THE IMPLEMENTATION OF BLENDED LEARNING MODEL AT ELECTRICAL MACHINES SUBJECT IN ELECTRICAL DEPARTMENT FAKULTAS TEKNIK UNIVERSITAS NEGERI PADANG

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Abstract
The purposed of this research is to find the difference of the learning outcomes by using blended learning model and conventional teaching and learning at Electrical Machines subject for student in Electrical Department, Technical Faculty University of Padang. The type of the research is quasi experiment. The subject in this research is all students of electrical department, which is amounted to 64 students. The first class 3La is experimental group while the second class 3Lb is control group. The class finding is being held by randomly from classes that had been formed. Data are collected by objective test. The question of the test based on lattice question refers to the syllabus and learning of the implementation plan of Electrical Machines subject. The results of this research also shown that there are significant differences from student grade in experimental group and control group, where average grade of experimental class is 80,87, while average grade of control class is 74,37. Statistical analysis t-test is used to answer the research of hypothesis, the results of the t-test obtained the t_{value} (2,436)> t_{table} (2,03) at 0,05 significance level. The meaning is there are differences in the learning outcomes of this study by using blended learning model and conventional learning model at Electrical Machines subject for student in Electrical Department, Technical Faculty Padang State University.

Key word: Blended Learning, learning outcomes..

Introduction
E-Learning is a teaching and distance learning that utilizes computer technology, computer network and/or Internet. E-Learning enables learners to learn through computers in their own place without being physically have to go to follow the lesson/lecture at the classroom. E-Learning is also understood as a form of web-based teaching and learning that is accessible from an intranet in a local network or the internet. Actually, e-Learning materials is not necessary distributed on-line either through a local network or the internet, the off-line distribution uses any dense disc media is also e-Learning patterns. In this case, the application and learning materials is developed according to the purposes and disseminated through the media. Then, the learners are able to use the compact disc and study at the place where they reside.
In implementing e-Learning there were lot of challenges faced, some of them were the loss of education nuance happened between educators and students because the key points in e-Learning is the teaching and learning. Therefore, it is required an e-Learning implementation method which can support the conventional teaching and learning. Thus, appeared a model of e-Learning named as Blended Learning (Romi, 2007). This model adopts the implementation of e-Learning model into the conventional teaching and learning model or vice versa the conventional model is adopted into e-Learning model.

![Figure 1. The Implementation of E-Learning Model (source: Romi, 2007)](image)

Blended learning or the hybrid teaching and learning has been become increasingly important in higher education because it has the advantage of web-based teaching and learning, as well as the traditional one. Generally, blended learning means the programs that generate some combinations of web-based teaching and learning and conventional teaching and learning (Owston 2008; Singh 2003; Voci and Young 2001; Wall, Ahmed and Smit 2006). However, to make it meaningful, blended learning should be the result of wise integration between conventional teaching and learning and a blended learning experience (Garrison and Kanuka 2004). Therefore, it is important to distinguish blended learning from web-based teaching and learning that is supported by the learning process and full web-based teaching and learning.
As described by Krause (2008):

*Blended learning is realized in teaching and learning environments where there is an effective integration of different modes of delivery, models of teaching and styles of learning as a result of adopting a strategic and systematic approach to the use of technology combined with the best features of face to face interaction.*

Models of blended learning are gaining widespread acceptance globally but a generally accepted definition has not emerged yet. Scholars outside of education have approached the meaning of blended learning from a scientific angle, drawing on its title’s connection to biology and botany. Sands (2002) for example, noted that since the word hybrid, refers to the offspring of two different genetically dissimilar parents, teaching and learning in this framework must also involve the successful joining of opposing parts online and face-to-face methodologies. Osguthorpe and Graham (2003: 227) described blended models as “pedagogies that change according to the unique needs of learners. Those who use blended learning environments are trying to maximize the benefits of both face-to-face and online methods using the web for what it does best and using class time for what it does best.” There are numerous definitions of blended learning at the course level. According to Rossett (Graham at al., 2003), “Blended learning is the use of two or more distinct methods of training.” House (Graham et al., 2003) stated that blended learning is “…training delivered by a combination of methods.” Blended learning is a method for organizing the learning environment facilitated by effective combination of different modes of delivery, models of teaching and styles of
learning, and is founded on transparent communication amongst all parties involved in a course (Heinze and Procter, 2006)

Blended learning is embodied in the process of teaching and learning environment in which there is an effective integration of various modes of delivery, teaching model and learning styles as a result of adopting a systematic and strategy approach with the usage of technology and it was combined with the best features of face-to face interaction.

In other words, blended learning is an effective combination of face to face teaching and learning that utilizes web-based technology. In order to achieve this model, the academic has to decide which content will be moved to the web-based teaching and learning and how it will be presented, and it certainly requires technical proficiency in creating the documents. It has also been argued that the study results will increase when the dynamics of a rich, fast information technology which is seriously integrated with traditional teaching and learning.

As stated by Steinberg (2004), online teaching and learning is not only advances in technology in teaching and learning, but also it is a new business model that is more competitive for higher education. In accommodating the different needs of students, further higher education institutions that combine the web sites in their programs by providing teaching and learning materials, having a podcast for learners who choose to listen to at their own convenience, using email and discussion forum for in-depth information, as well as using the internet for the delivery of tasks and feedback.

Based on literature studies, blended learning seems to be more effective than other forms of teaching and learning because it combines the advantages of both face-to-face interactions and web-based teaching and learning. It is in line with the theory of media, the wealth of rich media (by giving the same material using multiple media) helps to improve the learning ability especially for doing tasks. A Meta-analysis was performed by the U.S. Center for technology (2009) found that in the teaching and learning of blended learning, on average it has a greater advantage in comparison with the face to face instruction.
Garrison and Kanuka (2004) argue that the combination of face-to-face teaching and learning and web-based teaching and learning can provide ease-of-learning experience simultaneously, independently and collaboratively. In other words, teaching and learning can be independent in terms of space and time, but together. This is an element of face-to-face blended learning that maintains a high level of commitment of learners (Wall, Ahmed and Smit 2006). Also, in addition to fostering a community of learning, blended learning is also expanding the scope of teaching and learning and can produce greater reflection and better results of teaching and learning.

Based on the results of observation in Electrical Department at Technical Faculty showed that in the classroom learning, the learning method used by the lecturers was still conventional learning that lecturers and students should be at one place (face to face), the use of learning media tend to be simpler. The method of this type tend gave and handed the knowledge and limited the students. Thus, the students were limited in choosing the preferred topics and were relevant to the package of skills learned. Therefore, it needed improvements in the model and the applied learning media, such as blended learning combined with the conventional learning. With this type of student learning model the students were required to study independently but still under the guidance of a lecturer.

Method

The type of this research was experiment research which was categorized into quasi experimental design. In the research of learning outcomes from both groups of students will be compared. One of the student groups was given a treatment in the form of blended learning as the experiment classroom, and another group of students were given conventional learning as the control class. The instrument used in this research was in the form of objective test questions. The test questions were made based on the lattice question referred to the syllabus and the learning implementation plan at subjects Electrical Machines in Electrical Department of Technical Faculty, Padang State University.
Result and Discussion

Based on the results of research, the average value obtained ($\bar{X}$) the students practice learning outcomes in experiment class and control class, as can be seen in table 1.

<table>
<thead>
<tr>
<th>Class</th>
<th>The Number of Students</th>
<th>$\bar{X}$</th>
<th>Completeness Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>32</td>
<td>80,87</td>
<td>78,12</td>
</tr>
<tr>
<td>Control</td>
<td>32</td>
<td>74,37</td>
<td>56,26</td>
</tr>
</tbody>
</table>

Table 1. Summary of completeness of experimental and control class.

On table 1. It showed that learning outcome Electrical Machines of students experiment class used blended learning model had average value and the completeness percentage was higher than the control class that used the conventional learning.

Data Analysis

Data analysis was intended to find out the learning outcomes of student through learning model of blended learning and to know the difference of learning outcomes of experiment class and the control class. If the results of learning outcomes of the experiment was higher than the control class, then it was believed that the results of learning outcomes in this study as a result of the treatment given. The differences in learning outcomes were analyzed using t-test previous look at whether the subject was distributed normally and had a homogenous variants.

Normality Test

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In order to see whether the data of research subject class were normally distributed, was done normality test used the Kolmogorov-Smirnov method. The test results obtained value of $D_{\text{max}}$ and $D_{\text{table}}$ for both classes of subjects with $\alpha = 0.05$, as shown in table 2.

<table>
<thead>
<tr>
<th>Class</th>
<th>N</th>
<th>$D_{\text{max}}$</th>
<th>$D_{\text{table}}$</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>32</td>
<td>0.123</td>
<td>0.234</td>
<td>Normal</td>
</tr>
<tr>
<td>Control</td>
<td>32</td>
<td>0.123</td>
<td>0.234</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Table 2. The Summary of Normality Test Final Test

From table 2 it could be seen that the results of the calculation of both classes acquired $D_{\text{max}} < D_{\text{table}}$. It indicated that the data obtained from this research subject class were normally distributed.

**Homogeneity Test**

Homogeneity test was done to see whether the both classes were homogeneous or not. The homogeneity test of this research data was used Levene test, the test results obtained from data such as table 3.

<table>
<thead>
<tr>
<th>Class</th>
<th>n</th>
<th>$F_{\text{hitung}}$</th>
<th>$F_{\text{table}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>32</td>
<td>2.213</td>
<td>2.55</td>
</tr>
<tr>
<td>Control</td>
<td>32</td>
<td>2.213</td>
<td>2.55</td>
</tr>
</tbody>
</table>

Table 3. Homogeneity Test Final Test Results

From the table above, it could be seen that the value of $F_{\text{table}}$ on the experiment class and control class with $d_{k_1}=1$ and $d_{k_2} = 22$ was 2.55 at significance level of 0.05, while $F_{\text{hitung}}$ was 2.213. Thus, $F_{\text{hitung}} < F_{\text{table}}$ means both classes had a homogeneous variance.
Hypothesis Test

Based on normality test and homogeneity test, the final test obtained that both classes were normally distributed and had a homogeneous variance, thus the difference test between the two classes that appropriate was t-test, as seen in table 4.

<table>
<thead>
<tr>
<th>Class</th>
<th>n</th>
<th>X</th>
<th>S</th>
<th>t_{hitung}</th>
<th>t_{table}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>32</td>
<td>80,87</td>
<td>9,99</td>
<td>2,436</td>
<td>2,039</td>
</tr>
<tr>
<td>Control</td>
<td>32</td>
<td>74,37</td>
<td>10,64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. The Result of Hypothesis Test Final Test

From the results of the calculation of the hypotheses test above obtained the value of t-test (t_{hitung}) was 2,436, while for t_{table}, with dk = n-1 = 31, significance level 5%, was obtained t_{table} was 2,039. Thus, 2,436 > 2,039 (t_{hitung} > t_{table}), then Ho was denied and simultaneously receive Ha. Thus, the students learning outcomes of the Electrical machines used learning model of blended learning was better than the students who followed the conventional learning at electrical department of Technical Faculty of Padang State University..

DISCUSSION

Based on the average value of the two classes could be seen that the average value of experiment class (3La) was higher than the average value of control class (3Lb). Class 3 L1 only 7 students or 21.88%. While the class 3Lb there was 18 students or 43.75% which had not good pass. From that data, it was clearly seen that there was an improvement of student learning outcomes results on subjects of Electrical Machines after being given the treatment. Therefore, it could be concluded that the learning outcomes with the used of blended learning was very influential to the results of the study. This improvement was due to the experiment...
class used blended learning, the teaching and learning process was run well, the materials delivered could be explained properly, all the explanations given was easily understood by students.

**Conclusion**

From the research results obtained, it could be concluded that there was a significant difference between blended learning with conventional learning towards student learning outcomes on subjects *Electrical machines at Electrical Department of Technical Faculty, Padang state University*. From the results of analysis, the hypothesis of t-test was obtained $t_{hitung} = 2.436$. While $t_{table}$ with $df = 31 = 2.03$ on the significance level 0.05 so $t_{hitung} > t_{table}$.

**Suggestion**

Based on the results of the research done, then it is suggested: 1) that the lecturers who teach the subject of Electrical Machines should able to use learning model of blended learning for lecturing and learning process. 2) to the heads depeartment to provide periodic training to lecturers on the utilization of web as a media of teaching learning, it aims to help to improve the quality of graduates of technical faculty particularly for graduates of electrical department.

**Reference List**


