course in the odd semester of the academic year 2017/2018 and amounted to 37 people. This research uses a Class Action Research design: action plan, implementation, observation and reflection then the next action plan. The indicator of the success of the action if the average student score ≥ 70 , with completeness of classical learning $\geq 85\%$ and the student's learning activity was in a good category. The results of this study indicated that the application of Social Inquiry learning model can improve the student's activity and learning outcome on Non parametric Statistics Course in Mathematics study Program at UNIB by: the student actively participated in doing scientific research on various cases, so the students were trained in finding and using the principles of learning, the principle of scientific research as well as the student could develop the responsibility of being given the task independently. The scores of student's activity from cycle I to II were 21.5 (good enough category) and 28 (good category). The value of the student's post-test in the cycles I to II was 69.26 and 81.37 with the completeness of classical learning was 74.00% and 89.50%.

Keywords: Learning Model of Social Inquiry, Activity and Learning Outcome.

1. Introduction

[1] argued that the purpose of mathematic learning was to form the critical thinking skill, logical, systematic, and has the nature of objective, be honest, and discipline in solving a problem in the field of mathematic, the other field and in everyday life. Furthermore Sardiman in [2] said that one of the characteristic of mathematic was to have the object of study that is abstract, so that many students have difficulties in living and understanding the concept of mathematic.

Factors that should generally be considered simultaneously by teacher in planning a learning process at least among others: the goal to be achieved, the learning material, the student, the teaching media, the learning method and the learning time. Without ignoring the other factor, these factors together determined the outcome of the learning process that occurred. The quality and productivity of this lesson will be seen in how far the student achieved the learning objective that have been set. Meanwhile, to make the student could achieved the learning objective that have been determined was closely related to the effectiveness of instructional

strategy prepared by the teacher. For that, one of the task of teacher was how to organize the effective learning so that more varied, interesting and fun said Wina Senjaya in [2].

Furthermore [1] said that one of the factor that facilitated the student in understanding the concept of mathematic was the teacher (or lecturer), where a good lecturer was a lecturer who was able to cope and solve the problem of learning in the class wisely, so that a lecturer of mathematic was not only dependent on the strategy and learning technique that have been long, but can be used the new learning strategy to attract the attention of the student, the learning was more fun so expected to optimize the mastery of mathematical concept.

One of the mathematic education course in FKIP University of Bengkulu was non parametric statistic that was given in semester V with weight of 3 credits, as continuation of advanced statistic course. This course is expected to support the student in studying the field of statistic further, especially for the analysis of non parametric data on educational sciences. To increase the student's insight in non parametric statistic inference, this course was supported by a practicum using the SPSS program package to assist in the completion of the group field assignment. In essence, this course used by student to support them to analyze the research data when they was making the thesis. So, this course was very supportive of the student to complete their final task later which related to non parametric statistic analysis that they used.

However, the reality during the lecture took place, the majority of student had the lack understanding of interpretation of the work assignment task that they maked. The student only process data using SPSS program on the computer smoothly, but not so understand the meaning of the result that obtained. In addition, while the learning takes place in the classroom, the student also appear less active. They rarely do work with their friend and less enthusiastic in learning. This resulted in low final semester result, which was about 4 students still get D value (Less), and 7 students still get C value (enough).

In addition to the above, the researcher also made the observation of students who were conducting research or writing the thesis by using method of non parametric statistic. The average of student was less precise in determining the appropriate statistical method with their research and then the interpretation or analysis of data that was still wrong. This was the underlying the researcher to apply the learning strategy that could optimize the mastery of student in non parametric statistic course, in the hope of supporting the student to analyze their research data later.

Previously had been applied the scientific learning model with index card match strategy. The student's learning outcomes have increased considerably, but after reflection, there were many students who did not understand the good hypothesis testing procedure, distinguish the data types and dig the information that contained in the research data.

The next problem was that most the student tend to be lazy to prepare themselves before the start of teaching and learning process, inactivity and fear of the giving opinion, not confident in their ability, tend to wait for the information from the lecturer, and less motivated to find the other relevant literature with the current course that been studied. In addition, non parametric statistics courses were often be a scourge for the student. This was due to the growing perception of student that non parametric statistics was a difficult thing to solve. This negative perception bring the student to be normal when they could not get a good grade from this course, the other than that the subject matter was still felt difficult by many students.

The another method that has been used was the method of assignment of problem solving task. The task was usually done by tim. Usually if the group task, then the active work and know the step of the process is only 50% or 70% members only, the rest just "pass the name". Plus the result of the task was not presented because of the limited time, this cause individual assessment could not be done explicitly. So, the student that worked and the student that did not work had the same score if they were in a group.

One of the learning model that can be used to improve students' ability in processing information and improve their thinking ability was social inquiry model. The social inquiry model belong to the cluster of information processing model [3]. Furthermore, [4] suggested

that the learning model of information processing was a learning model that focused on activity that related to process the activity or information processing to improve student's capability through the learning process. This model focused more on the cognitive function of student. This model was based on cognitive learning theory so that the model was oriented toward the ability of student to process the information and system that could improve the ability. The information processing referred to how to collect / receive stimuli from the environment, organized data, solved problem, find concept, and solved the problem, and then used the verbal and non verbal symbol. This model deal with problem-solving skills and productive thinking skill, as well as with regard to general intellectual ability.

The social inquiry model related to the development of students' ability to discover and reflect the nature of social life. This model aim to help the student learn to organize themselves, provided the argument about causality and build a theory. [5] said that the main feature in Social Inquiry learning model were: (1) the existence of social aspect in the class that could foster the creation of class discussion atmosphere, (2) the existence of hypothesis determination as the direction in problem solving, and (3) use the fact as hypothesis testing. Furthermore, the implementation of learning that using social inquiry model through the stages: orientation, hypothesis, definition, exploration, verification and generalization.

Thus, the student's activity was expected to increase, because in this inquiry process, the student is been trained in finding and using the principles of scientific research, while the lecturer only act as a mentor who provided assistance to the students in the learning process, how to learned and in preparing plan that will they do. In the end, the student is been accustomed to doing scientific research and improved their thinking skill that had an impact on improving the student learning outcome.

The purpose of this study was to know how to apply the social inquiry learning model so as to increase the student's activity and learning outcome in non parametric statistic course at Mathematics Education Program UNIB.

2. Method

The method of this research was quantitative descriptive, that was research which described the state of the object under study such as the activity and the learning outcome based on quantitative data that obtained. This type of research was a Classroom Action Research with the research flow: action planning, action implementation, observation, reflection and planning the next action. The study used two cycles, each cycle consisting of 3 meetings. The procedure of this research was as follow:

1. Planning
composing and designing the Teaching Event Unit for cycle I, developing the learning scenario for cycle I, preparing the student's activity sheet, and designing the final test of cycle I and answer key.
2. Implementation
Implementation stage was the implementation of the content of the design, which was doing the action in the class according to the learning scenario.
3. Observation
The process of observation conducted by researcher on the implementation of action with attention to the student's activity and the student's test result.
4. Reflection
Analyzed and reviewed the data include: the result of student's learning activity and the result of student's learning test in the cycle I to see whether the learning was done to improve the activity and learning outcome. Then reflected to see the shortcoming, assess what had and had not happened, why it happened so and what the step need to be done to repair. The result of this reflection will be used to define the next step or plan the action for cycle II.

The subject of this research was the student of mathematic education JPMIPA FKIP UNIB semester V who took non parametric statistics in the odd semester of Academic Year 2017/2018 and amounted to 37 people.

2.1 *The Assessment of Test Result*

Data of student's test result was analyzed by using the class average value and the classical learning completeness with formula:

a. The average value

$$\bar{X} = \frac{\sum X}{N}$$

with: \bar{X} = The average score of student

$\sum X$ = The total score of student

N = The number of student [6]

b. The classical learning completeness

$$KB = \frac{NS \times 100\%}{N}$$

with: KB = The classical learning completeness

NS = The number of completed student

N = The number of student [7]

2.2 *The Assessment of Student's Learning Activity*

Table 1. The Score for Each Item Observation of Student's Activity

The Assessment criteria	The Notation	The Score
Less	L	1
Enough	E	2
Good	G	3

The Highest score = the number of statement x the highest score of statement item
 = 10 x 3 = 30

The Lowest score = the number of statement x the lowest score of statement item
 = 10 x 1 = 10

The interval category of observation of student,s activity observation that was:
 = $\frac{\text{the highest score} - \text{the lowest score} + 1}{3}$

$$= \frac{30 - 10 + 1}{3} = 7$$

Table 2. The Interval of Assessment Category of The Observation Sheet of Studen'st Activity

Interval	Actifty
$10 \leq x 17$	Less
$17 \leq x 23$	Enough
$23 \leq x 30$	Good

x : the scores that obtained by observer Adapted from [8]

The indicator of the success of the action was if the average of student's score ≥ 70 , with the classical learning completeness $\geq 85\%$ and the student's learning activity was in active (good) category or ($23 \leq x \leq 30$).

3. Result And Discussion

3.1 Result

Based on the observation, the researcher was known that the initial condition of the student of semester V that took non parametric statistic course in academic year 2017/2018 was as follows:

- a. Most the student still confuse different the type of data. This result in an error determining the method of statistical analysis that corresponded to the type of data in a particular case.
- b. The student rarely gave the idea or question about the material being studied. At the time of class discussion only certain student would dare to express their idea. They were only fixated on the sample problem in the student handbook.
- c. The student had lack of motivation to study so there were still most student who had less attention to the explanation of lecturer.
- d. The students still did not really understand the difference of testing two independent and dependent hypothese.
- e. The student had never applied the learning by using the model of social inquiry learning.
- f. The student was not yet accustomed to doing scientific research.

Based on the above, then the action was done by applying the model of social inquiry learning. The results of the study were as follow:

Table 3. The Student's Learning Activity Scores in Cycle I and II

The Aspect that observed	Cycle I		Cycle II	
	P ₁	P ₂	P ₁	P ₂
The student paid attention and listened to the lecturer's explanation at the orientation stage.	3	3	3	3
The student formulated their own problem according to the topic that given by the lecturer.	2	3	3	3
The student formulated the various estimate of possible answer (hypothesis) of a problem studied.	2	2	3	3
The student collected the information (data) related to the proposed problem formulation.	2	2	3	3
The student tested the proposed hypothesis.	2	1	2	3
The student was actively inquiring during class discussion	2	3	3	3
The student actively collaborated during group discussion	2	2	3	2
The student associated the result of hypothesis testing with the theory	1	2	2	2
The student communicated the result of group discussion	3	2	3	3
The student makde the conclusion at the generalization stage	2	2	3	3
The total score	21	22	28	28
The Average of activity score	21,5		28	
Criteria	Enough		Good	

Table 4. The Description of Student's Learning Result

	Cycle I	Cycle II
The Minimum value	43,12	58,40
The maximum value	79,47	90,61
The Variance	10,33	12,21
The Average of post test score	69,26	81,37
The classical learning completeness	74,00%	89,50%

3.2 Discussion

Based on the result of this study, in the analysis of observation sheet of student's activities cycle I and II, in general their activity increased for the better. In the first cycle the student were still less in relating the result of hypothesis testing with relevant theory. Nevertheless, in cycle I they had paid attention and listened to the lecturer's explanation on the topic of the material well (orientation stage), so that the student had been motivated and be active enough in formulating their own problem related to the topic that given by the lecturer. Furthermore, the student were also able to determine the hypothesis and collected the information that needed to answer the problem formulation. However, the student had not been very skilled in drawing conclusions (generalization).

This was probably because in cycle I they were not used to testing hypotheses and linking the result with relevant theory. This was understandable because in cycle I, they were not yet familiar with the model of social inquiry learning. During the class and group discussion, there were still some group that had not been seen well in collaboration, and few dare to ask for a idea.

Furthermore, in cycle II, seen an increase in student's learning activity were quite meaningful, especially at the stage of testing the hypothesis and the conclusion of the answer to the problem posed. However, there were still the student who was not yet skilled in relating the result obtained with the theory. This was because the student lack many reference (book or other literature) related to the given material. In general, the student's learning activity increase (from cycle I was in the enough category) to be active in cycle II.

The increased of student's activity in this research was in accordance with the theory proposed by [5] who said that this social inquiry learning model can improve the student's activity, because with the implementation of this model, the impact of learning was:

1. The student could conduct the scientific research on various cases, so that the student was trained in discovering and using the scientific research principle.
2. The students might develop the responsibility because they were tasked independently.

Therefore, the application of Social Inquiry learning model in non parametric statistic was very relevant because this method explored the student's ability to research the problem that supported by data and the fact that supported and reinforced by learned theory and concept.

Based on the average recapitulation of student's post test result from cycle I and cycle II, it could be seen that the average score of student in each cycle I is 69.26 and in second cycle is 81.37. This showed a significant increase in value in cycle II. Furthermore, the learning mastery also increased from cycle I (by 74%) to 89.50% in cycle II. This was because in cycle II, students had been familiar with the model of social inquiry learning. The student had been able to determine the appropriate form of hypothesis, the data in accordance with the appropriate test analysis and the general conclusion.

The result obtained in this study also in accordance with the theory proposed by [4] that the model of social inquiry learning was a learning model that focused on activity related to process activity or information processing to improve student's capability through the learning process. This model dealt with the problem-solving skill and productive thinking skill, as well as with regard to general intellectual ability.

Here was an example of the problem formulation proposed by the student after conducting the initial survey around the GKB3 lecture building:

"Is bakwan snack more in demand (preferably) compared to sweet fried sweet potato? (sample data was for 1 week, ie in canteen GKB3 UNIB) "

Furthermore, the student made hypothesis or temporary estimate of the problem that had been formulated. The data or information was searched by interviewing the cafeteria owner, asking about the frequency of bakwan and sweet fried sweet potato that sell every day for a week. Then after the data collected, they tested the hypothesis using appropriate non parametric statistic analysis technique (the case of two dependent or independent group) and looked at the case example that given by the lecturer during the orientation.

Furthermore, the student prove the hypothesis was based on sample data and finally draw the conclusion or make the generalization.

Based on the above description it was clear that the model of social inquiry learning could have an impact on student independence, they became more active because they were required to formulate problem hypothesis, collected the information and finally they tested the hypothesis (prove the truth) and took the final conclusion. In other word, this learning model trained the student to do scientific research and was able to solve the social problem, more responsible, and ultimately mastery of the concept of material in non-parametric statistic courses to increase.

4. Conclusion

The conclusion of this research was the application of Social Inquiry Learning Model can increase the activity and the result of student learning in non parametric statistic course at Mathematic Education Study Program UNIB, that was by the way the student actively participated in doing scientific research on various cases so that the student was trained in finding and using the principle of scientific research as well as the student could develop the responsibility for being given the task independently. The scores of student's activity from cycle I and II were 21.5 (good enough category) and 28 (good category). The post-test value of student in a row from the cycles I and II was 69.26 and 81.37 with the completeness of classical learning in cycle I and II was 74.00% and 89.50%.

The suggestion that can be donated was for the other researcher that interested in doing the similar research can modify it with the other cooperative learning strategy, so that it can be compared.

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