Analysis of student satisfaction of UPI SPOT e-learning services in UPI postgraduate Bandung, Indonesia, using the Fuzzy-Servqual Method

A R Prayudha¹, S Sumarto² and A G Abdullah²*

¹ Technology and Vocational Education Department, Postgraduate School, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudhi 229 Bandung, Indonesia
² Electrical Engineering Education Department, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudhi 229 Bandung, Indonesia

*ade.gaffar@upi.edu

Abstract. This article analyzes the level of student satisfaction in using SPOT UPI Bandung e-learning services. Student satisfaction is taken by distributing questionnaires to respondents. This article compares perceptions with students' expectations in using SPOT UPI Bandung services using fuzzy-servqual. Fuzzy-Servqual method can overcome the subjectivity problem of respondents in providing an assessment to fill out the questionnaire. The sample of this study amounted to 41 people using simple random sampling technique. The results showed that the gap value for postgraduate student satisfaction with SPOT UPI Bandung services was still high at -1.584 with a perception value of 7.695 and an expectation value of 9.277. The main conclusion of this study is that UPI Bandung graduate students who use SPOT e-learning services have not felt satisfaction in using SPOT UPI Bandung e learning services.

1. Introduction

E-learning is the use of the internet and multimedia technology that allows students to be involved in learning anywhere and anytime without having to do face-to-face meetings with lecturers [1-3]. The use of e-learning can improve the quality of teaching through distance collaboration learning between students and lecturers. The main motive behind the use of e-learning technology is to make major changes in the way of teaching in educational institutions that have been done long ago and overcome the weaknesses of traditional teaching [4-6]. E-learning has become an important trend in recent years. The use of e-learning in the current era is considered as a solution for multinational organizations or educational institutions in improving quality and can take place according to learning plans with lower costs than learning in schools [7-10]. Educational institutions increasingly use e-learning in their learning activities. The extraordinary development of e-learning makes it necessary for research to improve the quality of e-learning services [11]. In using e-learning students are required to be active and based on independent activities which means they do not have a monitoring mechanism such as traditional teaching [12]. While the teacher must design content that is in e-learning [11,13,14]. This is because if users are satisfied with the content and design of the e-learning interface, then they will be interested in using e-learning. User satisfaction is closely related to the quality of the system and information from e-learning. E-learning users will be satisfied if e-learning matches or exceeds what is expected by e-learning users.
Satisfaction that comes from the use of e-learning technology plays an important role for the effectiveness of learning, because it is able to increase the synergy between users and acceptance of e-learning technology [15]. Satisfaction is proven to be crucial for the purpose of ongoing user intentions in using e-learning. In addition, the readiness and performance of technology is closely related to the level of satisfaction of e-learning users [16]. The quality of the system and the quality of information are the main factors driving the intention and satisfaction of users towards the use of e-learning [17]. The individual impact felt by students is positively influenced by their satisfaction and the use of e-learning systems [18]. If users feel the value of utilities, they will have a continuing value for using e-learning systems [19,20].

However, no previous research has examined student satisfaction using e-learning SPOT UPI Bandung with the Fuzzy-Servqual method. Fuzzy-Servqual method is a combination of fuzzy logic with the Service Quality method. Fuzzy-Servqual method can overcome the subjectivity problem of respondents in providing an assessment to fill out the questionnaire. Fuzzy logic will help respondents give more actual values. Servqual (Service Quality) is a method that is often used to measure the quality of a service. To measure service quality, a 22-item questionnaire instrument called Servqual was proposed by Parasuraman et al [21,22]. Since then, the Servqual questionnaire has been used to analyze the quality of services in diverse organizations, such as retail organizations, the airline industry, restaurants, hotels, higher education, urban transportation, public or private health, information systems, e-learning [23,24]. The Integrated Online Learning System (SPOT) is an online-based learning application program for lecturers and students at the Universitas Pendidikan Indonesia (UPI). Learning programs based on the use of internet technology (online) that can be done without space and time limitations ‘any time anywhere’. The purpose of my research was to analyze student satisfaction in using UPI SPOT e-learning Bandung.

2. Method
This descriptive study was conducted with the aim of analyzing the level of student satisfaction in using new technology in lecture activities, namely the use of SPOT UPI Bandung e-learning services using the fuzzy servqual method. Servqual is widely applied in various companies and industrial contexts. The popularity of the Servqual survey instrument is due to a number of advantages. First, the Servqual instrument has developed into a standard for assessing various service quality dimensions. Second, various studies have shown that the Servqual instrument is valid for various service contexts. Third, research also indicates that the Servqual questionnaire is reliable, meaning that the questions are interpreted equally by different respondents. Fourth, the Servqual instrument meets the parsimony criteria, because it only consists of 22 items, so it can be filled quickly by respondents. This study uses a questionnaire in collecting data from respondents, namely UPI Bandung graduate students. The total number of samples in this study were 41 people. The technique used in sampling is simple random sampling technique. Of the students participating in the study, 14 were male and 27 female students with ages ranging from 24 to 32 years. The sample of this study was taken randomly, namely UPI Bandung graduate students who used UPI SPOT services for their lectures. The study sample was limited with the aim of obtaining objective results. The instrument used in this study was a questionnaire or questionnaire in the form of open-ended questions for research respondents. The questionnaire was adapted from servqual dimensions. The servqual dimensions used in the questionnaire consisted of reliability, responsiveness, tangibles, security and access. The questionnaire items consisted of 17 question items. Each questionnaire item was calculated using 5 alternative answers. The research instrument used to support student satisfaction data on SPOT UPI Bandung e-learning services by referring to the Likert scale model. The method of collecting data is done by distributing questionnaires to students who use the SPOT UPI e-learning service.

Data processing begins by integrating fuzzy with each servqual dimension contained in the questionnaire which includes reliability, responsiveness, tangibles, security and access. Second, data collection is carried out through questionnaire distribution and the formation of membership functions and then a fuzzyification process is carried out to produce a Triangular Fuzzy Number (TFN) value.
Third, after each criterion is obtained the difference, then the next step is to do defuzzification. Fourth, after the defuzzification process is completed, it is followed by determining the servqual value (gap). Servqual values can be known by reducing the defuzzification score of students’ perceptions and expectations. First determined the gap of each criterion, then then determined the gap per dimension and finally calculate the overall gap value. Analysis of the data in this study used the 2013 version of Microsoft Excel.

3. Results and discussion

3.1. Calculation of Servqual Value (Gap) per criteria
From the calculation of Servqual (Gap) per criterion, it is found that the biggest gap value is -2.537 item number 6 with a perception value of 6.841 and an expectation value of 9.378 which is included in the Responsiveness dimension. Whereas for the smallest gap value is 0.780 item number 15 with a perception value of 7.036 and an expectation value of 6.256 which is included in the Access dimension.

3.2. Calculation of Servqual Value (Gap) per dimension
From the calculation of Servqual (Gap) per dimension the results show that the biggest gap value is -2.341 with a perception value of 7.085 and an expectation value of 9.446 which is included in the Responsiveness dimension. Whereas for the smallest gap value is -0.884 with a perception value of 7.567 and an expectation value of 8.451 which is included in the Access dimension.

3.3. Overall Calculation of Servqual (Gap) value
From the Servqual (Gap) calculation as a whole, the results show that the gap value for graduate student satisfaction with the Bandung SPOT UPI service is -1.584 with a perception value of 7.695 and an expectation value of 9.279.

These findings indicate that students who use SPOT UPI e-learning services do not feel satisfaction. The readiness of technicians in serving the use of SPOT services and the technicians’ responsibilities when problems occur in the use of UPI SPOT services is something that really needs to be improved in improving the quality of SPOT UPI Bandung e-learning services. In other words, the two aspects that must be improved are the fundamental determinants of the user's intention to use SPOT UPI Bandung e-learning services in a sustainable manner. Previous research has shown that the alacrity of technicians and technology performance prove to be very crucial for user intentions in using e-learning [16]. Therefore, it is very important that any problems that arise in using e-learning are quickly identified and resolved to increase satisfaction of e-learning users.

4. Conclusion
The results of this research reveal that postgraduate students at UPI Bandung who use SPOT e-learning services have not felt satisfaction in using SPOT e-learning services. This can be seen from the high gap between students' perceptions and expectations in using the UPI SPOT Bandung e-learning service. Of the five dimensions used to measure the level of student satisfaction with SPOT e-learning services, the Responsiveness dimension is the biggest gap. While the smallest gap is in the Access dimension.

Measuring user satisfaction with e-learning can provide new opportunities for researching the use of other newest technologies in learning. This will also bring a new understanding of aspects in e-learning that need to be improved in tertiary institutions. The integrated view provided in this study can be used by other researchers as a basis / reference for testing the satisfaction of e-learning users in secondary education such as in vocational and high school.

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