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Measuring user experience on SIPEJAR as e-learning of Universitas Negeri Malang

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Abstract. E-learning has become the choice of several educational institutions to improve the quality of learning and educational affordability. Universitas Negeri Malang (UM) as one of the higher education institutions also has e-learning infrastructure with its main system called SIPEJAR. Every UM lecturer is required to use SIPEJAR in synchronous and asynchronous learning, but until now the use of SIPEJAR has not been too massive. Therefore the purpose of this paper is to measure learning effectiveness and user experience by implicit evaluation. However, it cannot reveal what "user feels" through interaction with the system neither record user feedback. The research instrument used was a questionnaire with a Likert scale using the User Experience Question framework and conducted interviews with 102 system users. Result shows that user experience score, usability score, learning design validation score, and student's response from the interview session indicate that the system is not good; therefore, an improvement is needed. For the future works, we proposed an evaluation of SIPEJAR's governance and critical success factors to determine the carrying capacity of implementation and the factors that support the successful implementation of SIPEJAR.

1. Introduction

Information and Communication Technology that is developing more rapidly makes the need for concepts and mechanisms of teaching and learning (education) based on ICT become a necessity [1-5]. ICT is a very appropriate solution to the problem of Indonesian education [6-9]. Geographical, time and socio-economic constraints of Indonesia as an archipelago, which consists of more than 17,000 islands, tropical and mountainous regions, so that it faces infrastructure problems. Unequal distribution of population, with the majority of uneducated public education, lagging behind the development of ICT and its beneficiaries from the developed world so that it is necessary to disseminate the utilization of ICT in the community, and to increase human resources in the field of ICT.

In the world of ICT education can contribute, among others: (1) acceleration of equal distribution of learning opportunities and improving the quality of education that is difficult to overcome by conventional means [10]; (2) improving the quality of human resources through the development and misuse of information and communication technology [11]; and (3) the realization of an integrated

educational technology system, efficiency and integration of resources, systematic (included in the curriculum), effective (high absorption through interactions to increase service capacity) [12,13].

The effects of the development of ICT in the last few decades have pushed the education sector to try to integrate ICT into the delivery of curriculum in various subject areas. The concept that became known as E-Learning brought the influence of the process of transformation of conventional education into digital form, both in content and system. E-Learning is a solution in providing quality education without limited space and time [14]. The implementation of e-learning based learning emphasizes constructivist approaches that activate all elements of learning, both teachers and students.

Through the constructivism approach, the focus of learning is no longer on the teacher but rather on the learner as an individual. The internet and websites that are part of students' daily lives are starting to be used to support the learning process so that it is more optimal. E-learning is one of the new methods of learning. With the availability of access to learning materials anytime and anywhere, it is hoped that productivity in education can increase. E-learning does not only focus on the process of knowledge transfer, but also leads to knowledge construction [15].

Over the past 10 years, e-learning has become the belle of choice of learning services aimed at improving the quality of education [16,17]. E-learning can provide many benefits both for universities and for students. For universities the existence of e-learning can reduce the cost of additional courses and make universities more open to technology. This is important in the current disruptive era because universities can contribute more to science by disseminating various research and education results. As for students themselves, e-learning can be an independent learning option [18]. They can manage their curriculum, time and learning rhythm.

The concept of e-learning learning is run through a platform commonly called the Learning Management System (LMS). Universities in Indonesia are currently competing in opening online classes that are used for internal students and for students from outside the university. The use of various LMS platforms is already very common in online learning. The importance of an LMS is especially in making it easy for users to get information and carry out online learning. The ease of accessing a system is inseparable from the name user interface. LMS has a user interface that functions to connect users with an online learning atmosphere. The attractiveness of students in utilizing LMS depends on the appearance of user interfaces and the design of the user experience that is presented on the system.

A good or attractive user interface and user experience makes it easy for users to carry out online learning. The principle in making user interface design is very important because if it is too complicated, users will have to learn more about how to use it and it will make them feel difficult using the LMS. As part of developing an LMS platform that meets the Human Computer Interaction (HCI) standards, an evaluation of usability must be carried out. Usability is intended as a user experience in interacting with an application or LMS until the user can operate it easily and quickly [19].

Based on previous research, most researchers looked at the successful implementation of e-learning to improve learning outcomes [20], learning motivation [21], independent learning [22], and advancing the quality of education [23]. However, when viewed from the HCI view, as shifting the paradigm for technology-centered to user-centered we must pay close attention to User-Experience (UX) [24]. Furthermore, user behavioral analysis or User Experience (UX) is a significant factor to determine whether the Information System / Information Technology (IS / IT) has gained sufficient acceptance by its users [25].

On this paper, we present the capture of new user impressions by UX evaluation as the larger scale of the respondent SIPEJAR users in State University of Malang (UM). SIPEJAR is a Learning Management System that has been officially used at UM since 2018. Some instruments that we use are User Experience Questionnaires (UEQ) to capture general impressions of UX and the short-interview technique to reveal depth analysis of SIPEJAR about their study. Through this research, it is expected to obtain research results that can answer the question of the not yet massive use of SIPEJAR by UM students and lecturers. The results of the research will be the subject of further studies in designing e-learning development that is better in accordance with user expectations.

2. Methods

The research method used is descriptive quantitative research to determine the SIPEJAR user experience design. Respondents of this study were 102 users consisting of 46 lecturers and 56 students from three faculties namely faculty of engineering, faculty of mathematics and science, and faculty of letter. The instrument used in this study is the User Experience Question (UEQ) framework which consists of six aspects, namely attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty [26-28]. This research is used long version of UEQ with 26 items. In addition, open questionnaires are also used to determine user expectations for the development of SIPEJAR in the future. To capture user experience will be discussed as follows:

- Recruiting: In the recruitment phase, ask all UM lecturers to fill in UEQ using SIPEJAR through google form.
- Selection: Filtering UM lecturers who have used SIPEJAR in their learning activities and students.
- Measurement: Assessment of user experience is done through 2 questionnaires namely User Experience Question (UEQ) to find out the UX value on SIPEJAR and open questionnaire to find out in-depth analysis of user expectations on SIPEJAR.
- Debrief: At the end of the study, users are advised to more actively explore SIPEJAR to improve the quality of online learning.

As a result of UX measurement the first result is UEQ data that we analyze with mean comparisons. We conduct Alpha-coefficient as a measure for consistency of a scale. Second result for capturing user expectation is actually qualitative data, but we present it into the percentage that responded in positive answer.

3. Result and analysis

SIPEJAR is an official e-learning developed by UM and used for online learning at UM both synchronous and asynchronous. SIPEJAR was developed from LMS Moodle (Modular Object-Oriented Dynamic Learning Environment) is an open source software developed to help the internet and website-assisted learning process [29] with a learning management system that is flexible and useful to add to the online learning experience [30]. Moodle development can be used to support the implementation of e-learning in learning that can contain various features such as assignments, quizzes, communication, collaboration, and the main features that can be used to upload various learning file formats [31]. The SIPEJAR start page is shown in Figure 1.
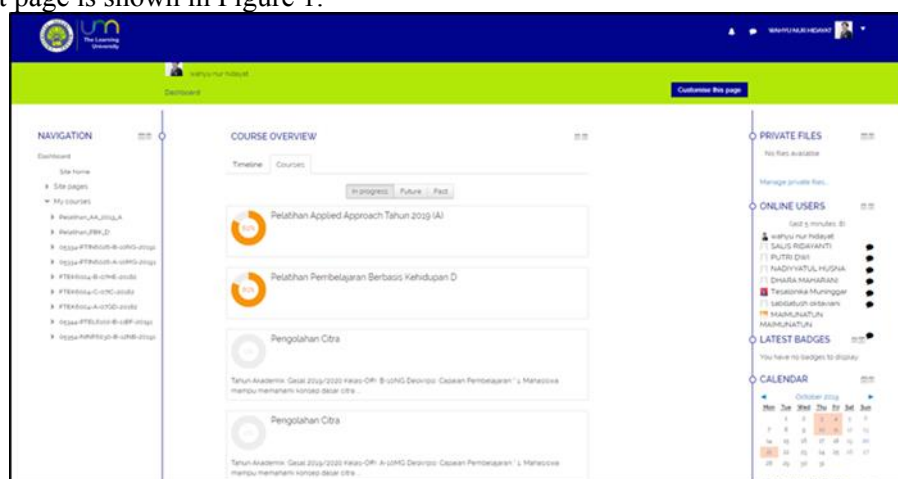

Figure 1. SIPEJAR homepage.

This research uses UEQ to represent the general impression of user experience. Furthermore, the measurement user experience can be displayed with a chart. A benchmark tool is already provided in

UEQ online. On the other hand, a short-interview can reveal SIPEJAR's effect on fostering students' learning. The results are discussed in the following subsections.

3.1. Correlation and cronbach's alpha-coefficient

The Alpha-Coefficient is a measure for the consistency of a scale. Before we discuss about the results of UEQ, we present the correlation between items and Cronbach's alpha-coefficient value of each aspect. There is no generally accepted rule of how big the value of the coefficient should be. As shown in table 1 that all aspects have a positive and good correlation. These correlations reflected how the items in each aspect have a relation. It shows that most of each item has a consistent scale.

Table 1. Correlation and cronbach's alpha-coefficient value.

Aspect	Value
Attractiveness	0,91
Perspicuity	0,86
Efficiency	0,86
Dependability	0,75
Stimulation	0,77
Novelty	0,78

3.2. Result of user experience questioners

Figure 2 shows that of the 6 aspects of assessment there are 4 aspects that fall into the category below average, namely attractiveness, efficiency, stimulation, and novelty. Whereas aspects of perspicuity and dependability are included in the bad category. This means that the user experience in using SIPEJAR is still poor. Some things that affect are the appearance of SIPEJAR which is still very rigid, the presentation of material that is less diverse, the complexity of menus and learning designs that do not pay attention to differences in individual abilities. On the lecturer side, SIPEJAR is considered complicated because in order to be able to use it, the lecturer must first upload a lesson plan of 16 meetings. This step is considered to hamper the performance of lecturers in utilizing SIPEJAR.

Based on user input related to UI / UX SIPEJAR, among others: (1) SIPEJAR's appearance needs to be improved so that it is more responsive, simple, elegant and modern; (2) SIPEJAR content can be developed to be more attractive containing multimedia content; (3) personalized systems need to be added to support the improvement of the quality of independent learning; (4) the content presented can be based on the characteristics of student learning models; and (5) gamification models can be added to increase system usage.
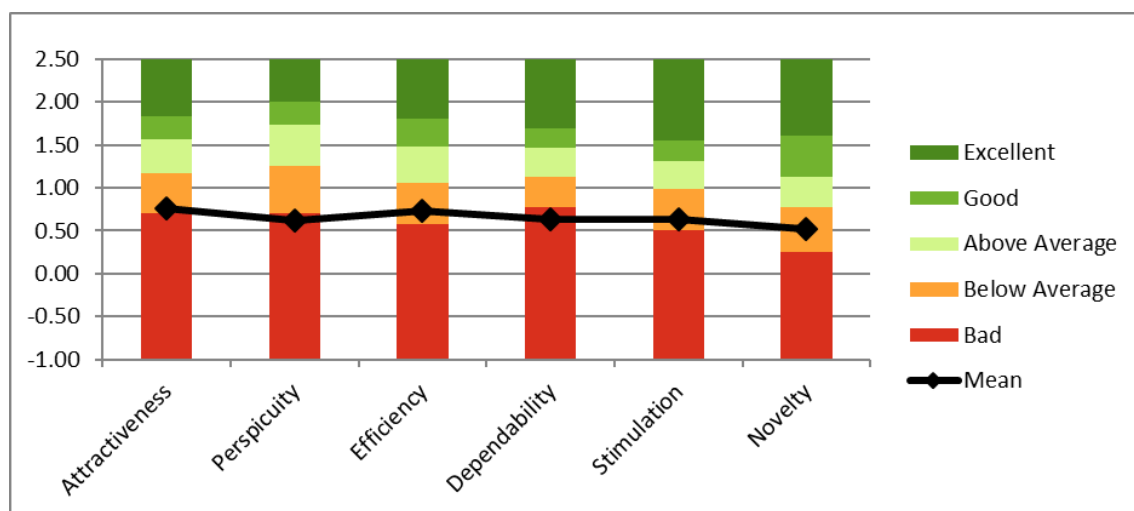

Figure 2. Benchmark UEQ

4. Conclusions

The e-learning functionality is also greatly influenced by the appearance and design of user experience (UI / UX). The UEQ benchmark shows that all aspects still get a low rating, therefore efforts to improve the appearance and design of user experience must be done. Until now the use of SIPEJAR which has not been massive has been supported by data from the results of this study. Improvements to SIPEJAR can pay attention to user input so that the successful implementation of SIPEJAR as an online learning medium increase.

5. Acknowledgement

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