

Development of Learning Methods on Elementary Statistics Course Through Participatory Online Methods

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Keywords: Elementary Statistics, Participatory Online Method, Learning Achievement.

Abstract: The Elementary Statistics is one of the compulsory courses in the 1st term in the Department of Mathematics, Faculty of Mathematics and Natural Science at Andalas University. The main problem faced in this course is the lack of activity of students that affect their academic achievement. This research concerns the impact of the new learning method that is a participatory online method on the learning achievement of undergraduate students who took this course in the academic year 2017 – 2018. The research was conducted by making WhatsApp group, whose members were all students who took the course and class assistants. By comparing the final grade in the academic year 2016 – 2017 and 2017 – 2018, it is found that this learning approach worked successfully to increase student' involvement, enhance student' learning achievement, and independence in learning process and teamwork.

1 INTRODUCTION

At present, learning that makes lecturers as centers of knowledge transfer is still a hallmark of learning in universities. With this approach, lecturers will become central figures in the transfer of knowledge and on the other hand, students passively listen only to lecturer lectures. As a result, students become less concerned with the learning process they are going through. On the other hand, the world of work needs college graduates who not only have good skills but are also able to think logically and analytically, critically and creatively, able to work in a team, have good communication skills and other soft skills. As a result, there will be an imbalance between the competencies possessed by universities and the expected competencies in the world of work.

For this reason, a paradigm shift is needed in the learning process from traditional learning to a learning approach that can make students the center of the learning process. Student-centered instruction [SCI] is an instructional approach in which students influence the content, activities, materials, and pace of learning. This learning model places the student (learner) in the center of the learning process. The instructor provides students with opportunities to learn independently and from one another and coaches them in the skills they need to do so

effectively. The SCI approach includes such techniques as substituting active learning experiences for lectures, assigning open-ended problems and problems requiring critical or creative thinking that cannot be solved by following text examples, involving students in simulations and role plays, and using self-paced and/or cooperative (team-based) learning. Properly implemented SCI can lead to increased motivation to learn, greater retention of knowledge, deeper understanding, and more positive attitudes towards the subject being taught (Collins & O'Brien, 2003).

Elementary Statistics courses are compulsory subjects in the Mathematics study program. This subject becomes the basic subject in the Lab Statistics course and the Opportunity Theory offered to the second-semester students of the Mathematics Study Program with a load of 4 credits. This course is offered to provide knowledge and experience to students in analysing data. This course will discuss various statistical methods used to describe and analyse data. The materials discussed in this course are useful for students when they have to provide information about a data and draw conclusions about the population of the data and provide an appropriate recommendation related to the analysis carried out. For students of the Mathematics Study Program, this Elementary Statistics course is the basis for studying further statistics courses, such as Regression

Analysis, Experiment Design, Non-Parametric Statistics, Multivariate Analysis, Time Series Analysis and others. This research aims to evaluate the impact of a student-centered learning approach through the online participative method on students' learning achievement on Elementary Statistics course.

The learning method that will be developed in this research is by utilizing the WhatsApp (WA) application. WA group will be made which consists of all students who take this Elementary Statistics course and assistant courses. The lecturers periodically (once a week) upload the lecture material along with the problems to then be asked by the students to respond and give answers to the problems given. The response is addressed to individual subject assistants (private network). The assistant is tasked with identifying students who respond and who do not, giving an assessment (in coordination with the lecturer) to then recap and report to the lecturer.

2 METHOD

This research is to improve learning methods, therefore the method that is considered appropriate is a classroom action research method, namely a systematic study conducted in an effort to improve educational practices by taking practical actions and reflection of these actions (Sukidi, 2002; Kasbulloh, 1998; Wardani, & Wihardit, 2008; Wibawa, 2003). The chosen research approach is a qualitative and quantitative approach that is a research based on facts and comparative analysis, aims to conduct empirical generalizations, establish concepts to prove the theory and develop and collect data and analyse the data running at the same time.

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Population in this study is all student that took Elementary Statistics course in academic year 2017/2018. The students are grouped into three classes A, B and C, consisting 33, 34 and 30 students

respectively. All population member are included as participant in this study.

This classroom action research is carried out in the even semester of the school year 2017/2018. This classroom action research was done through two cycles. Each cycle consists of four steps, planning, implementation, observations, and reflection.

In planning stage, a strategy is designed to achieve the learning objectives, starting from identifying the problems that arise in learning Elementary Statistics, analysing the causes and then developing an action plan through the development of the Semester Learning Plan, student worksheets for lectures and tutorials. In this activity, an indicator of the success of the action was also determined and the instrument used to measure the success rate of the action. This step are conducted through week 1.

In the implementation stage, actions that have been planned are implemented. The learning approach used is participatory method. This strategy is applied to any beginning topics, such as Statistic's are, Table data. This step is conducted through week 2-4.

Then, observations of the events encountered in the implementation of the action included obstacles encountered and activities carried out by students during the learning process. The observations were done indirectly since the proposed method was online. This activity was carried out in conjunction with the implementation of the action.

The last stage of this class action research is an evaluation of the results of actions taken based on predetermined indicators.

Data were collected during the implementation step. The measurement of student responses is done by making an online questionnaire and asking all students who take the Elementary Statistics course to complete it. The response measured is the student's perception of the effect of this participatory online learning method on students' active involvement, motivation to learn material independently, improve teamwork. The questionnaire is using a Likert scale. Data were analysed by descriptive statistics (central tendency and variability measures) as well as statistical table and graph.

Indicators used to assess the success of teaching methods and assessments developed in this Class Action Research activity, namely:

- a. Learning Outcomes. Learning outcomes will be measured from independent assignments and written exams.
- b. Value distribution. This activity is considered successful if the percentage of students who

get a score below B is reduced from the previous teaching year.

- c. Student responses to the development of learning methods and/or assessments applied. This learning method is concluded successfully if more than 60% of students give a good perception of this learning method.

3 RESULT AND DISCUSSION

Here we will describe development of learning method and assessment method as a solution of problems faced in Elementary Statistics course. We will also discuss the result of the action done.

3.1 Development of Learning Method

In the previous school years, learning Elementary Statistics courses were carried out by combining the TCL and SCL approaches with the Think Pair and Share (TPS) method. From the evaluation, this method was not effective enough to enable all students. In addition, because large classes make it difficult for lecturers to assess the activity of all students. The tutorial activity also did not provide enough opportunities for all students to be active in learning activities. From the learning outcomes of previous years, it was suspected that the learning outcomes of students in this course were related to their activeness in the learning process. Therefore, it is necessary to improve the learning methods that are carried out so that they can activate students and further improve the quality of student learning outcomes.

TCL and TPS methods will still be used to ensure that all material can be completed within the allocated time period of the meeting. In addition, quite a lot of material is not right if presented in other ways. The development of learning methods carried out is by Participatory Online Learning methods. The material chosen to be delivered with this strategy is the material of the Scope of Statistics, Presentation of Data with Tables, Presentation of Data with Descriptive Images and Data Size.

The procedure performed is as described previously. First the making of WA group by subject lecturers. All members are made group admins so they can include other course participants who have not been documented as admin by the lecturer. This WA group consists of three groups, based on the division of the subject class, WA Class A group, WA Class B group and WA Class C. group The following is the look of the WA group.

The teaching and learning process with this participatory online method is as follows. The lecturer periodically (once a week) uploads the lecture material along with the problems (assignments) to then be asked by the student to respond and give answers to the problems given. The response or answer to the problem given is addressed or sent to the individual assistant courses (Capri) via WA as well. The assistant is tasked with identifying students who respond and who do not, giving an assessment (in coordination with the lecturer) to then recap and report to the lecturer. Five students who give the earliest response will be given a bonus value.

3.2 Development of Student Assessment Strategies

Process assessment is measured through structured assignments and tasks with participatory online methods, namely by filling out the online questionnaire is <http://bit.ly/tindakkelas>. and tutorial. From the tasks collected by students, the ability to think logically and analytically (judged by the accuracy of results) and team collaboration (judging from the level of similarity of results of each student in the same team) will be assessed. Process evaluation was also carried out during the tutorial. Tutorials are carried out with a small group discussion approach of 2-3 students). The assessment conducted in this tutorial activity was active and critical thinking, analytical and creative, team work, team independence and time management. Assessment of student learning outcomes is carried out through written tests.

3.3 Student Assessment of Participatory Online Methods

The assessment or response of students to this participatory online method is obtained by making an online questionnaire, which is accessed on the <http://bit.ly/tindakkelas>. It is expected that all students can access this online questionnaire and fill out the questionnaire.

Of the three parallel classes involved in this class action research, there were 79 students who completed the questionnaire. The following figure presents information on the percentage of students who fill in for the three classes.it Assessment of Participatory Online Methods.

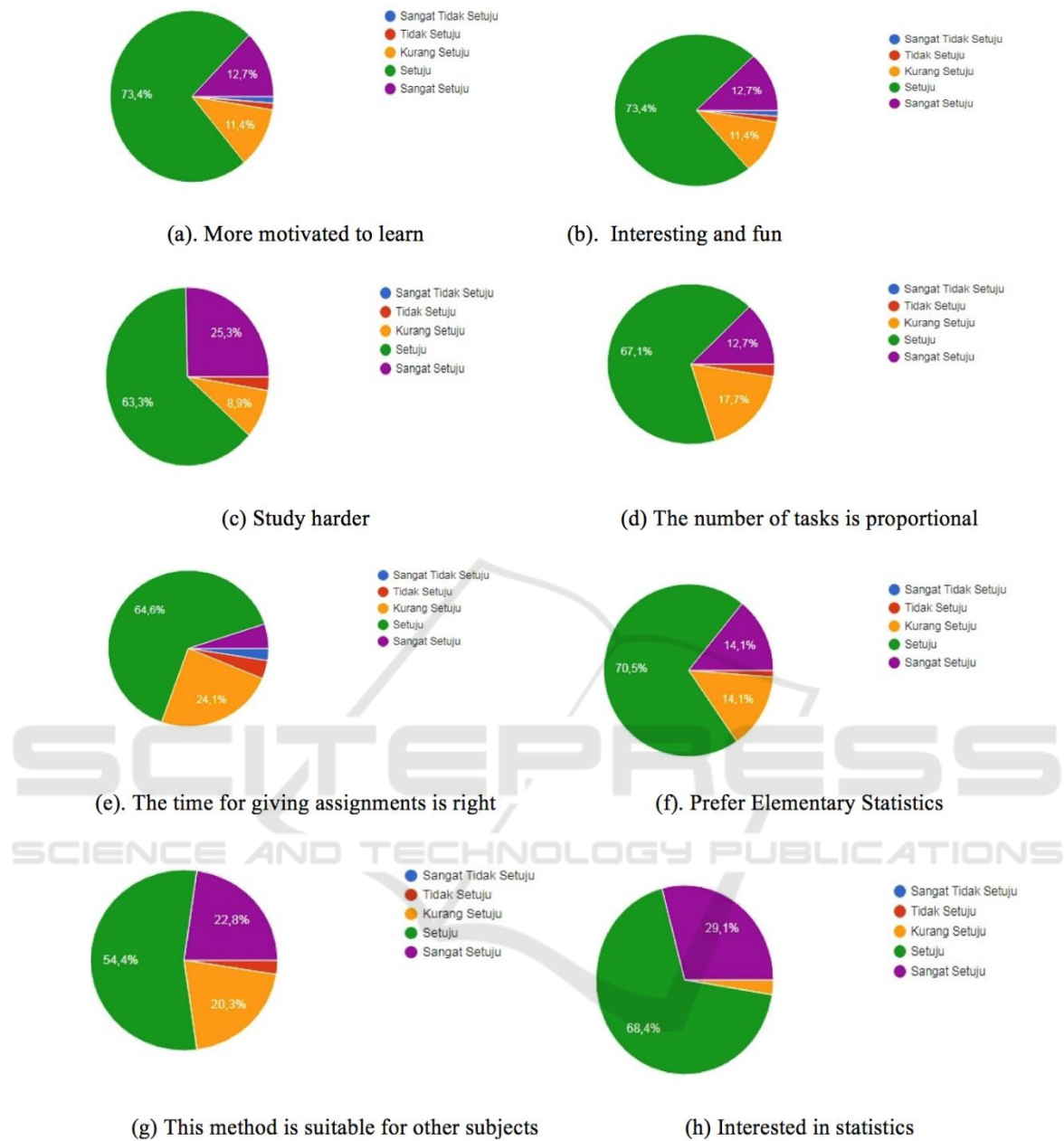


Figure 1: Student responses to the questionnaire.

Of all the images above it is known that the dominant student gave an Agree with response to the statement given (ie more than 60%). Related to the statement whether the use of participatory online methods through WAG media made students more motivated in learning Elementary Statistics, 73.4% of them responded in agreement. Likewise, with a statement stating whether this participatory online method is interesting and fun, more than 70% of students answered Agree. Based on the percentage of

student answers it can be seen that the proposed method is acceptable to students. More students were motivated to learn Elementary Statistics course.

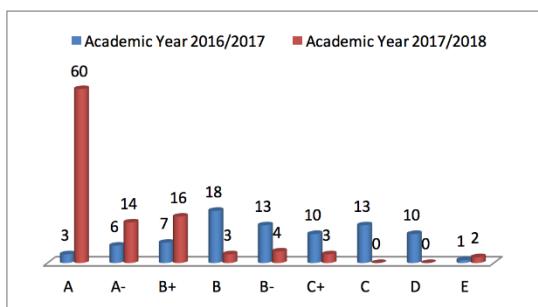


Figure 2: Comparisons The Grade Between Academic Year 2016/2017 and 2017/2018.

4 CONCLUSION

In this study, classroom action research was conducted to determine the effect of the application of participatory online methods on student learning outcomes in Elementary Statistics courses. From the results of this study concluded that this method is effective enough to improve student learning outcomes with the decreasing number of students who fail in this course. In addition, students also considered that this approach provided another atmosphere in the process of learning distribution. In the opinion of students, this method is quite fun, able to increase student involvement, improve student understanding, be able to improve teamwork and motivate students to be more diligent in studying lecture material.

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