

# Blended Learning Methods (Youtube, I-Learn, Zoom Application) in Operation Research Subject

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## ABSTRACT

Operations Research is a compulsory subject in Management Department, Faculty of Economics of University Andalas. During Covid-19, the teaching methods migrated online through the used of applications such as Youtube, Zoom and Whatsapp. The aim of this research is to know the best application according to the students. The method of the research used in this study is qualitative and uses questioners distributed to 23 students. Questioners given to student are tested valid and reliable. The majority of the respondents are females at 61%. The result of this research is that 65% of the students agree to use the Blended Learning method in the Operation research Subject and 35% disagree with the blended learning method. The learning applications that students prefer are Whatsapp 52%, Youtube 35% and Zoom 13%. Student constraints with the blended learning methods are as follow: no internet network, no internet package, not having a mobile phone and difficulties to understand the subject of operation research with Youtube , Whatapp and Zoom.

**Keywords:** *Blended learning methods, teaching method, zoom application*

## 1. INTRODUCTION

Optimization Analysis is a compulsory subject taught in Semester III in the Management Department, Faculty of Economics, Andalas University. The Optimization Analysis course or often referred to as Operations Research has a course code, namely EKM 20 with a weight of 3 credits.

Optimization Analysis Course Achievements

1. Students are able to simplify existing problems into mathematical models and find optimal solutions using graphs and simplex methods.
2. Students are able to solve assigned problems and find optimal solutions

3. Students are able to determine the minimum cost of transport with various existing transportation methods in order to obtain an optimal solution.
4. Students are able to determine the shortest time and critical path in completing a project using various existing methods.
5. Students are able to provide information on queuing conditions in a place and maintain a balance between service fees and queuing costs

The learning methods that have been applied in the Optimization Analysis Course are listed in Table 1

**Table 1.** Learning Methods in the Optimization Analysis Course in 2018-2019

Subject	Learning Model	What Students Do	What Lecturers Do
Preliminary: 1. Definition of Operations Research 2. Elements of a Decision Model 3. Types of Operations Research Models 4. The stages of the Operations Research Study 5. Calculations in Operations Research	<i>Self-Directed Learning</i>	Planning learning activities, implementing, and assessing their own learning experiences.	As a facilitator.
Linear Programming with Graphics Maximization Method and Minimization Method	<i>Self-Directed Learning</i>	Planning learning activities, implementing, and assessing their own learning experiences.	

Maximum Simplex Method	<i>Self-Directed Learning</i>	Planning learning activities, implementing, and assessing their own learning experiences.	As a facilitator.
Minimum Simplex Method	<i>Self-Directed Learning</i>	Planning learning activities, implementing, and assessing their own learning experiences.	

Evaluation assessing student ability is carried out by :

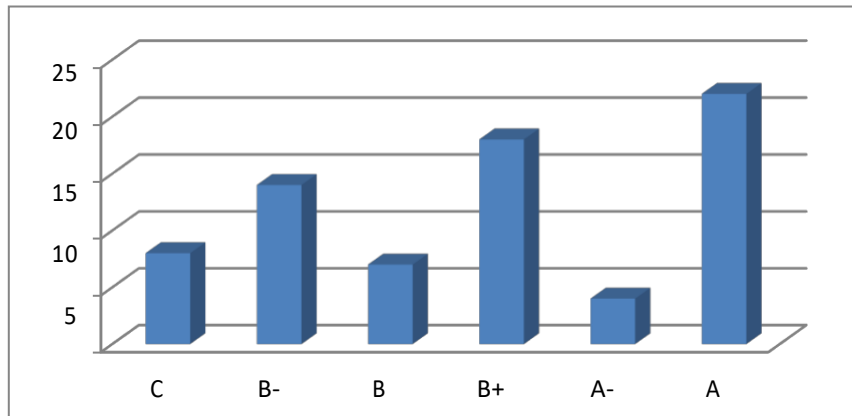
1. Quiz intended to find out the basic abilities of students
2. Discussion to bring the theory closer to reality
3. The test in the form of a case which is the subject of discussion
4. Exercises and assignments to do at home so that students practice and work on questions to complete the analysis
5. A structured exam as an evaluation material for the level of understanding of

students in Optimization Analysis Course

There are 73 students who took the Optimization Analysis Course in 2019. Among the students in the Optimization Analysis Course the scores were as follow:

Grades	A	A-	B+	B	B-	C
Nb.Students	22	4	18	7	14	8

The distribution of student scores in the optimization analysis course is shown in Figure 1.1



**Figure 1.** Distribution of Student Value in Optimization Analysis Subject

Until recently, the Optimization Analysis Course was carried out face-to-face but since the Covid-19 in Indonesia since March 2020, conventional learning methods cannot be done anymore. Even the Rector of University has announce a letter regarding vigilance in Facing the COVID-19 Pandemic (Corona Virus Disease-19) which displaced the learning methods online.

The Optimization Analysis course did not used blended learning so when adapting the Optimization Analysis Course online it shows limitations both in terms of network and application readiness.

Because of the Pandemic, face-to-face teaching as the students are used to is no longer viable. Moreover, the Optimization Analysis course is full of questions that require a mathematical solution, so it is necessary to apply the appropriate blended learning method. Among the methods used during the COVID-19 Pandemic, the Optimization Analysis Course uses the Moodle application known as "interactive learning (i-learn)".

Other learning media are used in the same context: Whatsapp, Zoom and ilearn.

In addition to the use of applications, the teaching methods need to be updated with the use of videos.

In addition to using Zoom, other medias that allow face to face dialogue with students were used, namely Webex and Skype. Those methods should be examined to know which applications are the best for students.

For this reason, this study aims to measure student satisfaction with the blended learning used in the Optimization Analysis Course. The blended learning used Interactive Learning (I-Learn) applications, Zoom, Skype, Webex, Whatsapp, Google Classroom and Discord.

The specific purposes of blended learning research used in the Optimization Analysis Course are:

1. Researching students' preferred online learning methods
2. Examining the obstacles faced by students with the blended learning method used in the Optimization Analysis Course.
3. Researching applications that are easier for students to use
4. Measuring student understanding with the blended learning method used in the Optimization Analysis Course

**2. METHOD**

The research method used in this research is a

**Table 2.1** Research Method

<b>Research Objectives</b>	<b>Research Type</b>	<b>Investigation Type</b>	<b>Time Horizon</b>	<b>Unit of Analysis</b>	<b>Research Methods</b>
To find out the learning methods preferred by students of the 2020	<i>Explanatory Research</i>	<i>Causal Study</i>	Cross Sectional (one shot) in 2020	Optimization Analysis Subject in Management Department, Faculty of Economics, Campus II University.	Quantitative survey method

This research uses a time horizon, namely the Cross-Sectional (One Shot) study, because the data is only collected at one particular time, namely in 2020 and no other research will be carried out at a different time. While the unit of analysis used in this research is students who take the 2020 Optimization Analysis Course in the Management Department, Faculty of Economics, Campus II, Andalas University. According to Sekaran (2017) the unit of analysis refers to the level of unity of data collected during the next data analysis stage.

[2] The data used in this study are primary data, according to Sekaran (2017) primary data is data or information obtained directly from the source by researchers without intermediaries and is used for analysis in finding solutions to the problem under study. The primary data in this study came from a questionnaire. According to Sekaran (2017) the questionnaire is a list of pre-formulated written questions where respondents will look for answers they think are appropriate to their circumstances. Measurements are made using a Likert scale using a five point scale, where the answer to each question has a very positive to very negative value. [3] According to Sugiyono (2013) states that the Likert scale is a variable that can be measured by describing the indicators of each variable, then these indicators are used as a starting point for developing instrument item in the form of questions.

quantitative approach. A quantitative approach can be defined as a research method that is based on numbers and statistics and is used to research a particular population or sample. [1] The use of a quantitative approach is based on several reasons, starting from data collection, research instruments, data testing, interpretation of the data to the elaboration of research results, all of which are quantitative / statistical in nature with the aim of testing the hypotheses that researchers have set (Setiaman, 2019).

The method used in this study is shown in Table 2.1

The value used on the Likert scale consists of five point or score scales, where each score has a certain value such as number one indicates that the respondent's answer strongly disagrees with the question on the questionnaire, number two indicates that the respondent does not agree with the question, number three indicates that the respondent is hesitant about the question, number four indicates that the respondent agrees with the question, and number five indicates that the respondent strongly agrees with the questionnaire question.

**3. RESULTS**

For the development of learning methods in the Optimization Analysis course, there are only 4 changes, namely the Linear Programming Maximization module, Linear Programming Minimization, Transportation Methods and Queuing Theory as in Table 3.1.

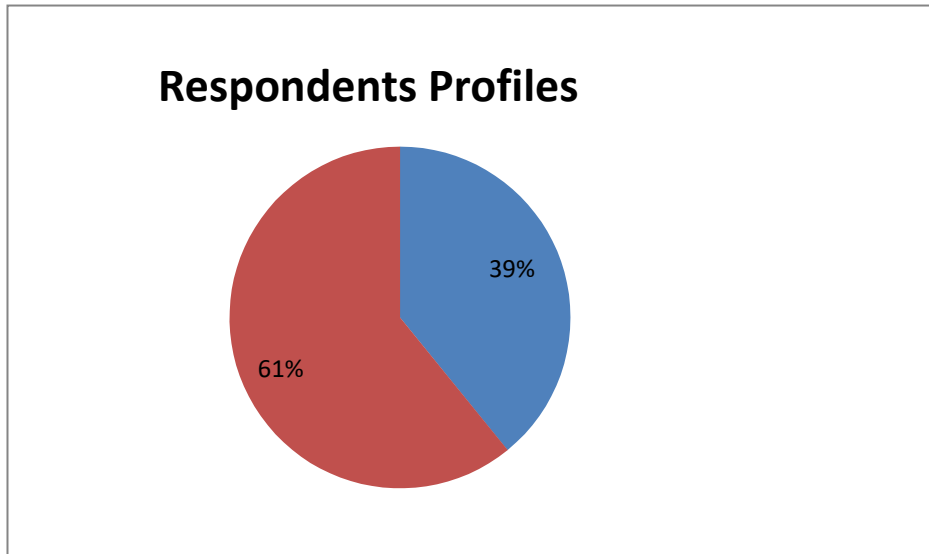
**Table 3.1.** Learning Method Development

No	Material	Old Learning Methods	New Learning Methods	Description
1.	Linear Programming Maximizing	<i>Self-Directed Learning</i>	Video Youtube	Already in -ilearn
2.	Linear Programming Minimizes	Demontrasi	Video Youtube	Already in -ilearn
3.	Transportation Methods	<i>Self-Directed Learning</i>		Already in -ilearn
4.	Queuing Theory	<i>Small Group Discussion</i>		Already in -ilearn

**3.1. Respondents Profiles**

Respondents in this study were students who took

the Optimization Analysis course for the January-July 2020 Period with a total of 23 students with a percentage of 39% male and 61% female.



**Figure 3.1.** Respondents Profiles based on Gender (Source: processed data, 2020)

Students who took the Optimization Analysis course are between 18-23 years old with the percentages as in Table 3.1.1. 65% of the respondents

are 19 years old, this is because the Optimization Analysis course is taught in Semester III.

**Table 3.1.1.** Respondents Profiles based on Age

Age	Total	Percentage (%)
18	1	4%
19	15	65%
20	4	17%
21	2	9%
23	1	4%

Total	23	100%
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(Source: processed data, 2020)

The questionnaire in this study was distributed directly to respondents within a period of one month, starting from May 1, 2020 to June 1, 2020. The data obtained were used as the main material for data analysis. The survey method was used for data collection. [4] The survey method was chosen because it allows to obtain large volumes of data in a relatively short period of time, and at a relatively more

economical cost (Cooper and Schindler, 2014).

Furthermore, the researcher distributed questionnaires to respondents who were considered relevant and entered the criteria for filling out the questionnaire. Table 3.1.1. presents the results of the distribution of research questionnaires and the percentage of questionnaires that can be processed in the study

**Table 3.1.2.** Results of the Research Questionnaire Distribution

Information per Individual	Total	Percentage (%)
Questionnaire	23	100
Questionnaires returned	0	0
The questionnaire cannot be analyzed / the questionnaire is incomplete / the number of questionnaires is less than half of the team members	(0)	(0)
Questionnaire that can be analyzed	23	100
<b>Total (Response Rate)</b>	<b>100</b>	<b>100</b>

(Source: processed data, 2020)

The unit of analysis used in this study is an individual who takes the Optimization Analysis course. The questionnaires were distributed to 23 respondents. A total of 23 students (100%) returned the questionnaire. This is in accordance with the population of the study. The number of samples is the same as the population in the study because the method used is the census method where all populations have the opportunity to become a sample (Sugiyono, 2013).

Research instruments must be tested to

determine whether an instrument is valid or not. Testing the validity of research instruments is carried out to assess whether an instrument is able to measure what you want to measure in a scientific study (Cooper & Schindler, 2014).

The validity test carried out is the construct validity test, namely by calculating the correlation coefficient (r count) between the statement items of each variable with r table.

**Table 3.1.3** Validity Test Results

Variables and Indicators		Validity Test		Information
		r <sub>count</sub>	r <sub>table</sub>	
<i>Youtube</i>	Y1	0,573**	0,174	valid
	Y2	0,606**	0,174	valid
	Y3	0,6534**	0,174	valid
	Z1	0,407**	0,174	valid
<i>Zoom</i>	Z2	0,408**	0,174	valid

	Z3	0,576**	0,174	valid
<i>Whatsapp</i>	W1	0,581**	0,174	valid
	W2	0,792**	0,174	valid
	W3	0,634**	0,174	valid
<i>Learning methods preferred by students</i>	M1	0,624**	0,174	valid
	M2	0,624**	0,174	valid
	M3	0,624**	0,174	valid

NN

otes= \*\*sig level 0.05, N=88

(Source: processed data, 2020)

Table 3.1.3. show the results of the validity test by comparing r count and r table. The degree of significance 0.05 with a sample size of 23. From Table 3.1.3. it appears that all items for each variable are valid.

[5] In addition to the validity test, the questionnaire was tested for reliability, which is a test to measure whether the research instrument that the researcher uses has consistency or reliability in measuring the variables or constructs used in this study (Neuman, 2014). The research instrument can be said to be reliable if a person's answer to the research instrument is consistent, accurate, and precise.

Consistency is the main requirement in testing reliability, because it will measure the homogeneity between measurement instruments that reflect the construct. Internal consistency can be measured using the Cronbach's alpha value which assesses a positive relationship to the number of items on the scale (Hair et al., 2014). An acceptable cronbach's alpha value score is at least 0.6 (Sekaran, 2017).

In general, the test results of the measurement instruments used in this study can be declared reliable, as seen from the Cronbach's alpha value  $\geq 0.6$ . Table 3.1.4 shows the reliability test results of the entire research instrument in more detail.

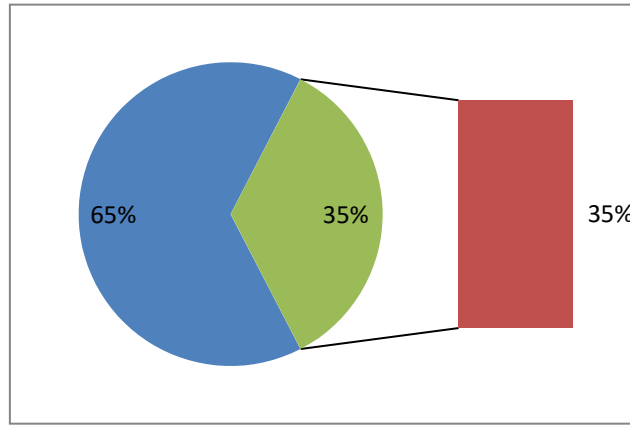
**Table 3.1.4.** Cronbach's Alpha Value

Variable	Cronbach's Alpha	Reliable limit	Information
Youtube	0,605	0,6	Reliabel
Zoom	0,918	0,6	Reliabel
Whatsapp	0,752	0,6	Reliabel
Learning methods preferred by students	0,843	0,6	Reliabel

Source: Primary data processed (2020)

The results of the study are shown in Figure 3.1.2. Regarding Student Perceptions about Blended Learning in the Optimization Analysis Course, 65%

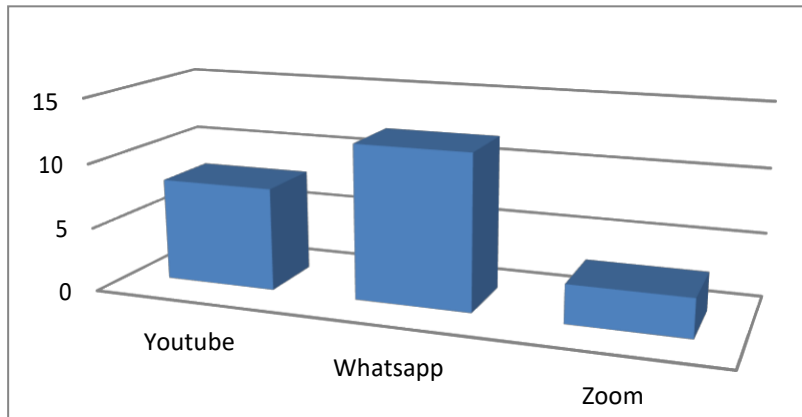
agree and 35% disagree with the blended learning method.



**Figure 3.1.2** Student Perceptions about Blended Learning in Optimization Analysis Subject (Source: processed data, 2020)

Of the three learning media, the method chosen by students was Whatsapp 52%,

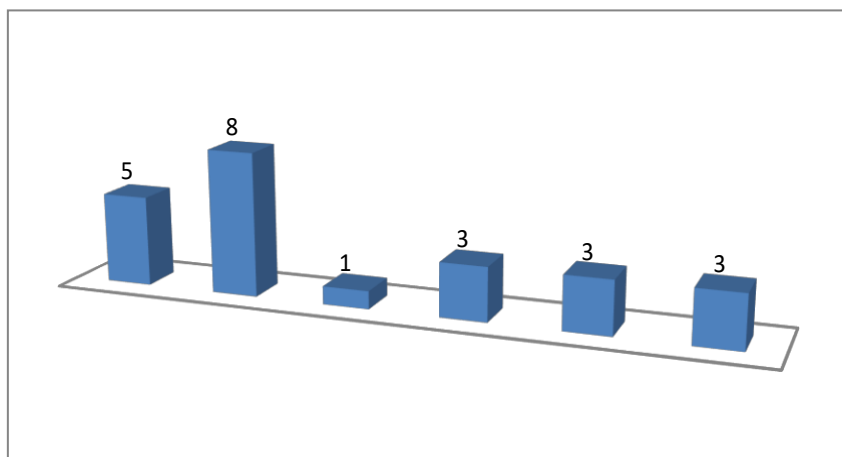
Youtube as much as 35% and Zoom 13% as in Figure 3.1.3.



**Figure 3.1.3** Learning Methods for Optimization Analysis Subjects preferred by students in 2020 (Source: processed data, 2020)

Some of the Learning Constraints with Blended Learning experienced by students,

namely 35% because there is no internet quota and 22% have no network.



**Figure 3.1.4** Learning Constraints with Blended Learning (Source: processed data, 2020)

Some of the Learning Constraints with Blended Learning experienced by students, namely 35% because there is no internet quota and 22% have no network.

### 3.2. Discussion

Optimization analysis is a mathematical subject so that students agree with the Blended Learning method

by 65% because 35% of students experience problems with the learning method, namely 22% no signal, 35% no internet package, 4% do not have a cellphone, 13% find difficult to understand the material with youtube, 13% find that it is difficult to understand the material with, 13% find that it is difficult to understand the material with a zoom.

Students gave the opinion that learning blended learning, especially the method using Youtube, Whatsapp and Zoom, would be good if it was supported by a stable internet connexion and a provision of cheap internet packages. Of the three student learning methods with blended learning the easiest to access is Whatsapp because it does not require internet package in learning. Meanwhile, in terms of understanding the material, students prefer to use Youtube because the displayed video that can be directly practiced by students. However, students still want to study face-to-face.

#### 4. CONCLUSION

1. 65% of the students agree to use the Blended Learning method in the Optimization Analysis Subject and 35% disagree with the blended learning method.
2. The learning media that students like are Whatsapp 52%, Youtube 35% and Zoom 13%
3. Student constraints when taking the optimization analysis course with the blended learning method, the experienced problems are as follow: no signal for 22% of the respondents, no internet package for 35%, not having a cellphone for 4%, difficulties to understand the material with youtube for 13%, difficulties to understand the material with whatapp for 13%, difficulties to understand the material zoom for 13%.
4. Video lessons from four modules, namely Linear Programming Maximization watched by 16 people, Linear Programming Minimization watched by 4 people, Transportation Methods watched by 39 people, and Queuing Theory` watched by 5 people.

#### 5. SUGGESTION

1. We recommend that the optimization analysis course still includes face-to-face learning methods
2. It is better if students are given free internet to study online
3. The government should make a policy to provide internet facilities to students to support online learning
4. It is better if telecommunication companies provide cheap and economical packages so that they are easily accessible for students to study online

5. There is a need for collaboration between universities, entrepreneurs, government and the community to support online learning.

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