COMPARATIVE ANALYSIS OF STUDENT SATISFACTION WITH SYNCHRONOUS MODELS AND ASYNCHRONOUS IN ONLINE LEARNING

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ABSTRACT

This study will analyse the comparison of student satisfaction with the synchronous and asynchronous model in online learning at the Jakarta State Polytechnic. The method used in this study is the chi square test analysis. The analysis needs to be supported by the availability of data that needs to be obtained through a questionnaire. The purpose of this study is to describe the tendency of students to choose between synchronous online learning and asynchronous online learning. Based on the research that has been done, it is concluded that there are differences in the satisfaction felt by students of the Jakarta State Polytechnic and Gunadarma University regarding synchronous and asynchronous learning systems. Research shows the level of satisfaction with the synchronous system is higher than the asynchronous system. For students of the Jakarta State Polytechnic, the average satisfaction with the synchronous system is 43.03 out of a maximum score of 55, while for Gunadarma University students, the average satisfaction with the synchronous system is 41.73 out of a maximum score of 55. student satisfaction with the synchronous learning system in the two universities, there was no significant difference in satisfaction.

Keywords : Asynchronous; Synchronous; Mann Whitn, Online Learning

INTRODUCTION

The Covid-19 case occurred in Indonesia the first time in March 2020. The issuance of a Ministry Circular Letter Education and Culture No. 4 years 2020 regarding policy implementation education during the coronavirus emergency disease (Covid-19)/ Then the whole school and colleges instructed make the transition from offline learning to online learning and suggest students to study from home one method that schools do and college is by doing Online learning method. In learning context at the State Polytechnic Jakarta (PNJ), on March 16, 2020 through Circular Letter Number: 6/PL3/HK.04/2020 concerning. According to Gikas & Grant, (2013) Efforts Precautions and Prevention of Spread Covid-19 Infection in the Polytechnic Environment The State of Jakarta Has Announced That PNJ organizes learning Go online according to government instructions. In the online learning process, required some facilities as support, such as smart phones, laptop or tablet that can be used to access information [1].

Online Learning at PNJ apply two models namely synchronous and asynchronous. Synchronous means learning is done in time the same, while asynchronous means implementation of learning is not carried out on the same time [2]. The purpose of this research is to give you an idea tendency of student satisfaction in learn online and become a reference to PNJ lecturer to determine the method optimal learning. Online Learning at PNJ applies the two models are synchronous and asynchronous [4]. Synchronous means learning done at the same time while asynchronous means implementation study is not done at the same time same. This study discusses analysis comparison of student satisfaction with synchronous online learning and asynchronous.

LITERATURE REVIEW

Comparative study of students' satisfaction. The finding showed nearly all university students were positive about the excellence of facility they have experienced in their own university with in general mean total above average [5]. According to Catherine et al. (2019) stated that several risks may occur while conducting distance learning, one of which is the difference capacity of every student and lecturer to access online learning features and facilities [6]. Aside from that, Sahu (2020) stated that students who do not have an Internet facility will suffer clear disadvantage while participating in distance learning and evaluation process, which would adversely affect their grade point averages [7].

During the pandemic of COVID-19, it examined and assessed the impact that e-learning had on the psychological distress of students COVID-19 demanded restraint and isolation, affecting teacher–student interactions [8]. Computer-based learning has replaced classroom education and one-on-one engagement. During the continuing COVID-19 epidemic, it is important to analyze University students' perceptions and preparation for online learning [9;4]. It is the goal of the investigation to look at how students' online learning experiences and overall satisfaction with their University's brand image are influenced by the use of ICT [10]. Several studies examined how college students see themselves as adopting, using, and accepting emergency online learning and the implementation of their online system, and how they make proper decisions to allow more University students to embrace e-learning [11;6]. Technological advances have affected web technologies and the e-learning process and demand initiatives to leverage the full capabilities of technical innovation to improve e-learning systems and their benefits [12].

Moreover, Mackay and Tymon (2014) also said that the difference in the level of knowledge and understanding between each lecturer in delivering the lecture can lead to misunderstanding and misinterpretation for the students while conducting distance learning [13]. According to Alchamdhani et al. (2020), many students also experience some obstacles and shortcomings during conducting distance learning such as excessive workload compared to offline learning, difficulties in understanding the material because they feel the lecture is less interactive and communicative during distance learning rather than offline class [14;8].

Before the COVID-19 epidemic, researchers looked at what made students stay with online learning. As a result of pandemic circumstances, students' participation in academic activities improves before favorably impacting their contentment [15]. During

the COVID-19 crisis, informal digital learning is critical for students as it investigates the link between digital competency and academic participation in higher education from diverse cultural backgrounds [16;5]. In this unexpected time, the swift migration from conventional face-to-face learning to online learning has been seen as a standard revolution in higher education [17]. With the COVID-19 epidemic, digital technologies have become an inescapable and vital aspect of learning, and colleges worldwide have suddenly halted face-to-face teaching and resorted to technology-mediated teaching [18]. Some studies examine the student e-learning satisfaction during the COVID-19 epidemic and the mediation effects of crucial variables, including learning stress and motivation to learn [19;12].

It is worth mentioning that students' satisfaction with e-learning is directly linked to their academic performance or achievement, and it may also be used to assess the effectiveness of online courses [20;14]. In a developing country like India, where device suitability and bandwidth availability are problems, e-learning planning, design, and effectiveness remain unknown [21;9]. Understanding student satisfaction with e-learning and its relationship to motivation and willingness through adopting online channels and digital competence will primarily assist students in achieving better academic achievements [22;13]. Perceived obstacles and COVID-19 knowledge directly affect students' intentions, but these impacts are further mediated by perceived utility and ease of use of e-learning technologies [23].

Students' readiness for live online learning is believed to be one of the prerequisite conditions for an effective learning process and educational achievement [24;8]. However, unlike traditional face-to-face teaching in class, remote learning does not guarantee the attendance of students, and it is thus difficult to determine the degree of concentration of students in online learning [25]. The live online learning readiness of students is important in affecting the willingness of students' participation in class and the quality of live online learning. Therefore, investigation of the core factors contributing to students' live online learning readiness is important [26;14].

RESEARCH METHODS

This research uses quantitative methods. The location of this research is at the Jakarta State Polytechnic. This study measures and compares student satisfaction with synchronous and asynchronous online learning. The data collection technique in this study was by sampling method and then analysed by statistical tests (validity, reliability, and Mann Whitney and Wilcoxon). The stages carried out in this research.

Data Collection

Data collection will be carried out through surveys that are distributed online through class groups at the State Polytechnic Jakarta. The sample is part of the research population which is a reference for estimating the results of research on the population. Assuming the population is uniform, sampling is carried out due to limited resources or the inability to conduct research based on data from the entire population. The selection of sampling methods is based on the type of research to be carried out. In general, the sampling method consists of two major classes, namely:

- Probability sampling. With this technique, every member of the population has the same opportunity to be taken into the sample.

- Non-probability Sampling. With this technique, sample selection usually does not provide equal opportunities for every member of the population, because there is a certain treatment/control in sampling.

The Likert scale is a scale that measures a variable through variable indicators.

The variable indicators are used as a reference for compiling instruments in the form of questions or statements. The answers to each question using a Likert scale have levels from very negative to very positive. This scale is usually used to measure the views, opinions, or attitudes of a person or group of people regarding a phenomenon.

The steps for compiling a Likert scale:

- Collect questions/statements that are relevant to the problem being studied.
- Then, these questions are tried out to a group of respondents who represent the population.
- For each question, each person answers whether the person has a very positive to very negative response to the question through an ordinal scale of 1-5.
  - Weight 1 = very dissatisfied
  - Weight 2 = not satisfied
  - Weight 3 = normal
  - Weight 4 = satisfied
  - Weight 5 = very satisfied

Then, the responses will be analysed to find out which questions give a significant difference between the highest score and the lowest score on the total scale. For example, responses at the upper 25% and lower 25% are analysed to see how far the two groups' responses to each question differ. If the difference is not significant, then the question is discarded so that the questions in the research are consistent.

Descriptive Statistics

Descriptive statistics from this study will be seen using SPSS software through the following steps:

Analyse → Descriptive Statistics → Descriptive

Jakarta State Polytechnic

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
asinkronus	67	38.76	6.308	22	55
sinkronus	67	43.03	5.651	27	55

Gunadarma University

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
asinkronus	73	39.30	8.008	20	55
siknronus	73	41.73	6.971	25	55

Number of sample units:
Jakarta State Polytechnic = 67 respondents
Gunadarma University = 73 respondents

Based on the two descriptive tables, it can be seen that students from both tertiary institutions have an average satisfaction with the synchronous system higher than the asynchronous system. To see whether the average satisfaction is really significantly different (statistically significant), it is necessary to carry out further hypothesis testing.

Analysis Stage

- Validity test
- Reliability test
- Mann Whitney test and Wilcoxon test
- Interpretation of test results
- Draw conclusions

Validity Test

Validity test was carried out using SPSS software with the following steps:

Analyse → Correlate → Bivariate

Jakarta State Polytechnic

c1	Pearson Correlation	.623**
	Sig. (2-tailed)	.000
	N	67
c2	Pearson Correlation	.511**
	Sig. (2-tailed)	.000
	N	67
c3	Pearson Correlation	.483**
	Sig. (2-tailed)	.000
	N	67
c4	Pearson Correlation	.531**
	Sig. (2-tailed)	.000
	N	67
a1	Pearson Correlation	.549**
	Sig. (2-tailed)	.000
	N	67
a2	Pearson Correlation	.685**
	Sig. (2-tailed)	.000
	N	67
a3	Pearson Correlation	.609**
	Sig. (2-tailed)	.000
	N	67
a4	Pearson Correlation	.547**
	Sig. (2-tailed)	.000
	N	67
f1	Pearson Correlation	.588**
	Sig. (2-tailed)	.000
	N	67
f2	Pearson Correlation	.655**
	Sig. (2-tailed)	.000
	N	67
f3	Pearson Correlation	.599**
	Sig. (2-tailed)	.000
	N	67
f4	Pearson Correlation	.660**
	Sig. (2-tailed)	.000
	N	67
e1	Pearson Correlation	.584**
	Sig. (2-tailed)	.000
	N	67
e2	Pearson Correlation	.559**
	Sig. (2-tailed)	.000
	N	67
e3	Pearson Correlation	.415**
	Sig. (2-tailed)	.000
	N	67
e4	Pearson Correlation	.426**
	Sig. (2-tailed)	.000
	N	67
e5	Pearson Correlation	.335**
	Sig. (2-tailed)	.006
	N	67
e6	Pearson Correlation	.423**
	Sig. (2-tailed)	.000
	N	67
t1	Pearson Correlation	.582**
	Sig. (2-tailed)	.000
	N	67
t2	Pearson Correlation	.502**
	Sig. (2-tailed)	.000
	N	67
t3	Pearson Correlation	.265*
	Sig. (2-tailed)	.030
	N	67
t4	Pearson Correlation	.330**
	Sig. (2-tailed)	.006
	N	67
sum	Pearson Correlation	1
	Sig. (2-tailed)	
	N	67

Gunadarma University

e1	Pearson Correlation	.623**
	Sig. (2-tailed)	.000
	N	67
e2	Pearson Correlation	.511**
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t1	Pearson Correlation	.582**
	Sig. (2-tailed)	.000
	N	67
t2	Pearson Correlation	.502**
	Sig. (2-tailed)	.000
	N	67
t3	Pearson Correlation	.265*
	Sig. (2-tailed)	.030
	N	67
t4	Pearson Correlation	.330**
	Sig. (2-tailed)	.006
	N	67
sum	Pearson Correlation	1
	Sig. (2-tailed)	
	N	67

Reliability Test

The reliability test was carried out using SPSS software with the following steps:

Analyse → Scale → Reliability Analysis

Jakarta State Polytechnic

Reliability Statistics

Cronbach's Alpha	N of Items
.856	22

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
c1	77.67	101.315	.582	.847
c2	78.19	101.128	.447	.850
c3	77.79	102.107	.421	.851
c4	78.46	100.707	.469	.849
a1	77.54	101.525	.496	.849
a2	77.81	97.280	.634	.843
a3	77.73	99.412	.554	.847
a4	78.30	100.788	.488	.849
f1	77.75	99.677	.530	.847
f2	78.28	98.479	.605	.845
f3	77.60	100.123	.546	.847
f4	78.13	96.270	.598	.844
e1	77.70	99.879	.527	.847
e2	77.67	99.527	.493	.848
e3	78.36	99.567	.298	.859
e4	78.82	100.392	.328	.856
e5	78.19	102.886	.235	.859
e6	78.49	100.466	.324	.856
t1	77.55	101.281	.534	.848
t2	78.04	100.104	.426	.851
t3	78.79	104.683	.165	.861
t4	78.73	103.018	.229	.859

Gunadarma University

Reliability Statistics

Cronbach's Alpha	N of Items
.912	22

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
c1	76.88	180.382	.683	.907
c2	77.09	177.511	.696	.906
c3	76.84	179.727	.647	.907
c4	77.23	175.686	.659	.906
a1	76.62	181.417	.566	.908
a2	76.69	180.299	.589	.908
a3	76.81	177.662	.687	.906
a4	77.11	173.605	.730	.904
f1	76.74	182.193	.505	.909
f2	77.12	178.437	.610	.907
f3	76.85	179.279	.636	.907
f4	77.31	173.916	.703	.905
e1	76.89	180.290	.559	.908
e2	76.85	179.909	.578	.908
e3	77.80	174.684	.505	.910
e4	77.81	173.608	.537	.909
e5	77.38	182.677	.317	.915
e6	77.65	181.409	.353	.914
t1	76.80	181.424	.535	.909
t2	76.92	178.432	.580	.908
t3	77.85	182.265	.344	.914
t4	78.07	181.324	.361	.913

Based on the validity and reliability tests conducted for samples of Gunadarma University students and the Jakarta State Polytechnic, it can be seen that the measuring instruments used met the validity and reliability requirements because all p-values in the validity test were < 0.05 and Cronbach's alpha > 0.7 and <0 ,95. According to Nunnally et al (1994), the reliability of a measuring instrument is said to be fulfilled if the Cronbach's alpha value is more than 0.7. However, this value should not be too high (less than 0.95) because it indicates all items measure the same thing (redundant information).

Normality Test

The next hypothesis test that will be carried out is the mean difference test on two dependent samples. Before carrying out further tests, there are conditions that must be met, namely the data must be normally distributed. Therefore, the

first step that must be done is to perform normality testing. In this study, normality testing was carried out using the Kolmogorovsmirnov test because the number of sample units was more than 30. To carry out the normality test, SPSS software was used with the following steps:

Analyse →Descriptive Statistics → Explore
→ Plots → Normality Plots with Tests

H0: Data is normally distributed
H1: Data not normally distributed $\alpha = 0.05$
Decision rule: H0 is rejected if the p-value < α, meaning that the data is not normally distributed.
Kolmogorov-Smirnov test results:

Jakarta State Polytechnic

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
sinkronus	.114	67	.030	.975	67	.207
asinkronus	.081	67	.200*	.986	67	.647

Gunadarma University

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
asinkronus	.104	73	.049	.964	73	.036
siknronus	.077	73	.200*	.977	73	.203

Based on the two tables above, it can be seen that the asynchronous variables from the Gunadarma University sample and the synchronous variables from the Jakarta State Polytechnic sample are not normally distributed because the p-value is <0.05 so H0 is rejected.

Based on this assumption test, because there are variables that do not meet the assumption of normality, parametric statistical tests cannot be used, so they must use non-parametric statistical tests which do not require certain distribution assumptions. In order to continue to fulfill the objective of conducting a comparative study between asynchronous and synchronous systems at each tertiary institution, the appropriate non-practical statistical test is the Wilcoxon test.

Wilcoxon Test (Wilcoxon Signed Rank Test)

The Wilcoxon test was carried out using SPSS software with the following steps:

Analyse → Nonparametric Tests → Legacy Dialogs → 2 Related Samples

H0: There is no significant difference between student satisfaction with synchronous and asynchronous systems

H1: There is a significant difference between student satisfaction with synchronous and asynchronous systems $\alpha = 0.05$

Decision rule: H0 is rejected if p-value < α

Jakarta State Polytechnic

Ranks

		N	Mean Rank	Sum of Ranks
sinkronus - asinkronus	Negative Ranks	10[a]	18.75	187.50
	Positive Ranks	48[b]	31.74	1523.50
	Ties	9[c]		
	Total	67		

a. sinkronus < asinkronus
b. sinkronus > asinkronus
c. sinkronus = asinkronus

The Ranks table above can be interpreted as follows:

1. Negative ranks (negative difference) between synchronous and asynchronous = 10, meaning that there are 10 respondents who experience a decrease in satisfaction from the asynchronous to synchronous system.
2. Positive ranks (positive difference) between synchronous and asynchronous = 48, meaning that there are 48 respondents who experienced an increase in satisfaction from the asynchronous to synchronous system.
3. Ties = 9, meaning that there are 9 respondents who did not experience an increase or decrease in satisfaction from the asynchronous to synchronous system.

Test Statistics[a]

	sinkronus - asinkronus
Z	-5.179[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Based on the test statistics table, pvalue or asymp is obtained. Sig. of 0 so that the pvalue <0.05 then H0 is rejected.

Gunadarma University

Ranks

		N	Mean Rank	Sum of Ranks
siknronus - asinkronus	Negative Ranks	10[a]	25.40	254.00
	Positive Ranks	44[b]	27.98	1231.00
	Ties	19[c]		
	Total	73		

a. siknronus < asinkronus
b. siknronus > asinkronus
c. siknronus = asinkronus

The Ranks table above can be interpreted as follows:

1. Negative ranks (negative difference) between synchronous and asynchronous = 10, meaning that there are 10 respondents who experience a decrease in satisfaction from the asynchronous to synchronous system.
2. Positive ranks (positive difference) between synchronous and asynchronous = 44, meaning that there were 44 respondents who experienced an increase in satisfaction from the asynchronous to synchronous system.
3. Ties = 19, meaning that there are 19 respondents who did not experience an increase or decrease in satisfaction from the asynchronous to synchronous system.

Test Statistics[a]

	asinkronus - siknronus
Z	-4.222[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

Based on the test statistics table, p-value or asymp is obtained. Sig. of 0 so that the p-value <0.05 then H0 is rejected. Based on the results of the Wilcoxon test for the two tertiary institutions, the results obtained were that both H0 were rejected, meaning that at each tertiary institution there was a significant difference between student satisfaction with the asynchronous and synchronous systems.

The Mann Whitney Test

The Mann Whitney test was carried out using SPSS software with the following steps:

Analyze → Nonparametric Tests → Legacy Dialogs → 2 Independent Samples

H0: There is no significant difference between student satisfaction at the Jakarta State Polytechnic and Gunadarma University with the synchronous learning system.

H1: There is a significant difference between student satisfaction at the Jakarta State Polytechnic and Gunadarma University towards the synchronous learning system $\alpha = 0.05$

Decision rule: H0 is rejected if p-value < α

Test Statistics[a]

	skor
Mann-Whitney U	2083.000
Wilcoxon W	4784.000
Z	-1.515
Asymp. Sig. (2-tailed)	.130

a. Grouping Variable: univ

The test statistics table above shows the pvalue or asymp. Sig. of 0.130 so that the p-value > 0.05 then H0 is not rejected.

Based on the results of the Mann Whitney test, the results show that H0 is not rejected, meaning that there is no significant difference between student satisfaction at the Jakarta State Polytechnic and Gunadarma University with the synchronous system.

RESULTS AND DISCUSSION

The results of the validity and reliability tests conducted for the student sample can be seen that the measuring instrument used meets the validity and reliability requirements because all p-values in the validity test are < 0.05 and Cronbach's alpha > 0.7 and < 0.95. This indicates that all items measure the same thing (redundant information).

According to Nunnaly et al (1994), the reliability of a measuring instrument is said to be fulfilled if the Cronbach's alpha value is more than 0.7. However, this value cannot be too high (less than 0.95) / because it indicates that all items measure the same thing (redundant information). Following are the descriptive statistics of the respondents:

To see whether the average satisfaction is really significantly different (statistically significant), further hypothesis testing is needed. The further hypothesis test that was carried out was the mean difference test on two dependent samples. Data must be normally distributed. The next thing to do is normality testing. In this study, the normality test used the Kolmogorov-Smirnov test because the number of sample units was more than 30.

H0: Data is normally distributed
H1: Data is not normally distributed $\alpha = 0.05$

Decision rule: H0 is rejected if the pvalue < α, meaning that the data is not normally distributed Kolmogorov-Smirnov test results:
Based on the research results, it can be seen that the asynchronous variables from the Gunadarma University sample and the synchronous variables from the Jakarta State Polytechnic sample are not normally distributed because the pvalue is > 0.05 so H0 is not rejected. Based on the assumption test, there are variables that do not meet the assumption of normality, so parametric statistical tests cannot be used, so nonparametric statistical tests are required which do not require certain distribution assumptions. In order to still be able to fulfill the objective of conducting a comparative study between asynchronous and synchronous systems at each tertiary institution, the Wilcoxon test is the most suitable non-practical statistical test.

H0: There is no significant difference between student satisfaction with synchronous and asynchronous systems.
H1: There is a significant difference between student satisfaction with synchronous and asynchronous systems α = 0.05

Decision rule: H0 is rejected if the p-value < α

CONCLUSION

Based on the research that has been done, it is concluded that there are differences in satisfaction felt by students at the Jakarta State Polytechnic and Gunadarma University regarding the system synchronous and asynchronous learning. Research shows the level of satisfaction with the synchronous system is higher than the asynchronous system. For Jakarta State Polytechnic students, the average satisfaction with the synchronous system was 43.03 out of a maximum score of 55, while for Gunadarma University students, the average satisfaction with the synchronous system was 41.73 out of a maximum score of 55. In further research looking at differences student satisfaction with the synchronous learning system at the two tertiary institutions, found no significant difference in satisfaction.

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