

Blended model of distance learning: Does it effective?

Calvin E. J. Mamahit*

Department of Electrical Engineering Education, Faculty of Engineering, Universitas Negeri Manado, INDONESIA

*Corresponding Author: calvinmamahit@unima.ac.id

<https://doi.org/10.24036/jptk.v3i4.15223>

Abstract— This study aims to determine whether distance learning is effective to implement. This study compares the blended model of distance learning with traditional learning. What is being compared is student learning outcomes and their perceptions in these two lessons. This research is a quantitative study using a quasi-experimental research design with a time-series model. The population of this research is all 4th semester students who take Digital Electronics courses. Data collection was carried out in two ways, namely by using several tests for data on learning outcomes and questionnaires for student perception data. Data analysis was made using the t test for paired samples. The results of the analysis obtained that there are differences in the two samples tested mean and the distance learning blended model has a higher average than traditional learning. This shows that the blended model of distance learning is more effective than traditional learning.

Keyword: *Distance Learning, Blended Learning, Student Learning Outcomes, Students' Perceptions*

I. INTRODUCTION

Changes in world conditions due to the pandemic that occurred this year greatly affected the condition of education globally. This condition really requires the teachers to adapt quickly and creatively. Learning models that previously could be various became fixated on just one learning model, namely online-based distance learning. Direct online learning is one of the most recommended in schools to universities. The Ministry of Education and Culture issued a circular on the Implementation of Education in an Emergency for Coronavirus Disease (Covid-19) and Guidelines for Organizing Learning from Home in an Emergency for the Spread of Covid-19 (Ministry of Education and Culture » Republic of Indonesia, n.d.). Due to the long pandemic period, online learning has become a necessity in schools and colleges.

The learning process has undergone many developments that previously were only carried out in the classroom but in the latest developments, it has used a blended learning model that combines all types of learning models. Synchronous and asynchronous learning combined with balanced proportions. Such a model is not new and has been widely applied in

universities. For teachers who have not implemented it, a lot of training in the application of blended learning is provided (Jansen, n.d.).

Blended learning is a learning model developed from the limitations of conventional classroom learning. The development of e-learning and the ineffectiveness of learning in the classroom led to the development of a combined learning model, which is called a blended learning model. (Kim, 2007). Blended learning is not just a slice but an amalgamation of face-to-face learning and online learning (Watson, 2008). Blended learning is not only a combination of face-to-face and online learning, but also the incorporation of all learning modalities and styles, as well as the incorporation of instructional methods. (Graham, 2006). Blended learning is also a combination of synchronous and asynchronous learning which can be online or offline as well as both.

Synchronous and asynchronous learning can be applied to blended learning models. Synchronous learning is learning that is carried out at the same time between the teacher and the one being taught or real time (Finkelstein, 2006). Asynchronous learning is learning that is not carried out at the same time between the teacher and the one being taught

(Shahabadi & Uplane, 2015). In its application, synchronous learning is often found in offline learning in classrooms, while asynchronous learning is often applied to e-learning in the early development of e-learning. In further development with the online meeting / video conference application, it is possible to apply synchronous learning to e-learning. So online-based distance learning can combine synchronous and asynchronous learning. This means that blended learning can be applied completely online only (Rahman & Ilic, 2019).

Online-based blended learning environment integrated with all learning activities. One of these blended learning environments is problem-based learning (PBL) and student center learning (SCL). Other learning environments are e-learning and its tools, commercial e-learning systems in the form of licensed applications, free e-learning systems (open source) such as Moodle and learning management systems in the form of virtual class rooms (Littlejohn & Pegler, 2007). Blended learning in tertiary institutions has been so rapidly implemented and developed, not only globally but also in Indonesia. Blended learning is an innovation that continues to diffuse and becomes a learning trend in the future where support from institutions, teaching staff and students is needed (Oakley, 2016).

Learning effectiveness is not always determined by a learning model. Planning and implementing appropriate and good learning models can produce good learning outputs. Relevant learning output is learning outcomes and academic achievement. Learning outcomes and academic achievements are obtained from learning evaluations (Ratnawulan & Rusdiana, 2014). Learning media is very important in improving the quality of learning (Miftah, 2013). All learning models, learning activities use good and effective learning media. Some students have high cognitive talent since birth. Some of them need special handling through appropriate strategies and learning models. A person's cognition and intelligence can be shaped by the learning process. The right learning model can process cognition, then develop the intelligence process, and improve student learning outcomes and academic achievement (Papadopoulos et al., 2015). The right learning model and approach can be the basis for knowing the learning outcomes of students at the end of learning (Öhrstedt & Lindfors, 2019).

Blended learning model has a relationship with student learning outcomes. Blended learning can affect student learning outcomes. With the large number of interesting learning content in the blended learning model, the level of student motivation jumps high which results in increased learning outcomes (Kintu et al., 2017).

The right learning model in its implementation can form a good perception of this learning. Students experience by seeing, hearing, and feeling the learning mix. Good perception determines the success of learning. Perception is about what a person experiences through the five senses and feelings (Matthen, 2015). It is about what a person sees, hears and feels in learning activities (Bruno, 2002). So, it can be concluded that students' perceptions in learning are in the form of students' opinions about what they experience and feel in learning activities. Student interest and satisfaction are often also determined by the application of learning models. Students' perceptions in blended learning can be seen from their motivation, independent learning, and their satisfaction in participating in blended learning. The blended learning model and its environment can increase the learning satisfaction of students in their learning (Wang et al., 2019).

The application of distance learning blended models in lectures raises the question whether the results can be effective? Then what is the student's perception? These two main problems are examined in this study. So that the objectives of this study are: (1) To find out whether there is a significant difference in student learning outcomes between traditional learning and distance learning blended models. (2) To find out whether there is a significant difference in student perceptions between traditional learning and distance learning blended models. (3) To find out whether the learning outcomes of the blended model distance learning are better than traditional learning. (4) To find out whether students' perceptions of distance learning blended models are better than traditional learning.

II. METHODS

This research is a quantitative study with a quasi-experimental design. The quasi-experimental type used is the time series design where there is no control group because only one group is given treatment in an ongoing time (Shadish et al., 2002). Groups were given the initial test several times when given traditional face-to-face learning in class. After 4 tests the results were stable, the new group was given treatment (Sugiyono, 2014). The treatment is the provision of distance learning blended models to students.

This research was conducted in the first semester of 2020, where in the first and second quarters a pandemic began to occur around the world, including Indonesia. This research was conducted in the Department of Electrical Engineering Education, Faculty of Engineering, Manado State University, in North Sulawesi Province.

The population of this study was the 4th semester students in the Digital Electronics course class which consisted of 2 classes, namely PTEA and PTEB which were combined. Its population size is 29 students. The sample of this research is all students who are active until completion of lectures who meet the criteria for attendance and participation of more than 70% of lectures. The sample size taken was 25 students.

In the quasi-experimental research design, several times the test is given in the form of a quiz or written test in traditional classroom learning and several times the test is online in the blended-model distance learning. Online tests are given via Google Form and content quiz resources in LMS Amelia (*LMS Amelia Unima*, n.d.). The test given is in the form of a formative test of the material that has been presented in the two learning models. The test results are student learning outcomes for each learning activity in the two learning models in turn.

The student perception questionnaire was given 2 times. One time after the stability of the test results was obtained in traditional classroom learning and one more time after the stability of the test results was obtained in distance learning with the blended model. The lattice of the student perception questionnaire instrument in learning is translated into 3 factors. The first factor contains 10 items of student perceptions of the implementation of learning activities (Table 1). The second factor is 10 points of student perceptions of the use of learning media in the learning model used (Table 2). The third factor is 5 points of attitude and student satisfaction with the learning model used (Table 3).

Table 1. Students' Perceptions of the Implementation of Learning Activities

No.	Perception of the Implementation of Learning Activities
1	<i>Greeting</i>
2	<i>Review</i> previous material
3	Learning objectives and instructions
4	Submission of the material is complete
5	Chance to ask
6	Discussion
7	Conclusion
8	practice
9	Duty
10	<i>Quiz</i> and evaluation

Table 2. Students' perceptions of using learning media

No.	Perceptions of learning media use
1	Using learning media
2	Availability of learning media
3	Ease of access and use
4	Audio and visuals are clear
5	Interactive and interesting
6	Adaptive to situation and environment
7	Allocation of usage time
8	The ability of lecturers to use learning media
9	Efficiency and cost of learning media
10	Effectiveness of learning objectives

Table 3. Student perceptions regarding attitudes and satisfaction of the applied learning model

No.	Attitude and student satisfaction
1	Learning activities
2	Use of learning media
3	The teacher's ability to manage the class
4	Understanding of the material
5	Learning evaluation

The data analysis required in this study is to test the difference in the mean of the two parameters. Because they come from the same group which produces two correlated data distributions, the test for the difference between the two means of the dependent sample is used. (Kadir, 2016). The data sample of student learning outcomes before and after the application of distance learning is rationally correlated. Likewise, the sample of student perception data before and after the application of distance learning is rationally also correlated. Comparability of 2 correlated samples can be tested by two-party test by testing the hypothesis (Sugiyono, 2015). The hypothesis tested for the sample data on student learning outcomes is:

H_0 : There is no difference in student learning outcomes between traditional learning and distance learning blended models.

H_a : There are differences in student learning outcomes between traditional learning and distance learning blended models.

The hypothesis tested for the student perception data sample is:

H_0 : There is no difference in student perceptions between traditional learning and distance learning blended models.

H_a : There are differences in student perceptions between traditional learning and distance learning blended models.

III. RESULTS

The results of this study consist of descriptive and analytical data. Descriptive data in the form of tables and graphs presenting data on learning outcomes and student perceptions in offline traditional learning and distance learning blended models. Data analysis in the form of tables and graphs of the output of the SPSS statistical application. The frequency of student learning outcomes data is shown in the table in table 4 and table 5.

Table 4. Data frequency of traditional learning outcomes

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
5.05	1	4.0	4.0	4.0
5.38	1	4.0	4.0	8.0
5.50	1	4.0	4.0	12.0
5.53	1	4.0	4.0	16.0
5.80	1	4.0	4.0	20.0
5.87	1	4.0	4.0	24.0
5.97	1	4.0	4.0	28.0
6.00	1	4.0	4.0	32.0
6.02	1	4.0	4.0	36.0
6.17	1	4.0	4.0	40.0
6.30	1	4.0	4.0	44.0
6.50	2	8.0	8.0	52.0
6.52	1	4.0	4.0	56.0
6.65	1	4.0	4.0	60.0
6.67	1	4.0	4.0	64.0
6.92	1	4.0	4.0	68.0
7.03	1	4.0	4.0	72.0
7.17	1	4.0	4.0	76.0
7.38	1	4.0	4.0	80.0
7.50	1	4.0	4.0	84.0
7.58	1	4.0	4.0	88.0
7.67	1	4.0	4.0	92.0
8.40	1	4.0	4.0	96.0
8.60	1	4.0	4.0	100.0
Total	25	100.0	100.0	

Table 5. Frequency of distance learning results data blended model

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
6.25	1	4.0	4.0	4.0
6.30	1	4.0	4.0	8.0
6.55	1	4.0	4.0	12.0
6.63	1	4.0	4.0	16.0
6.95	1	4.0	4.0	20.0
7.08	1	4.0	4.0	24.0
7.13	1	4.0	4.0	28.0
7.15	1	4.0	4.0	32.0
7.25	1	4.0	4.0	36.0
7.33	1	4.0	4.0	40.0
7.35	1	4.0	4.0	44.0
7.38	2	8.0	8.0	52.0

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
7.43	1	4.0	4.0	56.0
7.73	1	4.0	4.0	60.0
7.75	1	4.0	4.0	64.0
7.88	1	4.0	4.0	68.0
8.08	1	4.0	4.0	72.0
8.38	1	4.0	4.0	76.0
8.55	1	4.0	4.0	80.0
8.70	1	4.0	4.0	84.0
8.73	1	4.0	4.0	88.0
8.75	2	8.0	8.0	96.0
9.78	1	4.0	4.0	100.0
Total	25	100.0	100.0	

The presentation of learning outcome data is shown in the graphs in Figure 1 and Figure 2.

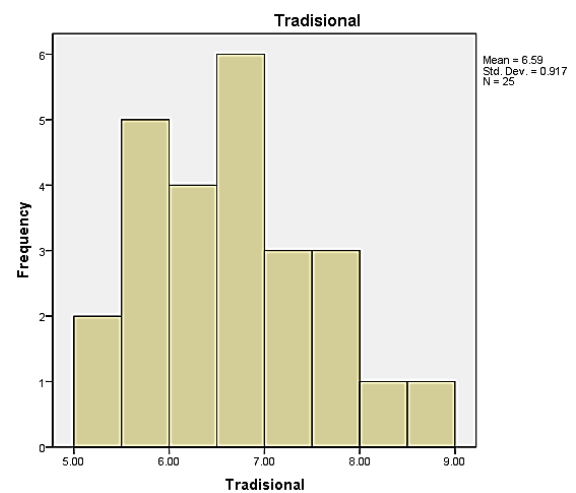


Figure 1. Traditional learning outcomes data histogram

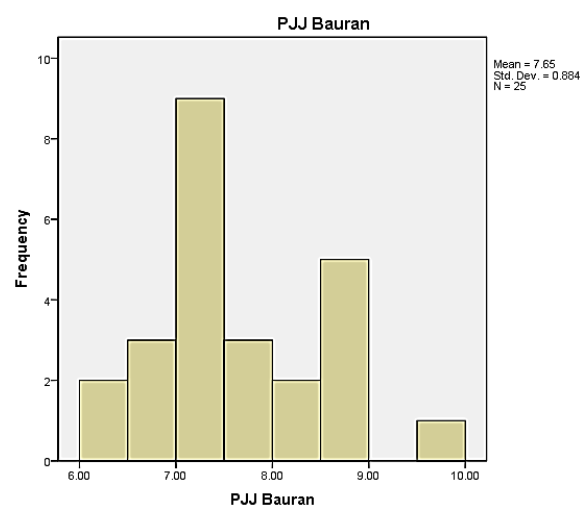


Figure 2. Histogram of distance learning data from blended model

The distribution of learning outcomes data can be seen in the Q-Q plot in Figure 3 and Figure 4.

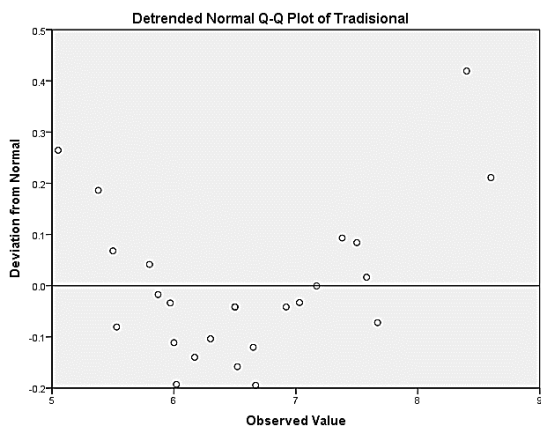


Figure 3. Detrended normal Q-Q Plot of traditional learning outcomes

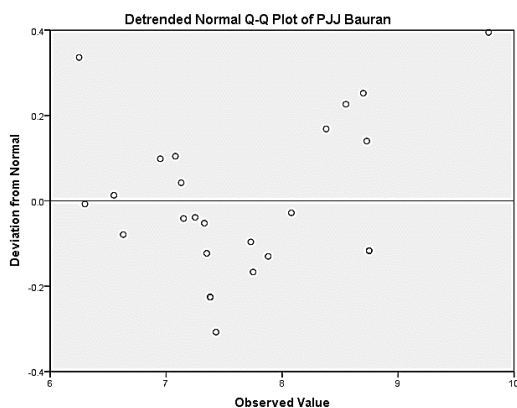


Figure 4 - Detrended normal Q-Q plot of the ODL results of the blended model

The frequency of student student perception data is shown in the table in table 6 and table 7.

Table 6. Data Frequency of student perceptions of traditional learning

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
91.00	1	4.0	4.0	4.0
92.00	1	4.0	4.0	8.0
93.00	1	4.0	4.0	12.0
94.00	2	8.0	8.0	20.0
95.00	1	4.0	4.0	24.0
96.00	3	12.0	12.0	36.0
97.00	3	12.0	12.0	48.0
98.00	1	4.0	4.0	52.0
99.00	3	12.0	12.0	64.0
100.00	2	8.0	8.0	72.0
101.00	1	4.0	4.0	76.0
103.00	1	4.0	4.0	80.0
105.00	2	8.0	8.0	88.0
107.00	1	4.0	4.0	92.0
113.00	1	4.0	4.0	96.0
114.00	1	4.0	4.0	100.0
Total	25	100.0	100.0	

Table 7. Data Frequency of Students' Perception of Distance Learning Blended Model

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
95.00	1	4.0	4.0	4.0
97.00	1	4.0	4.0	8.0
98.00	1	4.0	4.0	12.0
100.00	2	8.0	8.0	20.0
101.00	1	4.0	4.0	24.0
102.00	2	8.0	8.0	32.0
103.00	1	4.0	4.0	36.0
104.00	2	8.0	8.0	44.0
106.00	1	4.0	4.0	48.0
107.00	1	4.0	4.0	52.0
108.00	1	4.0	4.0	56.0
109.00	1	4.0	4.0	60.0
110.00	2	8.0	8.0	68.0
111.00	1	4.0	4.0	72.0
113.00	2	8.0	8.0	80.0
114.00	1	4.0	4.0	84.0
115.00	1	4.0	4.0	88.0
117.00	1	4.0	4.0	92.0
120.00	1	4.0	4.0	96.0
121.00	1	4.0	4.0	100.0
Total	25	100.0	100.0	

The presentation of perceptual data is shown in the graphs in Figure 5 and Figure 6.

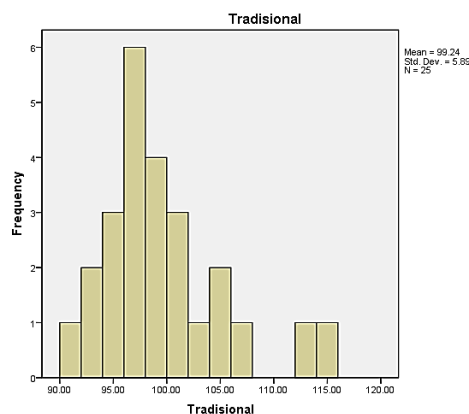


Figure 5. Histogram Data on Students' Perceptions of Traditional Learning

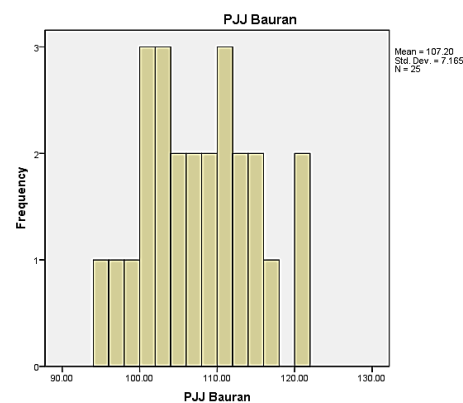


Figure 6. Histogram of Student Perception Data of Distance Learning Blended Model

The distribution of student perception data can be seen in the Q-Q plot in Figure 7 and Figure 8.

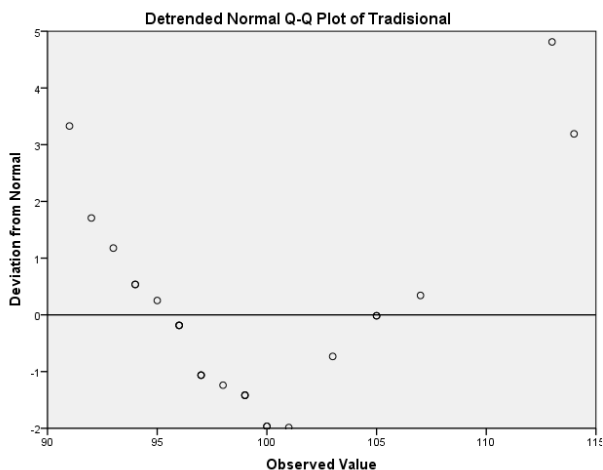


Figure 7. Detrended Normal Q-Q Plot of Students' Perceptions of Traditional Learning

Data analysis in this study is divided into two parts, namely comparative analysis of student learning outcomes data and comparative analysis of student perception data. The analysis used a comparison of the mean with paired sample t test.

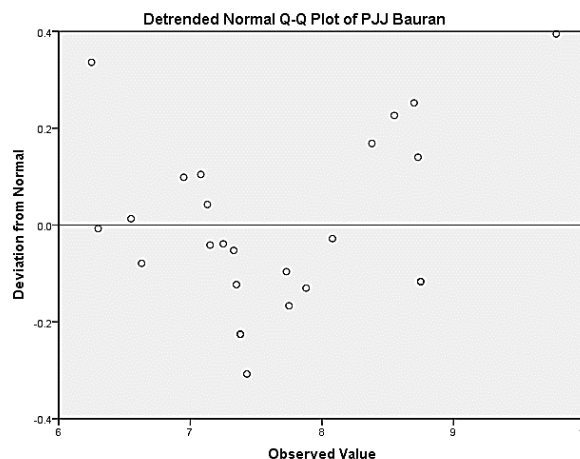


Figure 8 - Detrended Normal Q-Q Plot of Students' Perceptions of ODL Blended Model

The results of data analysis on student learning outcomes can be seen in tables 8, 9, and 10. The results of student perception data analysis can be seen in tables 11, 12, and 13.

Table 8. Paired Sample Statistics Data on Student Learning Outcomes

		Mean	N	Std. Deviation	Std. Mean Error
Pair 1	ODL Mix	7,6496	25	.88359	.17672
	Traditional	6,5872	25	.91725	.18345

Table 9. Paired Sample Correlation of Student Learning Outcomes Data

		N	Correlation	Sig.
Pair 1	ODL Mix & Traditional	25	.904	.000

Table 10. Paired sample test data on student learning outcomes

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Mean Error	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ODL Mix – Traditional	1.06240	.39490	.07898	.89939	1,22541	13,452	.000	

Table 11. Paired sample statistics for student perception data

		Mean	N	Std. Deviation	Std. Mean Error
Pair 1	ODL Mix	107,2000	25	7.16473	1.43295
	Traditional	99,2400	25	5.88982	1.17796

Table 12. Paired sample correlation of student perception data

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Mean Error	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ODL Mix – Traditional	7.96000	2.20756	.44151	7,04876	8.87124	18,029	24	.000

Table 13. Paired sample test for student perception data

		N	Correlation	Sig.
Pair 1	ODL Mix & Traditional	25	.962	.000

IV. DISCUSSION

The first is interpretation for data analysis of student learning outcomes in traditional learning and in distance learning the blended model is obtained by looking at the values in tables 8, 9, and 10. In Table 8 it can be seen that the average Digital Electronics learning outcomes of students in traditional learning before the application of distance learning with the blended model is 6.59 with a standard deviation of 0.92 and after applying distance learning blended model is 7.65 with the standard deviation 0.88. This means that descriptively there is a difference in the average student learning outcomes in traditional learning and after applying the blended model distance learning.

In Table 9, it is found that the correlation coefficient value of learning outcomes of Digital Electronics students between traditional learning and distance learning blended models is 0.90 with a sig value. or p-value of 0.00. The p-value obtained is less than 0.05. This means the correlation is insignificant. In Table 10, the mean difference is 1.06. This means that the difference in the value of Digital Electronics learning outcomes between traditional learning and distance learning with blended model is 1.06. A positive value of Mean (+1.06) means that the value of student learning outcomes with the application of distance learning blended models is higher than traditional learning. Still in this table, the value of Std. Mean error of 0.08. This value shows the standard error rate on the difference in the average value of student learning outcomes.

The t value in Table 10 is 13.45 with a df value of 24 and the sig (2-tailed) or p-value is 0.00. Because the p-value is less than 0.05, H₀ is rejected. This means that there is a significant difference between Digital Electronics learning outcomes in traditional learning and distance learning with blended model. Next is the interpretation to the analysis of student data perception in traditional learning and in distance

learning blended model is obtained by looking at the values in tables 11, 12, and 13. In Table 11, it can be seen that students' perceptions of traditional learning before applying the blended model distance learning amounted to 99.24 with a standard deviation of 5.89 and after applying the blended model distance learning was 107.20 with a standard deviation of 7.16. This means that descriptively there are differences in student perceptions of traditional learning and after the application of distance learning blended models.

In Table 12, it is found that the correlation coefficient value of student perceptions between traditional learning and distance learning blended models is 0.96 with a sig. value or p-value of 0.00. The p-value obtained is less than 0.05. This means the correlation is insignificant. In Table 13, the mean difference is 7.96. This means that the difference in student perceptions between traditional learning and distance learning blended models is 7.96. A positive value of Mean (+7.96) means that students' perceptions with the application of distance learning blended models are higher than traditional learning. Still in this table, the value of Std. Mean error of 0.44. This value shows the standard error rate on the difference in the average perception of students.

The t value in Table 13 is 18.03 with a df value of 24 and a sig (2-tailed) or p-value of 0.00. Because the p-value is less than 0.05, H₀ is rejected. This means that there is a significant difference between students' perceptions of traditional learning and distance learning blended models. From the interpretation of data analysis in this study, evidence is obtained that:

1. There is a significant difference in student learning outcomes between traditional learning and distance learning blended models.
2. There is a significant difference in student perceptions between traditional learning and distance learning blended models.
3. Digital Electronics learning outcomes in

distance learning blended models are better than learning outcomes in traditional learning.

4. Students 'perceptions of distance learning blended models are better than students' perceptions of traditional learning.

In the Digital Electronics lecture, there are 29 students and 25 active students. The results showed that there were differences in learning outcomes when two different learning models were applied to the same class and the same students. Initially, the lecture class applied a traditional offline learning model for 7 weeks. Then by looking at the normality of learning outcomes on some of the initial formative tests, then for the next 7 weeks a blended model distance learning is applied. Student learning outcomes data indicate that there is an increase in learning outcomes in the application of distance learning blended models. It turns out that student learning outcomes in the application of distance learning blended models are higher than learning outcomes in the application of traditional offline learning models.

In this lecture too, where at the end of the first 7 weeks of traditional learning, a questionnaire was given to students' perceptions of ongoing learning. Then at the end of the next 7 weeks a questionnaire was given to students' perceptions of the blended model distance learning that was being applied. The result turns out that there are differences in student perceptions on the application of these two learning models. Students 'perceptions of distance learning blended models were better than students' perceptions of traditional learning models.

We can see the average development of learning outcomes in Figure 9. It can be seen that there is an increase in the value of student learning outcomes in the application of distance learning blended models. The range of values in traditional learning and distance learning of the blended model is stable so that the quasi-experimental time-series design is the correct application. From the graph, it is clear that learning outcomes in distance learning are increased compared to learning outcomes in traditional learning.

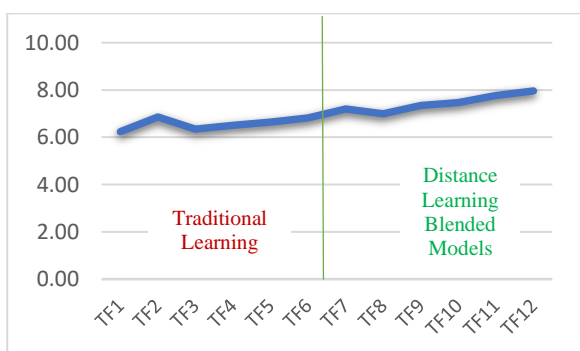


Figure 9 - Design Time Series

The results of this study can be described as shown in Figure 10. In accordance with descriptive data and interpretation, this research can be described as shown below.

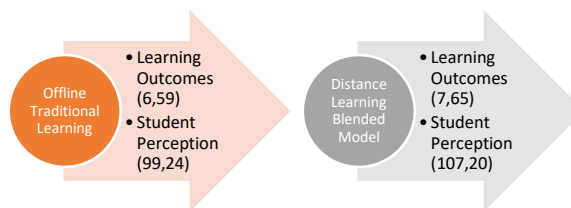


Figure 10 - Research Results

The results of this study indicate that the application of distance learning blended models is more effective than traditional learning. Student learning outcomes can improve significantly. This can also be seen in changes in student perceptions of the application of distance learning blended models. The collection of perceptions in this study is very useful to explain why student learning outcomes have increased after the application of distance learning blended models.

In many cases, the implementation of learning activities does not change much. Only in the implementation of exams and quizzes, their perceptions change. It turns out that they prefer online exams via apps to exams in classrooms. There are several factors that come to mind, such as online exams a lot to reduce their stress or tension, especially if the exam or quiz uses an app that is visually interesting. Students' perceptions experienced significant changes in the use of instructional media in distance learning blended models. Almost all of the factors questioned received positive responses in terms of the use of learning media in distance learning blended models.

Student perceptions are very positive in the use of learning media in distance learning blended models. The availability of learning media gets better responses because the use of information and communication technology is getting better. Students who came from villages at the start of the pandemic had not returned to their hometowns so there were no internet network problems. At the end of the lecture, there were several students who had returned to their hometowns but were not network constrained because in many villages there were already fiber optic internet connections from PT. Telkom which can be accessed by wifi.id hotspots at their respective village offices. There are also students who access via a cellular internet network that can be reached in their village.

The blended model of distance learning media is very easy to access and use. In the lecture that I apply, using several applications that are very easily

accessed by the internet network. For face-to-face synchronous lectures, the G-meet and Zoom applications are used. For asynchronous lectures, a Learning Management System (LMS) is used to access all materials, assignments, exercises, and quizzes. Delivery of assignments is also via the LMS. For some lecture information, it is sent via the Whatsapp chat group. Internet fees are free to access the LMS. Learning material content can be accessed repeatedly in the LMS.

Content that is clear in audio and visualization also greatly affects the positive perception of students on distance learning blended models. Learning material content in the form of online presentation slides and learning videos. The learning video is compressed to medium quality, so that it can be transmitted properly on slow internet networks.

Interesting and interactive content is the highest factor affecting students' perceptions of the baura model of distance learning. All learning material content is created with graphic design applications. The ability of lecturers to master multimedia and graphic design is very decisive here. In addition to mastering learning materials, a lecturer must also master multimedia technology and graphic design in order to be successful in implementing mix-based distant learning. Now there are many graphic and animation design applications that are very practical and easy to use compared to several years ago, which mostly only relied on Adobe Software. There are also many tutorials on using the application on the YouTube platform.

The characteristics of learning media in distance learning, the blended model, are very flexible to environmental conditions, and also get a better response from students. This learning is very adaptive, because it is not bound by time and space. Learning can be carried out anywhere and anytime. Students also like full time online time allocation. blended model distance learning is synonymous with full time online learning. The writer originally thought that the students would be bored but it turned out that they preferred this lesson until the end of the semester.

The ability of lecturers in the use of instructional media and design of online material content also has a positive effect on the success of far-reaching learning in the blended model. Lecturers must be able to use all information and communication technology. Lecturers must also be able to create and design online learning material content. Students' perceptions of the cost of using instructional media are neither too high nor low. This factor is not too different from traditional learning. The matter of cost is relative to each person and also relative to certain conditions.

Good mastery of information and communication technology, the ability to use online learning applications, and the ability to design good learning material content are determinants of the success of achieving learning objectives. This is also accompanied by student satisfaction in learning. Students are satisfied with all distance learning activities of the blended model. They are satisfied with the use of learning media, the ability of lecturers to understand the material, and succeed in evaluating learning materials. These things show that the distance learning blended model applied to Digital Electronics students is more effective than traditional learning. Traditional learning is not bad but compared to distance learning the blended model in the case of this research is not better.

There are several studies related to studies on the effectiveness of blended learning and distance learning. The study, entitled *The Effect of Blended Learning on Student Achievement and Science Process Skills in Plant Tissue Culture Subject* (Harahap et al., 2019) also concluded that there are significant differences in learning outcomes in the application of blended learning with traditional learning. They also found a significant positive effect on learning outcomes in the application of blended learning. Although it is not stated whether the blended learning carried out is full online distance learning or not, it can be a comparison to this study and research.

In another study, entitled *The Effect of Blended Learning Approach on Student Learning Outcomes of Postgraduate Public Health Classes* (Kiviniemi, 2014) also concludes the same thing where there is a positive effect on the application of blended learning on learning outcomes so that learning outcomes are more effective than traditional learning. It was also stated that by maintaining good learning content and consistent evaluation, the results of blended learning would be effective.

The research entitled *The Effect of Blended Learning on the Achievement of Ninth Grade Students in Science and Their Attitudes Toward Its Use* (Alsahli et al., 2019) explain how blended learning affects learning achievement outcomes. Education in the United Arab Emirates which is developing very rapidly where learning is applied and has a positive influence on student learning outcomes and achievements.

Several research results confirm that distance learning, both blended learning and e-learning models, has a positive effect on student perceptions. Such as a study entitled *Blended Learning: Students' Perceptions of Face-to-Face Classes and Online EFL Classes* (Wright, 2017). The research shows that students are interested and motivated in the use of

face-to-face or asynchronous learning mix in the form of e-learning accessed via the internet.

The study, entitled Student Perceptions about Blended Learning: Analysis of the Q Method (Kurt & Yıldırım, 2018) concluded that students' perceptions of blended learning are in accordance with the literature and previous studies. The role of the teacher and instructor must be carefully considered. Online material must match student characteristics and evaluation must be process-based. From several research results and studies that have been submitted, all of them support and confirm that the blended model distance learning is effective to be applied. Better learning outcomes than traditional learning are sufficient to prove that this learning is effective to apply. The existence of positive and better student perceptions in distance learning blended models, proves that students like and are satisfied with this learning..

V. CONCLUSION

The effectiveness of learning can be determined from the learning model and approach applied. It can also be determined from the success of learning outcomes of learners or students. Also, very influential here are the teaching and learning environment. Good teaching competence in implementing learning models really supports the success of learning. The learning environment regarding infrastructure, media, and good learning conditions also affects the success of learning. If all these conditions are met properly, the blended model distance learning can be effective and can be more effective than traditional offline learning.

The learning outcomes of learners or students in traditional learning are actually good and can still be the standard of learning. To get better learning outcomes, it is necessary to try several existing learning models that are in accordance with the characteristics of the learner or student. In the Digital Electronics class, it has been tried that the application of distance learning blended models after traditional offline learning and obtaining better learning outcomes. This means that to get better learning outcomes there is an alternative learning option, namely distance learning blended models.

Learners 'or students' perceptions can change if two different learning models are given. The application of the appropriate learning model and properly makes their perceptions different from previous learning models traditionally in the classroom. The application of the blended model distance learning model shows a better perception than traditional learning. Two factors that influence it are the implementation of learning activities and the

use of learning media. If these two factors are carried out well in both learning models, their perceptions can be used as a reference. Perceptions of learners or students turned out to be better and more satisfied with blended-model distance learning than traditional learning.

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