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by Hamzah Hamzah

Measurement of Website Functionality and Perceived Usefulness in Increasing User Satisfaction through the Role of Technology Readiness for E-Learning Users

Hamzah[1], Astri Ayu Purwati[2], Muhammad Luthfi Hamzah[3], Mazzlida Mat Deli [4]

[1] Department of Islamic Education, Universitas Islam Riau, Indonesia

[2] Department of Management, Institut Bisnis dan Teknologi Pelita Indonesia, Indonesia

[3] Department of Information System, Universitas Islam Negeri Sultan Syarif Kasim, Indonesia

[4] Graduate School of Business, Universiti Kebangsaan Malaysia, Malaysia

hamzah@fis.uir.ac.id

Abstract. The implementation of the E-Learning method makes it easier for students to access learning materials, access achievement of learning outcomes, access discussion forums, take tests, and others without being constrained by space and time, especially when education in Indonesia is faced with a pandemic and technological developments. For this reason, this study aimed to analyze the measurement of E-learning user satisfaction in terms of website functionality and perceived usefulness, and the mediating role of technology readiness. The population in this study was active students at Islamic Universities in Pekanbaru and as many as 150 research samples were selected using the Roscoe method. The data analysis technique used was the Structural Equation Model (SEM) with PLS. The results of the study show that website functionality does not have a significant effect on students as E-learning users, and the mediating role of technology readiness is also found to have not been able to mediate the effect of website functionality on E-learning user satisfaction. Furthermore, it is found that the effect of perceived usefulness in increasing E-learning user satisfaction and technology readiness also provides a significant impact in mediating the relationship between perceived usefulness and user satisfaction. Thus, this study provides practical and theoretical implications for the development of an effective e-learning use model that will be able to generate user satisfaction.

1. Introduction

The E-learning system is very much needed in the current era of globalization in the world of education. Recently, Indonesia was surprised by the Corona Virus 19 pandemic which caused social distancing and lockdown in Indonesia—and eventually, made the teaching and learning process run not as usual (Pramana et al., 2021). The implementation of the E-Learning method makes it easier for students to access learning materials, access achievement of learning outcomes, access discussion forums, take tests, and others without being constrained by space and time. E-Learning (Electronic Learning) is an electronic-based learning process. This learning usually uses a computer/ laptop/ tablet or smartphone that is connected to the internet network (Yakubu & Dasuki, 2018). E-Learning can be developed on a local computer network or intranet in the form of a web. For wider access, E-learning can be expanded to a wider computer network, namely the internet network. Some obstacles in the use of E-learning that still often occur today are, first, the network. This is because, in the use of E-learning strategies, a good network is needed to be able to access the internet for both students and teachers. Meanwhile, for students and teachers who live in remote areas, they will have difficulty in conducting E-learning due to a bad internet network. Then, the material taught in E-learning is absorbed by students according to their different levels of understanding, there are students who can absorb the material just by reading it, but there are also students who need more time to really understand it and even, there are students who need an explanation from the teacher or other people to understand it better. As a result, there are many students whose exam or test scores have decreased. Furthermore, students also face obstacles in terms of buying internet data, because not all students get free data from the government. Students complain about the many assignments given by the teacher at the same time—and they have to meet the deadlines of these assignments all at once. This has caused students to become stressed. They tend to do their assignments as fast as possible without further trying to understand them better. Students who do not have high learning motivation tend to be lazy and this can eventually cause them to fail in learning. This phenomenon sometimes comes from a learning system that is not varied, causing boredom and laziness in learning. When studying at home students become unfocused, because many things interfere with their concentration in learning.

Seeing some of the common problems in the use of e-learning that have been described above, this study tries to analyze the application of e-learning at Islamic universities in the area of Riau with research variables of Website Functionality and Perceived Usefulness through the mediating variable of Technology Understanding (Technology Readiness). Customer satisfaction can be seen from several things, the

first is website functionality (Hastuti et al., 2019). The usability of a website is crucial to e-learning user happiness. Website functionality is the degree to which a website runs systematically and is anticipated to function as intended by users (Law et al., 2008). So the website can be said to play a very important role so that users feel satisfied, and there are no mistakes in shopping as has happened in the cases above. Research shows that website functionality has a significant effect on user satisfaction (Harrati et al., 2016; Tandon et al., 2018). but other studies show that website functionality does not have a significant effect on website user satisfaction (Hastuti et al., 2019).

Perceived usefulness or perceived ease of use also has an impact on user satisfaction in a system's productivity and effectiveness, from usability in the system's overall task to enhancing users' performance (Tandon et al., 2018; Toni Mohr et al., 2012). According to (Masrom, 2007) The degree to which a person thinks that employing particular technology will be able to enhance their performance is known as perceived usefulness. Therefore, if a person thinks an application will enhance their ability to execute their job, they are more likely to use it. Meanwhile, according to other researchers (Harrati et al., 2016), perceived usefulness is a person's level of confidence in the use of a particular subject that can provide benefits for them, which means that perceived usefulness has a significant impact on user satisfaction. But, there is also research that indicate perceived usefulness has no impact on user satisfaction (Tandon et al., 2018).

Due to the gap from previous studies found as described, this study used the mediating role of technology readiness. E-learning readiness according to (Rohayani et al., 2015) is the level where the community is prepared to participate in technology in the field of education that can help build a better society. The definition of "e-learning readiness" is "an organization's level of mental or physical readiness for an E-learning experience or activity." (Coopasami et al., 2017; Mosa et al., 2016). The level of readiness has a great influence and high linearity on the intention to use E-learning where with high readiness, interest and the tendency to adopt E-learning is also increasing thus it can also lead to user satisfaction (Chau et al., 2021; Lai, 2008; Mosa et al., 2016)

2. Literature Review

E-Learning

There are several terms used in e-learning, namely internet-based learning, virtual learning (learning through a virtual environment), or online learning. Online learning can be in the form of technology-based learning such as audio or web-based learning with the help of computers and the internet (Baki et al., 2018). E-learning is all learning activities that use the help of electronic technology that can be applied in conventional education and distance education. In this case, teaching materials or

learning materials are packaged and sent to the network so they can be accessed via the internet. In addition to uploading the learning materials that can be accessed by students, the teacher also evaluates, establishes communication, collaborates, and manages other learning aspects in E-learning (Toni Mohr et al., 2012).

Website Functionality

The main function of a website is to convey information; with the availability of information, a website can be used to convert visitors into prospects. To turn website visitors into prospects, website administrators can provide a form where visitors can submit their email addresses and other information so that they become identified prospects (Harrati et al., 2016). According to , the aesthetic features of the website as a whole including color, graphics, layout, fonts, and design stimulate pleasure, purchase, and satisfaction.

The concept of usability consists of the following factors (Gil-García, 2005):

1. Understanding the website's layout, features, user interface, and content should be simple.

2. User-friendliness of the website.

3. The quickness with which users look for what they seek.

4. Ease of navigation on the website and purchases within the required time and the actions needed to achieve the desired results.

5. The ability of users to control what they do on the website, anywhere and anytime

Additionally, according to a study by (Tandon et al., 2018) the website function variable has a favorable and significant impact on user satisfaction. Therefore, the research hypotheses can be drawn as follows:

H1: There is an effect of website functionality on user satisfaction.

H2: There is an effect of website functionality on technology readiness.

Perceived Usefulness

Perceived usefulness, as described by (Hastuti et al., 2019), is how strongly a person believes that using a particular information system would improve performance. According to this definition, perceived usefulness is a viewpoint on the selection process. People will use a system if they have faith in its usefulness. On the other side, a person won't use an information system if they think it's not as beneficial (Toni Mohr et al., 2012). Perceived usefulness is the perceived perception of how much of the level of usefulness that can be obtained (Jalil Shah Scholar & Attiq, 2016). The term "perceived usefulness" refers to how much a person thinks using a particular technology will help them perform better at work (Yakubu & Dasuki, 2018). The degree to which a consumer thinks using a given system can make the system perform better is known as perceived usefulness. The amount to which consumers

believe that doing their purchasing online would improve their transaction performance is another definition of perceived usefulness. Customers also prefer a product or service that is considered useful in its use. According to research by (Hastuti et al., 2019; Jalil Shah Scholar & Attiq, 2016) usability has a significant effect on achieving customer satisfaction. A study conducted by (Jin & Lim, 2021) states that there is a positive and significant effect of perceived usefulness on customer satisfaction. Therefore, the research hypotheses can be drawn as follows:

H3: There is an effect of perceived usefulness on user satisfaction

H4: There is an effect of perceived usefulness on technology readiness.

Technology Readiness

The success of implementing new technology in an organization is largely determined by the readiness factor of the users (brainware) both internally and externally (Lai, 2008). The readiness factor of the users can be a very complex matter due to the thinking. The basic concept of technology readiness based on each person's thinking is different and can even be contradictory. The complexity of the users is often one of the causes of the failure of ICT implementation projects (Mosa et al., 2016).

An organization that is reluctant, refuses, and is unable to make changes to its design and organizational structure in accordance with the objectives of implementing the technology adopted will not benefit from the technology so it can be said that its application is futile and even fails. From various studies conducted on the implementation of ICT (Chau et al., 2021; Coopasami et al., 2017; Lai, 2008). The user is one of the keys to success in improving work performance. Therefore, the research hypotheses can be drawn as follows:

H5. Technology readiness mediates the effect of website functionality on user satisfaction

H6. Technology readiness mediates the effect of perceived usefulness on user satisfaction

Research Framework

Through the explanation above, the conceptual framework of this study is as follows:
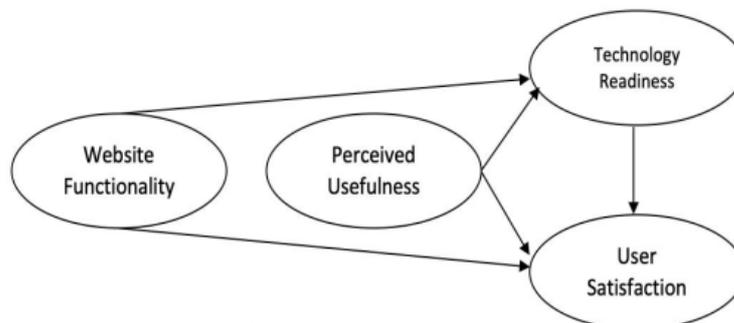

Fig. 1: Research framework.

3. Methodology

Population and Sample

The researchers conducted this study at Islamic Universities in Pekanbaru Riau. The population of this study consisted of all students at Islamic Universities in Pekanbaru since a population is a group, collection, or object of research that has particular standards of features set in advance. Because the population number was too big, the sampling technique used in this study was the Roscoe method using 4 variables and 30 minimum research samples. Therefore, as many as 150 students at Islamic Universities in Pekanbaru, Indonesia, were selected as research samples.

Research Instrument

Research instruments produced accurate quantitative data using a scale. The scale used to measure the variables in this study was the interval scale. The interval scale distinguishes categories with a certain interval or distance which is the same among categories. Respondent's answer score consists of five alternative answers graded in a variety of scores from the object of research through questions; scored from 1 to 5.

The 2 types of variables used in this study, namely (1) exogenous variables which affect other variables consisting of Website Functionality and Perceived Usefulness, and (2) endogenous variables which are influenced by other variables consisting of Technology Readiness and User Satisfaction. Measurement of these variables can be seen in the following table:

Table 1. Variable operationalization.

Variable	Indicators	Source
Website Functionality (WF)	Understanding the website's layout, features, user interface, and content should be simple. User-friendliness of the website. The quickness with which users look for what they seek. Ease of navigation on the website and purchases within the required time and the actions needed to achieve the desired results. The ability of users to control what they do on the website, anywhere and anytime	(Gil-García, 2005; Tandon et al., 2018)
Perceived usefulness (PU)	Enhance work performance Boost productivity Increase Efficiency Be useful	(Aristovnik et al., 2016; Toni Mohr et al., 2012)
Technology Readiness (TR)	Optimism Innovation Discomfort	(Lai, 2008)

Variable	Indicators	Source
	Insecurity	
User Satisfaction (US)	Overall service satisfaction Recommend to others Use the service again	(Hastuti et al., 2019)

Analysis using Structural Equation Model Partial Least Square (SEM-PLS)

The data for this investigation were analyzed using SmartPLS software, version 3.2.8. A method based on the structural equation approach (SEM) variation is the partial least squares test (PLS). The measurement model and the structural model are the two primary testing models used in the PLS test. The structural model will test causality, whereas the measurement model will evaluate validity and reliability.

Measurement Model Analysis (Outer Model)

The discriminant validity was computed utilizing the cross-loading value of the manifest variable against each latent variable. Individual reflexive measures are regarded high if they correlate more than 0.70 with the measured variable. Based on the correlation between item score or component score, convergent validity was assessed. If the correlation between each manifest variable (indicator) and latent variable is greater than the correlation with other latent variables, then the indicator is preferable to the other latent variables. Furthermore, construct reliability aimed to assess the value of AVE using composite reliability.

The instrument used in reliability testing to gauge a construct's actual level of dependability is called the AVE. The three elements above were used in this study for the measurement of reflective indicators. Meanwhile, for the measurement of formative indicators, the Multicollinearity Test was performed. This aimed to inquire if the regression model found a correlation among the independent variables. If the results show the Variance Inflation Factor (VIF) value of 10, it means that there is multicollinearity. Conversely, if the results show the VIF value of < 10, there is no multicollinearity (Hair et al., 2011).

Structural Model Analysis (Inner Model)

1. Coefficient of Determination (R2)

The coefficient of determination, often known as R Square, can be used to estimate and quantify the effect that variable X simultaneously (and jointly) has on variable Y.

2. Predictive Relevance (Q2)

When the values are 0.02 (small), 0.15 (middle), and 0.35 (big), the Q-square statistic measures the observed values produced by the model and the estimated parameters (large) (Hair et al., 2011).

The Q-Square value can be determined using the following formula:

$$Q2 = 1 - (1-R1^2)(1-R2^2) \ldots (1-RP^2)$$

$R_1^2 \cdot R_2^2 \ldots R_P^2$ is R square endogenous variable in the model

Q2's interpretation relates to the path analysis's overall determination coefficient (similar to R2 in the regression).

3. Effect Size (f2)

Finding the model's quality is the goal of this analysis. The f2 value of 0.02 is classified as a latent variable's moderate effect, the f2 value of 0.15 as an adequate effect, and the f2 value of 0.35 as a strong effect (Hair et al., 2011).

4. Hypothesis testing

Hypotheses testing in this study was performed using t-test. If p-value was 0.05 (alpha 5%), 0.1 (alpha 10%), or 0.01 (alpha 1%), it is considered significant, and vice versa.

4. Result and Discussion

General characteristics

From the data in Table 2, it can be seen that the distribution of respondents in this study is dominated by male students, with a percentage of 65.3%. In terms of age, the majority of respondents are 17-20 years old, with a percentage of 65.3%—this is the appropriate age for college students because at 17 years old students have completed their high school and they will continue their education to University. For the lecture program, the majority of respondents in this study take full-time courses (72%) and only a small proportion of those are studying while working as business owners (2%). For the major, the majority of respondents in this study are social studies majors, with a percentage of 58%.

Table 2. Results of respondents demographic.

Demographics		Total	Percentage
Gender	Male	52	34.7
	Female	98	65.3
	Total	150	100.0
Age	17-20 years old	98	65.3
	21-30 years old	50	33.3
	> 30 years old	2	1.3
	Total	150	100.0
Lecture Program	Full time	108	72.0
	Part Time worker	39	26.0
	Part Time business owner	3	2.0
	Total	150	100.0
Major	Sciences	62	41.3
	Social	88	58.7
	Total	150	100.0

Source: Processed data (2022)

Convergent Validity

Convergent Validity is a measurement approach based on the relationship between item scores and component scores with PLS. It has reflexive indicators. Only the correlation between indicators and exogenous constructions is considered when calculating the factor loading value. If the factor loading value is less than 0.7, the factor must be removed from the model and the factor loading value must be recalculated.

Table 3. Convergent validity

Variable	Indicator	Outer Loading
Website Functional (WF)	WF1	0.820
	WF2	0.869
	WF3	0.855
	WF4	0.813
	WF5	0.840
Perceived Usefulness (PU)	PU.1	0.750
	PU.2	0.806
	PU.3	0.887
	PU.4	0.783
Technology Readiness (TR)	TR.1	0.752
	TR.2	0.736
	TR.3	0.808
	TR.4	0.956
User Satisfaction (US)	US.1	0.796
	US.2	0.852
	US.3	0.773

Source: SmartPLS Processed Data (2022)

Each research variable indicator already has an outside loading value of greater than 0.7, according to the data in Table 3, and some indicators whose outer loading value is less than 0.7 have been left out of the study and the subsequent analysis.

Discriminant Validity

To confirm that each latent concept is unique from other components, discriminant validity is used. If the loading indicator value of each latent variable is greater than that of other connected variables, the model is said to have remarkable discriminant validity.

Table 3: Cross loading.

Variable	Indicator	WF	PU	RTU	US
Website Functional (WF)	WF.1	0.467	0.259	0.336	0.820
	WF.2	0.579	0,369	0.377	0.869
	WF.3	0.45	0.333	0.367	0.855
	WF.4	0.527	0.267	0.29	0.813
	WF.5	0.530	0.388	0.347	0.840
Perceived Usefulness (PU)	PU.1	0.750	0.383	0.283	0.631
	PU.2	0.806	0.349	0.405	0.367
	PU.3	0.887	0.404	0.349	0.612
	PU.4	0.683	0.344	0.327	0.301
Technology Readiness (RTU)	TR.1	0.337	0.752	0.373	0.202
	TR.2	0.326	0.736	0.430	0.401
	TR.3	0.433	0.808	0.499	0.311
	TR.4	0.430	0.956	0.470	0.347
User Satisfaction (US)	US.1	0.349	0.432	0.796	0.358
	US.2	0.375	0.438	0.852	0.304
	US.3	0.334	0.455	0.773	0.335

Source: SmartPLS Processed Data (2022)

As can be observed, each indicator item has a higher loading value on its build WF, PU, RTU, and US variable than the other cross loading values. As a result, it can be said that all constructs or latent variables have strong discriminant validity.

Multicollinearity Test

To confirm that each latent concept is unique from other components, discriminant validity is used. The model is deemed to have outstanding discriminant validity if each latent variable's loading indicator value is higher than other linked variables.

The basis for making decisions for the multicollinearity test is as follows:

1. If the tolerance value < 0.10 or VIF > 10, then multicollinearity occurs.
2. If the tolerance value > 0.10 or VIF < 10, then there is no multicollinearity.

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Table 5: Multicollinearity.

Exogenous Variable	Endogenous Variable	VIF
WF	TR	1.172
PU		1.262
WF	US	2,790
PU		1,813
OC	US	1,281

Source: SmartPLS Processed Data (2022)

According to the findings of the preceding test, all independent variables have tolerance values greater than 0.10 and VIF values less than 10 (Tolerance Value of > 0.10 and VIF of 10). As a result, it is possible to infer that this study is devoid of multicollinearity (there is no multicollinearity).

Coefficient of Determination Test (R Square)

The value of R-Square indicates the level of determination of the exogenous to the endogenous. If the value of R-Square Adjusted is greater, the level of determination will be better.

Table 6. R Square

Variable	R Square	R Square Adjusted
TR	0.239	0.229
US	0.357	0.344

Source: SmartPLS Processed Data (2022)

The Technology Readiness (TR) variable's R Square Adjusted value is 0.239. This indicates that additional factors that were not examined in this study account for 76.1 percent of the effect, leaving 23.9 percent to be influenced by website functionality and perceived usefulness. Additionally, the User Satisfaction (US) R Square Adjusted score is 0.344. This indicates that additional factors not examined in this study account for 65.6 percent of the effect, leaving 34.4 percent to be influenced by website functionality, user satisfaction, and technology readiness.

Hypothesis Testing

After the data satisfied the measurement criteria, the Bootstrapping approach was carried out using SmartPLS 3.3.5. In this test, the t value obtained from the T statistical computation is placed up against the t table. If the T statistical value is less than the t table, the null hypothesis will be accepted. If the T statistical value is more than the t table, the null hypothesis will be rejected. 1.660 is the result of the t table value of 0.05 and Pr = nk-1 = 120-3-1. The results of this study's hypothesis testing utilizing SmartPLS are displayed in the table below.

Table 7: Direct effect hypothesis result.

| Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	p-values
H1 : WF > US	0,163	0,159	0,105	1,547	0,122
H2 : WF > TR	0,164	0,160	0,093	1,778	0,076
H3 : PU > US	0,141	0,139	0,091	1,540	0,124
H4 : PU > TR	0,371	0,378	0,082	4,553	0,000
H5 : TR > US	0,418	0,428	0,071	5,844	0,000

Source: SmartPLS Processed Data (2022)
*significant

Table 8: Indirect effect hypothesis result.

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	p-values
H6: WF > TR > US	0,069	0,069	0,043	1,593	0,112
H7: PU > TR > US	0,155	0,160	0,038	4,058	0,000
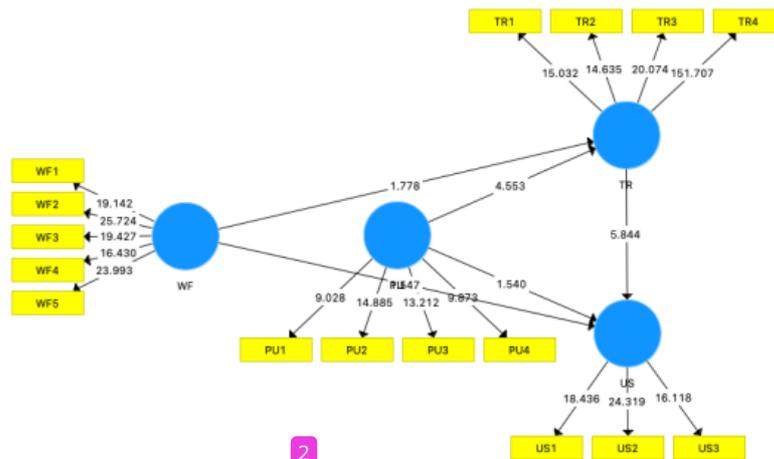
Source: SmartPLS Processed Data (2022)

Fig. 2: SEM model
Source : Data processed PLS (2022)

5. Discussion

The study's findings indicate that Website Functionality does not have a significant effect on technology readiness with a p-value of 0.076 > 0.05 (Hypothesis 2) as well as User Satisfaction with a p-value of 0.122> 0.05 (Hypothesis 1) so, there is no mediating role of Technology Readiness (Hypothesis 6) with a p-value of 0.112 > 0.05. In this study, the absence of the effect of website functionality from E-learning used at Islamic Universities in Pekanbaru means that functionally the use of E-learning for students is considered good and able to provide satisfaction to students

as users. Unique characteristics described as website service interaction quality will have an impact on a person (user), which consists of website reputation, website safety, personal information security, communication with the organization, and service as promised will affect user satisfaction. The website service interaction quality is considered more important than the content of the message. This will form the perception of user satisfaction. Good service interaction quality will increase user satisfaction. The results of this study are in contrast to a study conducted by (Gil-García, 2005; Tandon et al., 2018) which states that Website Functionality has a significant effect on User Satisfaction.

According to the results of the hypothesis testing for hypothesis 3, perceived usefulness does not significantly affect user happiness, with a p-value of 0.124 > alpha 0.05. However, the findings of hypothesis 4 testing show a p-value of 0.000 alpha 0.05, indicating that User Satisfaction is significantly impacted by Technology Readiness. These results are also answered by the significant role of the Technology Readiness variable as a mediator of the effect of Perceived Usefulness on User Satisfaction—in other words, User Satisfaction is realized if users have a good perception of the ease of use of an E-learning system which is supported by a good Technology Readiness as well. Perceived usefulness, according to (Asghar et al., 2021), is the degree to which a person thinks that employing particular technology will be able to enhance their performance. Therefore, if a person thinks an application will enhance their ability to execute their job, they are more likely to use it. Meanwhile, according to other researchers (Law et al., 2008; Yakubu & Dasuki, 2018) perceived usefulness is a person's level of confidence in the use of a particular subject that can provide benefits for them. In this study, the Perceived Usefulness by students in using E-learning is that it is felt to be able to provide convenience to students in obtaining learning at distance, especially during a pandemic like this. The results of this study are in line with a study conducted by (Jalil Shah Scholar & Attiq, 2016; Purwati et al., 2022) which states that Perceived Usefulness has a significant effect on user satisfaction.

The results of the mediating role of Technology Readiness in relation to Perceived Usefulness on User Satisfaction in this study are also an important part where information technology readiness is a person's readiness to accept technological developments, if students can accept the development of learning technology through E-learning well, then this will affect their satisfaction in receiving learning and using the system (Jin & Lim, 2021; Viriando & Sfenrianto, 2021). Information technology readiness can be defined as an understanding of Human Resources, competent management, and user roles related to the reception, use, and processing of data, and the reliability of hardware and software. Information technology readiness can also be affected by internet media and students' readiness to accept current technological developments, including the use of E-learning in learning. With this information technology, it will be easier for the public to collect,

prepare, process, publish, analyze, and disseminate information with more relevant data (Mosa et al., 2016).

6. Conclusion

The results of this study indicate that Website Functionality does not have a significant effect on students as E-learning users, and the mediating role of Technology Readiness is also found to have not been able to mediate the effect of Website Functionality on E-learning user satisfaction. Website functionality refers to the extent to which a website operates in a structured way and is expected to perform as consumers desired. Students are now familiar with using E-learning so that the functioning of the website has been able to be understood well, also students today are a generation that is responsive to the development of internet technology. Furthermore, the results of this study are related to the role of perceived usefulness in increasing E-learning user satisfaction. The results show that Perceived Usefulness is considered important because students need an E-learning system that can make online learning easier and more efficient. Besides, Technology Readiness also provides a significant impetus in mediating the relationship between perceived usefulness and user satisfaction.

This research model has limitations where it only reaches the stage of user satisfaction, even though it should be to reach the final level of measuring the effectiveness of the usability of an e-learning website, a study must be carried out to the level of loyalty. So that, the future researchers are expected to be able to examine more deeply related to the user loyalty in using E-learning for learning from the point of view of the use and process of delivering learning.

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