



Analysis of UT Student Satisfaction with the Tuweb system using CSI, IPA & SEM-PLS

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ABSTRAK

Bentuk perkembangan di dunia pembelajaran sebagai akibat kemajuan teknologi informasi dan komunikasi adalah proses pembelajaran dilaksanakan secara jarak jauh. Universitas Terbuka sebagai institusi yang melaksanakan berbagai model belajar juga harus menghadapi perubahan modus atau model belajar untuk mahasiswa yang memberikan pilihan model belajar dengan luring di kelas. Ditambah dengan adanya pandemi Covid-19, perubahan tersebut adalah perubahan sistem pembelajaran dari modus TTM yang digantikan dengan Tuweb (pembelajaran blended yang diselenggarakan secara online). Penelitian ini bertujuan untuk menganalisa kepuasan user atau mahasiswa UT terhadap sistem Tuweb dengan menggunakan dimensi Servqual. Sumber data berasal dari populasi mahasiswa UT di UPBJJ UT Denpasar, dimana untuk penentuan responden dilakukan dengan teknik sampling purposive. Teknik analisis yang dipakai adalah Customer Satisfaction Index (CSI), Importance Performance Analysis (IPA), dan Structural Equation Modelling (SEM) dengan pemakaian Partial Least Squares (PLS-SEM). Kesimpulan dari hasil irisan ketiga metode (CSI, IPA dan SEM-PLS) bahwa pelayanan Tuweb UT mendapatkan penilaian cukup puas dari mahasiswa, dimana variabel yang memberikan keunggulan pada tuweb UT adalah variabel empati. Sebagai catatan untuk perbaikan pelayanan tuweb dari UT adalah layanan Tuweb memiliki ketersediaan respon layanan pembelajaran pada setiap waktu dan tempat (variabel daya tanggap) serta layanan Tuweb memiliki akurasi kecepatan lebih baik dibandingkan dengan akurasi kecepatan yang dijanjikan (variabel keandalan).

ABSTRACT

One form of development in the world of learning as a result of developments in information and communication technology (ICT) is that distance learning is possible. The Open University, a public university, uses various modes of learning has also experienced changes in the modes of learning for students who decide to study in person during class. Coupled with the Covid-19 pandemic, this change is a change in the learning system from the TTM mode which is replaced by Tuweb (blended learning that is held online). This study aims to analyze user or UT student satisfaction with the Tuweb system using the Servqual dimension. The data source came from the UT student population at UPBJJ UT Denpasar, where the determination of respondents was carried out using a purposive sampling technique. The Customer Satisfaction Index (CSI), Importance Performance Analysis (IPA), and Structural Equation Modeling (SEM) using Partial Least Squares (PLS-SEM) are the analytical techniques used. The results of the slices of the three methods (CSI, IPA and SEM-PLS) is that Tuweb UT's services get quite satisfied ratings from students, where the variable that gives excellence to Tuweb UT is empathy. As a note for improving the tuweb service from UT, the Tuweb service has the availability of a learning service response at any time and place (responsiveness variable) and the Tuweb service has better speed accuracy than the promised speed accuracy (reliability variable).

1. INTRODUCTION

Advances in science and technology continue to develop along with the times. At this time, information and communication technology (ICT) has an impact on many facets of human life. both in the professional, commercial, academic, and entertainment worlds (Goh & Sigala, 2020; Xie et al., 2020; Zuppo, 2012). ICT is also widely acknowledged as a tool for accelerating change, including changes in working circumstances, how information is handled and exchanged, how students learn, how to conduct scientific research, and how to access information and communication technology (Goh & Sigala, 2020; Irving, 2006). Coupled with unexpected events in the form of a Covid-19 illness epidemic have forced rapid modifications

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in a number of industries. The virus immediately began to spread around the planet. The rising breadth and impact of covid-19 are being reported in daily statistics from throughout the world. Also experiencing a national emergency is Indonesia (Kanojiya, 2020; Mahsun et al., 2021). The government's recommendation to stay at home and avoid physical and social contact must be heeded, and the face-to-face learning mode must be switched to online (Apriyanti, 2020; Verdinelli & Scagnoli, 2013).

The process of change also occurs in the field of education or learning, namely traditional teaching has changed as a result of the growth of ICT and the adoption of the internet and the Covid-19 pandemic as a new teaching model (Oliveira et al., 2021; Rasheed et al., 2020). One advancement in the field of education is the ability to conduct learning activities remotely. This eliminates the need for face-to-face interactions or direct interaction between teachers and students in the same place and time, as occurs in the learning process generally (Islam et al., 2022; Misra & Mazelfi, 2021). In accordance with the times, where technology is increasingly sophisticated, the development of distance education system services is increasingly diverse. Universities providing distance education in various countries are also growing, with educational service facilities that are increasingly varied, such as using electronic, print and internet media (Lassoued et al., 2020; Putri & Sari, 2020).

Universitas Terbuka (UT) as a state university that implements various modes of learning has also experienced changes in the modes of learning for students who choose to study face-to-face in class. The role of the lecturer as a bridge for students in supporting independent learning, so that learning activities are called tutorials, and teachers are called tutors. For students with online tutorial learning modes, video conferencing, Webinar Tutorials, the outbreak of the Covid-19 pandemic has not created an obstacle because of the learning methods that have been implemented so far (Torres-Gastelú & Kiss, 2016; Zuhairi et al., 2019). Changes are needed for UT students who choose face-to-face Tutorial mode which is replaced with Tuweb. Tuweb, or Tutorial Webinar, is a blended learning tool that blends in-person instruction with online learning, particularly the second generation, which enables students to collaborate during the learning process (Budiarso et al., 2022; Matukhin & Zhitkova, 2015). The new mode accepted by students requires readiness to deal with it, both in terms of mastery of technology and the initial problems encountered by students. Organizing Tuweb which originally only provided synchronous activities via Ms. Teams will be supplemented with asynchronous activities through virtual classes.

Now that the Covid-19 pandemic has ended, the learning system using the Webinar Tutorials mode at UT is again being held using the Tuweb mode so that the number of Tuweb classes has decreased drastically because it is a replacement system for the Face-to-Face Tutorial mode. The implementation of the Webinar Tutorial in general has a positive impact, namely replacing the Face-to-Face Tutorial mode which requires quite high operational costs, the same system as the Face-to-Face Tutorial mode but held virtually, the learning process takes place on time and can be done in various places, as well as the service process learning is done quickly with the same student achievements as other learning systems (Alawamleh et al., 2022; Azlan et al., 2020). From this, an evaluation of the Tuweb system is needed in order to convince UT management to maintain the system so that the institutional goals are achieved optimally, effectively and have high efficiency values. The results of this evaluation will also add results or empirical evidence to the success of blending learning.

In a Systematic Review, previous study conducted study to examine the effects of moving class time to an online learning environment (Müller & Mildenerger, 2021). The findings indicate that there is not much of a difference between traditional and mixed classroom learning. Similar learning outcomes were discovered. As a result, blended learning with shorter class periods does not significantly improve learning in traditional classroom setting. Other study wants to investigate the variables that affect learners' happiness with blended learning in his research (Huang, 2021). 173 undergraduates who were enrolled in a first-year interactive game design course at Ling Tung University in Taichung, Taiwan, were among the respondents. This clarifies how perceived utility is influenced by perceived ease of use. Learning motivation is positively impacted by perceived utility and usability. Learning satisfaction is positively impacted by learning motivation. According to research using a computer-assisted blended learning strategy promotes student engagement, active learning, and the development of highly sophisticated analytical thinking (Sarkar et al., 2021).

In this study, a collaborative learning approach paradigm was used to offer education to medical students both online and in person. The findings demonstrated that blended learning is a method that fosters deeper understanding of educational outcomes while also enhancing student involvement and participation. Contradictory results were obtained by research sought to conclusively show the empirical relationship between reversed and mixed learning pedagogies and desired student outcomes engagement, performance, and satisfaction (Fisher et al., 2021). The results show that both reversed and blended learning favorably affect students' perceptions of their performance, engagement, and satisfaction.

However, reversed learning buffers the blended learning effect, highlighting the fact that blended learning pedagogy is a delivery method that has no bearing on students' learning.

From the results of previous research, especially the research gap and the start of the Covid-19 pandemic to subside by entering the post-pandemic period and readiness to welcome this period or era of disruption, the researcher is interested in conducting research with the aim of analyzing user or UT student satisfaction with the Tuweb system using the Servqual dimension and updates in using various learning evaluation methods. This study will take a population of UT UPBJJ Denpasar students. From this research, it will have a contribution to UT's management in maintaining the system and recommendation materials for the Tuweb system so that it can further enhance its use as a distance learning system in this era of change/disruption.

2. METHODS

The design of this study is a quantitative research with experimental methods (Yudatama et al., 2019). From the experimental results of the three analytical techniques in the form of CSI, IPA and SEM-PLS which are used, then a comparison of the results will be carried out so that recommendations from each dimension and indicators can be obtained that affect student satisfaction in the Tuweb system. This study consists of several stages or experimental procedures as shown in the Figure 1.

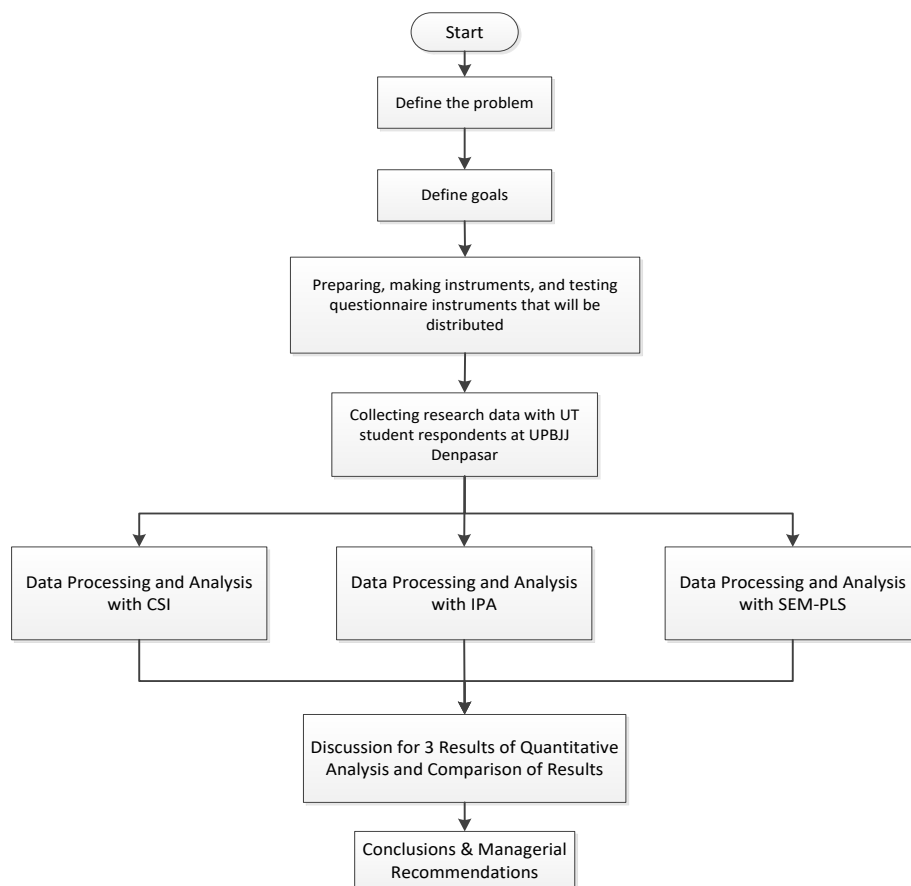


Figure 1. Experimental Procedures

The population of UT students at UPBJJ UT Denpasar served as the data source, and a selective sampling technique was used to identify respondents. Using this sampling strategy, the sample is chosen while taking specific factors into account (Gandhy & Hairuddin, 2018). The conditions used are as follows: UPBJJ UT Denpasar students and have used the Tuweb learning method.

Testing the measuring instrument for all variables in this study used 2 types of questionnaires, namely questionnaire 1 and questionnaire 2, submitted to respondents to be able to give statements according to what they felt and experienced. The basis for making a questionnaire statement using the variables from Servqual, where the indicators used are as listed in Table 1.

Table 1. Respondent Profile

No.	Variables	Code	Indicators
1	Tangibles	X1.1	The appearance of the device used in Tuweb is attractive and not confusing in the learning process
		X1.2	Tuweb services (MS Team & LMS UT) have clear menus or links used in the learning process.
		X1.3	The content on the Tuweb system is related to
		X1.4	the field of Education and learning.
		X1.5	The navigation process in using the Tuweb system device is not confusing in carrying out the learning process.
		X1.6	Devices used in the Tuweb system can be displayed perfectly on different browsers
2	Reliability	X2.1	The Tuweb service has conformity with the promised learning service
		X2.2	Tuweb services have the reliability of the quality of learning services
		X2.3	Tuweb services have the consistency of learning services on different content access
		X2.4	Tuweb service has better speed accuracy than the promised speed accuracy
		X2.5	The Tuweb Service Toolkit can be accessed at any time
		X2.6	The Tuweb Service Toolkit can quickly restart in the event of a crash
3	Responsiveness	X3.1	Tuweb services have a fast response when contacted to find information and convey problems in learning
		X3.2	The Tuweb service has notifications to remind something in the learning process
		X3.3	Tuweb service has a good response speed in meeting the facilitation and new technology
		X3.4	Tuweb services have a willingness to solve learning service problems
		X3.5	Tuweb services have proactiveness in providing assurance of the quality of learning services
		X3.6	Tuweb services have the availability of learning service responses at any time and place
4	Assurance	X4.1	The devices used by the Tuweb system have good security
		X4.2	Tuweb service providers are reputable
		X4.3	Tuweb services provide convenience in answering a problem in learning
		X4.4	Tuweb services are serious about appreciating students through quality assurance of learning services
5	Empathy	X5.1	Tuweb services have good skills in providing learning suggestions and solutions to students
		X5.2	Tuweb services provide space for students
		X5.3	in
		X5.4	Tuweb services prioritize the choice of learning services according to the wishes of students
		X5.5	Tuweb services pay attention to students on learning service information
6	Satisfaction	Y1	Tuweb services have service quality that meets standards and is good in terms of learning
		Y2	Tuweb services have a quality of service that fits both in terms of learning
		Y3	Tuweb services create a strong emotional bond between tutors and students
		Y4	Tuweb services provide cost savings in carrying out the entire learning process.
		Y5	Tuweb services provide convenience in the learning process.

Before data collection was carried out, the questionnaire instrument was tested first so that the instrument could be said to be valid and reliable (Schmid et al., 2020). For data collection procedures, it is carried out by distributing questionnaires to respondents using the online method. Questionnaires are made in a Google form and then distributed online via these links. The Customer Satisfaction Index (CSI),

which is an approach that takes into account the relative relevance of the measured service quality criteria, is used to calculate the overall degree of customer satisfaction. The Customer Satisfaction Index (CSI) value is calculated using the Importance and Performance Analysis (IPA) score of each dimension and service quality attribute in order to assess the degree of satisfaction with service performance (Anurrasyid & Sumitra, 2019).

The Importance Performance Analysis (IPA) method, often known as quadrant analysis, seeks to quantify the relationship between consumer perceptions and product/service quality improvement goals. The primary purpose of IPA is to provide data linked to service elements that customers claim have a significant impact on their level of satisfaction and service factors that need to be changed because of unsatisfactory existing conditions. It is simple to explain data and acquire useful recommendations thanks to IPA, which combines factor measurements of the level of importance (expectations) and level of performance (perceptions) in a two-dimensional graph (Wijaya et al., 2021). Based on the findings of the importance-performance measurement, which give interpretation, the IPA graph is divided into four quadrants, as illustrated in the accompanying Figure 2.

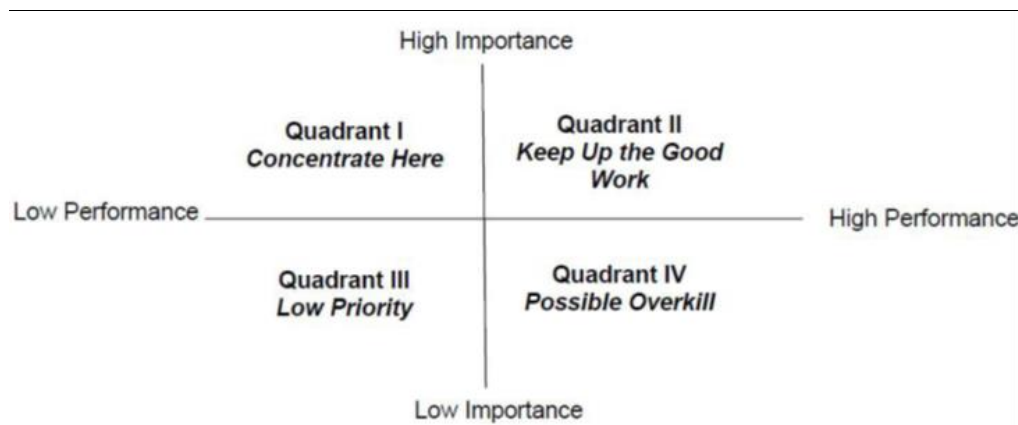


Figure 2. Importance Performance Analysis Quadrant Division

Using the Partial Least Squares (PLS-SEM) method of Structural Equation Modeling (SEM), hypotheses were tested with the aid of the SmartPLS 3 program. PLS-SEM can be used without normally distributed data, a small number of samples, or the need for goodness of fit because parameter estimation can be done immediately. According to previous studies these methods are frequently utilized in research in the management and educational domains with the goal of examining cause and effect connections between latent components (J. F. Hair et al., 2019; Purwanto & Sudargini, 2021). This method is highly useful for determining the causal linkages in theoretical models based on empirical evidence.

3. RESULT AND DISCUSSION

Results

Respondent Profile

Students at UT UPBJJ Denpasar participated in the study as respondents. There are 243 participants in the survey. In Table 2, the respondent's profile is described in more detail.

Table 2. Respondent Profile

Characteristics	Category	Amount
Age	< 21 years	11
	21-25 years	55
	26-30 years	59
	31-35 years	62
	36-40 years	29
	41-45 years	14
	46-50 years	10
	51-55 years	3
Registration Year	2019.1	13
	2019.2	5

Characteristics	Category	Amount
	2020.1	3
	2020.2	6
	2021.1	11
	2021.2	13
	2022.1	51
	2022.2	45
	2023.1	96
Gender	Male	54
	Female	189

Instrument Testing

Two different types of questionnaires—questionnaire 1 (CSI and IPA) and questionnaire 2 (SEM PLS)—were used to test the measuring instrument for all variables in this study. These questionnaires were given to respondents so they could make statements based on how they felt and experienced things. The essential criteria for the questionnaire as an instrument are validity and reliability. Valid and trustworthy results have been acquired from the test results.

CSI Method

Calculating the Mean Importance Score (MIS) and Mean Satisfaction Score (MSS) The average score for the importance of a characteristic is known as the Mean Importance Score (MIS), and it is obtained from the typical expectations of every respondent. The average reality of an attribute obtained from the typical respondent perception of system performance is the Mean Satisfaction Score (MSS), while. The average level of satisfaction, also known as the Mean Satisfaction Score (MSS), and the Weight Score (WS) are multiplied to create the weighted score. UT student satisfaction index based on the servqual attribute is show in Table 3.

Table 3. UT Student Satisfaction Index based on the Servqual Attribute of the UT Tuweb System Service

No.	Atributte	Code	MIS	MSS	WF (%)	WS (%)
1	The appearance of the device used in Tuweb is attractive and not confusing in the learning process	X1.1	4.03	4.02	3.73	14.99479
2	Tuweb services (MS Team & LMS UT) have clear menus or links used in the learning process.	X1.2	4.08	4.04	3.78	15.25616
3	The contents of the content on the Tuweb system are related to the field of education and learning	X1.3	4.12	4.10	3.82	15.66128
4	The navigation process in using the Tuweb system device is not confusing in carrying out the learning process.	X1.4	4.04	4.02	3.74	15.01009
5	Devices used in the Tuweb system can be displayed perfectly on different browsers	X1.5	3.95	3.97	3.66	14.50817
6	The information provided by the Tuweb system is clear, complete and accurate	X1.6	4.05	4.03	3.75	15.1177
7	The Tuweb service has conformity with the promised learning service	X2.1	4.00	3.99	3.70	14.76571
8	Tuweb services have the reliability of the quality of learning services	X2.2	3.95	3.93	3.66	14.38769
9	Tuweb services have the consistency of learning services on different content access	X2.3	3.91	3.88	3.62	14.04438
10	Tuweb service has better speed accuracy than the promised speed accuracy	X2.4	3.84	3.79	3.56	13.50026
11	The Tuweb Service Toolkit can be accessed at any time	X2.5	4.05	4.06	3.74	15.1948
12	The Tuweb Service Toolkit can quickly restart in the event of a crash	X2.6	3.86	3.80	3.58	13.60198

No.	Atributte	Code	MIS	MSS	WF (%)	WS (%)
13	Tuweb services have a fast response when contacted to find information and convey problems in learning	X3.1	3.91	3.90	3.62	14.13362
14	The Tuweb service has notifications to remind something in the learning process	X3.2	3.90	3.88	3.61	14.01472
15	Tuweb service has a good response speed in meeting the facilitation and new technology	X3.3	3.97	3.93	3.67	14.4175
16	Tuweb services have a willingness to solve learning service problems	X3.4	3.99	3.97	3.69	14.64419
17	Tuweb services have proactiveness in providing assurance of the quality of learning services	X3.5	3.98	3.92	3.68	14.4472
18	Tuweb services have the availability of learning service responses at any time and place	X3.6	4.00	3.97	3.71	14.70464
19	The devices used by the Tuweb system have good security	X4.1	4.03	4.02	3.73	14.99479
20	Tuweb service providers are reputable	X4.2	4.05	4.01	3.74	15.00987
21	Tuweb services provide convenience in answering a problem in learning	X4.3	4.04	4.00	3.74	14.94857
22	Tuweb services are serious about appreciating students through quality assurance of learning services	X4.4	4.04	4.03	3.74	15.08697
23	Tuweb services have good skills in providing learning suggestions and solutions to students	X5.1	4.02	3.98	3.73	14.8262
24	The Tuweb service provides space for students to submit suggestions	X5.2	4.10	4.09	3.79	15.52066
25	Tuweb services prioritize the choice of learning services according to the wishes of students	X5.3	3.97	3.95	3.68	14.50809
26	Tuweb services pay attention to students on learning service information	X5.4	4.04	4.01	3.74	14.97933
27	Tuweb services provide easy access to learning services.	X5.5	4.09	4.07	3.79	15.41148
Total			108.02	107.34	100.00	397.69

Find the Customer Satisfaction Index (CSI) value. CSI can have a maximum value of 100%. Poor service performance is indicated by a CSI value of 50% or less. Users are satisfied with service performance when the CSI value is 80% or higher, as demonstrated in [Table 4](#).

Table 4. Satisfaction Level Criteria

No.	CSI Value (%)	Description
1	81% - 100%	Very satisfied
2	66% - 80.99%	Satisfied
3	51% - 65.99%	Quite satisfied
4	35% - 50.99%	Less satisfied
5	0% - 34.99%	Not satisfied

The weighted score is divided by the largest scale used to determine the CSI percentage value. The attribute on the interest questionnaire for Tuweb service that gets the smallest score is attribute X2.4 (Tuweb service has better speed accuracy than the promised speed accuracy) with an average score of 3.84 and for the attribute with the highest score is X5.2 (Service Tuweb provides space for students to convey suggestions) with an average score of 4.10. Based on this, from 27 service quality attributes in this study, all UT students were considered satisfied because they had an average MIS score of greater than 3 (three).

Calculations at each stage of the CSI method then obtained a satisfaction index for Tuweb service quality of 79.54%. This indicates that UT students are satisfied with the Tuweb services provided.

Importance Performance Analysis (IPA) Method

The following is the outcome of averaging the levels of importance or expectation (importance) and performance (performance) elements as given in [Table 5](#).

Table 5. Measurement of the Level of Importance and Performance Factors

No.	Attribute	Code	Mean	
			Importance	Performance
1	The appearance of the device used in Tuweb is attractive and not confusing in the learning process	X1.1	4.03	4.02
2	Tuweb services (MS Team & LMS UT) have clear menus or links used in the learning process.	X1.2	4.08	4.04
3	The contents of the content on the Tuweb system are related to the field of education and learning	X1.3	4.12	4.10
4	The navigation process in using the Tuweb system device is not confusing in carrying out the learning process.	X1.4	4.04	4.02
5	Devices used in the Tuweb system can be displayed perfectly on different browsers	X1.5	3.95	3.97
6	The information provided by the Tuweb system is clear, complete and accurate	X1.6	4.05	4.03
7	The Tuweb service has conformity with the promised learning service	X2.1	4.00	3.99
8	Tuweb services have the reliability of the quality of learning services	X2.2	3.95	3.93
9	Tuweb services have the consistency of learning services on different content access	X2.3	3.91	3.88
10	Tuweb service has better speed accuracy than the promised speed accuracy	X2.4	3.84	3.79
11	The Tuweb Service Toolkit can be accessed at any time	X2.5	4.05	4.06
12	The Tuweb Service Toolkit can quickly restart in the event of a crash	X2.6	3.86	3.80
13	Tuweb services have a fast response when contacted to find information and convey problems in learning	X3.1	3.91	3.90
14	The Tuweb service has notifications to remind something in the learning process	X3.2	3.90	3.88
15	Tuweb service has a good response speed in meeting the facilitation and new technology	X3.3	3.97	3.93
16	Tuweb services have a willingness to solve learning service problems	X3.4	3.99	3.97
17	Tuweb services have proactiveness in providing assurance of the quality of learning services	X3.5	3.98	3.92
18	Tuweb services have the availability of learning service responses at any time and place	X3.6	4.00	3.97
19	The devices used by the Tuweb system have good security	X4.1	4.03	4.02
20	Tuweb service providers are reputable	X4.2	4.05	4.01
21	Tuweb services provide convenience in answering a problem in learning	X4.3	4.04	4.00
22	Tuweb services are serious about appreciating students through quality assurance of learning services	X4.4	4.04	4.03
23	Tuweb services have good skills in providing learning suggestions and solutions to students	X5.1	4.02	3.98
24	The Tuweb service provides space for students to submit suggestions	X5.2	4.10	4.09
25	Tuweb services prioritize the choice of learning services according to the wishes of students	X5.3	3.97	3.95

No.	Attribute	Code	Mean	
			Importance	Performance
26	Tuweb services pay attention to students on learning service information	X5.4	4.04	4.01
27	Tuweb services provide easy access to learning services.	X5.5	4.09	4.07

The IPA analysis's findings reveal where each indication is located in the IPA matrix's four quadrants. [Figure 3](#) displays the results of a quadrant test using IPA.

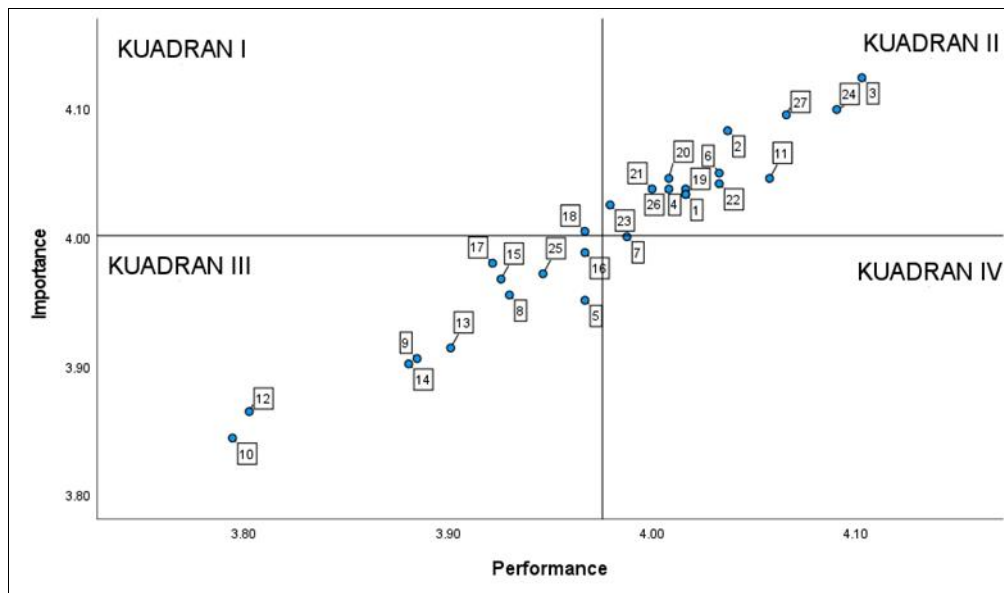


Figure 3. IPA analysis results

[Figure 3](#) shows that all items have been divided into four quadrants. Quadrant I (Top Priority) indicate that one attribute, questions with code X3.6 (Tuweb services have the availability of learning service responses at any time and place), is included in quadrant I. These attributes are regarded as important by customer users, but their performance is subpar, necessitating urgent performance improvement.

Quadrant II (Maintain Performance) shows that there are 14 attributes included in quadrant II, namely questions with code X1.1 (The appearance of the device used in Tuweb is interesting and not confusing in the learning process), X1.2 (Tuweb Services (MS Team & LMS UT) has clear menus or links used in the learning process), X1.3 (Content content on the Tuweb system is related to the field of education and learning), X1.4 (The navigation process in using the Tuweb system device is not confusing in carrying out the learning process), X1.6 (Information provided by the Tuweb system is clear and complete and accurate), X2.5 (Tuweb Service Devices can be accessed at any time), X4.1 (Devices used by the Tuweb system have good security), X4.2 (Institutions providing Tuweb services have a good reputation), X4.3 (Tuweb services provide convenience in answering a problem in learning), X4.4 (Tuweb services are serious about appreciating students through quality assurance of learning services), X5.1 (Tuweb services have good capabilities in providing suggestions and learning solutions to students), X5.2 (Tuweb services provide space for students to submit suggestions), X5.4 (Tuweb services pay attention to students on learning service information), X5.5 (Tuweb services provide easy access learning services) where these attributes are deemed appropriate or important by UT students and must be maintained, because the factors in this quadrant have good performance.

Quadrant III (Low Priority) This quadrant describes the attributes that fall into the low priority category or do not really need attention. There are 11 attributes included in quadrant III, namely X1.5 (Devices used in the Tuweb system can be displayed perfectly on different browsers), X2.2 (Tuweb services have reliable learning service quality), X2.3 (Tuweb services have service consistency learning on different content access), X2.4 (Tuweb Service has better speed accuracy compared to the promised speed accuracy), X2.6 (Tuweb Service Device can quickly reactivate in case of crash), X3.1 (Tuweb Service has a fast response when contacted to find information and convey problems in learning), X3.2 (Tuweb service has notifications to remind something in the learning process), X3.3 (Tuweb service has good response speed in meeting

facilitation and new technology) , X3.4 (Tuweb services have a willingness to solve learning service problems), X3.5 (Tuweb services have proactiveness in informing certainty about the quality of learning services), X5.3 (Tuweb services prioritize learning service choices according to student wishes). These attributes have a low level of importance and a low level of performance as well. Because users do not have high expectations or interests for this attribute. So this attribute will not affect the overall performance too much.

Quadrant IV (Excess) One attribute, X2.1 (Tuweb services have learning service compliance with what was promised), is listed in quadrant IV. The attribute's placement in quadrant IV is an exaggerated condition since it has a low degree of value but a high level of performance, making it of excessive quality and frequently disregarded by students.

SEM-PLS Method

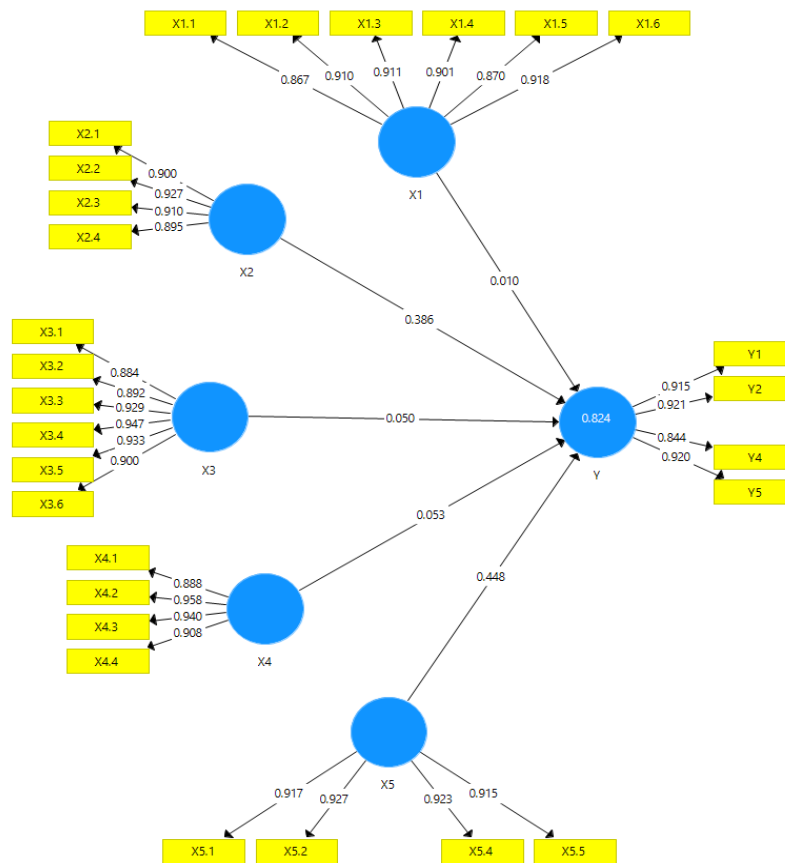


Figure 4. Research Model

Table 6. Loading Factor, Average Variance Extracted (AVE), Cronbach's Alpha, and Composite Reliability Values

		Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Tangibles	X1.1	0.867	0.951	0.961	0.804
	X1.2	0.91			
	X1.3	0.911			
	X1.4	0.901			
	X1.5	0.87			
	X1.6	0.918			
Reliability	X2.1	0.9	0.929	0.949	0.824
	X2.2	0.927			
	X2.3	0.91			
	X2.4	0.895			
Responsiveness	X3.1	0.884	0.961	0.968	0.836
	X3.2	0.892			
	X3.3	0.929			

		Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
	X3.4	0.947			
	X3.5	0.933			
	X3.6	0.9			
	X4.1	0.888			
Assurance	X4.2	0.958	0.943	0.959	0.854
	X4.3	0.94			
	X4.4	0.908			
	X5.1	0.917			
Empathy	X5.2	0.927	0.94	0.957	0.847
	X5.4	0.923			
	X5.5	0.915			
Satisfaction	Y1	0.915	0.922	0.945	0.811
	Y2	0.921			
	Y4	0.844			
	Y5	0.92			

Based on Table 6, each indicator's loading factor value for each test variable has a value that is higher than the general value (> 0.70). Each variable's average variance extracted (AVE) value is greater than the general value of 0.50. According to Cronbach's alpha values and the results of reliability tests for composite reliability, they were able to achieve values that were greater than the value that is considered to be the rule of thumb (> 0.70).

The Fornell-Larcker Criterion approach was used to assess the discriminant validity of indicators in model testing. You can use the Fornell-Larcker Criterion technique by contrasting the AVE's square roots with the correlation of latent particles. If the square root of the AVE value along the diagonal line is higher than the correlation between one construct and another, the variable is said to meet the assumption of discriminant validity. The measurement results above demonstrate that the same variable's AVE root value is higher than that of other variables' AVE roots. This shows that the requirements for the discriminant validity test have been satisfied.

Measurement Model (Inner Model)

Table 7. R Square

	R Square	R Square Adjusted
Satisfaction	0.824	0.82

According to the analysis of Table 7 results for testing the model, the construct known as the satisfaction construct has a R Square value of 0.824, which indicates that 82.4% of the variability of decisions in the model can be explained by the variables of physical evidence, reliability, responsiveness, assurance, and empathy. This puts it in the strong model category.

Hypothesis test

Table 8. Hypotheses, Path Coefficients (Direct Effects), T Statistics, and P Values for Model Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Bukti Fisik -> Satisfaction	0.01	0.027	0.1	0.103	0.918
Responsiveness-> Satisfaction	0.05	0.049	0.108	0.464	0.643
Emphaty -> Satisfaction	0.448	0.43	0.148	3.025	0.003
Assurance -> Satisfaction	0.053	0.067	0.135	0.389	0.698
Reliability -> Satisfaction	0.386	0.375	0.108	3.577	0

From Table 8 results for the path coefficient for model testing, it is clear that there is no significant relationship between the influence of physical evidence and satisfaction, with a significance value of 0.918 from an alpha level of 5%. In terms of responsiveness' effect on satisfaction, responsiveness has a direct, albeit little, positive impact, with a significance value of 0.643 from an alpha level of 5%. Regarding the

impact of guarantees on customer satisfaction, guarantees have a direct, albeit little, beneficial impact, with a significance value of 0.698 from a 5% alpha level. Regarding the relationship between reliability and satisfaction, dependability has a direct, favorable, and statistically significant impact on satisfaction, with a significance level of 0.000 5%. Empathy has a direct, positive, and statistically significant impact on contentment, with a significance value of 0.003 5% alpha level.

Discussion

Based on the results of the CSI method, Tuweb's service quality has a CSI value of 79.54%. This indicates that UT students are satisfied with the Tuweb services provided. This result is in line with the results of research from (Sarkar et al., 2021; Sidik et al., 2019). Previous study stated that perceived ease and usability have a positive effect on learning satisfaction (Huang, 2021). In this study, the same thing also happened because the servqual dimension represented the perceived ease and usability of the learning system, and even had a wider scope, especially in the service sector, namely the use of tangibles, reliability, responsiveness, assurance, and empathy variables. With the level that UT students feel about the satisfaction of the Tuweb system, it indirectly affects the student's learning achievement. In other words, there are no significant differences or have the same results when face-to-face learning and Tuweb are implemented (J. Hair & Alamer, 2022; Müller & Mildenerger, 2021). So that without face-to-face learning, the Tuweb learning system can be implemented properly and obtain the same student learning achievements. Other research with blended learning objects with a combination of face-to-face learning and online learning at UT obtained the same results, namely students get satisfaction but ignore technological factors (Zaato et al., 2023). This is because the blended learning objects used still consist of face-to-face learning elements and the respondents also come from students who received scholarships so that in terms of financial ability they are still lacking. The results of this study can be used as an update to complement the results of the previous study (Sembiring, 2018), by changing the Tuweb research object which is one hundred percent blended learning using a virtual system.

The output of the CSI analysis results in the form of UT student satisfaction with Tuweb services specifically indicated by the MIS value of the 27 servqual indicators used having a value above 3. This result is reinforced with more specific results from the IPA analysis in the form of attributes that are in quadrant II, which is a quadrant for attributes that are considered appropriate or important by UT students and must be maintained because they have good performance (Mimbs et al., 2020; Nispi et al., 2023; Sperling, 2021). Attributes that have good performance and are considered important are statements with code X1.1 (The appearance of the device used in Tuweb is interesting and not confusing in the learning process), X1.2 (Tuweb services (MS Team & LMS UT) have clear menus or links used in the learning process), X1.3 (The contents of the content on the Tuweb system are related to the field of Education and learning), X1.4 (The navigation process on using the Tuweb system device is not confusing in carrying out the learning process), X1.6 (Information provided by the Tuweb system is clear, complete and accurate), X2.5 (Tuweb Service Devices can be accessed at any time), X4.1 (Devices used by the Tuweb system have good security), X4.2 (Tuweb service provider institutions have a good reputation), X4.3 (Tuweb Services provide convenience in answering a problems in learning), X4.4 (Tuweb services are serious about appreciating students through quality assurance of learning services), X5.1 (Tuweb services have good skills in providing suggestions and learning solutions to students), X5.2 (Tuweb services provide space for students to submit suggestions), X5.4 (Tuweb services pay attention to students on learning service information), X5.5 (Tuweb services provide easy access to learning services).

Of the attributes that are in the maintain performance quadrant, in general these attributes come from the variables physical evidence, reliability, assurance, and empathy. Only the responsiveness variable does not have a representative in that quadrant. Consistent results were also obtained from the SEM-PLS analysis method that the five variables of physical evidence, reliability, responsiveness, assurance, and empathy had a positive relationship to UT student satisfaction and in addition that empathy and reliability variables had a significant relationship compared to the other three variables (Abidin et al., 2021; Sembiring & Rahayu, 2020; Zhang & Dang, 2020). These results are in line with the research who examined UT institutions that implement open distance learning, where all servqual variables influence student satisfaction but not significantly (Sembiring & Rahayu, 2020). In a pure ODL system implementing pure asynchronous learning, it has the same results in implementing the Tuweb (virtually Blended Learning) system. The ODL study strengthens the results of this study because in its implementation it has the same platform at UT institutions with all the readiness for learning that has been mature.

So from the results of the slices of the three methods (CSI, IPA and SEM-PLS) that Tuweb UT's services get satisfied ratings from students, where the variable that gives excellence to Tuweb UT is the empathy variable with indicators/attributes that Tuweb services have a good ability to provide learning suggestions and solutions to students, Tuweb services provide space for students to submit suggestions,

Tuweb services pay attention to students on learning service information, and Tuweb services provide easy access to learning services (Afthanorhan et al., 2021; Alhamad et al., 2021; Müller & Mildemberger, 2021). As a note for improving the Tuweb service from UT management, the Tuweb service has the availability of learning service responses at any time and place (responsiveness variable) and the Tuweb service has better speed accuracy than the promised speed accuracy (reliability variable). These results are in line with the results of research conducted with blended learning objects (a mix of face-to-face learning and online learning), namely the need to improve performance indicators: fast interactivity and fast response to help student requests (Sembiring, 2018).

The results of this study provide a complete and specific assessment as well as up-to-date in research because they slice the results of the three methods used. In addition to analyzing the factors that influence the satisfaction of a learning system, it also presents specifically the advantages of the indicators of these variables for the learning system used, and even contributes to improvement for indicators that build a better learning system. As is known for the analysis of causal relationships only produces variables that are effective on satisfaction. An overall evaluation is also given in the form of satisfaction from UT students with their learning system. This can be used as a consideration for UT management to continue the program in the future, not only as a substitute for the face-to-face learning system as a result of the Covid-19 pandemic. Based on the results of this study, it is hoped that other researchers in the future will carry out other similar studies to examine other factors in the form of blended learning services in an educational institution and use other analytical methods and expand the scope of the distribution of respondents.

4. CONCLUSION

A conclusion can be drawn from the results of the slices of the three methods: CSI, IPA and SEM-PLS that Tuweb UT services get satisfied ratings from students, where the variable that gives excellence to Tuweb UT is the empathy variable with indicators or attributes that Tuweb services have the ability to both in providing advice and learning solutions to students, Tuweb services provide space for students to submit suggestions, Tuweb services pay attention to students on learning service information, and Tuweb services provide easy access to learning services. As a note for improving and improving the tuweb service from UT management to pay attention to variables and indicators, namely responsiveness with indicators: Tuweb services have the availability of learning service responses anytime and anywhere and reliability variables with indicators: Tuweb services have better speed accuracy than accuracy promised speed. The results of this study provide a complete and specific assessment as well as up-to-date in research. This can be used as a consideration for UT management to continue the program in the future, not only as a substitute for the face-to-face learning system as a result of the Covid-19 pandemic.

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