The effect of blended learning model on senior high school students' achievement

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Abstract. The purpose of this research was to determine the effect of blended learning model on senior high school students' achievement. This study used experimental research method with randomized control group pretest-posttest design. The study was carried out with 63 students attending information and communication technology course, where 31 of whom were in the experimental group and 32 of whom were in the control group. In the experimental group, teacher used blended learning as instructional model, while in the control group, the course was taught based on traditional teaching model. Data collected from the result of learning objective test with 35 questions. The research showed that the learning result of experimental group is higher than the learning result of control group. Based on the result of this research, it can be concluded that the blended learning model contributed more to the students' achievement.
Keywords: blended learning, instructional model, students' achievement

1 Introduction

Instructional model is an important component that can affect the effectiveness and efficiency of teaching and learning process. An instructional model serves a good master plan for teaching. Besides, it is also a conceptual framework which describes a systematic procedure in organizing learning experiences to achieve certain learning goals and serves as a guide for the teachers in planning and implementing learning activities [1]. To implement an instructional model, the teachers provide various learning aspects to achieve learning objectives [2,3]. Furthermore, instructional model encourages students to get involve in teaching and learning process. By doing that, student centered learning can be realized.

The rapid development of Information and Communication Technology (ICT) gives different views in the learning process. Conventional or traditional learning is no longer used by the teacher. The teachers are required to use a variety of methods that provide more opportunities to learn by utilizing various sources. The implementation of ICT in learning may change the teacher paradigm of learning from teacher centered learning into student centered learning [4].

The use of technology in education has an important role and it should be applied in the learning system. On the other hand, there is still a learning process which is done by

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emphasizing the method of lecturing and memorizing. By using this old method, the students have less experience in getting information in the learning activities. Information technology-based learning is one of technology utilization in education and teaching systems. One of the technologies that can be implemented is internet. In this globalization era, it is easy for the teacher and the students to find the internet connection because of spread of computer and the existences of internet connection [5].

Internet technology supports the learning process through online learning (e-learning). E-learning is distant learning environments in which internet and network technologies are used for presenting and receiving the content used [6]. E-learning ensures the flexibility and efficiency which cannot be found in classroom environment. It is allowed the student to learn everywhere and every time.

Moreover, learning is not only based on technology but also it is a process of interaction between teachers, students and learning resources. That is not all learning can be done by online environment [7]. Although e-learning has several advantages, there is also several limitation of online learning environment. It cannot replace learning in the classroom. Face to face learning provides the social interaction which is needed for learning. In other words, face-to-face processes are important and it should not be left behind in learning [5,8,9].

The two instructional models, online and traditional (face to face) model have several advantages and disadvantages. It is better to the teacher to combine the two teaching models. The combination of e-learning and traditional face to face learning may integrate in teaching and learning process [10,11]. It is known as blended learning.

Blended learning is the combination of traditional (face-to-face) and online learning so that instruction occurs both in the classroom and online [11,12,13]. Blended learning integrates the advantages of online learning with some advantages of face to face learning. Then, it maximizes the efficiency of classroom training and provides better reinforcement in the web-based elements. Through blended learning, the students had prepared for the course in the classroom and it can be more efficient because the students may discuss with their teachers and their friend that they could not do during classroom interaction [5].

Because it combines the two advantages of instructional models, blended learning has positive impact to the learning process. Some researchers stated that blended learning can enhance students' learning outcomes, improve students' motivation, and it is effective way for achieving learning objectives [4,5,14,15]. Blended learning also spends lower cost for training and it may enhance the students' learning experience [16,17].

On the other hand, the formula for organizing a well blended learning course is not easy. The teachers encourage to re-think and redesign courses that afford students more, and it requires to the teacher to practice how to teach by using blended learning in the classroom to get the good result [18,19,20]. In short, applying the blended learning as instructional model will take the teachers' serious effort in order to get maximum benefit.

Recently, the use of blended learning as a learning model has increased especially in colleges. However, this learning model also can be used in high schools. This study tried to determine the effect of blended learning model on senior high school students' achievement.

2 Method

In this study applied experimental method. The randomized control group pretest-posttest design was used. Students were divided into two groups, experimental group and control group. Both of the groups were given different treatment. In experimental group teacher used blended learning model (part online, part face to face), while in control group traditional learning model was used.

In the experimental group, students were informed about blended learning and they were introduced how to use online learning. Online learning (available at http://elearningsman1lintau.com) was designed by using Moodle, a Learning Management System (LMS). In this web, before login to the system, students have to register themselves by creating an account on e-learning web as in Figure 1 below

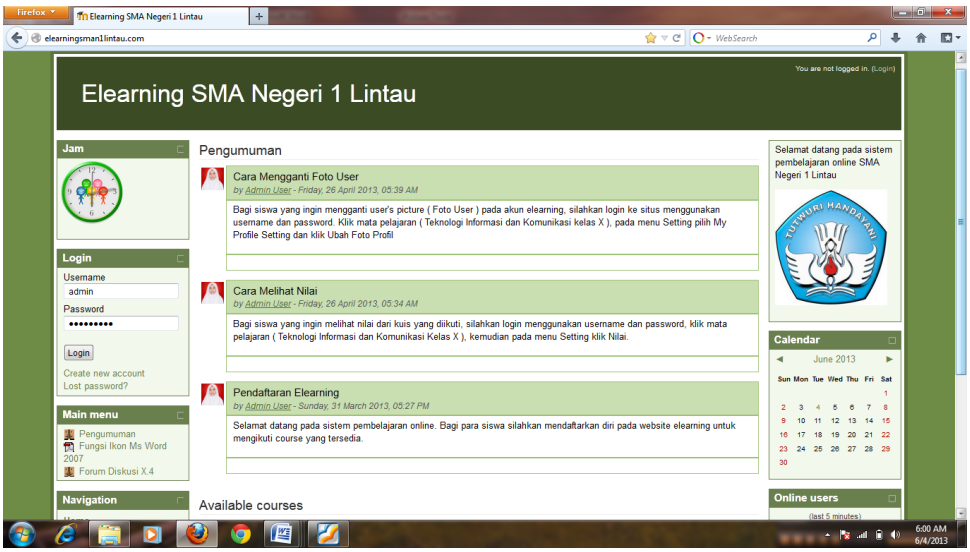

Fig. 1. Homepage screen of online learning

To follow up learning activities, students were asked to login by using their own account. Online learning was design to support face to face learning. In this online learning teacher may give lesson materials, quizzes, assignments and discussion forum. Then, students can follow all the learning activities provided by teacher on the web page.

The population in this study consisted of all of students enrolled in the information and communication technology course at the first grade of SMA Negeri 1 Lintau Buo 2012/2013 academic year. Selecting of sample used random sampling technique. There were 31 students in the experimental group and 32 students in the control group.

Objective test as research instrument in form of multiple choices was conducted to collect data. Before the tests were given, a trial test including 50 questions was established. After analyzing the question items which include the validity, difficulty index, discrimination index and reliability, there were 35 questions were used to achievement test. Then, both groups were given the same pretest and data obtained were analyzed to look at the students' initial ability. Furthermore, each group was treated differently. At the end of the learning both two groups will equally given posttest to see the results of the learning model that has been given. The data obtained were analyzed to know the normality and homogeneity. Finally, a t-test for independent samples was conducted.

3 Result and discussion

Based on the test were given to both of the sample groups, the average of learning outcomes in experimental group was 57.8 for pretest and 82.5 for posttest. While in control group the average scores was 58.3 for pretest and 72.9 for posttest. Those result can be seen in Figure 2.

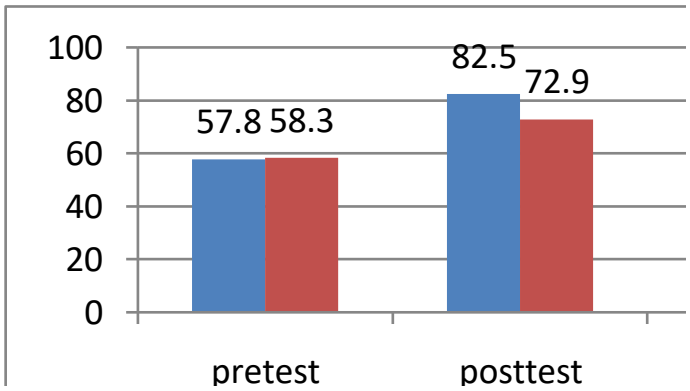

Fig. 2. Student learning outcomes

To investigate the effect of blended learning model in terms of students' achievement, in comparison to traditional instruction, this study conducted a t-test analysis for independent sample.

Hypothesis test was established to scores of pretest. The findings obtained are presented in Table 1 below

Table 1. The result of independent t test for pretest

Groups	**N**	$\bar{x}$	**Sd**	**df**	**t**	**sig**
Experimental	31	57.8	6.340	61	-301	0.764
Control	32	58.3	7.215			

Based on the result on the table above, it can be interpreted that there was no significant difference ($t_{(61)}$=-301, sig >0.05) between the experimental group and control group scores. It states that the students in the experimental group and control group had similar levels of knowledge.

At the end of application, the posttest score of the two groups were analyzed. The finding was obtained and it is presented in Table 2 below:

Table 2. The result of independent t test for posttest

Groups	**N**	$\bar{x}$	**Sd**	**df**	**T**	**sig**
Experimental	31	82.5	6.117	61	5.657	0.000
Control	32	72.9	7.328			

From the table above, it shows that there was a significant difference ($t_{(61)}$=-5.657, sig <0.05) between score of the experimental group and control group. It can be concluded that the students in the experimental group had higher levels of learning achievement than control group.

The present study was to determine the effect of blended learning on senior high school students' achievement. In this instructional model, learning activities can be done by online and face to face learning, it takes advantages of both two teaching models. By combining these two models, efficient learning can be achieved [21,22,23]. In this study, the submission of material was done through online learning so that face-to-face learning can run effectively and efficiently. Learning can be done anytime and anywhere. It also reduces instructors' workloads and they have more time to work with other material. Furthermore, blended learning helps the students in achieving learning objectives. This result is similar with the resembles studies [19,20].

Blended learning model encourages students to learn more actively. They have opportunity to learn on their own pace. They can prepare themselves for the course before coming to the class and it can realize student centered learning and reflect the value of 21 century education [5,23,24,25]. The research indicated that student who attended blended learning course had higher achievement scores than those who attended traditional teaching. The survey results are in line with other researchers [4,14], who also argued that blended learning effective for increasing students' performance. Most of those studies also found that blended learning improves the academic achievement averages [15,16,26].

The present study was not only give a concern about how to balance the online learning and face to face learning, but also give attention to content to be provided. Blended learning can help teachers to provide several formats of learning material [21]. Then, it can increase student motivation and they can get new experience on learning process. The other relevant study also stated that blended learning can help for enhancing students' motivation [19,24,27]. In this research, content was presented in various formats such as text and also video format. Each learning topic was provided with a quiz as an evaluation. Last, discussion forums were also available as a communication and sharing media between teachers and students and among fellow students.

4 Conclusion

The aim of recent study was to determine the effect of blended learning model on students' achievement. The scores obtained from the learning objective test that applied to the experimental and control group were compared. There is a difference to the learning outcomes of students, where the average learning results of experimental class is higher than control class. The other finding was found that there is a significant increment in student learning outcomes on information and communication technology subjects after using blended learning. Based on the research finding, revealed that the blended learning model contributed more to students' achievement than traditional learning model did. Blended learning can be used as an alternative learning model for teachers in order to support students' learning achievement. To implement this model, teachers should develop their computer and internet literacy rate. School has the important rule to provide training or workshop for the teachers in applying this model. This research is still limited to information and communication subject, it is hoped that further research will be conducted for other courses and also it is suggested to give a concern about how to blend professionally between face to face and online instruction.

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