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Development of Virtual Learning in Financial Management Courses to Improve Student Critical Thinking

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ABSTRACT
Financial management courses are compulsory courses taken by students at Education Management Department, which are presented in the form of virtual learning to answer challenges in developing the learning process in the industrial revolution era 4.0. The purpose of this study is to measure the effectiveness of virtual learning in financial management courses taught to students in the Department of Education Management. This research method is research and development using the Borg and Gall model. The population and samples in this study totaled 78 students taking financial management courses in the odd semester. The results showed there was an increase in students' understanding in critical thinking. This is indicated by the gain test, where in the experimental class a gain value of 0.51 means that the experimental class has increased learning outcomes in the moderate category ($0.7 > g \geq 0.3$). Meanwhile, the control class obtained a gain value of 0.26, which means the control class also experienced an increase in learning outcomes, but the increase was in the low category because it was at an interval of $g < 0.3$. The effectiveness of the application of virtual learning in financial management courses in order to see students' higher-order thinking skills is done by giving questions in the form of essays.

Keywords: *Virtual learning, financial management, critical thinking*

1. INTRODUCTION

Financial management courses are compulsory courses taken by students of the S1 Management Study Program in Surabaya State University. The scope of competency learning in financial management courses includes understanding financial management concepts, being able to make decisions about financial management of educational institutions, and being able to work together in groups related to financial management. From the scope of these competencies, theoretical and practical learning is used to teach financial management courses. Where theoretical learning is given to students to understand the concepts of financial management and practice in managing the financial institutions of education with the application of financial accountability of educational institutions. Learning methods developed to achieve learning outcomes using blended learning, where students will carry out learning in class and virtually (online).

Blended learning as "it represents an opportunity to integrate the innovative and technological advances offered by online learning with the interaction and participation offered in the best of traditional learning" [1], [2]. Some research results also support the importance of developing blended learning. Conducted by [3]–[6] found that blended learning programs have the potential to improve student learning outcomes compared to learning that is fully online learning, and their research show that blended learning also produces feelings of community stronger among students than traditional learning or fully online. The use of effective blended learning methods to be implemented in financial management courses. Where the use of learning media is integrated, both face to face and virtual. In virtual learning, the design of interactive media development in the form of quizzes and active involvement of students in discussion forums will be a benchmark of successful implementation. Where students can be moreover overall (100%) with the support of existing infrastructure. Likewise with the application of quizzes, the results / grades that students work on can also appear directly to measure learning achievement.

The development of this virtual lecture is to measure the effectiveness of students' mastery achievement. For this reason, e-learning research on financial management courses is important, especially in the Department of Education Management as a scientific developer that strengthens the existence of study programs at Surabaya State University.

2. RESEARCH METHOD

The learning development model used in this study is the Borg and Gall model [7]. Development is the process of translating design specifications into physical forms, the steps for developing the steps for implementing a research and development strategy were conducted as follow. The initial stage is collecting data which includes needs measurement, literature study, small scale research, and considerations in terms of value.

The second stage is planning. At this stage, researcher compile a research plan, including the abilities needed in conducting research, formulating objectives to be addressed within the research, design or research steps, and possibly within a limited scope. The third stage is development of product drafts (develop preliminary form of product), which includes development of learning materials, learning processes, and evaluation instruments.

The next stage is the preliminary field testing, revising the results of the trial (main product revision) and the main field testing, improvement of product field test results (operational product revision), field implementation testing (operational field testing). Conducted for all students who program financial management courses in the Department of Education Management. Testing is done through a questionnaire, interview, observation and analysis of the results. The final stage includes refinement of the final product (final product revision) and dissemination and implementation.

3. RESULTS AND DISCUSSION

3.1 Result

Profile of Financial Management Courses

Financial management courses are compulsory subjects for Department of Education Management. This course is the core courses of study taken by third semester students. The characteristics of financial management courses are very different from financial management courses at profit institutions. This financial management course concentrates on educational financial institutions. Where educational institutions are educational services provided to students and the community. For this reason, the basic concepts of financial management relate to school financial management obtained from various sources of education, budgeting, auditing, and accountability. Students learn about theory and also skills in managing financial institutions through software or the School Operational Assistance (BOS) application.

3.1.1 Research Data Analysis Results

(a) Descriptive statistics

Descriptive statistics provide a description of data that is seen from the average value (mean), standard deviation, variance, maximum, minimum, sum, range, kurtosis and skewness (skewed distribution) of each variable [8]. The variables used in the control class and experiment by giving pre-test and post-test treatment.

(b) Normality test

Normality test is used to determine data obtained from research results that are normally distributed or not. A data normal distribution if the significance level is ≥ 0.05, whereas if the significance level is <0.05 then the data to be not normally distributed. Normality test can be done in various ways. In the data normality test, if the data is normally distributed then it will be analyzed by parametric statistical tests. Meanwhile, if the data are not normally distributed, they will be analyzed by non-parametric statistical tests. This normality test uses the help of statistical data processing software with the Kolmogorov Smirnov technique as the results in the following table.

Table 1. Normality Test Results

Tests of Normality

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
The results of student's critical thinking	Pre-test Eks	.187	40	.001	.926	40	.012
	Post-test Eks	.256	40	.000	.897	40	.002
	Pre-test Kon	.157	37	.021	.940	37	.048
	Post-test Kon	.250	37	.000	.853	37	.000

a. Lilliefors Significance Correction

Based on the above output, the results of normality test calculations that have been carried out for the experimental class obtained a significance value of 0.001. Because the significance value $\alpha \leq 0.05$, it can be concluded that the average data in the experimental class is not normally distributed. While the normality test in the control class obtained a significance value of 0.021. Because the significance value ≤ 0.05, it can be concluded that the average data in the control class is also not normally distributed. So, it can be concluded from the calculation of normality test that has been done that the distribution of data in the experimental class and the control class are not normally distributed. Because the data are not normally distributed, the Wilcoxon test performed as a substitute for parametric T test sample testing.

(c) Wilcoxon Test

The Wilcoxon Signed Rank Test is a nonparametric test to measure the significance of the difference between two pairs of ordinal or interval scale data but with an abnormal distribution. Wilcoxon test results obtained data as follows.

Table 2. Wilcoxon Test Results

Test Statistics[a]

	Post-test Eks - Pre-test Eks	Post-test Kon - Pre-test Kon
Z	-5.681[b]	-5.512[b]
Asymp. Sig. (2-tailed)	.000	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

From the Wilcoxon test results with the statistical data processing software it can be seen that the Wilcoxon p-value test is smaller α (0.05) so it can be concluded that there are differences in critical thinking skills between before (pre-test) and after (post-test) given an essay question.

(d) Homogeneity Test

Homogeneity test is used to determine whether the data from the results of research in the experimental class and the control class have the same variant values or not. It is said to have the same variant value / not different (homogeneous) if the significance level is ≥ 0.05 and if the significance level is < 0.05 then the data concluded do not have the same / different variant value (not homogeneous). From the results of homogeneity test calculations using statistical data processing software, it is known that the significance value is 0.845. Because the value obtained from the homogeneity test is of significance level ≥ 0.05, the data have the same variant value / not different (homogeneous).

(e) Mann-Whitney Test

The average difference test used is the mann-whitney average difference test at the significance level $\alpha = 0.05$. The form of the hypothesis of the average difference test is as follows.

H0: There is no difference in the initial ability between students in the experimental class and the control class with the initial ability of students in the control class.
H1: there is a difference in the initial ability between students in the experimental class and the control class with the initial ability of students in the control class.

The test criterion is that H0 is rejected if the P-value (sig.2-tailed) is smaller than $\alpha = 0.05$. The results of statistical data processing, it can be seen that the results of the calculation of the difference in the average pre-test of the experimental and control groups by using the U test at the significance level $\alpha = 0.05$ obtained the value of P-value (sig.2-tailed) = 0,000. These conditions indicate that H0 is rejected because the value $\alpha \leq 0.05$. Thus, there are differences in the initial abilities of students in the experimental class and the control class.

(f) Gain Test

Gain test is the difference between the posttest and pretest values, the gain shows an increase in understanding or mastery of students' concepts after learning is done through critical thinking skills. Normalized gain (N-gain) can be calculated by the equation:

$$g = \frac{Sposttest - Spretest}{Smaksimum - Spretest}$$

Information:
g = normalized gain (N-gain) of both models
Smaks = maximum scores from the initial test and the final test
Spre = initial test score
Spost = final test score

Normalized gain criteria (N-gain) are as follows:
g ≥ 0,7 = high
0,7> g ≥0,3 = medium
g < 0,3 = low

Based on the calculation of critical thinking ability test data results obtained by the gain test results as follows.

Table 3. Gain Test Results

Class	Experiment class	Control class
S pretest	71,2	72,1
S posttest	85,8	77,2
Gain	0,51	0,26
Information	Medium	Low

Based on these data, the experimental class gain calculation results obtained an average pre-test of 71.2 and an average post-test of 85.8. So that a gain of 0.51 is obtained. This means that the experimental class has increased learning outcomes in the medium category because 0.7> g ≥ 0.3. In the control class obtained an average of 72.1 pretest and posttest average 77.2. So that the gain is 0.26. This means that the control class also experienced an increase in learning outcomes, but the increase was in the low category because of g <0.3.

3.2 Discussion

This study aims to determine and analyze the effectiveness of learning virtual financial management courses in students majoring in education management class. The population and sample in this study are the same, where class A and B students number among 78 students.

In this study using the experimental method with the design "nonequivalent control design". This design was chosen because in this study, researchers chose one group as an experimental class (class-A) to be given treatment by implementing virtual learning, while the other group as a control class (class-B) were not treated with methods and approaches such as those in the experimental class, but using the conventional method of using the lecture and question and answer method.

The data analysis is to determine the effectiveness of the experimental method with a scientific approach, carried out quantitatively. The process of collecting data, the authors use the method of testing, observation, and documentation. The test method is used to obtain cognitive learning data of students in the experimental and control classes before and after being given different treatments. Observation method is used to get data during the learning process. While the documentation method is used to obtain the names and number of students who program Financial Management courses in the Department of Management Education.

The experimental class and the control class before being given treatment, the two classes were tested with a test instrument that is the pre-test. After getting the values of the two classes, a normality test, a homogeneity test, an average two equation test are held. Both classes must have the same initial abilities. This is done to determine whether there are significant differences in initial ability. The next process, the lecturer gives material about the basic concepts of financial management, in the experimental and control classes. The experimental class uses virtual learning which is supported by applications developed by Surabaya State University, while the control class uses conventional learning methods in the classroom.

Class-A as an experimental class, is treated by providing virtually virtual material that can be accessed by students about the basic concepts of education management. This material is also equipped with a quiz that is able to measure the level of understanding of students in learning material virtually. Quiz

given in the form of choice questions by matching or heading-matching as well as filling short answers to the questions provided or fill the blank.

The Class-B learning model is carried out conventionally by giving lectures to students in the class. The lecturer explains the material in the power point that has been prepared, students are given the opportunity to ask questions and combined to make conclusions from the material explained during face to face. In this control class no treatment is given to working on quizzes like the experimental class.

In the normality test of the data the results of the study indicate the data are not normally distributed. This is involved from calculations with statistical data processing software that shows the results of normality test calculations that have been done for the experimental class obtained a significance value of 0.001. Because the significance value ≤ 0.05, it can be concluded that the average data in the experimental class is not normally distributed. While the normality test in the control class obtained a significance value of 0.021. Because the significance value ≤ 0.05, it can be concluded that the average data in the control class is also not normally distributed.

Because the data are not normally distributed, the Wilcoxon test is then performed as a substitute for parametric T test sample testing. The Wilcoxon test is used to analyze observations about two paired data. Where in this study to be tested is the ability to think critically on students taking financial management courses. From the Wilcoxon test results with statistical data processing software, it can be seen that the Wilcoxon p-value test is smaller α (0.05) so it can be concluded that there are differences in critical thinking skills between before (pre-test) and after (post-test) after being given an essay question. From these results it can be given an initial conclusion, that the treatment given with virtual classes using virtual learning software developed by Surabaya State University has an impact on students' critical thinking.

To find out the magnitude of the increase in student understanding in material through critical thinking, a gain test is used. Based on the calculation of experimental class gain data obtained an average pre-test of 71.2 and an average post-test of 85.8. So that a gain of 0.51 is obtained. This means that the experimental class has increased learning outcomes in the medium category. This corresponds to the categorization at intervals of $0.7 > g \geq 0.3$. Meanwhile, the control class obtained an average of 72.1 pre-test and post-test average 77.2 so that the gain is 0.26. This means that the control class also experienced an increase in learning outcomes, but the increase was in the low category because it was at an interval of $g < 0.3$.

Based on the calculated data using the statistical data processing software, it can be concluded that there is an increase in student learning outcomes in financial management courses with the application of virtual learning, this finding support to the research result [9]–[11]. The improvement found in this medium category is considered effective in developing students' critical thinking models. This is indicated by the questions given to students in the form of essays that can measure high-level thinking patterns of students [12], [13].

4. CONCLUSION

This virtual learning study in financial management courses aims to find out and analyze the effectiveness of learning through questions that contain higher order thinking skills with statistical measurement tools. From the data calculation results through statistical data processing software, the normality test obtained a significant value in the experimental class of 0.001 and the control class of 0.021. Because the significance value ≤ 0.05, it can be concluded that the average data in the experimental class is not normally distributed. Calculators for data not normally distributed then use the Wilcoxon test. From the Wilcoxon test results obtained significance value ≤ α (0.05), so it can be concluded that there are differences in critical thinking skills between before (pre-test) and after (post-test) when given an essay question.

To find out the effectiveness or the magnitude of the increase in student understanding in the material through critical thinking, a gain test is used. Based on the calculation results of the experimental class gain obtained 0.51 gain value, which means the experimental class has increased learning outcomes in the moderate category ($0.7 > g \geq 0.3$). Meanwhile, the control class obtained a gain value of 0.26, which means the control class also experienced an increase in learning outcomes, but the increase was in the low category because it was at an interval of $g < 0.3$. Based on the calculated data using the statistical data processing software, it can be concluded that there is an increase in student learning outcomes in financial management courses with the application of virtual learning. The improvement found in this medium category is considered effective in developing students' critical thinking models. This is indicated by the questions given to students in the form of essays that can measure high-level thinking patterns of students.

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