



End-User Computing Satisfaction Instrument: Assessment of Students' Satisfaction Using E-Learning in Higher Education

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Abstract. This study aims to test the validity and reliability of the End-User Computing Satisfaction instrument (Content, Accuracy, Format, ease of Use, Timeliness, and User Satisfaction) for e-learning users at the Faculty of Engineering, Universitas Negeri Makassar. The research method used in this research is quantitative. This study uses primary data from a Likert scale measurement questionnaire. The questionnaire was distributed to respondents who were students. The questionnaires distributed were 98 questionnaires at the Faculty of Engineering, Universitas Negeri Makassar. From the validity test, it can be concluded that the results of the instrument validation test with product moment on satisfaction with using the e-learning Information System, this research instrument is declared valid. All were declared valid ($r\text{-count} > r\text{-table}$). In comparison, the reliability test is used to measure a questionnaire which is an indicator of a variable or reliability if it provides a Cronbach-Alpha (α) value of each variable value greater than 0.60. The results showed that the End User Computing Satisfaction instrument (Content, Accuracy, Format, ease of Use, Timeliness, user satisfaction) is feasible/excellent consistency (perfect) as a research measuring instrument to be used repeatedly.

Keywords: E-Learning · Information System Quality · User Satisfaction · Validity and Reliability

1 Introduction

The development of information and communication technology that is increasingly rapid and available has encouraged various organizations to improve the quality of their services and work productivity. One is the University that implements an open and distance learning system. The learning system is organized to increase the reach and equitable distribution of quality higher education opportunities for all Indonesian citizens. Universities try to provide the best service to students and lecturers by implementing a modern learning system remotely with the application of e-Learning [1].

E-learning is one of the results of technological developments in education that is very beneficial. With e-learning, lecturers and students can still do the learning process even though they are not in a class or offline. E-learning uses computer media or

electronic devices to support learning [2]. E-learning is information and communication technology that enables students to learn anytime and anywhere [3, 4]. There are 3 (three) requirements for e-learning activities: learning activities are carried out via the internet network, the availability of learning service support in the form of video content or others, and the availability of tutor service support that can help learners when experiencing difficulties [5].

The quality of e-learning influences user satisfaction; the better the quality, the more satisfied users will be with the e-learning. The level of user satisfaction with e-learning is fundamental in measuring the success and usefulness of the system's quality. It will result in more and more people using it. The level of user satisfaction with e-learning is essential in measuring the success and usefulness of the quality of a system. System implementation and user satisfaction are measures of success [6]. Satisfaction can be interpreted as a condition within a person or group who has succeeded in making something they need or want [7]. In other words, if users are not satisfied with an information system, it is not easy to consider the success of the e-learning system. In this study, the End User Computing Satisfaction (EUCS) model was used to measure the satisfaction level of the e-learning system.

EUCS was developed by Doll & Torkzadeh in 1998 to measure user satisfaction with five variables: Content, Accuracy, Format, Ease of Use, and Timeliness [8]. EUCS is a technique for gauging the contentment of a product's end users by contrasting their hopes with the product's actual performance [8, 9]. The term "end user computing satisfaction" refers to the degree to which an individual is satisfied with their computing experience [10]. The five factors are content, accuracy, format, ease of use, and timelines [9, 11].

During the COVID-19 pandemic season, which causes the learning process to be carried out online, educational institutions are required to provide e-learning services, including one of the State Universities, namely Universitas Negeri Makassar, which is required to make online learning in the form of e-learning which is expected to overcome the problem of limited time, place, distance and also costs due to the lack of face-to-face learning. Universitas Negeri Makassar's learning process utilizes one of the technologies commonly used in the world of education, namely e-learning. The ease and advantages of implementing an e-learning system include activities not limited by distance and time, the evaluation process on a scheduled and automatic basis, exciting and creative content, and more efficiency [12].

E-learning managers must be able to design and manage data correctly so that managed e-learning can be sustainable and always used by users. Measuring the level of satisfaction with e-learning aims to help improve system performance as much as possible. This study aims to measure e-learning user satisfaction implemented at Universitas Negeri Makassar.

2 Method

2.1 Research Approach

The research method used in this research is quantitative. Quantitative research is research by obtaining data in the form of numbers. This investigation uses associative research to analyze how a particular set of variables relates to other variables [13,

14]. The purpose of distributing questionnaires is to seek information about a problem from respondents without worrying if the respondent answers not following reality in filling out the list of questions. This study aims to measure e-learning user satisfaction implemented at Makassar State University.

2.2 Population and Sample

The population of this study was e-learning users at the Faculty of Engineering, Universitas Negeri Makassar. In this study, researchers will use a sample of the population of e-learning users at the Faculty of Engineering, Makassar State University, with simple random sampling, namely population sampling, carried out randomly without paying attention to the strata in the population. Following this study with a population of 5497 people and using $e = 10\%$, the number of samples used will be measured by the Slovin formula [15]:

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

The total population is 5497, and the desired level of inaccuracy is 10%, so the number of samples used is 98.

2.3 Data Analysis Technique

The data analysis technique carried out in this study was carried out in several ways, namely:

2.3.1 Validity Test

The validity test used the product moment technique by correlating each statement with the respondent's answer score results for each variable. The number obtained from the calculation of the r-count is compared with the r-table owned. If $r\text{-count} > r\text{-table}$, the item can be declared valid; if $r\text{-count} < r\text{-table}$, the item can be declared invalid. To test the validity of this research instrument, researchers used the SPSS ver. 23 Program.

2.3.2 Research Variables

Indicators of satisfaction based on the EUCS [8] are as follows (1) the content dimension, which assesses the level of a user's happiness concerning the content of the currently available system. The content of the system typically takes the form of functions and modules that are utilized by system users as well as information that is generated by the system; (2) the accuracy metric assesses the degree to which the user is satisfied with the system's ability to produce accurate information based on the input that was provided; (3) the format or form dimension measures customer satisfaction based on how the application program is presented to the customer; (4) The ease-of-use dimension assesses how satisfied users are with the system as well as how user-friendly it is in terms of things like data entry, data processing, and information looking up; (5) the timeliness dimension,

which measures user satisfaction in terms of the system's timeliness in presenting or providing data and information that is necessary for users (Table 1 and Fig. 1).

This study used a questionnaire to determine the level of e-learning user satisfaction at the Faculty of Engineering, Universitas Negeri Makassar using indicators/variables from EUCS. The questionnaire used to use points 1 (strongly disagree), 2 (disagree), 3 (disagree), 4 (agree), and 5 (strongly agree).

Table 1. Research Instrument

Variables	Indicator
Content	The learning information system provides precise information (C1)
	The e-learning system provides relevant information based on the user's needs (C2)
	The content produced by the e-learning information system is beneficial for users in obtaining information (C3)
	The e-learning information system provides complete information, such as notification of acceptance of practical work, and re-registration files (C4)
Accuracy	Practical work data contained in the e-learning information system is very accurate (A1)
	E-learning information system does not occur errors when used (A2)
Format	The color composition in the e-learning information system is excellent (F1)
	The interface of the e-learning information system is attractive (F2)
Ease of Use	The practical work data input/entry process carried out on the e-learning information system is easy to do (E1)
	The overall process of using the e-learning information system is not confusing (E2)
Timeliness	The e-learning information system provides what is needed quickly (T1)
	E-learning information systems provide fast responses to users (T2)
User Satisfaction	The content provided by the e-learning information system satisfies users (U1)
	E-learning information systems provide accurate/correct services that users need (U2)
	The aesthetic side of the interface display has an organized structure in the e-learning information system that provides user satisfaction (U3).
	The level of ease of use of the e-learning information system provides user satisfaction (U4)
	The accuracy of time in using information technology e-learning services provides reports/notifications quickly when needed by users (U5)

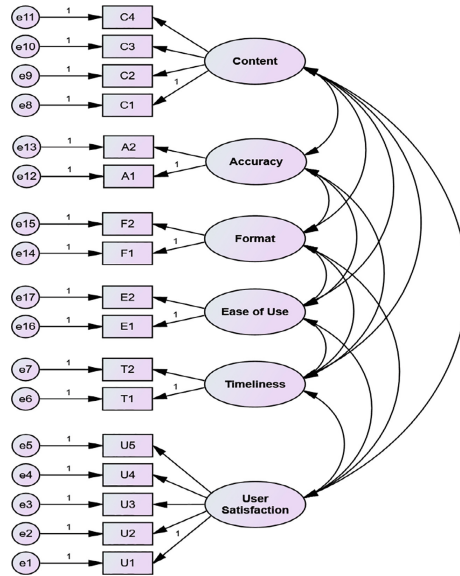


Fig. 1. Research Model

2.3.3 Reliability Test

After testing the validity of the statements used, the reliability test will then be carried out. The objective of this reliability test is to determine how significant the processes of information technology resources are and to determine the tool’s accuracy, stability, or consistency in revealing specific symptoms from a group and individuals. The reliability is immediately removed when testing if an invalid instrument is invalid. This reliability test uses Cronbach’s Alpha model because the alternative answers used in this questionnaire are more than 3 (three) choices. The results of Cronbach’s Alpha are consulted with the list of interpretations of the coefficient [16] as follows (Table 2):

The reliability test determines whether the data collection instrument is accurate, stable, or consistent in detecting specific symptoms among individuals, even though it is given at different times. Valid statements are subjected to the reliability test. Cronbach’s Alpha was used for this test as the answer scores ranged from high to low.

Table 2. Interpretation of Reliability Test Coefficient

Coefficient	Reliability
0.800–1.000	Very High
0.600–7.999	High
0.400–0.599	Medium
0.200–0.399	Low
0.000–0.199	Very Low

Table 3. The Results of The Validity Test Analysis with the Product Moment Formula

No	Variable	Indicator	Scale if Item Deleted	Scale Variance if Item Deleted	r-count	r-table	Result
1	Content	C1	109.5000	44.741	0.948	0.199	Valid
		C2	109.5333	44.740	0.848	0.199	Valid
		C3	109.5000	44.466	0.947	0.199	Valid
		C4	109.5000	44.328	0.967	0.199	Valid
2	Accuracy	A1	109.4667	44.326	0.946	0.199	Valid
		A2	109.4333	47.013	0.751	0.199	Valid
3	Format	F1	109.5000	42.810	0.943	0.199	Valid
		F2	109.5333	42.947	0.944	0.199	Valid
4	Ease of Use	E1	109.5667	43.220	0.845	0.199	Valid
		E2	109.5667	42.047	0.942	0.199	Valid
5	Timeliness	T1	109.5000	43.431	0.945	0.199	Valid
		T2	109.7000	44.355	0.949	0.199	Valid
6	User Satisfaction	U1	109.6333	44.033	0.947	0.199	Valid
		U2	109.5667	43.357	0.645	0.199	Valid
		U3	109.5000	43.017	0.944	0.199	Valid
		U4	109.5000	43.017	0.864	0.199	Valid
		U5	109.5000	43.017	0.948	0.199	Valid

3 Results and Discussion

3.1 Validity

Validity shows how well a measuring instrument can capture the desired data. The questionnaire that the researcher used as a measuring tool in this study was tested for its validity level by referring to the r-table value, and it is accepted that the correlation value to be used to measure validity must be positive or significant. Validity test using product moment technique by correlating each statement with the respondent's answer score results for each variable. The number obtained from the calculation of the r-count is compared with the r-table owned (Table 3).

3.2 Reliability

Reliability test of each variable, namely Content (C), Accuracy (A), Format (F), Ease of Use (E), Timeliness (T), and User Satisfaction (U), then further reliability testing can be carried out. To measure reliability using the Cronbach's Alpha statistical test, this test was carried out using the Cronbach's Alpha technique because the answer value consists of a range of values with the Alpha coefficient must be more significant. To measure

Table 4. Reliability test of 6 variables

Variables	Cronbach's Alpha	Items	Description
Content	0.845	4	Very High
Accuracy	0.753	2	High
Format	0.847	2	Very High
Ease of Use	0.698	2	High
Timeliness	0.863	2	Very High
User Satisfaction	0.782	5	High

Table 5. Participation Item Reliability Measurement Scale

Cronbach's Alpha	N of Items
0.948	17

reliability using Cronbach's Alpha statistical test, variables can be made reliable if they provide a value of $\alpha > 0.60$ (Table 4).

The reliability test results obtained an Alpha Cronbach Coefficient of 0.700 – 0.800, which means that it has an excellent (perfect) feasibility/consistency as a research measuring instrument to be used repeatedly. From the question instrument analyzed with the help of the SPSS version 23 computer program, it can be seen that all items of this research variable are reliable because the value is >0.60 (Table 5).

EUCS is one of the measurement tools of Information System (IS) success widely recognized by many researchers [17]. First introduced end-user satisfaction (user information satisfaction) as a measure of system success [18]. They stated that Information systems (IS) that meet user needs could increase user satisfaction [19]. User satisfaction is multi-dimensional, subjective, and elusive [20]. However, in an Information System (IS), user satisfaction can be considered a measure of success Users indirectly evaluate the quality of the IS in their daily lives. If users are dissatisfied with the quality and functionality of the system, the quality of the information it produces, or they are dissatisfied with the service of the system, then users are less likely to use it or not use the system properly [21]. Therefore, for an IS to be considered successful, it should be uncomplicated, adaptable based on user needs, easy to use, and meet user expectations [19].

4 Conclusion

Analysis of the End-User Computing Satisfaction (EUCS) instrument's feasibility shows that the instrument can be used for e-learning users and that it has excellent consistency (perfect) as a research measuring instrument to be used repeatedly (content, accuracy,

format, ease of use, timeliness, user satisfaction). User satisfaction is users' reactions and feedback after interacting with a system or application. One subjective metric for gauging how well-liked an information system is by its end users is the users' assessment of how much they like it. EUCS can gauge user happiness with a given application by comparing user expectations and the actual performance of computer systems.

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