Service Quality Parameters of e-Learning in Higher Education

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Abstract—**E-learning is an electronic learning platform designed for distance learning by eliminating aspects of distance and time limitations in the education process. The purpose of this study is to discuss the parameters to analyze the e-learning service's quality. The methodology used in this study is a qualitative approach, with the primary source of information from literature reviews. The discussion is limited to service quality parameters based on the perspective of lecturers and students in Higher Education, where service quality is a comparison between expectation and performance of e-learning. The validation process of the results of the study was carried out through Focus Group Discussions conducted by seven lecturers from the Department of Informatics, UIN Sunan Gunung Djati Bandung. The results of the discussion showed that the SERVQUAL model could be used as a logical framework in parameters to analyze e-learning service quality. These parameters are reliability, assurance, tangibles, empathy, and responsiveness. The conclusion of the study shows that the operationalization of SERVQUAL parameters in e-Learning needs to align with aspects of the process, product, and people.**

Keywords—e-learning, parameter, service quality

I. INTRODUCTION

Technological development trends have an impact on changing patterns of human life, including in the field of education. The paradigm delivers in the implementation of teaching using technology has become a trend that is happening, including the emerging trend of distance learning that is implemented with e-learning [1]. E-learning has become mainstream in the education sector and has been massively adopted in higher education [2]. At present, e-learning platforms available for organizing e-learning in Higher Education vary, including moodle [3], google class [4], edmondo [5], or e-learning models explicitly created by higher education to use in their university.

Referring to many studies of the educational process by using e-learning has a positive impact on the effectiveness of the learning process [6–8]. Other research states that the effectiveness of e-learning is influenced by the quality of services owned by e-learning [9–11]. To measure the quality of e-learning services, necessary parameters that can use as analytical tools to determine that e-learning has met user expectations. The study in this article discusses the service quality of e-learning based on the SERVQUAL model that is associated with people, processes, and products in the implementation of e-learning in Higher Education.

Relevant studies that have been conducted using SERVQUAL in e-learning include: measuring e-learners' perceptions of service quality [12], evaluation of e-learning websites using the webqual method and importance-performance analysis [13], the success of e-learning systems in management education in Chennai City–using user's satisfaction approach [14], and measuring learner satisfaction in e-learning using SERVQUAL [15]. The novelty aspect of this study lies in the discussion of SERVQUAL on e-learning with the approach to people, process, and products involved in implementing e-learning in higher education.

II. METHODOLOGY

The methodology used in this study uses a qualitative approach by analyzing Service Quality Parameters on the use of e-learning. The concept of service quality discussed in this study is a comparison between the expectations and performance of the use of e-learning as a learning process in Higher Education. The main model used as an analysis tool in this study is the SERVQUAL model that uses parameters of reliability, empathy, tangibles, responsiveness, and assurance in measuring the service quality of a product service [16,17]. These parameters in the measurement of e-learning service

quality are juxtaposed with aspects of people, processes, and product. To analyze the validity of the parameters used, a Focus Group Discussion was conducted by seven informatics lecturers at UIN Sunan Gunung Djati Bandung.

III. RESULTS AND DISCUSSION

Quality parameters of e-learning as IT applications regarding Software Quality Assurance. Software Quality Assurance is a scientific and systematic approach to measuring/ evaluating the quality, product standards, processes, and procedures of software. The general rule used to assess software quality is ISO/ IEC 9126. ISO/ IEC 9126 is a standard created by the International Standardization Organization to evaluate the quality of software. Software quality characteristics include six parameters, namely, functionality, efficiency, reliability, usability, maintainability, and portability [18]. Evaluation of software quality requires appropriate measurements and metrics. Where measurements and metrics can be doing to measure products, people, and processes in software development [19–21].

Referring to the various literature on service quality in software development, conceptually, the learning process in e-learning can develop from the "Framework of Knowledge Management System for the Higher Learning Institution" established by Abdullah et al. [22]. The modification of the framework is doing by adjusting the analysis topic in this study, based on the people, process, and product approach (Figure 1).
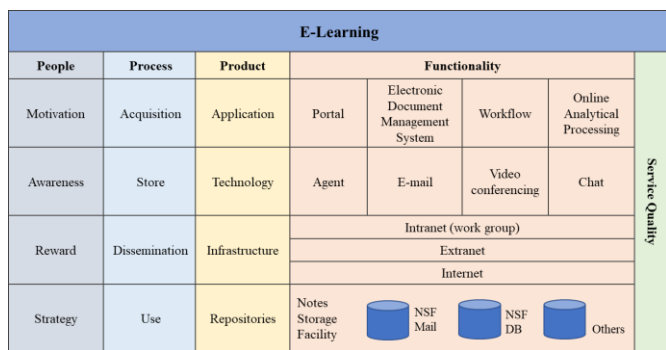

Fig. 1. The framework of e-Learning for the Higher Education.

The study used in this article uses the SERVQUAL approach, which evaluates the gap between expectations and performance of e-learning. According to Parasuman, there are five parameters in determining the quality of products or services [17], namely:

- *Reliability*, the ability to provide services accurately and reliably following the promises offered.

- *Empathy* includes individual care and attention to customers and an understanding of the customer's unique needs.

- Tangibles, including the appearance of adequate physical facilities and equipment.

- Responsiveness, which is the willingness or response in helping customers and providing attention and service that is fast and responsive.

- Assurance, the guarantee that gives a sense of trust and confidence.

The author's understanding of the e-learning framework leads to SERVQUAL models and concepts as parameters of service quality in e-learning. The relationship between SERVQUAL parameters and aspects of people, process, and product e-learning presented in Table 1.

TABLE I. THE SERVQUAL MATRIX BASED ON THE PEOPLE, PROCESS, AND PRODUCT PERSPECTIVE ON E-LEARNING

Parameter	People	Process	Product
Reliability	Generating motivation in the learning process, users can identify the benefits of e-learning	The excellent knowledge acquisition process, with transparent and objective information content	The features of e-learning are easy to recognize and execute. No technical errors
Empathy	Build awareness to use e-learning, and users have the perspective of the ease of using e-learning	Guaranteed user security and privacy	Ownership of software and hardware is worth it with the benefits obtained
Tangibles	E-learning has a unique appearance/ personality for each user.	The learning media used vary according to the user's wishes.	E-learning can be used with a variety of devices, whether desktop, laptop, tablet, or smartphone.
Responsiveness	Availability of responsive helpdesk for solving problems in the use of e-learning	Provision of short-cut and detail pathways to overcome issues in the learning process.	Interactive communication menu between actors (student, lecturer, and admin)
Assurance	Users can look back on the learning process that they have experienced	The objective in providing evaluation	Well documented for very data and learning process

A. Reliability

Reliability relates to the ability of e-learning to provide an accurate and reliable learning process.

1) People: E-learning provides a strong motivation for the learning process. Motivation is a determinant factor that determines the achievement of learning outcomes [23–25]. The users of e-learning are required to understand the benefits of using e-learning [26].

2) Process: E-learning needs to provide a conducive learning space by providing transparent and objective information content. The information content is an aspect that

influences the effectiveness of the learning process through e-learning [27].

3) Product: Ease of operation on e-learning products is part of the reliability parameters of e-learning products. Ease of use has a positive and significant impact on the benefits and actual use of e-learning [28].

B. Empathy

Empathy is an evaluation parameter for individual care and attention to users and an understanding of the unique needs of e-learning users.

1) People: Build awareness and responsiveness from users towards the implementation of e-learning. Appreciation and respect from e-learning users will increase learning outcomes [29].

2) Process: Empathy factors that are sensitive for e-learning users are privacy and security aspects. The service quality of e-learning is determined by the privacy and security of the system [30–32].

3) Product: The ability to purchase software and hardware by users in carrying out e-learning is an essential dimension for the successful implementation of e-learning [33,34].

C. Tangibles

Tangibles parameters are measured based on the dimensions of the appearance of physical and equipment facilities in the e-learning system.

1) People: The style of human and computer interaction provided in e-learning provides a unique model for each user. The model and style of e-learning display can adapt to the type of user [35,36]. The difference/ uniqueness of this style can create a sense of ownership of users in the use of e-learning.

2) Process: The information content provided in e-learning can accommodate various forms of information, both in text, voice, figures, and videos [6].

3) Product: Variation of devices used in implementing e-learning is a platform that can be running well on a variety of tools, namely desktops, tablets, and smartphones [37].

D. Responsiveness

Responsiveness is an admin and system behaviour that is measured based on the willingness or response in helping users, providing attention, and fast service for e-learning users.

1) People: Provision of the help menu, FAQ, and helpdesk are dimensions of measuring the responsiveness of e-learning implementation. The need to answer user questions about e-learning procedures is substantial in implementing e-learning [38].

2) Process: Forms of learning are generally determined based on the level of knowledge taught (beginner, intermediate, or advance). Users can run e-learning based on their knowledge needs [39,40].

3) Product: The product can accommodate interactive communication between actors (student, lecturer, and admin), both in the form of chat, voice, and video, so that they can provide responsive services.

E. Assurance

Assurance is a parameter that measures the trust and confidence of users in utilizing e-learning as a platform in the users' education process.

1) People: Users can look back on the learning process they have experienced, to evaluate their experiences and learning outcomes. Evaluation in e-learning is vital to ensure successful delivery, effective use, and positive impacts on learners [2].

2) Process: The evaluation process of learning outcomes can be seen transparently by the users. Learning evaluation results are judgments that are considered objective by the users.

3) Product: The e-learning system has reliability in managing the learning process database, where the data and learning process well documented. This database is useful for giving feedback to all users, both students, lecturers, admins, and university management [41].

IV. CONCLUSION

Service quality parameters in e-learning applications can be measured based on the perspective of reliability, assurance, tangibles, empathy, and responsiveness. People, process, and product e-learning considerations are units of analysis that must consider in evaluating service quality in e-learning applications. Further research can do by looking at e-learning service quality based on the e-learning application quality approach, both based on the conceptual view of ISO / IEC 9126, McCall Software quality, IBM Software Quality, or others.

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