The Effect of Blend-Learning on Basic Electrical and Electronics Subject in New Normal Period

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Abstract

This research is motivated by student learning outcomes in the basic electricity and electronics learning process which is not as expected. Therefore, an active and innovative learning model is needed. The research method used is experimental, using a one-group posttest design. In the experimental class using the Blended Learning model. The research sample is TITL class X students at SMK Negeri 1 Bukittinggi. The learning outcome assessment instrument used cognitive tests and the distribution of affective questionnaires. The results of the study prove that the Blended Learning model is effective and can improve student learning outcomes as evidenced by student learning outcomes that have reached the minimum completeness criteria (KKM) of 83.42 and from affective total average percentage based on the items obtained is 72.92% for the control class and 73.15% for the experimental class in the good category.

Keywords: *effectiveness, blended, learning, DLE*

Introduction

The Indonesian government is very concerned about education in Indonesia today, so the government requires the nation's children to study for nine years. The Indonesian government needs nine years of study with the aim that the education of Indonesian children is not left behind from other countries and ready to compete on the international scene, especially now is the era of technology, if there is no education, the nation's children cannot keep up with the rapid development of the times. This is one of the important educational things for the lives of Indonesian children.

However, at the end of 2019, there was an unavoidable pandemic, namely the Covid-19 virus that caused the education system in Indonesia not to go as desired. UNESCO stated that "as of March 12, 46 countries from 5 continents have announced the national closure of complete schools aimed at avoiding the spread of Covid-19.[1]

International organizations pay particular attention to the issue of "Educational Response in Crises and Emergencies". UNESCO stated in the 2030 Incheon Education Declaration and Framework for Action that countries should "provide alternative models of learning and education for children and adolescents outside of school at primary and secondary levels, and implement equity and bridging programmers, recognized and accredited by the state, to ensure effective learning in formal and non-formal settings, including in emergencies".

In particular, the Indonesian government has banned most face-to-face activities, including teaching. Currently, based on the development of the Covid-19 emergency, several countries and one of them is Indonesia has adopted a variety of flexible teaching and learning approaches in their education systems, and online education is one of the approaches applied. With the development of information and communication technology, new forms of learning have emerged that can open up more opportunities for flexible learning. This open learning aims to make students more independent and creative, whereas teachers only act as facilitators. To realize the effective application of learning aimed at improving the quality of students' learning processes and outcomes

in the New Normal period, effective learning assessment is needed in an uncertain way. Effective learning is an aspect of learning and how good your skills are.[2]

Blended learning has been described as a mode of teaching that eliminates time, place, and situation. national barriers, while enabling high-quality interaction between teachers and students[3]. The characteristics of the effectiveness of the learning program are successfully delivering students to achieve predetermined instructional goals, providing an attractive learning experience, engaging students actively so as to support the achievement of instructional goals and have means that support the teaching and learning process [4]. Blended learning or combination learning is learning that combines a face-to-face learning model with a learning model based on information and communication technology. [5], [6].

Based on the results of research that has been done, it shows that by using the Blended Learning method, students' curiosity and activeness in performing tasks is increased because the learning process can be done anytime and anywhere and with this combination of learning, students are easier to access learning materials. With the utilization of the Blended Learning Model is expected to be able to improve the academic ability of learners in the midst of the covid-19 pandemic conditions. Academic ability is the ability and proficiency of a person in the academic field. The academic field encompasses all the sciences taught in formal education. Academic ability is closely related to cognitive or Intelligence Quotient (IQ). In contrast to attitudes and behaviors related to affective and competence that lead to psychomotor abilities. Academic ability will affect other learning outcomes both on attitudes and behaviors and competence of learners.[5]. Advantages of combination learning: (1) Can be used to convey learning anytime and anywhere; (2) Learning takes place online and traditionally, both of which have advantages that can complement each other; (3) Learning is more effective and efficient; (4) Increase accessibility. With the combination of learning, students are easier to access learning materials. [7]. Flexible learning as a set of approaches and educational systems associated with giving students more choice, comfort, and personalization to suit their circumstances. [9]. In particular, flexible learning delivery gives students choices about where, how, and when learning takes place, using a variety of technologies to support the learning process. Provide appropriate support for students to take on increased responsibilities. In online learning scenarios, where the structure of the online curriculum is largely automated, students have more flexibility in deciding when, how and with what content and activities they engage in. [10]. The Flexibility learning approach is a learning approach that is commonly implemented in the on-line learning process during the COVID-19 outbreak [11].

SMK Negeri 1 Bukittinggi is one of the vocational schools that aim to prepare graduates who are skilled and professional in their fields and can continue to the university level or can also work in various businesses. Based on observations that have been made at SMK Negeri 1 Bukittinggi, there are several reasons why it is difficult for students to get learning outcomes following predetermined standards because almost all students have problems in the learning process, namely the mismatch of learning methods carried out in the learning process. During the Covid-19 pandemic learning period, the learning process only takes place online or online. Teachers only provide materials and tasks that dominate the implementation of learning to students so that students do not understand in doing the given tasks because there is no explanation of the material taught, so students are not enthusiastic in carrying out the learning process. This can be seen from the lack of active participation of students in the learning process, which in turn the quality of the student learning process will affect the student's learning outcomes. This kind of learning process has an impact on students' learning outcomes, most of whom have not yet reached the Minimum Completeness Criteria set by the school.

This combination learning is also called hybrid instruction or hybrid learning method, which is a learning method that combines face-to-face learning methods with online teaching methods. Mixed learning aims to incorporate the characteristics of a web-based learning model, namely time

efficiency, low cost, and ease of access for students at all times. Then the nature of the learning model in the classroom, which is to help students learn the learning materials that have been presented, and interact with other students and teachers in the classroom.

This research aims to see the effectiveness of blended learning in the field of Basic Electrical and Electronics Class X TITL at SMK Negeri 1 Bukittinggi on basic competencies (KD 3.6) Analyzing electric power and energy.

Method

The research method used is the experimental method. The experimental design used is a posttest-only control group design. In the experimental class, the Blended learning model was treated. Then give *a posttest* at the end of the lesson. The sample of this study was 26 students of the X TITL experimental class and 26 control classes as a comparison of learning methods at SMK Negeri 1 Bukittinggi.

The instrument used for data collection in the study used a learning outcome test in the form of cognitive and affective. Data analysis test aims to determine student learning outcomes in blended learning model on the material to analyze power and electrical energy. The test uses a prerequisite test with normality, homogeneity, and dependent sample t-test tests.

Results and Discussion

The purpose of this study was to determine the effectiveness of the Blended learning model in Basic Electrical and Electronics subjects in analyzing power and electrical energy, to assist participants in improving cognitive and affective aspects in carrying out learning.

The following average cognitive learning outcomes obtained by students in the experimental class who received the blended learning treatment and the control class who did not receive the treatment can be seen in Table 1.

Table 1. Average cognitive learning outcomes obtained by students in the experimental class who received the blended learning treatment and the control class who did not receive the treatment

No	X TITL 1 (experimental class)	X TITL 3 (control class)
Average	83.42	74.5

Based on the table, it can be seen that the cognitive average results of class X TITL 1 student are 83.42 good categories, and the cognitive average results of students of class X TITL 3 with an average of 74.5 sufficient categories. The following is a graph of each process as a function of the respondent. Graph of Cognitive Average Results of figure 1.
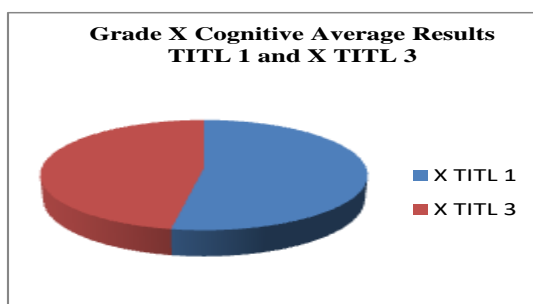
Figure 1. Graph of Cognitive Average Results

For the affective assessment of blended learning, it can be seen based on the average number of students in answering 20 statement items. The total average percentage based on the items obtained is 72.92% for the control class and 73.15% for the experimental class in the good category.

Before analyzing student learning outcomes, the analysis requirements test is carried out first, namely the normality test and homogeneity test.

a) Test Requirements Analysis
1) Normality test

A normality test is conducted to determine whether the data from the sample is normally distributed or not. Test for normality in the sample class using Chi-squared statistical hypothesis where the significant level = 0.05 can be seen in Table 2.

Table 2. Data Normality Test Results

Number of Samples (N)	Average ($\bar{x}$)	Standard Deviation (S)	X2 Count	X table	Conclusion
Experiment	83.42	6.83	5.1	9.49	Normal
Control	74.5	9.6	3.88	11.07	

From table 2 above, the average for the experimental class is 83.42 and for the control class are 74.5. The standard deviation results obtained for the experimental class is 6.83 and for the control class is 9.6. After the normality test, it was obtained that X2 Count for the experimental class = 5.1 and X2 Count for the control class = 3.88 with DK = k-1, significance level = 0.05. From the Chi-square table, the X table for the experimental class is 9.49, and the X table for the control class is 11.07. The test criteria are that H0 is accepted if the value of the X2 Count is less than the X table. From the calculation results, it is found that X2 Count < X table, so H0 is accepted. So it can be concluded that both groups come from a normally distributed population.

2) Homogeneity Test

The homogeneity test was carried out on the student learning outcomes test with the data criteria being said to be homogeneous if the significance level was less than 0.05 with DK = k-1. This test is also intended to provide confidence that the data set that is manipulated in a series of analyzes does come from populations that are not much different in diversity The results obtained from the homogeneity test can be seen in the table.3.

Table 3. Homogeneity Test of Sample Class

Class	N	variance	F count	F table	Conclusion
Experiment	26	9.68	2.71	6.26	Homogeneous
Control	26	26.30			

From table 3, the variance for the experimental group class is 9.68 and the variance for the control class is 26.30 with a significance level $\alpha=0.05$ from the distribution table F obtained Ftable = 6.26 with DK = k-1. The criteria from the H_0 test are accepted if the value of F count is less than F table.

From the calculation results obtained that F count < F table. So H_0 is accepted. Thus, both groups have the same variance or both classes are homogeneous.

3) Test-T

From the results of the tests given to the experimental class and control class, if it is proven that the sample is normally distributed and comes from a population with homogeneous variance, then the t-test analysis (t-test) with a significance level of 5% (0.05) can be identified. And analysis as follows.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n1} + \frac{s_2^2}{n2}}}$$

For db of the experimental class n-1 =26-1 =25, for db of control class n-2=26-2 =24. Then the price of t corhan-cox (tα). The conclusion is the value of t count > from t corhan-cox so that there is a significant difference in the effectiveness of the two sample classes.

Through the application of the Blended Learning model, it is possible to optimize individual student learning. The Blended Learning model can increase student activity and motivation in learning. The results of the effectiveness of the Blended Learning model show that there are significant differences in learning outcomes. This is evidence that the use of the Blended Learning model is effective for use in learning in Basic Electrical and Electronics subjects, especially in Analyzing power and electrical energy.

Conclusion

Based on the results of the study showed application learning model Blended Learning with syntax (1) Looking for information; (2) Obtaining information (3) understanding knowledge; (4) the final result. Then obtained the results of a significant increase in student learning outcomes after applying the Blended Learning model. Implications of this finding produce good learning outcomes. Students become more active and motivated in carrying out learning because of the implementation of the Model *Blended* Learning it is arranged systematically. it can be seen that the average cognitive result of class X TITL 1 student is 83.42 good category, and the average cognitive result of class X TITL is 74.5 adequate category., when compared to class X TITL 1 which received blended learning treatment, the average result obtained was higher. Recommendations from these findings can provide regulations that regulate the learning process using Model Blended Learning systematically.

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