

The Effectiveness of Blended Learning Model of Audio System Engineering Subject in Vocational High Schools

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Abstract - This study aims at finding out the effectiveness of the blended learning model to improve the competence of students' learning outcomes of in the subject of audio system engineering at the Department of Audio Video in Vocational High Schools. This study used a quasi-experimental design with a non-equivalent control group design. The research site is located at SMKN 2 Makassar and SMKS Kartika Jaya Wirabuana Makassar. The population in this study was the students of SMKN 2 and SMKS Kartika Jaya Wirabuana majoring at Audio Video courses. Sampling technique was purposive sampling that is a sampling technique with a particular consideration. In determining the suitability of these samples, there is a consideration of the subject schedule. Therefore, the sample used in this study consisted of two classes with the total number of the students were 60 students consisting of 33 students from class XI in SMKN 2 Makassar as an experimental class and 27 students from class XI in SMKS Kartika Jaya Wirabuana as the control class. The data were collected by using a competency test in the form of multiple choice. Then, the data were analyzed using parametric statistical *t*-test with a significance level of 0.05. The results of this study indicate that based on the output of Independent sample *t*-test is obtained sig (2-tailed) of 0.02 <0.05, then based on decision making in independent sample test with *T*-test. Therefore, it can be stated that H_0 is rejected and H_a is accepted. It means that there is a difference of gain achievements between experimental and group control. According to the data of pretest and posttest in the experimental class, it is obtained that the normalized gain value of the experimental class is 21.38, and the control class is 15.44. The value is interpreted into the value criterion (*g*). Therefore, the effectiveness of the blended learning model in the experimental class is in moderate level.

Keywords — Blended Learning, Vocational High School, Teaching Method

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I. Introduction

Vocational High School in Indonesia called SMK is one institution that is responsible for producing human resources that have good competence, skills, and expertise so that graduates can develop performance when in the workplace. The Indonesian Law on National Education System Article 15 Ministry of Education states that the Vocational Education is a secondary education that prepares students to work in particular field. It is a formal educational institution that vocationally produces many graduates annually. Vocational graduates are required to have the appropriate competence fields of expertise and to work more independently than high school graduates.

Based on the observations and interview conducted on 9th of November 2014 to the teachers with engineering audio system subject at SMK 2 Makassar, it is found that the problems that occurred in that school are that the students' motivation is still low. It is characterized by the lack of interest of the students. Many students feel bored to follow the learning process so that their learning outcome decreased. Therefore, there is still a learning outcome of students under the standard or KKM. In addition, in this school, two students drop out from the school. Furthermore, the teachers stated that one of the causes why the learning of expert package is not running optimally is that the discussion of the course material is not completed optimally since the material covers too much. Therefore, there are some materials which are left behind so that it makes the students difficult in learning. In addition, learning the skill package of audio video in SMKN 2, Makassar is still conducted conventionally that is face to face or lecturing in the classroom.

The conventional method is a method of giving a description or explanation to some students at a particular time and place [1]. The conventional method is a way of delivering information verbally to the listener [2]. In addition, lecturing method is explaining the learning materials orally to a group of listeners to achieve specific learning objectives in a relatively large amount [3]. Therefore, it can be concluded that the face to face method is a method of teaching in which teachers teach to convey information and knowledge to achieve the learning objectives to the number of students in a particular time and place.

In its application, face-to-face itself method has strengths and weaknesses. There are some strengths of the face-to-face method. First, it can convey information quickly. Second, the material can be provided to the students can clearly. Third, this method can be applied in a big class with many students. However, the weakness of the face-to-face method is only listening skills, and it means that it can only take place properly if the students have a good skill in hearing and listening. This method emphasis on communication in one direction in which to control the students' understanding of the learning material will be insufficient as well. In addition, one-way communication can make the students' knowledge of participants will be limited to what is given. The face-to-face method may not be able to serve an ability differences, knowledge differences, interest differences, talent differences, and differences in learning styles.

Conventional method in which the source of knowledge is only from the teachers is still not effective when it is used as the sole source of transferring knowledge to students. It is time to support the learning process with e-learning concept. The implementation of e-learning is one instructional technology innovation that integrates information technology and computers with lesson content [4]. E-learning system is a form of distance education using electronic media as a medium for the delivery of content and communication between teachers and their students. Thus, e-learning is an educational activity which is individually or in groups done online or offline via the network or personal computers and other electronic devices.

In its application, the e-learning method itself has advantages and disadvantages. E-learning has the following advantages [5]. First, there is an availability of e-moderating facility where the teachers and students can communicate easily through the internet facility on a regular basis or whenever the communication is done without being limited by distance, place, and time. Second, teachers and students can use the teaching materials structured and scheduled through the internet. Third, students can learn teaching material at anytime and anywhere if necessary since teaching materials are stored in the computer. Fourth, if the student requires additional information relating to the material he or she can access the internet. Fifth, both teachers and students can conduct discussions via the internet that can be followed by a large number of participants. Sixth, there is a changing role of the student from the passive to active. Seventh, it is relatively more efficient. For example, those who live far from a college or a conventional school can access the material. Based on this principle, the concept of e-learning greatly assists the process of learning, especially in the delivery of materials since it can encourage the students to follow the lessons. In addition, they are motivated to understand the contents of the subject matter.

Even so, the use of the Internet for e-learning cannot be separated from various shortcomings.

First, the lack of interaction between teachers and students or even among the students themselves can slow down the formation of values in the learning process. Second, the tendency to ignore the academic or social aspects and vice versa encourage the business or commercial aspects. Third, the learning and teaching process tends toward training rather than education. Fourth, the changing role of the teacher from the original master conventional learning techniques, are now required to master the technique of learning by using Information Communication Technology (ICT). Fifth, students who do not have high learning motivation tend to fail. Sixth, not all internet facilities are available (concerning the problem of availability of electricity, telephones, and computers). Seventh, some of the students do not know and do not have the skills of in answering the questions on the internet. Eight, there is a lack of mastery of computer language. Although e-learning can be used independently by learners, the existence of teachers is significant as adults who serve to support and assist the learner in the learning process. In other words, the face to face method becomes essential and should not be left behind in learning.

Based on the problems as described above, a solving problem is required an order to compensate for the shortcomings of the conventional methods and e-learning system itself. The blended Learning method is an alternative method that is appropriate for use in the learning process. The blended Learning method is a merger between conventional learning models (face to face) and the learning model based e-learning by utilizing electronic media. It means that blended learning is a conventional learning model supported by the learning model based e-learning so that the learning process will run optimally because of the advantages of these two models will be mutually supplemented from each lacked both the learning model. With blended learning methods, teachers and students gradually adapt to the technological advances of education, but it is still supported by the method which is usually performed face to face. As mentioned above, in the blended learning method, there are two principal components, namely teaching in the conventional way (face to face) and through the medium of e-learning. Blended Learning starts from the advantages contained in the traditional way of learning so that blended learning aims at combining with the advantages that exist in e-learning.

The model that can combine face to face with the method of e-learning in an integrative and systematic is Blended Learning model. Therefore, the blended learning method that combines face to face with the e-learning in an integrative and systematic is expected to make the learning process being effective. In general, the framework in the research development of blended learning teaching model can be seen in the following Figure 1.

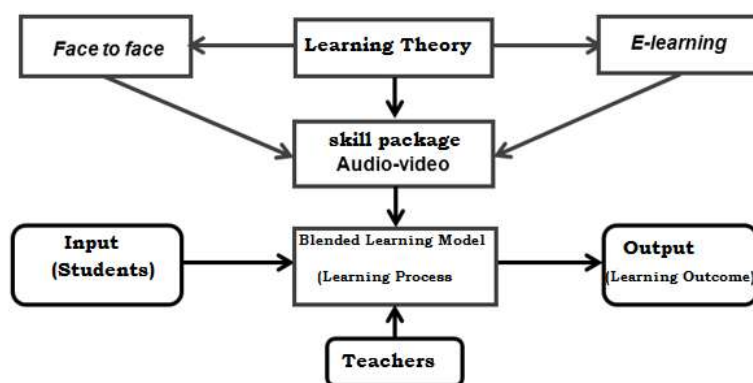


Fig. 1. Conceptual Framework

Efforts to improve the quality of education can be conducted through three dimensions of educational input, educational process, and educational output. Educational input is related to learners who become subject learners. Educational proses cover the means, infrastructure, and learning models. The educational output is the results expected in the learning process or other words it is the learning outcomes of students. The dimension developed in this research is the learning process. This research was conducted through a development model of blended learning in the learning process. The developed model of blended learning is the combination between face to face learning, and e-learning in an integrative and systematic an underlying theory of learning applied learning skills package of audio-video. This blended learning model is expected to provide learning models of Audio-video areas of expertise that are practical and effective which aims at producing the achievement of learning outcomes in the Package Expertise of Audio-video.

II. Research Methods

This study used a quasi-experimental design with a non-equivalent control group design. This study was held at SMKN 2 Makassar and SMKS Kartika Jaya Makassar Wirabuana, conducted from March to April in the academic year 2016/2017. The population in this study is the students in class XI in Odd semester with Audio Video study programs in academic year 2016/2017. The samples were determined using purposive sampling technique with particular consideration. In the determination of this sample, the conformance of schedule subjects becomes the consideration. The samples used in this study were 2 classes in which there were 60 students consisting of 33 students from class XI SMKN 2 Makassar as experimental class and 27 students from SMKS Kartika Jaya Wirabuana as the control class.

To measure the effectiveness of blended learning models, pre-test and post-test in the experimental group and the control group were implemented. The effectiveness of blended learning models can be seen from the average difference between pre-test and post-test in the experimental group and the control group. Testing the significance of differences in mean more than two different groups due to the use of several treatments on an independent variable can be performed with the statistical parametric test using t-test. Before performing statistical parametric tests, the obtained data have the requirements for testing with parametric tests such as normality and homogeneous distribution. If the data meet those requirements, hypothesis test with the parametric test was conducted. However, if the data did not meet the requirements, the hypothesis test was conducted with a non-parametric test.

The research process begins with defining the groups of learners first who are involved in it. The group used a quasi-experimental study refers to the existing classes previously formed well as the control group and the experimental group. In this study, the experimental group applied blended learning model (X-1) while the control group used face to face model (X 2). All the previous group was given a pretest to help to establish their equivalence, before an experimental treatment.

Table 1. Research Design

Group	pre test	Treatment	Post test
Experiment	O ₁	X ₁	O ₂
Control	O ₃	X ₂	O ₄

Notes:

- O 1: The ability of the experimental group before being given treatment
- O 2: The ability of the experimental group after being given treatment
- X 1: Treatment with *Blended Learning* model

- X 2: Treatment with Conventional models of learning (face to face)
- O 3: The ability of the control group before being given treatment
- O 4: The ability of the control group after being given treatment

III. Results

Field testing to know the competence of learning outcome was performed in SMKN 2 Makassar as the experimental group and SMKS Kartika Makassar as group control. Before conducting hypothesis testing, test requirements analysis was carried out. Test requirements analysis is conducted to determine whether the data to be tested meets the requirements to perform hypothesis testing or not. Test requirements analysis carried out are normality and homogeneity testing. Normality testing is a test that aims at determining whether the data in the variables to be analyzed were normally distributed. Good and feasible data to be used in research were the data that have a normal distribution. Normality test is conducted by using the Shapiro-Wilk test. The results of the normality testing can be seen in Table 2.

Table 2. Gain score of Kolmogorov-Smirnov Normality Testing

		Unstandardized Residual
N		16
Normal Parameters ^{a,b}	Mean	0E-7
	Std. Deviation	5.14831901
Most Extreme Differences	Absolute	.190
	Positive	.175
	Negative	-.190
Kolmogorov-Smirnov Z		.759
Asymp. Sig. (2-tailed)		.611

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Table 3. Test Homogeneity Score of Pretest

Levene Statistic	df1	df2	Sig.
.892	3	7	.491

Based on the output of Homogeneity test of variance above, it is known that value significant of pretest in the experimental group based on pretest in control group is $0.491 > 0.05$. It means that the data of pretest in the experimental group based on data of pretest in control group have the same variant.

3.1 Hypothesis testing

The gain value is derived from the difference between the posttest value and the pretest value. Because learning outcomes are the results obtained by learners after learning, the learning outcomes, in this case, is an increase experienced by learners. The normalized gain calculation was used to know the effectiveness of blended learning model in the experimental class and the use of conventional learning media in the control class. The results of the normalized gain calculation (g) in the experimental and control classes can be seen in Table 4.

Table 4. The results of the experimental class gain index and control class index

Class	Pretest	Posttest	Gain	Maximum Score	Gain (g)
Experiment	24.31	45.69	21.38	54	0.53
Control	24.38	39.81	15.44	45	0.41

Based on pretest and posttest value data in the experimental class, the normalized gain value in experimental class is 0.53 and control class is 0.41. Those values are interpreted into the value criterion (g). Therefore, the effectiveness of the blended learning model in the experimental class is moderate.

3.2 Hypothesis

Ho: there are no differences in achievement gain between experimental and control group

Ha: There are differences in achievement gain between experimental and control group

➤ If significant value or sig. (2-tailed) > 0.05, then Ho is accepted and Ha is rejected

➤ If significant value or sig. (2-tailed) < 0.05, then Ho is rejected and Ha is accepted

Hypothesis testing is conducted using *independent sample test*. The results of hypothesis testing using *independent sample t test* can be seen in Table 5 below.

Table 5. Independent Sample T test

Score	Levene's Test for Equality of Variances		t-test Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
Equal variance assumed unequal variance	21001	.000	3.465	30	.002
			3.465	3,007	.002

Based on output Independent sample t-test is obtained sig (2-tailed) of 0.02 < 0.05. Therefore, based on the requirement in deciding to test the independent sample using T-test, then it could be concluded that Ho is rejected and Ha is accepted, which means that there are differences in gain achievements between experimental and group control.

Based on the data of pretest and posttest value in the experimental class, the normalized gain of the experimental class was 21.38, and the control class was 15.44. Those values were interpreted into the value criterion (g), and the effectiveness of the blended model in the experimental class is in the moderate category.

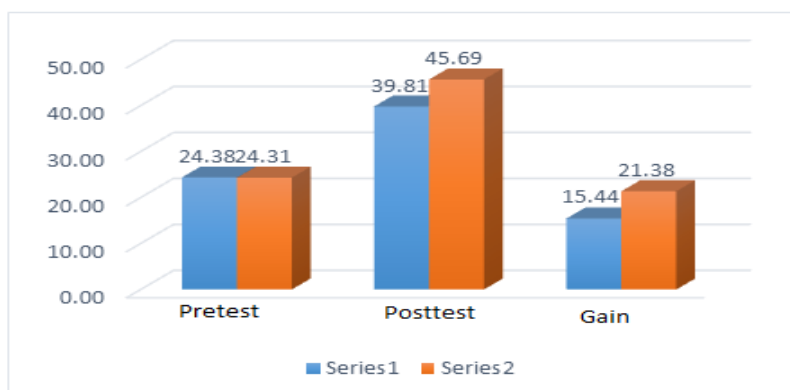


Fig. 2. The gain value of the experimental class and control class

If the gain values between the experimental class and the control class are compared, it can be concluded that the effectiveness of using blended learning model in the experimental class is higher than the control class using the conventional learning model.

IV. Discussion

Learning is effective if it maximally achieves the desired goals, both regarding learning objectives and learning outcomes of students. The findings of this study indicate that the gain value of the experimental class is higher than in the control class. Therefore, the effectiveness of using the blended learning model in the experimental class is higher than in control class which uses conventional learning model. This finding is in line with the research finding of [1] who found that the method of Blended Learning can enhance learning outcomes compared with conventional models. It is also in line with the research which concluded that there are differences in learning outcomes between students taught using blended learning than students taught using conventional teaching. Thus, the blended learning model has more advantages than conventional models regarding learning achievement for the learning package of audio-video. In other words, it can be said that the blended learning model is effective regarding achieving the learning outcomes of the audio-video skill package.

Other findings from this study that the students actively follow the steps of learning based on the syntax of blended learning models. Besides that, there is an enhancement of discussion activities either individually or group. Submitting assignment and using varied learning source are also increased. Therefore, it can be stated that the application of the blended learning model can enhance the learner's activity in the audio-video as learning package. This is in line with the research finding of [6] who stated that the model of blended learning is more stimulating learners to play an active role and develop the ability to think with their challenging

problems in learning activities, so that students who used this model can produce much of a problem-solving strategy than the students who use direct instructional model (conventional models).

According to constructivism view, the objective of learning will be achieved, if the students actively build knowledge in learning. Therefore, effectiveness is also influenced by the activities of learners in learning. It is in line with the opinion of [7] which states that learning is said to be effective if learners are actively involved in organizing and finding information (knowledge) as well as linkage of information provided.

The students do not passively receive the knowledge provided by the teacher. Learning outcomes like this not only improve the understanding and competence of learners but also improve their thinking skills. How the involvement of learners organizes lessons and knowledge needs to be thought in learning. Therefore, the more active learners, the greater the competence of learning achievement, and it makes effective learning.

In addition, the learning is effective if it maximally achieves the desired goal, both in terms of learning objectives and learning outcomes of students. When the gain value is compared to experimental and control class, it can be concluded that the effectiveness of using e-learning media in experimental class is higher than control class using conventional learning media. Based on results of validity testing, practicality testing, and effectiveness testing, then the final product of blended learning model in vocational high school is successfully produced based on the results of field testing.

V. Conclusion

Based on the results and discussion, it can be concluded that the results of an engineering study audio system using a model of Blended Learning Audio-video is higher than students who use conventional learning. Blended Learning Model Audio-video in audio systems engineering subjects in vocational schools meet the efficiency criteria. It is indicated by the attainment of learning outcomes of students.

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