The Influence of Accounting Module Usage with Scientific Approach Based Towards Students' Critical Thinking Ability

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Abstract—The purpose of this study was to determine the ability of students to think critically about the subject of Adjusting Journal Entry after following the learning using the Accounting Module with a scientific approach and to determine the effect of using the Accounting Module with a scientific approach towards students' critical thinking ability on the subject of Adjusting Journal Entry for year III students in class IIIC Economic Education Program Universitas Swadaya Gunung Jati Cirebon. This study uses the Quasi Experiment method, there are two classes namely a control class and experimental class. The sample method that used was purposive sampling. Based on the results of data analysis of the usage of accounting modules with scientific approach, the results gained from the posttest results on the t-test of two independent samples (T Test Independent Sample) from experimental class and control class resulted that the value of $t_{account} = 5.97$, obtained $t_{table} = 2.00$. Therefore, it can be concluded that $t_{account} > t_{table}$ so H_0 is accepted meanwhile H_1 is rejected, this means the usage of accounting module with scientific approach influenced student's critical thinking ability. Where the posttest mean of the experimental class was 86.59 and posttest mean of the control class was 72.86. Thus, it concluded that the response of students towards learning by using accounting modules with scientific approach was good, and students' critical thinking skills on Adjusting Journal Entry subject in Basic Financial Accounting II subjects on experimental class was better than the control class.

Keywords—accounting module; scientific approach; critical thinking

I. INTRODUCTION

The use of teaching materials is very helpful on learning process. Teaching materials in the learning process have a crucial role, both for educators and students, because without teaching materials the learning process will not run smoothly and the selection of appropriate teaching materials can optimize the process of transferring knowledge from educator towards the students.

On its implementation, only few numbers of lecturers are able to develop teaching materials creatively and innovatively. This is one of the constraints for students in understanding the Adjusting Journal Entry materials. During the learning process holds, students are mostly inactive and giving small contribution to the process, so students' critical thinking ability in understanding the Adjusting Journal Entry is not on their maximum level of comprehending.

Good teaching materials are teaching materials that can accommodate the students to understand the learning materials that will be delivered and can improve student learning achievement. Teaching materials that can be developed to overcome these problems, one of the developed useful material is a module. In the Kamus Besar Bahasa Indonesia (Bahasa Indonesia Dictionary) according to Andi Prastowo, module is "Teaching and learning program which can be learned by students with minimal assistance from the teacher or supervisor, including: goals planning that clearly will be achieved, subject matter provision , necessary tools, as well as tools which can assessed and measured students' achievement in completing lessons" [1].

By developing teaching materials, students are easier to understand a material because the module is made in accordance with the needs and characteristics of students, with understandable way by students. The implementation of the 2013 curriculum is carried out by practicing process skills reflected in learning activities [2], so that the modules developed are also based on a scientific approach. According to Hosnan, the scientific approach is a learning process designed in such a way that students actively construct concepts, laws or principles through the stages of observing, formulating problems, submitting or formulating hypotheses, collecting data with various techniques, analyzing data, draw conclusions and communicate concepts, laws or principles that are "discovered". The use of module teaching materials is expected to open students' knowledge and insight, especially accounting comprehension so the students are more critical [3].

Critical thinking skills that developed in this paper refer to critical thinking abilities which developed by Michael in Fisher, Critical thinking is an academic competency similar to reading and writing and almost as important. Therefore, he defines critical thinking as a skilled and active interpretation and evaluation of observation and communication, information, and argumentation [4].

Based on the results of previous studies conducted by Puspitasari and Imas Amaliyah, it was concluded that learning

with a scientific approach makes it easier for students to understand and understand the concepts of material provided and can improve students' critical thinking skills and student learning outcomes [5,6]. Previously, a study was conducted by Setiawan on the Use of Modules Based on Scientific Approaches to Improve the Independence of Elementary School Student Learning [7].

Problem Formulation in this study is whether there are differences between students' critical thinking skills whom use accounting modules with scientific approaches and students who use conventional models and whether using accounting modules with scientific approaches affects year one students' critical thinking skills in Unswagati Cirebon Economic Education Study Program. Furthermore, the hypothesis which proposed in this research is there is influence of accounting module with scientific approach towards first grade students' critical thinking ability in Unswagati Cirebon on Economic Education Study Program.

II. METHOD

The author conducted this research using a quantitative approach. The method that used was quasi experiment, with quasi experimental design. The research design that used in the study was the Nonequivalent Control Group Design. The focus of the problem discussed in this study was to determine the differences between students' critical thinking abilities by using the Accounting Module with Scientific Approach and students whom use Conventional models and to determine the effect of the Scientific Approach-Based Accounting Module on Critical Thinking Ability of Level I Students of Unswagati Economic Education Study Program Cirebon. The sample of this study were 43 students at the IB class as the control class and 43 students at the IC class as the experimental class.

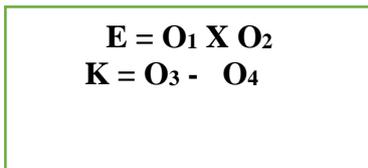$$E = O_1 \ X \ O_2$$
$$K = O_3 - \ O_4$$

Fig. 1. Nonequivalent control group design [8].

Information:

X: the treatment given to the experimental class and the control class

O1: experimental class treated.

O2: the results of the experimental class treated.

O3: control class which is not treated.

O4: the results of the control class are not treated.

Data collection in this research was using paper test with 10 question items and 1 item essay. Research test instrument (questions) can be distributed after the researcher tested the instrument to determine the feasibility of the test by testing the validity, reliability, different tests, and the level of difficulty. This is done by researchers with purpose to produce feasible instrument and can be used in this research. The data that has

been obtained was analyzed with SPSS for Windows version 23.

A. Normality Test

Normality test is used to figure whether the sample was taken from the normal distribution or not. The calculation will aid SPSS program for Window version 23 by using the Shapiro Wilk test. The examined score were the scores that obtained from pretest and post test score from each control and experiment class. By using a significance level of α 5% with description:

If the sig value is <0.05, the H1 is rejected

If the sig value is> 0.05 then H1 is accepted

B. Correlation Test

In this research, the relationship between the inquiry model and the ability of small cash management is known. If the data is normally distributed according to Sundayana [9], then the product moment formula can be used as follows:

$$r_{xy} = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{(n\sum X^2 - (\sum X)^2)(n\sum Y^2 - (\sum Y)^2)}}$$

To find out the coefficients correlation which the results are significant or not, the t-test with correlation test steps then can be used, according to Sundayana [9], as follows:

1) Hypothesis: H_ (0): ρ = 0, meaning there is no significant correlation between the value of student activity in the use of a scientific approach based module with the posttest of students' critical thinking skills

H_ (1): ρ ≠ 0, means that there is a significant correlation between the value of student activity in the use of a module based on the scientific approach and the posttest value of students' critical thinking abilities.

2) Specifies the value of $t_{account}$*:* To specifies the value of $t_{account}$, using the formula as follow:

$$t_{account} = r\sqrt{\frac{n-2}{1-r^2}}$$

3)   Determine the value of t_{tabel}*:* To determine the value of t_{tabel} , using the formula as follow:

$$t_{tabel} = t_a(dk = n - 2)$$

4) Testing: H_0 is accepted if $-t_{table} \leq t_{account} \leq t_{table}$

5) Make conclusions: Estimation of H_0 is accepted or rejected. To find out the measurement of the influence between variables can be determined by the coefficient of determination (D).

$$D = r^2 \times 100\% \ [10]$$

C. Gain Test

The calculation of the gain index aims to find out the improvement of students' critical thinking ability on Basic Financial Accounting II subject in chapter Adjusting Journal Entry. The calculation is obtained from the pre-test and post-test scores of each class, from the experimental class and

control class. In this research, the gain index will be used if the average post-test control class and experimental class showed a clear difference. With the following criteria:

TABLE I.   N-GAIN CLASSIFICATION

g ≥ 0,7	High
0,3 ≤ g < 0,7	Medium
g < 0,3	Low

D. Homogeneity Test

Homogeneity test was conducted to find whether the data sample has a homogeneous variant or not, so a prior testing of the variance homogeneity was necessary. For the calculation was using SPSS for Windows version 23 with the Shapiro Wilk test. The test used a significance level of α of 5% with description:

If sig value <0,05 then H1 is rejected

If sig value > 0,05 then H1 is accepted

E. t-Test

Further testing was the hypothesis test by using paired independent sample t-test. The data that compared was the results of the post-test of control and experimental class. With following rules:

Ho: there is no effect of using an accounting module with a scientific approach to students' critical thinking abilities

H1: there is an influence of using an accounting module with a scientific approach to students' critical thinking abilities

The calculations will use SPSS for Windows version 23 with Shapiro Wilk.

III. RESULTS

A. Analysis of Classroom Control Research Results

In below, the pretest and posttest results in the control class that use conventional learning in its learning, as follows:

TABLE II.   DESCRIPTION OF CLASSROOM CONTROL RESULTS

Description	Pretest	Posttest
Students Number	21	21
Mean	57,62	72,86
Median	60	70
Modus	60	70
Highest Score	70	90
Lowest Score	40	60

The pretest and posttest results table in the control class, it can be seen that the lowest score at the pretest was 40, and the highest score at the pretest was 70, with the average score at pretest was 57.62, the value that often appeared or a lot of score that obtained by students at pretest was 60, the middle score of the pretest was 60. While the lowest score at posttest was 60, and the highest score at posttest was 90, with the average score at posttest was 72.86, the score that often

appeared or the score the most students get when the posttest was 70, and the posttest midpoint was 70. This means that there was an increase in students' cognitive learning achievement in the control class.

B. Analysis of Experiment Class Result

Pretest result data was obtained from the tests that conducted prior the learning process and posttest results were obtained from tests that conducted post the learning process. The following data pretest and posttest for learning by using scientific approach inquiry model of inquiry, which is as follows:

TABLE III.   DESCRIPTION OF EXPERIMENT CLASS RESULT

Description	Pretest	Posttest
Students Number	22	22
Mean	58,64	86,59
Median	60	85
Modus	60	85
Highest Score	70	100
Lowest Score	40	75

Looking at the Table of pretest and posttest results in the experimental class, it can be seen that the lowest score at the time of pretest is 40, and the highest score at the time of pretest is 70, with the average score at pretest being 58.64, the value that often arises or the value which the students get when the pretest is 60, the middle value of the pretest is 60. The lowest score at the posttest is 75, and the highest score at the posttest is 100, with the mean score at the posttest being 86.59, the value that often arises or the value that a lot of students get when the posttest is 85, and the mean posttest is 85. This means an increase in the students' cognitive learning outcomes in the experimental class.

C. Normality Test

The data that used were the pretest and posttest scores of each class. The results of normality test were presented in the following table:

TABLE IV.   NORMALITY TEST WERE PRESENTED

Class		Shapiro-Wilk		
		Statistic	Df	Sig.
Control Class	Scores	.924	21	.106
Experiment Class		.925	22	.095

Based on the table above, with the level of trust α = 0.05, it obtained the significance value (Sig.) in the Shapiro-Wilk test (Sig 0.095 and Sig .0106) > 0.05, it means the data was normally. Thus, it shows that the research data meets the requirements of data analysis or normal distribution.

D. Homogeneity Test

The data that used was the pretest score of each class. Test results were presented in the following table:

TABLE V.   HOMOGENEITY TEST RESULT ANALYSIS TEST OF HOMOGENEITY OF VARIANCES VALUE

Levene Statistic	df1	df2	Sig.
1.256	1	41	.269

Based on the table above, it can be seen that the significance value (Sig.) Is 0.05 (0.269> 0.05). Thus, it can be concluded that the data is homogeneously distributed, which means that the students' initial ability in the control class and the experimental class were the same.

E. Test Gain

The calculation is derived from the pretest and posttest values of each class of control class and experiment class.

TABLE VI.   DESCRIPTION OF FINDING RESULT

Description	Control Class	
	Pretest	*posttest*
Students Number	21	21
Total Score that gained	1210	1530
Mean	57,62	72,86
Maximum Score	100	100

- N-gain of the Pretest and the posttest results of the Control class

$$g = \frac{\text{postest score} - \text{pretest score}}{\text{maximum score} - \text{pretest score}}$$

$$= \frac{72,86 - 57,62}{100 - 57,62}$$

$$= 0,36$$

Based on the calculation of n-gain test from the control class obtained 0.36 which means that there is an increase of student learning achievement in the control class with low level.

- N-gain of pretest and posttest result of Experiment class

$$g = \frac{\text{postest score} - \text{pretest score}}{\text{maximum score} - \text{pretest score}}$$

$$= \frac{86,59 - 58,64}{100 - 58,64}$$

$$= 0,67$$

Based on the calculation of n-gain test from the experimental class obtained 0.67 which means that

there is an improvement on the students' learning achievement in the experimental class with moderate level.

F. Hypothesis Testing

The t-test was conducted to determine the differences in students' petty cash management skills between the experimental class and the control class. The data that used was the posttest score of each class.

TABLE VII.   REGRESSION TEST SUMMARY MODEL

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.685[a]	.469	.456	7.48639

[a.] Predictors: (Constant), Class

TABLE VIII.   CORRELATIONS

		Value	Class
Pearson Correlation	*Score*	1	.685[**]
	Sig. (2-tailed)		.000
	N	43	43
Pearson Correlation	*Class*	.685[**]	1
	Sig. (2-tailed)	.000	
	N	43	43

Correlation is significant at the 0.01 level (2-tailed).

Based on the table above, it can be seen that the correlation between X and Y was 0.685, with a significance level of α = 0.05, and a significance (Sig.2-tailed) of 0.000. Because the value of Sig. 0.000 <0.05 means that the correlation between two classes were significant with a correlation level between 0.500 - 0.700 or in the medium correlation range. It can be explained that there was a significant influence on the use of accounting modules with specific approach to students' critical thinking abilities.

TABLE IX.   T-TEST ANALYSIS RESULT GROUP STATISTIC

	Class	N	Mean	Std. Deviation	Std. Error Mean
Control Class	*Score*	21	72.8571	8.45154	1.84428
Experiment Class		22	86.5909	6.43398	1.37173

Based on the table above, it was found that the average posttest of the experimental class was 86.59 and the average posttest of the control class was 72.86. Thus, it can be concluded that the students' critical thinking ability in the accounting course material of the experimental class was better than the control class.

TABLE X. INDEPENDENT SAMPLES TEST

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | | | | | | | | 95% Confidence Interval of the Difference | |
		F	*Sig.*	*T*	*Df*	*Sig. (2-tailed)*	*Mean Difference*	*Std. Error Difference*	*Lower*	*Upper*
Value	*Equal variances assumed*	1.084	.304	-6.013	41	.000	-13.73377	2.28395	-18.34629	-9.12124
	Equal variances not assumed			-5.975	37.360	.000	-13.73377	2.29848	-18.38941	-9.07812

Based on the table above, it obtained $t_{account}$ = 5.97 with degrees of freedom (n1 = n2) - 2 = 43 - 2 = 41, it also obtained t_{table} = 2.00 with α = 0.05 and obtained the value of Sig. (2-tailed) = 0,000 <0,05. Thus, it can be concluded that $t_{account}$ > t_{table} so that H_1 is accepted and H_0 is rejected, it means that there was an effect of using an accounting module with scientific approach to students' critical thinking abilities.

IV. DISCUSSION

The results of data analyzing in the form of scores obtained by students' pretest and posttest showed the results that, the prior ability of students' critical thinking on Adjusting Journal Entry material in control class and experimental class was homogeneous, namely the prior ability of the control and experimental classes were equal to the average pretest score of the control class which was 57.62, meanwhile the average score of the experimental class was 58.64. The average score obtained from each class if interpreted into grades in accordance with the KKM, was still below the KKM, where the KKM in the Unswagati Economic Education Study Program in Cirebon is 75. Whereas, the results of the posttest scores show that there is an increase in ability critical thinking students material adjusting journal verses, it can be seen from the average posttest score of students in the control class is 72.68, and the average posttest value of the experimental class is 86.59. This shows that students' critical thinking skills in the adjusting control journal class material and the experimental class students appear to be superior to the experimental class.

After the data was tested, the effect of using the accounting approach based on scientific approach to students' critical thinking skills was obtained. This can be seen from the improvement in student learning outcomes that use accounting modules based on scientific approaches better than student learning outcomes using conventional learning models. The learning outcomes are seen from the N-gain score achieved by each student. The average N-gain score in the experimental class shows a higher average than the control class. This can be seen from the results of the N-gain calculation manually, the average value of the N-gain of the experimental class is 0.67, and the average value of the N-gain of the control class is 0.36. Thus, the use of accounting modules based on the scientific approach has a significant effect on students' critical thinking ability in the material of adjusting journal entries.

V. CONCLUSIONS AND SUGGESTIONS

A. Conclusion

- There are differences in critical thinking skills of students who use accounting modules based on scientific approaches with students who use conventional models. Based on the N-gain results show that the critical thinking ability of the adjustment journal material students in the control class and experimental class students has increased with a moderate level and it can be seen that the difference is superior in the experimental class.

- The use of an accounting module based on a scientific approach has a significant effect on the ability to think critically on the subject of adjusting journal entries.

B. Suggestion

Learning using the accounting module based on scientific approach can be used as an alternative to be applied at the time of learning process in order to train and improve students' critical thinking ability in accounting subject.

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