

The Effectiveness of Blended Learning as an Instructional Model in Vocational High School

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ABSTRACT

The purpose of this research was to evaluate the effectiveness of blended learning as an instructional model in vocational high school. The method used was a Quasy Experimental with Nonequivalent Control Group Design. Students are divided into two groups: an experimental group is a group of students that use blended learning model and control group with conventional learning models. Data were collected by achievement test in the form of an objective matter than do the test requirements analysis in the form of normality test, homogeneity test, and t-test. The results showed that 1) the results of student learning experimental group was higher than the results of student learning control group, 2) improving student learning outcomes in the experimental group was higher than the control group, 3) The completeness of student learning outcomes after using blended learning models reach the set limit. Based on the findings of the study, concluded that the blended learning model is effective to be used as an instructional model.

Keywords: *blended learning; instructional model; vocational.*

INTRODUCTION

Instructional model is one important component that can affect the effectiveness and efficiency a learning process. Instructional models used by teachers should be able to meet the demands of various aspects so that learning objectives can be met. Instructional model or also known as learning model should also be able to encourage students to be more active in teaching and learning process to realize student-centered learning.

In particular, the term model is defined as a conceptual framework used as a guide in conducting an activity. The instructional model refers to the learning approaches to be used, including the teaching objectives, the stages in the learning activities, the learning environment, and the management of the class. Prawiradilaga

(2009: 33) says "The model can be interpreted as a graphical display, work procedures are regular or systematic, and contain the thought of a description or explanation following suggestions. Winataputra (2005: 3) mentions that "Instructional model is a conceptual framework that describes a systematic procedure in managing learning experiences to realize certain learning goals and serves as a guide for learning designers and teachers in planning and implementing learning activities".

The sophistication of Information and Communication Technology (ICT) has given a different nuance in the learning process. Conventional learning is no longer entirely a mainstay, but in the midst of technological advances, today required a variety of methods that provide more opportunities to learn by utilizing various sources, not just from

manpower as well as teachers. Utilization of Information Technology in learning is slowly changing the paradigm of teacher-centered learning into student-centered learning. As mentioned Kusairi (2011: 1) that teacher-centered learning is perceived as irrelevant to the rapid development of information so that it needs to be modified.

Utilization of technology in education that has an important role should be applied to the learning process. But in reality, there is still a learning process that is done by emphasizing the method of lecturing and memorizing so that the students have less experience in absorbing information in the learning process. At the same time, demands and civilizations have changed from the analog world to the digital dimension.

Learning with this pattern has some disadvantages such as limited and insufficient face-to-face learning time for teachers to provide all material to students, so materials that require lengthy deliberations should be explained in a short period of time. In addition, the process of learning that takes place tends to seem monotonous because face-to-face learning in the class more using lecture methods and has not been varied with other learning methods.

Another fact that is often found is the learning process that is still centered on the teacher (teacher centered) where the teacher is active, which makes himself as a source of learning, while students tend to be passive because only rely on teachers during face-to-face meetings to get the subject matter. In fact, in the learning process, students who attend the learning actually need to have the initial knowledge and do not start from zero. Of course, this kind of learning model will have an impact on student achievement.

Information technology-based learning comes as a form of technology utilization in education and teaching systems. One of them with the presence of internet technology that can be used in learning. Mutaqin (2016: 136) said that the benefits of the internet in the world of education that can be as an access to information and human sources and as a medium of learning. For the world of education, the large use of the Internet is a potential and solution for the development of learning with the online system so that global demands for education can be fulfilled.

One form of utilization of internet technology to support the learning process is

online learning (e-learning). Kahiigi (2012: 68) says that e-learning provides facilities for more active communication between students and teachers without limited of space and time so that students have more opportunities to improve their achievements through knowledge sharing, improved cognitive understanding and learning experience. According to Budhiarti (2015: 141), e-learning can give new shades in education that had only centered on the teacher. E-learning as a medium has a very high flexibility, meaning that students can access materials at any time and repeatedly and access information widely anytime and anywhere.

But learning is not only based on technology because learning is essentially more on the process of interaction between teachers, students, and learning resources. As the opinion of Sukmadinata (2007: 208) which states that although e-learning learning has several advantages, it cannot replace learning in school. In other words that face-to-face process is important and should not be left behind in learning.

Learning using e-learning, the result is not in accordance with what is expected. There are still many deficiencies that make obstacles in applying e-learning. As found by Bersin (2004: 12) that not all learning can be done with the web. Sneeze (2004: 12), the discovery of the weaknesses of e-learning resulted in the innovative mixing of face-to-face learning and web learning that became known as blended learning.

Learning interaction should occur when a teacher is directly able to provide guidance and observe the learning process that occurs and is done by the students. If online learning is applied in full regardless of the nature of learning then students will only be accompanied by computers and teachers only guiding from a distance, this is certainly wrong. Teachers have a responsibility to get students to learn. Given both the face-to-face learning and online learning have their respective advantages, then by integrating (blending) both in an integrative and systematic in the learning process is expected to provide better results.

Blended learning, according to Smaldino (2008: 44) is a hybrid learning, which is mixing and learning arrangements are varied to fit appropriately to meet the learning needs of learners. The purpose of blended learning is to combine the best features of classroom learning

(face-to-face) and the best characteristics of online learning to improve the quality of learning. Hidayati (2013: 38) mentions that blended learning consists of several understandings that are 1) integration of traditional learning with web-based approach online; 2) a combination of media and equipment (eg textbooks) used in e-learning environments, and 3) a combination of a number of teaching and learning approaches regardless of the technology used.

Blended learning combines the best of online learning and face-to-face learning. Yusuf (2011: 235) states that on learning face to face and online learning there are advantages and disadvantages of each, so that if these two models are combined then the potential to strengthen each other and minimize the weakness. Vernadakis (2012: 440) in his research found that blended learning is one alternative learning model that should be developed by teachers because it can help students improve their achievement in learning.

The integration of traditional learning and online learning in blended learning can be combined ideally by mixing the advantages of both aspects of learning (Akkoyunlu, 2008: 185; deNoyelles, 2016: 140). Electronic learning has a high degree of flexibility and efficiency while the traditional learning that takes place in the classroom has a pre-eminence in the social interactions needed in learning.

With the help of internet technology, teachers can optimize the allocation of face-to-face learning time is relatively short. In addition, by looking at the potential of the internet and the ability of students in accessing the internet is expected with a learning model that combines online learning and face to face make learning more interesting for students so as to improve student learning outcomes themselves. Blended learning contributes greatly to the achievement of student learning outcomes (Yapici, 2012: 235; Lee, 2016: 216; Mutakhin, 2015: 140; Ceylan, 2017: 308).

Effective means there is an effect or can bring results (Big Indonesian Dictionary, 2002). Effectiveness is a measure that illustrates how far a target can be achieved. While the product is called effective if the product gives results in accordance with the goals set by the developer (Asikin and Cahyono, 2004). Effectiveness in this research relates to the impact of blended learning on student achievement. Based on the

above description, the purpose of this study is to measure the effectiveness of the blended learning model as an instructional model on Basic Network subjects at SMK Negeri 1 Lintau Buo.

METHODS

The research method used in this research is Quasi-Experimental Design. While the research design used is Nonequivalent Control Group Design. The subjects of the study were the students of class X IT at SMK Negeri 1 Lintau Buo which were divided into two groups: experimental group and control group. An experimental group is a group of students who study with blended learning model, while the control group with conventional learning model. The instrument used to measure the effectiveness of the blended learning model is the result of learning test as much as 30 of objective items. This test is in accordance with the material given during the treatment. Data collection is done by giving pretest and posttest to the experimental group and control group students by using the questions made for the purpose and checking the test results given. The pretest and posttest questions use the same questions with the intent to know the improvement of student learning outcomes after getting treatment. To avoid the bias, after pretest the instrument was gathered again and no discussion was made. In addition, the use of the same questions is not notified to the students.

Before the test is given, a trial test to determine the validity, reliability, and level of difficulty of the question is conducted. Testing the validity of test instruments is done by comparing the instrument with the material that has been taught. Technically, it conducted by making the instrument outline then to find out the questions used, analyzed by finding the level of difficulty, reliability, and the difference index. Of all the questions that have been tested and analyzed, obtained the result that the 3 questions are categorized as difficult, 28 the questions are classified as moderate criteria and 9 questions are categorized as an easy category. Of all the questions that have been tested, it was obtained that the 3 categories of a good category, 27 questions enough category, 6 questions ugly category and 4 negative category questions. The result of the analysis and based on the interpretation of r-value, it can be seen

that the test has a high test reliability level that is 0.68. So from the analysis of 40 test questions, there are 10 unused questions because they do not fulfill the requirements, so the number of test questions used in the experimental class and control class is 30 questions.

Analysis of the effectiveness of the use of blended learning model is determined by looking at the comparison of student learning outcomes of both groups. Then also see the improvement of learning outcomes of both groups of samples. The increase in question is the difference between the pretest and posttest values. If the improvement of student learning outcomes in the experimental group is higher than the increase of student learning outcomes in the control group then it can be said to be effective. Furthermore, for significance testing can be done by doing a t-test (Sugiyono, 2012: 304). Before doing t-test first tested normality and homogeneity test.

Effectiveness analysis is also determined by looking at the achievement of student learning outcomes. Learning result data can be tested individually after using blended learning model compared with minimum criteria of completeness. If 85% of students pass the minimum criteria then it can be effective.

RESULTS AND DISCUSSION

Results

Data collections to see the effectiveness of

blended learning using the test results given to the two sample groups were experimental class and control class. Instrument test result of learning is multiple choices as many as 30 items.

Furthermore, to see the effectiveness of the blended learning model on the basic network subjects is arranged by conducting the test of learning outcomes established at the beginning (pretest) and the end of learning (posttest) to the two sample groups. Both of these test results are then compared to see the effectiveness of the applied blended learning model.

In the beginning, both groups were given pretest to determine the initial ability of the students. Based on the pretest, the mean score of the experimental group was 61.0 while the control group average score was 60.6. From the pretest results, then t-test was held to see whether the two sample groups have the same ability.

The result of normality analysis using Shapiro Wilk test on SPSS obtained the sig value of both groups greater than 0.05 where the control group pretest is 0.084 and the experimental group sig value is 0.147 so that it can be concluded that both groups are normally distributed. Furthermore, the results of homogeneity test calculations obtained $F_{count} \leq F_{table}$ ($1.30 \leq 2.40$). Thus it can be concluded that the research group data is homogeneous. To prove it then t-test is conducted. The result of pretest t-test of both groups can be seen in table 1:

Table 1 Result of t test of Pretest value

t-Test: Two-Sample Assuming Equal Variances		
	<i>eksperimen</i>	<i>Kontrol</i>
Mean	61.0	60.6
Variance	32.197	41.812
Observations	16.000	16.000
Pooled Variance	37.005	
Hypothesized Mean Difference	0.000	
Df	30.000	
t Stat	0.198	
P(T<=t) one-tail	0.422	
t Critical one-tail	1.697	
P(T<=t) two-tail	0.845	
t Critical two-tail	2.042	

Based on table 1 can be seen t count is 0.198 and t critic is 2.042 then result from t count smaller than t critic, so H_0 accepted and H_a rejected. It can be concluded that there is no significant difference between control group learning outcomes and experimental group. In other words, both groups have the same initial ability.

After knowing the two groups have the same initial ability, both groups were given different treatment, where the experimental group used blended learning model and control group using conventional learning model. After giving treatment in each sample then the final test (posttest) is arranged. The purpose of the final test in this study is to know the difference between the results of student tests using blended

learning model and the results of student tests using conventional learning model.

From the posttest result, the average of experimental group learning outcomes was 83.5 and the mean of control group learning outcome was 76.2. The result of normality analysis of posttest data obtained sig value of both groups greater than 0,05 where posttest of control group equal to 0,327 and experimental group sig value equal to 0,295 so that can be concluded both groups is a normal distribution. Homogeneity test results obtained $F_{count} \leq F_{table}$ ($1.22 < 2.40$). Thus it can be concluded that the research group data is homogeneous. The result of t-test for difference of learning result of both groups can be seen in table 2:

Table 2 Result of t test of Posstest value

t-Test: Two-Sample Assuming Equal Variances		
	<i>eksperimen</i>	<i>Kontrol</i>
Mean	83.5	76.2
Variance	45.037	36.905
Observations	16	16
Pooled Variance	40.971	
Hypothesized Mean Difference	0	
Df	30	
t Stat	3.217	
P(T<=t) one-tail	0.002	
t Critical one-tail	1.697	
P(T<=t) two-tail	0.003	
t Critical two-tail	2.042	

Based on table 2 can be seen t count is 3.217 and t critic is 2.042 then t count is higher than t critic, so H_0 is rejected and H_a accepted. It can be concluded that there is a significant difference between the learning outcomes of the control group and the experimental group.

Further effectiveness is seen from the improvement of student learning outcomes. Based on the test of learning result there is an improvement of student learning outcomes in both sample groups, but the increase of student learning outcomes in the experimental group is higher that is 22,5 compared to the improvement

of student learning outcomes in control group with the increase of 15,6. The increase in question is the difference between the initial and final test scores. Thus it can be concluded that the effective blended learning model is used as a learning model.

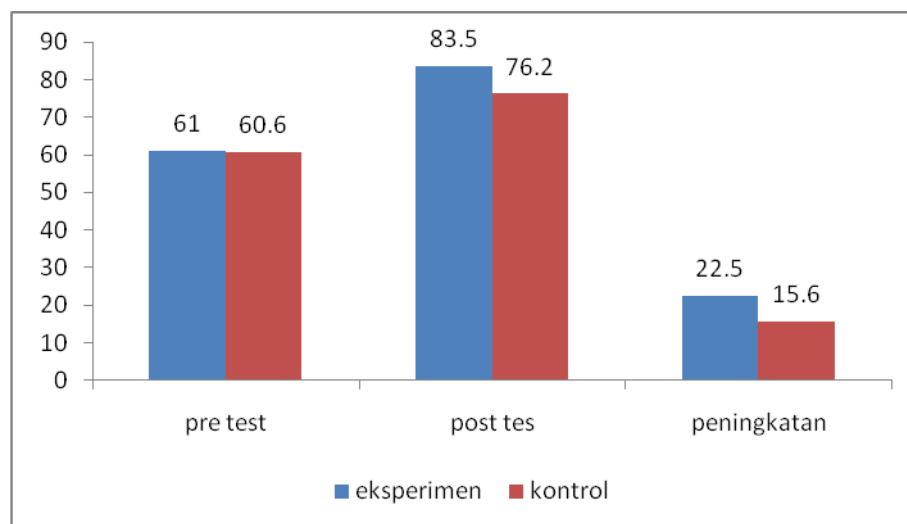
In addition to observing differences in learning outcomes between groups using blended learning models and groups not using blended learning models, the t-test on the gain score was also used to prove the effectiveness of the blended learning model, the result of the t-test for the gain score can be seen in table 3:

Table 3 Result of t test value of Gain Score

t-Test: Two-Sample Assuming Unequal Variances		
	<i>eksperimen</i>	<i>Control</i>
Mean	22.48	15.64
Variance	13.89	5.47
Observations	16	16
Hypothesized Mean Difference	0	
Df	25	
t Stat	6.222	
P(T<=t) one-tail	0.000	
t Critical one-tail	1.708	
P(T<=t) two-tail	0.000	
t Critical two-tail	2.060	

Based on table 3 can be seen t count is 6.222 and t critic is 2.06. Then the result of t count is greater than t critic, so H_0 is rejected and H_a accepted. It can be concluded that there is a significant difference between the

improvement of group learning outcomes using blended learning model with groups that do not use a blended learning model. In summary, the students' learning outcomes in both sample groups are presented in Figure

**Figure 1** Graph the average student learning

The effectiveness test of the blended learning model also done by comparing the students' learning result with minimum completeness criteria. Minimum Criteria for completeness for basic network subjects is 75. Based on data of student learning outcomes from 16 students, there are 14 students with the

value minimum completeness criteria and 2 students with the value below Minimum Criteria for completeness. Thus the percentage of students who reach the Minimum Criteria for completeness is 87.5%. So it can be concluded that the effective blended learning model to improve student learning outcomes.

Discussion

In blended learning model, students can learn anytime and anywhere. Students can also access the material over and over, do the exercises and discuss and communicate with the teacher outside the face-to-face learning hours with the internet network. In the blended learning model, students get more learning materials, because they are obtained both online and face-to-face learning. Students play a more active role in learning and teachers can use face-to-face lessons effectively, as part of the delivery of the material has been done online. Learning that goes like this certainly contributes positively to the learning result.

The use of blended learning models contributes positively to student learning outcomes. In this learning model, the delivery of the material can be done through online learning so that face-to-face learning can run effectively and efficiently. This is in accordance with the opinion of Husamah (2014: 20) that by combining face-to-face learning and online learning can be achieved maximum learning.

In this study, online learning blended learning model is built using the Learning Management System (LMS) Moodle which features a complete and has a user-friendly appearance. Rusman (2011: 248) explains some advantages of blended learning with Learning Management System that can increase the level of interaction between students and teachers, allowing interaction anywhere and anytime, reaching learners with a wide scope and facilitate the delivery and storage of teaching materials.

The effectiveness of blended learning model in this research is measured by three criteria. The first uses the difference in posttest results of both sample groups which gives results that there are significant differences in learning outcomes in both groups where the experimental group learning outcomes are higher than the control group. Relevant research result that is research of Syarif (2012) about the influence of application of blended learning model on KKPI subjects in SMK Negeri 1 Paringin give the result that there is an improvement of motivation and result of student learning by using blended learning model. Excess relevant research is that testing is not only done limited to student learning outcomes but also done to measure the increase in student

learning motivation. The drawback is that the research did not test the validity of the online learning medium used. The advantages of this blended learning effectiveness research compared with the above relevant research is in this study conducted trials of validity before the trial run.

Second, the effectiveness of the blended learning model is also seen from the significance of improving student learning outcomes in both groups of samples. The result of the analysis showed that there were significant differences in the improvement of the students' learning outcomes in both groups where the improvement of students' learning outcomes in the experimental group was higher than the improvement of the students' learning outcomes in the control group. Similar research results have also been found by Sjukur (2012) in his research on the influence of blended learning on learning motivation and student learning outcomes of SMK level. His research shows that the blended learning model proved to be effective in terms of improving student learning outcomes. Kurniati's research (2014) on the development of blended learning model in Computer Science and Information Management (KKPI) Class XI at SMKN 2 Purwodadi gave the result that blended learning model development was effective in terms of learning outcomes and students' activeness and motivation improvement.

Furthermore, the effectiveness of the blended learning model is also seen from the completeness of student learning outcomes in a classical. From the data obtained concluded that 87.5% of student learning outcomes have reached the limit of Minimum Exhaustiveness Criteria set. So that student learning outcomes in classical have reached the limit set is as much as 85%.

Another relevant research is Rahmi's research on the development of blended learning model for DPBK subjects at the State University of Padang. The results of his research indicate that the blended learning model is effective to achieve the learning objectives set previously. Kusni (2008) study on the implementation of the blended learning system in Ae3121 Mechanical Vibration at Aeronautics and Astronautics Study Program of Faculty of Mechanical Engineering and Aerospace of ITB shows that blended learning model gives the positive contribution to the implementation of the learning process in

AE3121 Mechanical Vibration in Aeronautics Study Program and Astronautics FTMDITB. This model incorporates face-to-face learning in the classroom with the web system via the internet outside the classroom as well as with the practice system, which allows increasing the quantity and quality of interaction between lecturers and students, hence the problem of overcrowding of lecture material can be overcome. In the implementation of blended learning here also includes practicum activities as a way to achieve learning objectives.

The application of blended learning model is also done by Basori (2010) in his research about improving the quality of learning of Chasis and Body course with blended learning model in Mechanical Engineering Education Program of FKIP UNS. This type of research uses class action research in order to know the effectiveness of blended learning on the quality of learning conducted between lecturers and students. In particular, this study aims to determine the quality of learning on the components: (1) the quality of student learning; (2) the ability of lecturer; (3) climate/learning atmosphere; (4) teaching materials; (5) learning media. The result of the research shows: (1) there is improvement of student's learning quality (2) there is improvement of lecturer's ability in KBM process (3) the learning climate becomes more conducive (4) the learning material happened quality improvement and relevant to stakeholder (5) the quality of learning media including very high category.

Further research Aytac (2009: 538) which concluded that the use of blended learning can increase learning activities. The effectiveness test on the relevant research is done with the essay test instrument at the end of the lesson. Based on the above explanation of the use of blended learning as a learning model provides an innovation that can add learning experiences for learners so that impact on the learning outcomes they earn. This learning model also improves students' skills in using technology so that they can adapt and respond to the demands of the times. From the above description, it is concluded that learning using blended learning model can provide a meaningful role in improving the quality of learning.

CONCLUSION AND SUGGESTION

Based on the results of the study found that the results of student learning using blended learning is higher than student learning outcomes without using blended learning. The improvement of students' learning outcomes in the experimental group is higher than the improvement of student learning outcomes in the control group. Completeness of student learning outcomes after using the blended learning model in classical reach 87.5%. So it can be concluded that effective blended learning is used as a learning model.

It is suggested for teachers to use this blended learning as an alternative learning model to help streamline the relatively little face-to-face learning time and to help improve student learning outcomes.

This research is still limited to the addressing protocol competence in the subjects of Basic Network Class X SMK, it is expected that further research is done for other materials and can be developed also for other subjects.

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