

# Usability Evaluation of Adaptive Features in E-Learning

Johan Reimon Batmetan, Maxi M. Mintjelungan,  
Hizkia Kamang Manggopa  
Information and Communication Education Engineering  
Department  
Universitas Negeri Manado  
Manado, Indonesia  
john.reimon@unima.ac.id

Billy M.H. Kilis, Djubir Ruslan Eddy Kembuan  
Electrical Engineering Education Department  
Universitas Negeri Manado  
Manado, Indonesia

**Abstract**—The usefulness of an e-learning application feature is important to ensure a feature can continue to be used. This study aims to measure the usefulness of e-learning application features and to evaluate the adaptive features of e-learning used in higher education. This study uses measurement the usability test based on the combined use of two techniques: a questionnaire-based survey and an empirical analysis. The survey has been used to achieve feedbacks from the subjects' point of view. In particular, it has been useful to capture the perceived usability of the subjects. This result is further confirmed by the empirical analysis we carried out by analyzing the correlation between the effort of usability feature to adopted e-learning and some measures suitable defined for those processes. The majority of subjects assess that some e-learning features still have to be developed again. Why? Because there are still some features that have not been in accordance with the needs of users and less adaptive to the information required by the user. Indeed, empirical analysis is found to still have features that can produce adaptive information in a better learning process. The results of this study recommend features adaptive according to user needs so that e-learning becomes an alternative in the learning process in higher education.

**Keywords**—*adaptive feature; e-learning; evaluation; higher education; usability*

## I. INTRODUCTION

E-Learning has become the choice of information technology applications in learning that uses computer technology, multimedia, and other modern communication technologies. E-Learning consists of two types, computer software, and web-based applications. The web-based E-Learning system has basically a multi-layer structure. E-learning is widely used as a learning medium that utilizes computer technology, computer networks or the Internet. Indonesia is the 8th country of E-learning users based on the total e-learning market every year which is 25%. Data of Manado State University (UNIMA) Academic Information System (E-Learning) users in 2017 was recorded at 18,289 students. The information system (e-learning) is compiled by the main directory on the web server, including sub-directories, virtual directories, and a large number of documents and databases that are sources of E-Learning [1].

Academic Information System (SIA) is an internet-based technology that is used to support Operation and Data management. With the Information System, Data Processing and Academic Services on Campus become more effective and efficient. But there were many obstacles in SIA UNIMA for that we made Usability Measurements and adoption rates in Academic Information Systems at UNIMA, which should have an integrated Information System and make it easier for users to understand the functions of SIA and SIA usage in re-registration.

The sustainable use of information systems which as a medium to access learning content in addition to the academic administration process is very dependent on the features provided. The usefulness of an e-learning application feature is important to ensure a feature can continue to be used. The ease of use the e-learning feature guarantees the adoption of an e-learning.

E-learning is learning that uses telephone, audio, videotape, satellite transmission or information technology-based media. e-learning is used to support teaching efforts through internet electronic technology. Internet, satellite, audio/video tape, interactive TV, and CD-ROM are some of the electronic media used [2].

E-learning is a form of learning model that is facilitated and supported by the use of information and communication technology. characteristics of E-learning, namely 1) Having content that is relevant to the learning objectives; 2) Using instructional methods, for example presenting examples and exercises to improve learning; 3) Using media elements such as words and pictures to convey learning material; 4) Allows direct learning to be centered on teaching (synchronous e-learning) or designed for self-learning (asynchronous e-learning); 5) Build understanding and skills related to learning objectives either individually or improve group learning performance [3]. Briefly e-learning is a web-based learning activity (which can be accessed from the internet). In simple terms it can be said that e-learning is a learning activity that utilizes networks (internet, LAN, WAN) as a method of delivery, interaction, and facilities that are supported by various other forms of learning services. In addition, e-learning does not have to be distributed online through both local and

internet networks. Interaction with using the internet can also be run on-line and real-time or recara off-line or archived. Offline distribution using CD / DVD media also includes e-learning patterns. applications and learning materials are developed as needed and distributed through CD / DVD media, then the learner can use the CD / DVD and learn where he is [2,4].

The problem in this study is The low adoption of e-learning in higher education and The e-learning feature that is still difficult to use. This study aims to measure the usefulness of e-learning application features and to evaluate the adaptive features of e-learning used in higher education

## II. METHOD

This study uses the Technology Acceptance Model (TAM) Analysis Model to determine the level of acceptance of e-learning used in higher education [5,6]. This study uses measurement the usability test based on the combined use of two techniques: a questionnaire based survey and an empirical analysis. The survey has been used to achieve feedbacks from the subjects point of view. In particular, it has been useful to capture the perceived usability of the subjects.

### A. Technology Acceptance Model (TAM)

To find out the level of acceptance of the Academic information system used in UNIMA can be analyzed using the TAM model. Thus, TAM is a knife of analysis used to determine the attitude of user acceptance of the presence of technology [4].

Through TAM, the assumption is that when the user will use the new information system, there are 2 (two) factors that influence it, namely: 1). Perception of Ease of Use, if applied to the Academic information system, then the user believes that the system Academic information is easy to use so it does not require hard work and will be free from difficulties. This includes the use of information systems in accordance with the wishes of its users. if it is perceived easily, the system can be accepted by the user. 2). Usefulness Perceived, it is intended that users believe that using the Academic information system will improve its performance. This illustrates the benefits of the system from its users related to various aspects. So in perception this usefulness forms a trust for decision making whether or not to use an information system. So to further analyze the acceptance of the system Academic information at UNIMA with the TAM model, then several variables are used, including [4]:

1) *Perception of ease of use*: Is a statement about the user's perception of the ease or difficulty of using the Academic information system. This can be seen from a variety of indicators, including: easy to learn, clear operations, easy to understand, flexible information systems, free of difficulties, easily accessible, easy to control, clarity in information systems, proficient for users, assessment that in general academic information systems are easy to use [7].

2) *Perception of benefit*: Is a statement about the user's perception of the usefulness of the library information system. The indicators include: accelerating work, increasing work

productivity, improving performance, increasing task effectiveness, an assessment that the information system used is beneficial for students and lecturers [8,9].

3) *Acceptance*: acceptance actually includes the intensity variable information system usage behaviour and the actual use of information systems [10]. To find out if the technology in question is the Academic information system is truly accepted by users [11,12] (Students and Lecturers), it can be seen from the indicators when users always use, always access, or create user satisfaction.

This study uses 150 respondents taken by purposed sampling technique. Respondents consisted of active e-learning users both lecturers and students. Questionnaires are distributed to respondents both offline and online. The next step is analyzed using the TAM model.

## III. RESULT AND DISCUSSION

The results obtained from respondents from students and lecturers on the use of e-learning SIA Unima can be seen through the tables below.

*The appearance of e-learning*, it can be seen that the majority of respondents agreed with the existing display and stated that e-learning is easy to operate and also easy to understand.

TABLE I. THE APPEARANCE OF E-LEARNING

No	Statement	Information
1	The e-learning interface is good in terms of design	50% agreed
2	E-learning display is easy to operate	60% agreed
3	The appearance on the e-learning menu is easy and understandable	43% agreed

*The usefulness of e-learning*, the survey results show that the average respondent strongly agrees that the features available in e-learning are very useful, the majority of respondents said that it saves time to get learning resources, respondents also significantly stated e-learning is very useful, meet learning needs and are very effective and efficient in the learning process in higher education. seen in table 2.

TABLE II. THE USEFULNESS OF E-LEARNING

No	Statement	Information
1	Save time in using it	63,3% agreed
2	This application is useful	96,6% agreed
3	Make ends meet	100% agreed
4	This application is effective and efficient	70% agreed

*Ease of Use of e-learning*, the results of this study indicate that the majority of respondents agree that e-learning is easy to use. There are still 43.3% of respondents stated that there is still a long enough step to get complete information on e-learning and 33.3% of respondents stated that they are always successful when using e-learning while the majority of respondents do not always complete using e-learning. These results also show that as many as 30% of respondents still need written instructions when operating e-learning. seen in table 3.

**TABLE III. EASE OF USE OF E-LEARNING**

No	Statement	Information
1	Easy to use	83,3% agreed
2	It takes the fewest steps to achieve what I want to do in this application	43,3% agreed
3	Always successful when using it	33,3% agreed
4	Can be used without written instructions	30% agreed

These results indicate that e-learning still improves some more features to be used easily. Improvements in some features are needed so that e-learning is adopted more quickly.

*Satisfaction in the use of e-learning*, the results of this study indicate that as many as 66.7% expressed satisfaction with e-learning, and soon would recommend e-learning to others to use. While as many as 56.7% stated that e-learning is fun to use but only 33.3% of respondents stated that e-learning worked as desired. seen in table 4.

**TABLE IV. SATISFACTION IN THE USE OF E-LEARNING**

No	Statement	Information
1	Satisfied with SIA UNIMA	66,7% agreed
2	Recommended to others	100% agreed
3	Fun to use	56,7% agreed
4	Work as desired	33,3% agreed

This result is further confirmed by the empirical analysis we carried out by analysing the correlation between the effort of usability feature to adopted e-learning and some measures suitable defined for those processes. The majority of subjects assess that some e-learning features still have to be developed again [13]. Why? Because there are still some features that have not been in accordance with the needs of users and less adaptive to the information required by the user [14].

Indeed, empirical analysis is found to still have features that can produce adaptive information in a better learning process. The results of this study recommend features adaptive according to user needs so that e-learning becomes an alternative in the learning process in higher education.

#### IV. CONCLUSION

There are still some features that have not been in accordance with the needs of users and less adaptive to the information required by the user. Indeed, empirical analysis is found to still have features that can produce adaptive information in a better learning process. The results of this study recommend features adaptive according to user needs so

that e-learning becomes an alternative in the learning process in higher education.

#### REFERENCES

- [1] P.W. Wirawan, "Pengembangan Kemampuan E-Learning Berbasis Web ke dalam M-Learning," *Jurnal Masyarakat Informatika*, vol. 2, No. 4, pp. 21-26, 2012.
- [2] N.S. Hanum, "Keefetifan E-Learning sebagai Media Pembelajaran (Studi Evaluasi Model Pembelajaran E-Learning SMK Telkom Sandhy Putra Purwokerto)," *Jurnal Pendidikan Vokasi*, vol. 3, No. 1, 2013.
- [3] S. Muzid and M. Munir, "Persepsi Mahasiswa dalam Penerapan E-Learning Sebagai Aplikasi Peningkatan Kualitas Pendidikan (Studi Kasus pada Universitas Islam Indonesia)," In *Seminar Nasional Aplikasi Teknologi Informasi (SNATI)*, 2005.
- [4] E. Fatmawati, "Technology Acceptance Model (Tam) Untuk Menganalisis Penerimaan Terhadap Sistem Informasi Perpustakaan," *IQRA*, vol. 09, 2015.
- [5] J.R. Batmetan Suyoto, and J.D.C.L. Soares, "An Empirical Investigation on Customer Behavior to Adopt Mobile Commerce among the Y Generation in Indonesia," *Sriwijaya International Conference On Engineering, Science and Technology [SICEST 2016]*, 2016.
- [6] J.R. Batmetan and V.R. Paliligan, "Higher Education Students' Behaviour to Adopt Mobile Learning," *IOP Conference Series: Materials Science and Engineering*, 2018, vol. 306, Issue 1, pp. 012110, 2018.
- [7] Byrne-davis, Lucie, Dexter, and Hilary, "Just-in-time research: a call to arms for research into mobile technologies in higher education," *Research in Learning Technology*, vol. 15, pp.1-10, 2015.
- [8] S. Yang, "Understanding undergraduate students' adoption of mobile learning model: A perspective of the extended UTAUT2," *Journal of convergence information technology*, vol. 8, No.10, pp. 969, 2013.
- [9] A. Abu-Al-Aish, and S. Love, "Factors influencing students' acceptance of m-learning: an investigation in higher education," *The International Review of Research in Open and Distributed Learning*, vol. 14, No.5, 2013.
- [10] K.F. Hashim, F.B. Tan, and A. Rashid, "Adult learners' intention to adopt mobile learning: A motivational perspective," *British Journal of Educational Technology*, vol. 46, No.2, pp. 381-390, 2015.
- [11] J. Mtebe and R. Raisamo, "Investigating students' behavioural intention to adopt and use mobile learning in higher education in East Africa," *International Journal of Education and Development using ICT*, vol. 10, No. 3, 2014.
- [12] M. Ally and J. Prieto-Blázquez, "What is the future of mobile learning in education?," *International Journal of Educational Technology in Higher Education*, vol. 11, No. 1, pp. 142-151, 2014.
- [13] T. Thomas, L. Singh, and K. Gaffar, "The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana," *International Journal of Education and Development using ICT*, vol. 9, No. 3, 2013.
- [14] K. Mac Callum and L. Jeffrey, "The influence of students' ICT skills and their adoption of mobile learning," *Australasian Journal of Educational Technology*, vol. 29, No. 3, 2013.