Influence Use of Blended Learning Against Competence Drawing 3 Dimensions with Autodesk Inventor

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ABSTRACT

Study This aim, for now, is to influence blended learning against competence and draw three dimensions with Autodesk inventor on students' technique machine—self-learning use of blender use Elena developed by UNNES. The research method used is the experiment. The design used study. This is a Randomized Control Group Pre-test-Post-test Design, which is an implementation study. This is in the Mechanical Engineering Department UNNES with a population student Mechanical Engineering Education study program currently This takes eye Computer-Aided Design/Manufacturing course with amount sample taken as much as 2 class with the number of each participant college 20 students as a class experiment and class control. The results of the analysis of the T-test performed obtained a data t_{count} of 21.299. then the data was compared in table t with degrees freedom (dk) = (n1+n2-2) = (20+20-2) = 38. Results of analysis seen with α = 1% and dk = 38 obtained t (0.99) (38) = 2.712. Based on the criteria, Ha accepted if t_{count} is bigger than t_{table}, where mark $t_{count} > t_{table}$ or 21.299 > 2.712. So that can say the count is in the area acceptance Ha or the area H0 rejection. Research conclusion: Using blended learning models can influence and improve mastery competence, drawing three dimensions Autodesk inventor seen from results learning gained.

Keywords: Blended Learning, 3D, Computer-Aided Design

1. INTRODUCTION

The development of the world of education moment This No, regardless from influence exists revolution industry fourth. The revolution era started with the invention of the machine steam the revolution industry first, until the revolution industry generation four, which changed sector industry in the world affected by the rise of developed technology and the internet. Revolution Industry fourth has changed the landscape of technology education, supported by intelligence creation and system physical -virtual connection between humans and machines become more general [1]. This influences institution education from the level base until high, where internet function starts signs in and supports education.

University as an institution of education has a vital role in taking advantage of that era, where the ability of colleges Keep developing and improving innovation. Semarang State University, one of Indonesia's leading universities, supports in a manner that completes the development revolution industry in the fourth moment. This, among others, is through the series method in developing technology learning. Utilization of technology in support of education. That is, he did lectures online, in a manner distance away and use internal internet network implementation as well as combined with addresses stare familiar face with blended learning. Blended learning itself, including learning models. This utilizes technology web-based information (IT) that can be accessed from a distance so that learning is done. I am not only fixated on room classes and specific hours, but I can still do When only and where, of course, just offset with lecture stare face.

The fusion of web-based learning models with stare advance creates a new atmosphere; however, matter Still becomes something new and natural and can hinder the learning process If not done right. It is an existing learning moment. This characteristic still prioritizes

meeting in advance so that it can impair the development of lectures. This is one of them due to limitations time owned by lecturers and students _ For carrying out meetings inside _ class. Limitations in time can also hinder the delivery of material from lecturer to student. To overcome problems, they then make E-Learning [2]. To describe these various learning systems several terms are used such as computer mediated learning, web-based training and most often e-learning [3]. E-learning is an abbreviation of electronic learning, where the teaching and learning process uses electronic media, specifically the internet as a learning system [4]. Blended learning combines the best aspects of online learning, structured face-to-face activities, and real-world practice. Online learning systems, classroom training, and on-the-job experience have major drawbacks by themselves. The blended learning approach uses the strengths of each to counter the others' weaknesses.[5]

Condition This also happened in the Mechanical Engineering Department UNNES, especially in the eyes where study Computer Aided Design (CAD). Studying the is looks like studying practice and theory simultaneously, so applying blended learning is systematically proper. Computer Aided Design (CAD), namely a computer-aided design process. CAD software not only makes the process of turning ideas into design drawings easier, but also acts as a product database. [6]. Based on the description above, it is necessary to know the effect of the integrated learning model when involved in eye Computer-Aided Design (CAD) courses; in particular, competence draws three dimensions to bring up the proper application of the model for use and set implementation. Because that is, research about the influence of blended learning against competence draws three dimensions with Autodesk inventor on students' technique machine necessary for carried out.

2. RESEARCH METHOD

Study This uses a method study with an approach of Experimental Design. The research method used for researching populations is not sample specific, with the technique of taking samples done at random, where data collection is carried out using instrument research; data analysis is quantitative or statistics to test a hypothesis that has been determined [7] Research design This has group control. However, no can function fully for control variables outside influences implementation experiments

Design of the research this uses a Randomized Control Group Pre-test-Post-test Design approach." The design study can be seen in the following table:

Table 1. Research plan

Group	Pretest	Treatmen	Postest
X	X1	Blended Learning	X2
Y	Y1	Without Blended Learning	Y2

Description:
X   : Group experiment
Y   : Group control
X1   : Pretest in groups experiment
Y1   : Pretest on the group control
X2   : Post-test on the Group Experiment
Y2   : Post-test on the Group Control

Based on table 1 shows that every group before giving treatment check, especially formerly condition initial (pretest) ability students, obtained the same condition. Then, after the state is known, every group is given a different treatment. One group uses the method of blended learning as a method for help control material, and groups only learn without using the blended learning method. The stage ends after getting treatment, and the second group will be tested return (post-test) to see whether the results from the application blended learning.

Population study This is a student in the Mechanical Engineering Education study program currently taking eye Computer Aided Design courses, totaling four classes. Next one 2, groups will be selected to Act as group experimental and control groups, following stages of research:

2.1. Validity Test Instrument

Validity test instrument, which works to show level validity from some devices. Testing validity instrument applied to each question item. On research This uses validity comparison Where given test _ as tool measuring provided in period same time with in a manner appropriate has capable show exists a unidirectional relationship between test First with a trial next [8]. About

Table 2. . Test Assessment Criteria

No	Result	Score
1	Very Suitable	3
2	Fits	2
3	Unsuitable	1

can wear If declared valid with showing results evaluation from expert own mark more giant or the same with two served in describing scale minimum score, median value, and score maximum.

Figure 1 score scale

Table 3. Results of Control and Experiment Class Values

Responden	Rata-Rata Nilai		Peningkatan	Persentase Peningkatan
	Pre Test	Post Test		
Control class	76.00	84.35	8.35	10.99
Experiment class	75.58	89.34	13.76	18.21

Based on the picture of the above scale, determining its validity can show table distribution frequency like under this by looking closely at scores given by experts, then can is known mark the median, accordingly category score above.

2.2. Normality Test

which test is intended to determine whether the data is usually distributed. A normality test was caarried out with the Chi-square formula to find out the distribution of the data obtained.

$$X^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i} \tag{1}$$

Description:

X^2: Chi- squared.

E_i: Expected frequency

O_i: Frequency of observation

k: many intervals group

Furthermore, price x^2_{data} obtained _ compared to with x^2_{tables} with (dk) = k - 1 and level significant 0.05. The data tested will generally be distributed if $x^2_{data} < x^2_{table}$.

2.3. Homogeneity Test

used to determine whether the experimental and control groups have the same level of variance so that it can be used to determine the hypothesis test formula. The procedure used for the homogeneity test is:

$$F = \frac{VariansTerbesar}{VariansTerkecil} \tag{2}$$

2.4. t-test

This study's final stage is used to analyze the data of the two groups after being given treatment. To compare the post-test averages of the two groups, a t-test was carried out to find out the difference in quality between the two groups so that the more influential group would be answered. The right-hand t-test is used to test the proposed hypothesis's validity.

3. RESULTS AND DISCUSSION

The results of research that has been carried out in the end, the researcher gets data in the form of instrument test results, analysis results research, data analysis along with the discussion. In addition, the result data test end of the two control classes and experimentation can enhance

students' competence in drawing three dimensions with Autodesk inventors. Based on the results of data analysis, then can be described as follows:

Table 4. Frequency Distribution

Criteria	*Svore Category*
Valid	Median ≤ x ≤ Maximal
No Valid	Minimal

3.1. Validity Instrument

The instrument used in this study must be valid, so it is necessary to validate the tool that experts hold. Then the results are tabulated, the scores are calculated, then sorted from the highest value to the lowest to obtain the validity of the questions. A summary of the test results of the instrument can be seen in the table below.

Table 5. Results of Research Instrument Validity

No	*Expert*	*Number Question*				
		1	*2*	*3*	*4*	*5*
1	UA-1	2	2	2	3	3
2	UA-2	2	2	2	2	2
	Me	2.0	2.0	2.0	2.5	2.5
	Criteria	Val	Val	Val	Val	Val

Based on Table 4, the validity test shows that the median value for each question from experts produces data greater than or equal to 2 (two) medians determined for the validity of the questions, according to Figure 1 (Score scale) and Table 3 (Frequency distribution).

3.2. Analysis Initial Stage

Before students obtain 3-dimensional drawing learning materials with Autodesk Inventor, the control and experimental classes are first tested (pre-test) to find out their abilities; after the pre-test is carried out, students use work-piece-based learning strategies; after that, a final test (post-test) is also carried out.) after receiving treatment.

The results of the implementation of the pre-test and post-test will show how much the understanding of students has increased after receiving treatment, where this implementation was attended by 40 students with the distribution of control classes and experimental classes of 20 students each and for more details can be seen in the following table.

Based on the table above, there is an increase in the average student learning outcomes before and after

learning in both control and experimental classes. The magnitude of the rise in the average pre-test to post-test results can also be seen in the image below.
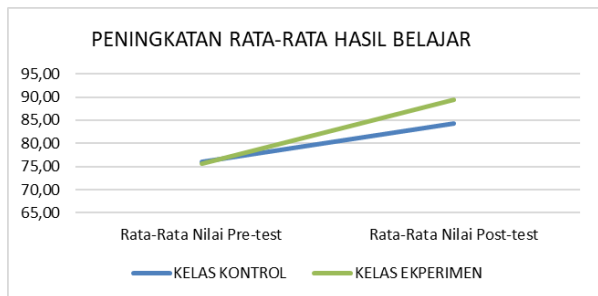
Figure 2 Increase in average yield pretest to post-test student in control competence

3.3. Normality Test Results

Tests at this stage are carried out to determine whether the data is usually distributed by using the chi-square formula, which can be summarized in the following table.

Table 6. The results of the normality test pretest and post test

Responden	Pre test		Post test		Description
	χ^2 hitung	χ^2 tabel	χ^2 hitung	χ^2 tabel	
Control class	8.20	11.07	1.19	11.07	Normal
Experiment class	7.77	11.07	1.09	11.07	Normal

Based on the table above _ shows that the data is usually distributed if the chi-square value counts smaller from the chi-square value table, with level real (α) = 5% and dk = 6 – 1 = 5 obtained chi-square value χ^2 table = 11.07. Based on the results calculation received χ^2 count < χ^2 table, it can concluded that the data is usually distributed.

3.4. Normality Test Results

Homogeneity testing at this stage is intended to determine whether the experimental group and the control group have the same level of variance; the results are summarized in the table below.

Based on the table showing that the data is usually distributed if the chi-square value count is more minor from the chi-square value table, with level authentic (α) = 5% and dk = 6 – 1 = 5 is obtained chi-square square value χ^2 table = 11.07. Based on the calculation of the

Table 7. Homogeneity Test Results

Responden	S_1^2	S_2^2	F_{Hitung}	F_{tabel}	Description
Control class	182.5	101.67	1.80	2.53	Homogen
Experiment class	36.24	15.87	2.28	2.53	Homogen

results received χ^2 count < χ^2 table, it can be concluded that the data is usually distributed.

Data results for the *pretest* obtained (S_1^2) in class control were equal to = 182.5 and in the class experiment as big as 36.24; meanwhile, For the *post-test,* received variance (S_2^2) as significant as in class control equal to = 101.25 and in the class experiment as big as 15.87. From comparison, F count in each class shows that F count < F table, then matter. This indicates that Ho is accepted and shows variable questions spread homogeneously.

3.5. Discussion

Analysis Final Stage T Test Results is the most recent test, where the final average group control and group experiment are tested. For now, There is an average difference between the second group. Results of the t-test performed get data t arithmetic of 21.299, then the data compare within table t with degrees freedom (dk) = (n_1 +n_2 -2) = (20+20-2) = 38. Analysis results in table 5.4 with α = 1% and dk = 38 obtained t (0.99) (38) = 2.712. Based on the criteria, H is accepted if the t count is greater than the t table, where mark t count > t table or 21.299 > 2.712. So that can say t counts are in the area reception H a or are in the area rejection H 0.

Based on Table 8 exists $\bar{x}$ with a significant difference between the values of or average value between the control class with a class experiment using _ learning with *blended learning,* so that can be said happen enhancement competence student in draw three dimensions use Autodesk inventor

4. CONCLUSIONS AND SUGGESTIONS

Based on the research that has been done, we can conclude that: 1. The use of blended learning models can influence results, Study competence draws three dimensions Autodesk inventor, 2. Using blended learning models can increase mastery competence. Draw three dimensions using Autodesk Inventor, though the value is No significant.

Suggestions that can submitted to research Is to use the blended learning model. Though capable of increasing knowledge and results learned, the use of the

Table 8. T Test Analysis Results

Responden	Rata – Rata	dk	t_{hitung}	t_{tabel}	Description
Control class	84.35				
Experiment class	89.34	38	21.29	2.71	Ha accepted

material practice needs deepening return Because different character.

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