The Impact of Remote Learning on Unnes Student Satisfaction during The Covid-19 Pandemic: Structural Equation Modeling Approach

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Abstract. *The remote learning process during the Covid-19 pandemic impacted high student expectations of service quality. If educational institutions, especially lecturers, cannot provide quality services to students, there will be a problem of dissatisfaction in learning. Student dissatisfaction has an impact on low student participation during the learning process. This can reduce student participation and lower independent learning online. Therefore, institutions and related parties must analyze the quality of learning services consisting of tangible, reliability, responsiveness, assurance and empathy for student satisfaction. The method used to analyze these factors is to use the structural equation modelling (SEM) method. SEM analysis results show that the service quality factors consisting of tangible, reliability, responsiveness, assurance, and empathy, which significantly influence student satisfaction, significantly affect UNNES student satisfaction during the learning process using virtual learning. The important elements that are very influential are tangible and responsiveness with a significance level of α = 5% with a value of t> 1, 96, namely 0,009 and 0.004 with an estimate of 0, 44 and 0. 79. SEM analysis results also show that the factor reliability, assurance and empathy have no significant effect on student satisfaction, which is indicated by the t value <1.96, namely 0,664 0,438, 0,396 with an estimated value of -0,281, 1,166 and -0,722*

Keywords*: Tangible, Responsiveness, Service Quality, Student Satisfaction, Structural Equation Modeling (SEM)*

1 Introduction

The Covid-19 pandemic globally has affected all aspects of life, both socially and economically. One of the institutions greatly affected by this pandemic is educational institutions. Almost all schools and colleges, which initially held a face-to-face learning process, have switched to online learning. This has caused many controversies, especially for parents, teachers, lecturers and students, especially concerning online learning facilities and infrastructure. Therefore, educational institutions and related parties must be more careful and responsive in observing students' needs and desire to know what students want and fulfil these desires by providing quality services to students.

The quality of service encourages students to forge strong bonds and relationships between lecturers and students. Good quality service in a higher education institution will create learning satisfaction and comfort for students. According to [1] in their research on student satisfaction

in business schools in Pakistan, it explained that service quality significantly affects student satisfaction. Student satisfaction has been a major challenge for universities and colleges it has been recognized that student satisfaction is a major source. According to [2] student satisfaction is a competitive advantage and satisfaction also leads to students retention, an attraction for new students and positive word of mouth communication.

Several factors affect student satisfaction during remote learning, using online or online learning. This can be seen from several research results that examine student satisfaction with the quality of learning services. Based on the research results by [1] on business schools in Pakistan shows that service quality has a strong influence on student satisfaction. Besides, the system and service dimensions are important factors in increasing the learning process's ease [3]. Student satisfaction is also greatly influenced by tangible and responsiveness factors, and this is under the results of research conducted by [4]. This is also supported by other studies on student satisfaction with service quality which greatly affects student satisfaction [5]; [6]. Service quality is an important factor in surviving and winning people's interest in choosing the next level of study.

Based on these descriptions, this study intends to analyze the influence and quality of e-learning services on student satisfaction using the Structural Equation Modeling approach. These influencing factors can be used as a reference by related institutions in developing strategies so that student satisfaction can continue to increase.

2 Pandemic Covid-19

At the beginning of 2020, the world was shocked by the coronavirus outbreak (Covid-19), which infects almost all countries in the world. WHO Since January 2020 has declared the world entered into a global emergency related to this virus. In Indonesia, the government has issued a disaster emergency status starting from February 29, 2020, to May 29, 2020, related to this virus pandemic with total time the government has taken 91 days 4. Steps to get solve this extraordinary case are by socializing the movement of Social Distancing.

Based on the Circular (SE) [7] issued by the government on March 18, 2020, all indoor and outdoor activities in all sectors are temporarily postponed to reduce corona's spread, especially in the education sector. On March 24, 2020, the Minister of Education and Culture of the Republic of Indonesia issued Circular Letter Number 4 of 2020 [8].Regarding the Implementation of Education Policies in an Emergency for the Spread of Covid-19. The circular explains that the learning process is carried out at home through online / distance learning to provide meaningful learning experiences for students.

3 Remote Learning

Remote learning (RL) is learning by using media to occur between teacher and learner. In RL between teachers and learners not face to face, with words others through RL are possible between teachers and learners are different places, even can be separated by a distance very far. Remote learning (too also called remote education) is the training given to participants or students who did not gather together in one place regularly to receive lessons directly from the instructor. Materials and specific detailed instructions sent or made available to the participants, who then carry out tasks to be evaluated by the instructor. In fact, it can make possible that instructors and participants are separate not only in a separate manner geographic but also time.

The presence of information technology in supporting daily activities is increasingly beneficial. In its development, the current education world cannot be separated from information technology to convey messages and knowledge to everyone. Not only providing information, with the development of information technology, educational institutions also provide online

services (remote learning) for students as a means of supporting academic activities. In Indonesia, e-learning system can become a solution to overcome the backwardness of education in international world. The lag can be due to the remoteness, limited facilities and infrastructure, to the lack of qualified educators [9]. Semarang State University is one of the higher education institutions in Central Java that strives to provide learning satisfaction by providing quality services to students. One of the On line services used by Semarang State University to support the continuity of academic activities is the E-Learning System (ELENA). Elena is one of the methods used to measure the quality of e-learning based on end-users perceptions. In this study, the extent to which users' perceptions of ELENA service quality are perceived (actual) with the level of expectation (ideal). However, the reality shows that there are still complaints from students about the institution's quality of services, including tangible factors, reliability, responsiveness, assurance, and empathy. This has an effect on the decline in student graduates during the Covid-19 pandemic. This can be seen from the average graduates in the graduation period during 2020 in the following table 1.

Table 1. Students Graduated Departement of Education in 2019-2020

Description	Step 1	Step 2	Step 3	Step 4
2019	1	53	330	77
2020	108	34	33	22

Sumber: http://data.unnes.ac.id/index.php/lulusan/masastudi

Based on table 1, it can be seen that the decline in graduates during the pandemic that occurred in 2020. Therefore, educational institutions must be more aware of improving infrastructure quality and service by understanding the variables that affect student satisfaction. According to [10]Students who graduate with feelings satisfied to the university will help universities in reaching a wider market.

As stipulated by MEN.PAN No 63/KEP/M.PAN/7/2003, 2003)regarding General Guidelines for Public Service Delivery explains that service quality is a transparent and accountable certainty of procedures, time, and financing that must be carried out in full by every agency and service unit of government agencies following their overall duties and functions. According to [12], the service itself is the maximum effort provided by service officers from an industrial company to meet customer expectations and needs so that satisfaction is achieved. Meanwhile, according to [13] the definition of quality in the term conformance to requirement, which is by what is required or standardized, if a product has quality if it is following predetermined quality standards including raw materials, production processes, and products.

4 Student Satisfaction

Student satisfaction can be seen as customer satisfaction. Satisfaction students do not just depend on teaching considerations only, but must there is an in-depth analysis to find out overall influencing factors that contributes to satisfaction college student [14]. Customer satisfaction, term which is often used in marketing, is a measure of how the product is and services provided by the company meet or exceed expectations customers [15].Student satisfaction as the favorability of a student's subjective evaluation of the various outcomes and experiences associated with education [16]. Whereas [17] define satisfaction as "the sum of a student's behavioral beliefs and attitudes that result from aggregating all the benefits that a student receives from using the blended system. According to [18]; [19] student satisfaction is a complex concept, consisting of several dimensions. Service quality can be seen from five dimensions, including direct evidence (tangible), reliability (reliability), responsiveness (responsiveness), assurance (assurance) and empathy (empathy) [20].

5   Structural Equation Modelling

Structural Equation Modeling (SEM) is a multivariate analysis technique developed to cover the limitations of the previous analysis model which has been used extensively in statistical research.

According to [21] A technique statistic used to construct and test statistical models is usually deep forms of causal models. SEM is a hybrid technique that includes confirmatory aspects of factor analysis, path analysis and regression that can be considered a particular SEM case.

6   Method

This study uses a Structural Equation Modeling (SEM) approach to analyze the complex relationship between service quality factors and student satisfaction. The conceptual model used is based on the development of the [1] model, which shows the relationship between service quality and student satisfaction formulated in the following hypothesis:
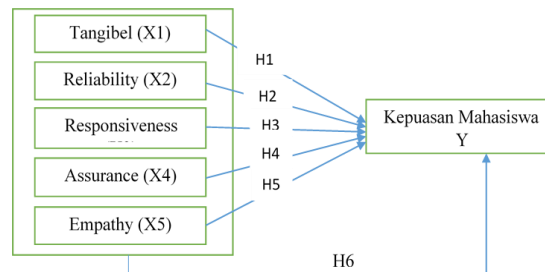

Image 1. Relationship between Service Quality and Student Satisfaction

a. Hypothesis 1:
    Ho: Tangible does not affect student satisfaction
    H1: Tangible affects student satisfaction
b. Hypothesis 2:
    Ho: reliability does not affect student satisfaction
    H1: reliability affects student satisfaction
c. Hypothesis 3:
    Ho: responsiveness does not affect student satisfaction
    H1: responsiveness affects student satisfaction
d. Hypothesis 4:
    Ho: assurance does not affect student satisfaction
    H1: assurance affects student satisfaction
e. Hypothesis 5:
    Ho: empathy does not affect student satisfaction
    H1: empathy affects student satisfaction

The data collected was taken from the population using a questionnaire with a likert scale of 1-5 as a data collection tool. The sample of this research is using a simple random sampling technique. In this study, the number of samples taken was 250 students considering that it can be eliminated if there is any missing data. The amount of missing data is not more than 10% [22]. Based on the study of research that has been done previously from several sources, a questionnaire consisting of 15 attributes was generated. The number of questionnaire items for each variable and the questionnaire items' source can be seen in Table 2.

Table 2. Service Quality Construction and Indicators

Tangibel	1. Lecturer Performance
	2. Mastery of ICT by Lecturers
	3. Ease of using e-learning
Reliability	1. According to the level of Knowledge
	2. According to Job Skills
	3. Work Experience
Responsiveness	1. Clarity of Material
	2. Giving Tasks
	3. Feedback
Assurance	1. Lecturer Competence
	2. Courtesy
	3. Credibility
Emphaty	1. Attention to students
	2. Multidirectional communication
	3. Sympathy

The questionnaire distributed by researchers to 123 respondents was obtained from UNNES PGSD students even semester 2020/2021. Number and percentage general description of respondent characteristics based on gender 47%;(male gender 30.42%, female 50.25%), domicile 55.46%, learning time 60-90 minutes 48.32%, internet fluency 54, 20%, and credit budget > 100 thousand.

Validity Test and Reliability Test Validity test is carried out to determine the extent to which the measuring instrument can measure what it wants to measure. Based on the data from the questionnaire results for the assessment of student satisfaction, the validity of questions 1 to 15 was tested using the product-moment correlation equation (Pearson). All variables are valid because r count> r critical (0.300) (Sugiyono, 2016).

Reliability testing is done to determine whether the questionnaire that has been made is reliable or not by using the Alpha cronbach formula. Because the value of r count (0.967)> 0.60 (Suyuthi, 2005), the questionnaire data is declared reliable, it can be concluded that the questionnaire can be trusted with the correctness of the data.

Analysis of the measurement model used in SEM is Confirmatory Factor Analysis (CFA); with this tool, it is known whether the existing indicators really can explain a construct. The suitability test analysis uses a measure of conformity or Goodness of Fit (GOF). The criteria used as a measure of conformity are normed chi-square, CFI (Comparative Fit Index), GFI (Goodness of Fit Index) and RMSEA (The Root Mean Square Error of Approximation) to test the suitability between the model and the data. Structural model analysis using Multiple Regression Analysis. With this tool, it can be seen whether there is a significant relationship between exogenous (independent) and endogenous (dependent) variables. If there is a relationship, how strong is the relationship?

6.1 Measurement Model Analysis

The measurement model analysis was performed using Confirmatory Factor Analysis (CFA). With CFA, it is known whether the existing indicators can really explain a construct. By carrying out CFA, it is possible that an indicator is considered not to have a strong influence or can explain a construct. The criteria used are for the validity test is at-value of 1.96, Standard Loading Factor (SLF) 0.5, and for the reliability of Construct Reliability (CR), 0.70 & Variance Extracted (VE) 0.50.

$$Construct\ Reliability = \frac{(\sum Std.Loading)^2}{(\sum Std.Loading)^2 + \sum \varepsilon_j}$$

$$Variance\ Extracted = \frac{\sum Std.Loading^2}{\sum Std.Loading^2 + \sum \varepsilon_j}$$

Table 3. Model Reliability Results

Latent variable	CR Value	VE Value	Conclusion Reliability
KM	0,799	0,668	Good
TAN	0,950	0,614	Good
REL	0,976	0,819	Good
RES	0,955	0,657	Good
ASS	0,974	0,805	Good
EMP	0,973	0,794	Good

Table 3 above shows that the whole latent variables have good model reliability because CR > 0.70 and VE > 0.50.

6.2 Suitability Test Analysis

In data processing, it has been explained that several measures are used to determine the GOF of a model. Four measures can be used as a basis for indicating that a model is fit by utilizing the normed chi-square test, CFI, GFI and RMSEA. From Table 4, it can be seen that the estimation results are within the target level of fitness so that it can be said that the model is fit.

Table 4. Fit Summary Model

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	45	248,074	126	,000	**1,969**
Saturated model	171	,000	0		
Independence model	18	1321,363	153	,000	8,636

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	,044	**,844**	,788	,622
Saturated model	,000	1,000		
Independence model	,302	,291	,208	,261

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,812	,772	,898	,873	**,896**

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	**,068**	,073	,105	,000
Independence model	,250	,238	,263	,000

Based on table 4, it can be seen that the confidence level is around 90 per cent, the RMSEA population for the Default model is between 0.073 and 0.105. while the significance level is around 90 per cent, the RMSEA population for the independence model is between 0,238 and 0.263

6.3 Structural Model Analysis

The structural model analysis was performed using Multiple Regression Analysis. With this tool, it can be seen whether there is a significant relationship between exogenous (independent) and endogenous (dependent) variables. If there is a relationship, how strong is the relationship? The criteria used are t 1.96 for a significance level of 5% and t 1.282 for a significance level of 10%. Structural model analysis can be seen in Table 5.1.

a. Analysis of the relationship between tangible variables and customer satisfaction variables. Based on the identification of the value of the tangible variable path coefficient, it is proven to significantly affect customer satisfaction at a significance level of $\alpha = 10\%$ because the t-value> 1.282 in the initial model and the final model with a significance level of $\alpha = 5\%$ > 1.96, namely 0.07 and 0,09 with estimated values of 0.45 and 0.44. Thus Hypothesis 1: H1 is accepted; tangibles are statistically proven to affect customer satisfaction. This is in line with the theory that builds this hypothesis based on a study of tangible literature that has a positive effect on customer satisfaction [5], [1].

b. Analysis of the relationship between the reliability variable and the Customer Satisfaction variable. Based on identifying the value of the variable path coefficient, the reliability variable does not significantly affect customer satisfaction at the significance level of $\alpha = 5\%$ because the t-statistic <1.96 is 0,34 and 0,66 and with SLF values in the initial and final models are 0,11 and -0.28. Thus Hypothesis 2: H1 is rejected; reliability does not statistically affect customer satisfaction.

c. Analysis of the relationship between the Responsiveness variable and the Customer Satisfaction variable. Based on identifying the path coefficient value, the responsiveness variable significantly affects customer satisfaction at a significance level of $\alpha = 5\%$ with a t-statistic value> 1.96, namely 0,001 and 0,004. The SLF value in the models are 0,69 and 0.79. Thus Hypothesis 3: H1 is accepted; responsiveness statistically affects customer satisfaction. This is in line with the theory that builds this hypothesis, which is based on literature studies that responsiveness positively affects customer satisfaction (Akbar, 2009; Ijaz et al., 2011)
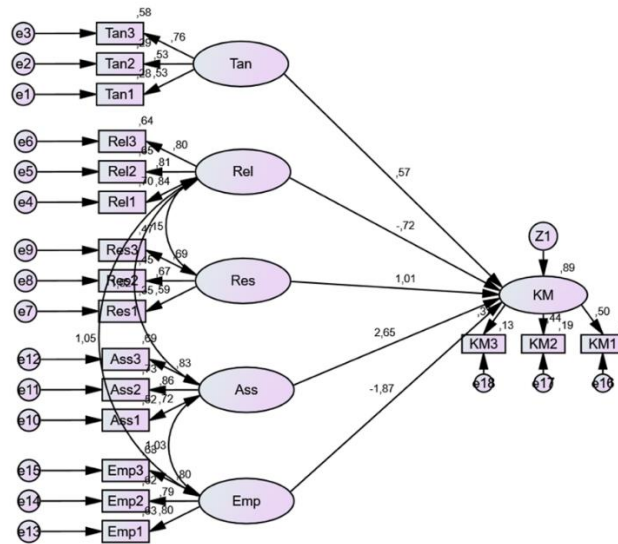
Figure 2. Measurement Model

Table 5. GOF Measurement Results from the initial model and after modification.

GOF size	Target Match Rate	Initial estimation results	The final estimation result
CMIN/DF	Between 2-5 and <2	4,993	1,969
GFI	Approaching one is very good	0,696	0,844
CFI	Approaching one is very good	0,556	0,896
RMSEA	< 0,08 good fit	0,181	0,068

Table 6. The results of the analysis of the influence between latent variables

Path analysis	Estimation		CR value		sig-value		Conclusion
	Early	End	Early	End	Early	End	
TAN → KM	0,459	0,440	2,704	2,603	0,007	**0,009**	Significant
REL → KM	0,116	-0,281	0,942	-0,434	0,346	0,664	Not significant
RES → KM	0,698	0,790	3,442	2,871	0,001	**0,004**	Significant
ASS → KM	-0,259	1,166	-2,075	0,776	0,038	0,438	Not significant
EMP → KM	0,158	-0,722	1,234	-0,848	0,217	0,396	Not significant

d. Analysis of the relationship between the Assurance variable and the Customer Satisfaction variable. The identification of the assurance variable's path coefficient value significantly affects customer satisfaction at the significance level α = 5% t-statistic <1.96, namely 0,03 and 0,04 and the SLF value at initial models are 0.25 and 1,16. Thus Hypothesis 4: H1 is accepted; assurance does not statistically affect customer satisfaction.

e. Analysis of the relationship between the Empathy variable and the Customer Satisfaction variable. Based on the identification of the empathy variable's path coefficient value, it does not significantly affect customer satisfaction at the significance level α = 5% because the t-statistic <1.96 is 0.21 and 0.39 and the value The SLF in the initial and final models

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is 0.15 and 0.72. Thus Hypothesis 5: H1 is rejected; empathy does not statistically affect customer satisfaction.

7 Conclusion

This study analyzed remote learning's impact on student satisfaction during the COVID-19 pandemic using e-learning (ELENA). The model developed is service quality as an exogenous variable and student satisfaction as an endogenous variable. The results obtained based on the theory developed and processed using SEM show that the tangible and responsiveness dimensions significantly affect student satisfaction. This study indicates that the quality of the e-learning system to maintain student satisfaction must pay attention to the dimensions of service quality, which consist of tangibles such as ease of access to elements and more attractive learning features. Meanwhile, students hope that all lecturers can carry out the remote learning process properly from the responsiveness dimension.

References

[1] A. Ijaz, S. Irfan, S. Shahbaz, M. Awan, and M. Sabir, "An empirical model of student satisfaction: Case of Pakistani public sector business schools," *J. Qual. Technol. Manag.*, vol. 7, no. 2, pp. 91–114, 2011.

[2] M. Hossain, "An Empirical Model of Students Satisfaction and Service Quality of Jahangirnagar University," J. Soc. Sci. Res., vol. 13, no. December, pp. 2806–2814, 2018.

[3] L. Eberle, G. S. Milan, and E. Dorion, "Service quality dimensions and customer satisfaction in a Brazilian university context," Benchmarking, vol. 23, no. 7, pp. 1697–1716, 2016.

[4] A. Pasaribu and K. Syahputri, "Pendekatan Structural Equation Modeling Untuk Menganalisis Kepuasan Pelanggan Di Pt Telkomsel Sumbagut," J. Tek. Ind. USU, vol. 3, no. 3, pp. 52–58, 2013.

[5] M. M. Akbar and N. Parvez, "IMPACT OF SERVICE QUALITY, TRUST, AND CUSTOMER Mohammad Muzahid Akbar and Noorjahan Parvez," ABAC J., vol. 29, no. 1, pp. 24–38, 2009.

[6] S. Thakur and D. SINGH, "Impact of Service Quality, Customer Satisfaction and Trust on Customer Loyalty: A Study with Special Reference to Telecommunication Company in Madhya," Zenith Int. J. Business, …, vol. 1, no. 2, pp. 66–78, 2011.

[7] Kemendikbud, "Surat Edaran Menteri Pendidikan Dan Kebudayaan Republik Indonesia Tentang Pencegahan Corona Virus Disease (Covid-19) Pada Satuan Pendidikan," Surat Edaran Menteri Pendidik. Dan Kebud. Republik Indones. Nomor 3 Tahun 2020, vol. 3, no. 1, p. 2, 2020.

[8] S. Arifin, "Panduan Pengembangan dan Penyelenggaraan Kuliah Daring Indonesia Terbuka & Terpadu," Buku Pembelajaran Daring, vol. 1, no. 1, pp. 1–159, 2013.

[9] D. Ayuni and A. Mulyana, "Applying Service Quality Model as a Determinant of Success in E-learning: The Role of Institutional Support and Outcome Value," Rev. Integr. Bus. Econ. Res., vol. 8, no. 1, pp. 145–159, 2019.

[10] P. Lenton, "Determining student satisfaction: An economic analysis of the National Student Survey," Econ. Educ. Rev., vol. 47, no. May, pp. 118–127, 2015.

[11] Keputusan Menteri Pendayagunaan Aparatur Negara No 63/KEP/M.PAN/7/2003, "MENPAN_63_2003.pdf." 2003.

[12] I. D. Arindita, Aloysius Reza, Sulistyaningtyas, "Pengaruh Kualitas Pelayanan Terhadap Citra Perusahaan Di Olimart Pt. Wina Wira Usaha," FISIP - Atma Jaya Yogyakarta, pp. 1–14, 2013.

[13] E. Sufiyanti, A. J. Sayutu, and A. O. Windarti, "Tingkat Kepuasan Konsumen Terhadap Kualitas Pelayanan Minimarket," J. Ris. Bisnis dan Investasi, vol. 3, no. 1, p. 43, 2017.

[14] P. Songsathaphorn, C. Chen, and A. Ruangkanjanases, "A Study of Factors Influencing Chinese Students' Satisfaction toward Thai Universities," J. Econ. Bus. Manag., no. January, pp. 105–111, 2014.

[15] Q. Mazumder, "Student Satisfaction in Private and Public Universities in Bangladesh," Int. J. Eval. Res. Educ., vol. 2, pp. 78–84, 2013.

[16] K. M. Elliott and D. Shin, "Student Satisfaction: An alternative approach to assessing this important concept," J. High. Educ. Policy Manag., vol. 24, no. 2, pp. 197–209, 2002.

[17] J.-H. Wu and T.-L. Hsia, "A study of student satisfaction in a blended e-learning system environment," Comput. Educ., vol. 55, pp. 155–164, 2010.

[18] M. Marzo, M. Iglesias, and P. Rivera, "A new management element for universities: Satisfaction with the offered courses," Int. J. Educ. Manag., vol. 19, pp. 505–526, 2005.

[19] J. T. E. Richardson, "Instruments for obtaining student feedback: A review of the literature," Assess. Eval. High. Educ., vol. 30, no. 4, pp. 387–415, 2005.

[20] A. Parasuraman, V. A. Zeithaml, and L. L. Berry, "A Conceptual Model of Service Quality and Its Implications for Future Research," J. Mark., vol. 49, no. 4, p. 41, 1985.

[21] Y. Sarwono, "Pengertian Dasar Structural Equation Modeling (SEM)," J. Ilm. Manaj. Bisnis Ukrida, vol. 10, no. 3, p. 98528, 2010.

[22] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*. 2014.