Project based learning model of entrepreneurially-oriented on statistics

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Abstract. All The use of Project Based Learning (PBL) model of entrepreneurially-oriented during Statistic II. This article aims to students’ learning activeness and innovative behaviour reach up to 75%. Furthermore, the ability to think reflectively reaches 60, activeness and innovative behaviour affect towards the ability to think reflectively and this ability is better than conventional learning. The flow of research that will be used in this study is referring to the study of true experimental design. The population of this study were students who took Statistics II on the Academic Year 2017/2018 in Universitas Pancasakti, Indonesia, Management Study Program. Analysis of test items is carried out to determine the quality of the questions from the tests of reflective thinking skills. The results of the study obtained activeness, innovative behavior and the ability to reflect reflections that meet the expectations, then there is a positive influence of activeness and innovative behavior on the ability to think reflective.

1. Introduction
Statistics Course is a subject that has many applications in the real world, social, industry, health, and so on. Students are less interested when learning statistics is only delivered conventionally (lectures and structured tasks). Because the nature of this course is very applicable, it will be more meaningful and not boring if the Project Based Learning (PBL) model is based on Entrepreneurship to be analyzed by students in a computer laboratory and done outside of lecture hours, then the results are displayed in class and discussed.

Applying the lecture model to the field project in the Statistics course will not only enhance mastery / understanding of concepts related to its application in the real world but also can improve skills as a result of activities, innovative behaviour and the ability to reflect reflective on the subject will also increase. If this skill increases then students can develop later after work or use it for other subjects such as Research Methodology and Thesis Preparation, it will also improve student capabilities. In the era of globalization, as now competition for jobs is getting tighter, it is not easy and not fast for college graduates to get jobs, especially those that are in line with their fields and qualifications. By equipping students with applicable skills, they will increase their competitiveness in the job market. If many students are quickly absorbed in the world of work, it will increase the accountability and relevance of universities. If students do not immediately get a job, students can also entrepreneurship with computer skills they have.

Research using cooperative structures in universities finds positive results, because it encourages active students to find their own discoveries through innovative behaviour. Learning partners support improving problem solving [1-3].Interaction between students shows that problem solving and conceptual reasoning can be improved in learning in cooperative groups [4],[5]. There is a consensus...
among Statistics educators that Basic Statistics learning needs to be improved [6],[7]. A better understanding of the appropriate interpretation and use of various procedures is due to conceptual lessons, as well as better skills with computer packages that process data faster and more thoroughly than passively listening to lecture lectures.

The results of the research on the use of the PBL Model can improve statistical education, because substantial open project methods using real data are then analyzed. This method is successfully applied in a basic statistical class. Here students design, implement, and examine data from a field [8-10]. Apply basic statistics to cultural and social science knowledge, which emphasizes data presentation and analysis, sampling, and experimental design. Emphasis is on familiarity with data and statistical packages as an integral part.

This study uses the PBL model added by including the spirit of entrepreneurship, because according to [11] Entrepreneurship education needs to be applied in higher education, because the logic here is more effective in meeting new demands. Likewise According to [12] The application of entrepreneurship education projects in universities can motivate students towards the entrepreneurial process and transform the process of students becoming entrepreneurs. Then according to [13] entrepreneurial success is not dependent on gender but the influence of personality is crucial. This learning focuses on participation, collaboration, and creativity. [14] can design this learning which aims to support the success of student business projects through real implementation. Likewise according to [15] educators must provide educational experiences that motivate students to be cognitive and metacognitive. One is the case with entrepreneurial-oriented case studies as a means to improve student attitudes, namely a logical, creative, spontaneous and assertive attitude, a forward-looking perspective and results-oriented.

Students not only learn PBL on the subject matter of Correlation, Simple Linear Regression Analysis and Multiple Regression Analysis but teach and train students to implement the material taught into the lives of students by entrepreneurship or entrepreneurship so that not only students learn academically in school but can applied in his life. As a result, it has an impact on students' reflective thinking skills in which students play a direct role, are more active and indirectly train students to become entrepreneurs so that the conceptual understanding of the material being taught can be achieved.

The application of entrepreneurship-based learning models has been successfully implemented successfully. [15] Engineering faculty students can implement authority in their environment. Likewise [16] Successfully designed the latest public policy managerial changes to stimulate investment in technology and entrepreneurship. [17] Student learning outcomes in hydrocarbon material can increase.

Through the use of entrepreneurship PBL models during Statistics II on Correlation material, Simple Linear Regression Analysis and Double Linear Regression Analysis students can experience activeness and innovative behavior reaching 75%, ability to achieve reflective thinking is 60, activeness and innovative behavior affect thinking ability Reflective and reflective thinking skills are better than previous learning.

Research in this article is expected that students can increase independence, practice the ability to express opinions, improve the ability to think reflectively, form the entrepreneurship spirit and provide a positive attitude towards the Statistics II course. Likewise, lecturers can overcome the problem of students' low reflective thinking skills.

2. Method
This research was carried out by applying PBL based on entrepreneurship learning model. This research is included in the type of experimental research. The flow of research that will be used in this study is referring to the true experimental design study, that is in addition to the experimental group, the control group will be presented as a comparison.

The population used in this study were students who took the Academic Year II Academic Year 2017/2018 in the Management Study Program of the Faculty of Economics and Business, Universitas Pancasakti, Tegal, Indonesia. The study was conducted in October to December 2017. Sampling
technique by Random Sample Cluster. The sample used is class III G experimental class and class III control class F. In the experimental class conducted a learning activeness survey and innovative behavior of students. This learning is expected to improve activeness and innovative behavior and the ability to think reflective students.

The variables used in this study are independent variables and dependent variables. The independent variables are activeness and innovative behavior and the dependent variable is the ability to think reflective.

The indicator of student activity in this study refers to the opinion of (D derich Rusyan: 1992) as follows: 1) Visual Activities, 2) Oral Activities, 3) Listening Activities, 4) Writing Activities, 5) Drawing Activities, 6) Motor Activities, 7) Mental Activities, 8) Emotional Activities.

[19] suggests that innovative behavior in organizations consists of three different behavioral principles: idea generation, promotion, and realization of ideas. The need for innovation organization ends with a focus on the role of the leader to make a difference in the success of creative efforts [20].

Bruning, et al [22] stated that reflective thinking processes involve thinking abilities such as interpreting problems, making conclusions, assessing, analyzing, creative and metacognitive activities. [23] details reflective thinking which includes activities: observing, reflecting, collecting data, considering moral principles, making estimates, considering strategies and actions. Reflective thinking is the way of thinking used with modes of thinking such as metacognition, critical thinking, analytical thinking, and creative thinking among modern education approaches during the education process [24].

Analysis of test items is carried out to determine the quality of the questions from the tests of reflective thinking skills. The analysis of test items intended in this study is validity, reliability, level of difficulty and differentiation. Then it was tested by proportion test using z test statistic, completeness test using one sample t-test, and the effect test used multiple linear regression analysis and two sample comparison test.

After treatment, a test of students’ reflective thinking skills was held. The test instrument is given to the control class and experimental class.

3. Results and Discussion

Based on observations of the learning effectiveness of the Entrepreneurship-based PBL learning model, the average number of observations during the 10 meetings was 3,642, the results showed that more than half of the categories carried out meant that the learning could be carried out well. Activity values obtained in the range of 79.65 to 84.28%, with an average yield of 82.16%, as well as the value of innovative treatments in the range of 76.35 - 83.85% with an average yield of 77.03%. The above results can be said that learning This can be seen from the enthusiasm of students in each group to discuss the material given by the lecturer, then also found new creative ideas to be applied to problems related to entrepreneurship. with entrepreneurship-based PBL model is very active and has high innovative behavior. This can be reinforced from research [2],[14],[19] that group learning in universities finds positive results, learning partners support improvements in problem solving and on tests. It was also found that each group had students who could motivate their friends who were less eager and lacking in confidence and they wanted to share and help their friends who lacked knowledge of the material. The discussion atmosphere is very lively, in this learning students are very active and innovative.

Likewise by applying entrepreneurship education can motivate students so that activities and innovative behavior will emerge, this is in accordance with the opinion [11].

The results of the proportion test obtained $Z_{count} = 2.042 > Z_{table} = 1.645$, it can be said that more than 75% of students’ reflective thinking ability is more than 60. then the output on Table 1 one of the
test sample obtained $\text{sig} = 0.009 = 0.9\% < 5\%$ means $H_0$ refused. So the average sample does not represent the population of 60. then by testing the mean $t$ test of the right party is obtained $t_{\text{count}} = 2.810 > t_{\text{table}} = 1.645$ means that $H_0$ is rejected. so the average ability to think reflective students is more than 60. During the learning process with PBL models based on entrepreneurship lecturers and students can carry out reflections on the activities and results of projects that have been carried out. Reflection process both individually and in groups. So that every student can know each other's weaknesses, this can spur them to study harder, and can be proven by the ability to think reflective above 60. This can strengthen that this model is successfully applied in a basic statistical class, students design, implement, and examine data from a field, because the open project method is substantial by using real data then analyzed. [11],[22],[24],[25].

Table 1. One-Sample Test

| Test Value = 60 | T | Df | Sig. (2-tailed) | MeanDifference |
|-----------------|---|----|----------------|----------------|
| KPRlk           | 2.810 | 31 | .009           | 8.522          |

The results from the Table 2 obtained a multiple linear regression equation, namely. Then from the Table 3 is obtained $\text{sig} = 0.000 = 0\% < 5\%$, means that innovative activities and behavior together positively influence the ability of reflective behavior. Next from the Table 4 is obtained the value. This value shows that activities and innovative behavior together affect the ability of reflective thinking by 61.7%. With this project in learning, students are responsible for completing it. As a result, students become actively involved in this learning so that many new creative ideas emerge which can bring better change. his process can make students understand the project situation, so that continuously to maintain its truth, students can think critically.

Table 2. Coefficients$^a$

| Model | Unstandardized Coefficients | Standardized Coefficients | T | Sig |
|-------|-----------------------------|---------------------------|---|-----|
|       | B                           | Std. Error                | Beta |     |
| 1(Constaant) | -38.423 | 17.338 | -2.216 | .035 |
| Aktivits | .307 | .322 | .169 | .951 | .034 |
| Perilu inov | 1.061 | .291 | .649 | 3.643 | .001 |

Table 3. ANOVA$^b$

| Model | Sum of Squares | Df | Mean Square | F | Sig. |
|-------|----------------|----|-------------|---|------|
| I. Regression | 5630.614 | 2 | 2815.307 | 23.379 | .000$^a$ |
| Residual | 3492.180 | 29 | 120.420 |    |      |
| Total | 9122.795 | 31 |            |    |      |

$^a$Predictors: (Constant), Plnt, AKT
$^b$Dependent Variable: KPRlk

Table 4. Model Summary$^b$

|    | R   | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|----|-----|----------|-------------------|---------------------------|---------------|
| 1  | .786$^a$ | .617 | .591 | 10.974 | 1.978 |

$^a$Predictors: (Constant), Plnt, AKT
$^b$Dependent Variable: KPRlk
Results from the Table 5 are obtained sig=0.004=0.4%<5% then Ho is rejected. So the average ability of the experimental class to reflect reflective is different from the average of the control class thinking ability. Furthermore, by comparing the two samples in one right direction, obtained tcount = 2.973> ttable = 1.645, so Ho is rejected. Ho the ability of students' reflective thinking on the material of Correlation, Simple Linear Regression Analysis and Double Linear Regression Analysis which is learning with entrepreneur-based PBL models is better than students who learn in the usual way, namely conventional. Students feel the responsibility for the project, so that being more active in finding new creative ideas can foster critical thinking as a result of increased thinking ability. This can strengthen the results of the study [14],[24] the cognitive abilities of students in the learning subjects with the PjBL model are better than conventional learning [3],[4],[25]. Likewise, the PBL Model learning with whatever cognitive abilities are better than conventional learning. It is appropriate that PBL with entrepreneurship is applied in universities, this supports the opinion [12].

Table 5. Independent Samples Test

| Levene's Test for Equality of Variances | t-test for Equality of Means |
|----------------------------------------|-----------------------------|
|                                        | F  | Sig. | T  | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| KP Reflktif Equal variances Assumed | 1.690 | .198 | 2.973 | 70 | .004 | 10.955 | 3.685 |
| Equal variances not assumed | 2.909 | 59.756 | .005 | 10.955 | 3.766 |

4. Conclusions

Based on the results of the study of learning entrepreneurship-based PBL models, it can be concluded that the activeness and innovative behavior of students reached 75%, the ability to think reflective students achieve completeness is 60, there is a positive influence on activeness and innovative behavior on the ability to reflect reflective, the results of students' reflective thinking skills that are learning with entrepreneur-based PBL models are better than students who are learning as usual.

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