Analysis of student satisfaction of e-learning using the end-user computing satisfaction method during the Covid-19 pandemic

T A Prasetya¹, C T Harjanto¹, and A Setiyawan²
¹ Department of Mechanical Engineering Education, Universitas Negeri Yogyakarta, Indonesia
² Department of Mechanical Engineering Education, Universitas Negeri Semarang, Indonesia
E-mail: triadiprasetya@uny.ac.id

Abstract. The government's physical distancing policy to prevent transmission of the covid19 virus caused changes in learning patterns from face-to-face learning to distance education. The application of distance education at Universitas Negeri Yogyakarta is one of them through e-learning. Measurement of the level of e-learning user satisfaction is an assessment of the success of e-learning itself. The method used to measure students' level of satisfaction using e-learning is End-User Computing Satisfaction (EUCS). EUCS has five indicators, namely, Content, Accuracy, Format, Ease of Use, and Timelines. The research sample was taken using a random sampling technique. The data collection technique was carried out using a questionnaire. Data analysis uses descriptive statistical analysis and inferential statistical analysis. Based on the analysis results, the content evaluation value is 4.0300, the accuracy evaluation value is 4.0200, the evaluation value is 4.2550, the evaluation value for easy use is 4.0288, and the evaluation value for timeliness is 4.0900. The overall analysis results showed that the students were satisfied with the e-learning course in vocational learning media.

1. Introduction
When the covid19 pandemic entered Indonesia, the government issued various policies to suppress the transmission of the covid19 virus. One of the Indonesian government's policies is physical distancing or maintaining a distance between individuals. In line with government policies, the Ministry of Education and Culture applies physical distancing policies to implement learning activities. The physical distancing policy was adopted in the educational environment when the co-pandemic changed face-to-face learning pattern to distance learning.

One of the applications of distance learning at Universitas Negeri Yogyakarta is using e-learning media. At Yogyakarta State University, e-learning is implemented using an electronic learning media called Besmart. One of the courses that use Besmart e-learning is Vocational Learning Media. The selection of appropriate learning media according to student needs, will increase student activity [1].

E-learning can be interpreted as a learning activity that utilizes the internet in its implementation [2]. By using the internet, teachers and students interact through learning media to achieve the learning objectives contained in the curriculum[3].

E-learning is an excellent learning medium to complement face-to-face learning in the class [4]. E-learning helps transform the educational process from face-to-face learning to learning concepts that transcend boundaries called classrooms. Learners can access learning materials anytime and anywhere; learning resources are wide open from anywhere, fostering creativity and students' skills [5].

E-learning gives students the freedom to access learning content, determine the order of learning, determine the pace of learning, and choose appropriate learning media to meet learning outcomes [6]. Online learning using e-learning requires students' active role during the learning process; students' active role during the learning process will be able to improve student learning outcomes [7].
Students interact with peers, instructors, tools and technology, materials, and content in an online learning environment. These interactions increase students' opportunities to construct their knowledge, especially when students interact with their instructors and other learners [8].

Figure 1. The basic model of the UECS

Evaluation of e-learning systems is essential to ensure successful e-learning implementation, effective use, and a positive impact on students [9]. An assessment of the quality of e-learning must be done to see the effectiveness of distance learning. Measurement of the quality of e-learning must include aspects of e-learning user satisfaction. Traditionally, assessing the quality of learning is done using user satisfaction [10] [11].

User satisfaction is being happy or disappointed after comparing reality with students' expectations after using e-learning [12]. Student satisfaction during learning has a positive influence on student learning outcomes [13]. The method used to compare the reality and expectations of using an e-learning system is End-User Computing Satisfaction (EUCS).

End-User Computing Satisfaction (EUCS) evaluates a system's user satisfaction based on its use [14]. Measurement of the level of satisfaction of e-learning users consists of five indicators, namely Content, Accuracy, Format, Ease of Use, and Timelines [15] [16].

Indicators of the level of student satisfaction using the EUCS method are as follows;

1.1. **Content**
The content dimension measures the level of student satisfaction with e-learning Vocational Learning Media in terms of content. In this study, the measurement of satisfaction on the dimensions of content in terms of the appearance of e-learning and the availability of all information on learning activities.

1.2. **Accuracy**
The accuracy dimension measures student satisfaction with e-learning of Vocational Learning Media in terms of the accuracy between the data displayed in e-learning and the vocational learning media syllabus. In this study, the accuracy of e-learning is measured by the suitability of the material and tasks presented in e-learning with the syllabus.

1.3. **Format**
The format dimension measures student satisfaction with the Vocational Learning Media in terms of the e-learning display. In this study, the measurement of e-learning user satisfaction in terms of format is seen from the availability of space to access material, space to collect and see the value of assignments, and space to communicate.

1.4. **Ease of use**
The dimension of easy of use is the ease of using e-learning vocational learning media. Ease of use measures satisfaction or users friendly such as ease of access, ease of downloading material attachments, ease of uploading assignments, ease of knowing the status of assignments, and ease of getting e-learning operating guidelines.
1.5. **Timeliness**

The timeliness dimension is a measurement of student satisfaction in terms of online learning timeliness using e-learning. In this study, timeliness refers to the time provided to students in learning material and doing assignments. Timeliness is adjusted to the lecture syllabus. Based on the description above, this study aims to determine students' level of satisfaction using e-learning media for vocational learning. This study will be a picture of the level of satisfaction of users of e-learning Besmart. This evaluation will become a guideline for the improvement of online learning in vocational learning media so that later it can increase students' satisfaction using e-learning.

2. **Method**

This research is descriptive. This research was conducted in five stages;

2.1. **Identification of problems**

The author identifies the problem that will be discussed in this study. The problem is related to measuring students' level of satisfaction using e-learning media for vocational learning.

2.2. **Literature Study**

At the literature study stage, the writer seeks out several studies consistent with this research topic. Some references taken by the author relate to measuring the level of satisfaction using End-User Computing Satisfaction (EUCS).

2.3. **Data Collection**

The research sample was taken using a random sampling technique—data collection techniques using online questionnaires. The questionnaire was used to measure the level of satisfaction of students who use e-learning vocational learning media.

2.4. **Data Analysis**

Data analysis uses descriptive statistical analysis and inferential statistical analysis.

2.5. **Conclusion**

The last step is concluding the results of data analysis.

3. **Results and Discussion**

3.1. **Validity and Reliability Test**

Every research that uses a data collection instrument in the form of a questionnaire needs to test the validity and reliability. A validity test is done to determine the accuracy of the questionnaire used to obtain data from respondents. The reliability test was conducted to determine the reliability of the instruments used in this study.

Test the validity and reliability of research instruments using SPSS Statistics 21. Test the validity of the questionnaire used in the study using the Pearson correlation coefficient formula. This document demonstrates the numbering for sections upper case Arabic numerals, then upper case Arabic numerals, separated by periods. Initial paragraphs after the section title are not indented. Only the initial, introductory paragraph has a drop cap.

Questionnaire items can be valid if \( r_{count} \) or Pearson Correlation is greater than \( r_{table} \). The \( r_{table} \) of the number of respondents is 3.339. Based on the above calculation, it can be concluded that all instrument items are valid.
Table 1. Item reliability for the corresponding competency constructs.

| Item | Pearson Correlation | r table |
|------|---------------------|---------|
| 1    | 0.395               | 3.339   |
| 2    | 0.346               | 3.339   |
| 3    | 0.677               | 3.339   |
| 4    | 0.733               | 3.339   |
| 5    | 0.725               | 3.339   |
| 6    | 0.602               | 3.339   |
| 7    | 0.754               | 3.339   |
| 8    | 0.722               | 3.339   |
| 9    | 0.624               | 3.339   |
| 10   | 0.581               | 3.339   |

| Item | Pearson Correlation | r table |
|------|---------------------|---------|
| 11   | 0.447               | 3.339   |
| 12   | 0.681               | 3.339   |
| 13   | 0.695               | 3.339   |
| 14   | 0.777               | 3.339   |
| 15   | 0.773               | 3.339   |
| 16   | 0.736               | 3.339   |
| 17   | 0.650               | 3.339   |
| 18   | 0.751               | 3.339   |
| 19   | 0.707               | 3.339   |
| 20   | 0.610               | 3.339   |
| 21   | 0.540               | 3.339   |

The Reliability Test was carried out using the Cronbach's Alpha value in the SPSS Statistics 21 output table. The values determined by the experts guided the basis for the decision making of questionnaire reliability. The results of Cronbach's Alpha calculations using SPSS Statistics 21 can be seen in Table 2.

Table 2. Reliability test results.

| Cronbach's Alpha | N of Items |
|------------------|------------|
| 0.929            | 21         |

Questionnaire items can be reliable if Cronbach's Alpha value is more significant than 0.8 [17]. Based on the above calculation, the value of Cronbach's Alpha is more significant than 0.8, so it can be concluded that the questionnaire used has excellent reliability.

3.2. Statistic analysis

Data from the questionnaire were analyzed descriptively. The results of the descriptive analysis of each indicator of user satisfaction can be seen in Table 3. I am making the criteria for students' level of satisfaction using e-learning using the assessment criteria formula and component interpretation.

Table 3. Descriptive statistics

| Indicator | Mean Statistic | Std. Error |
|-----------|----------------|------------|
| Content   | 4.0300         | 0.20429    |
| Accuracy  | 4.0200         | 0.09539    |
| Format    | 4.2550         | 0.07632    |
| Easy to use | 4.0288     | 0.06028    |
| Timeliness| 4.0900         | 0.06245    |

Table 4. Satisfaction criteria

| Satisfaction criteria   | Value Range |
|-------------------------|-------------|
| Very satisfied          | 4.08 to 4.8 |
| Satisfied               | 3.36 to 4.08|
| Quite satisfied         | 2.64 to 3.36|
| Not satisfied           | 1.92 to 2.64|
| Very dissatisfied       | 1.2 to 1.92 |

They conclude e-learning student users' satisfaction by comparing the mean (Table 3) with the user satisfaction criteria (Table 4). The results of the evaluation of the satisfaction level can be seen in Table 5.
Table 5. Satisfaction level evaluation results

| Indicator   | Value | Satisfaction criteria |
|-------------|-------|-----------------------|
| content     | 4.0300| Satisfied             |
| Accuracy    | 4.0200| Satisfied             |
| Format      | 4.2550| Very satisfied        |
| Easy to use | 4.0288| Satisfied             |
| Timeliness  | 4.0900| Satisfied             |

The results of the evaluation level of e-learning user satisfaction based on table 5 can be concluded that:

- The content indicator has a satisfaction level value of 4.03; this means that students who use e-learning are satisfied with the content of e-learning.
- The accuracy indicator has a satisfaction level value of 4.02; this means that students who use e-learning are satisfied with the accuracy of e-learning.
- The format indicator has a satisfaction level value of 4.25; this means that students who use e-learning are very satisfied with the format of e-learning.
- The easy to use indicator has a value of satisfaction level of 4.25; this means that students who use e-learning are satisfied with the easy to use of e-learning.
- The timeliness indicator has a value of satisfaction level of 4.09; this means that students are e-learning users with the timeliness of e-learning.

4. Conclusion

Overall, student users are satisfied with e-learning vocational learning media. Student responses based on indicators of the level of satisfaction using e-learning are as follows; a) E-learning users are satisfied with the aspect of the content; b) E-learning users are satisfied with the aspect of accuracy; c) E-learning users are very satisfied with the aspect of formatting; d) E-learning users are satisfied with the aspect of the easy to use; e) E-learning users are satisfied with the aspect of timeliness.

References

[1] A. Marwanto, N. Hendrik, and T. A. Prasetya, "The development of tungsten inert gas welding practical manual for vocational high school," J. Phys. Conf. Ser., vol. 1446, p. 012005, Jan. 2020, doi: 10.1088/1742-6596/1446/1/012005.

[2] W. A. Cidral, T. Oliveira, M. Di Felice, and M. Aparicio, "E-learning success determinants: Brazilian empirical study," Comput. Educ., vol. 122, pp. 273–290, 2018, doi: 10.1016/j.compedu.2017.12.001.

[3] R. Ajmera and D. K. Dharamdasani, "E-Learning Quality Criteria and Aspects," Int. J. Comput. Trends Technol., vol. 12, no. 2, pp. 90–93, 2014, doi: 10.14445/22312803/ijctt-v12p117.

[4] S. Sukardi and M. H. Rahmat, “Pencapaian Hasil Belajar Teori Kejuruan Ditinjau dari Persepsi Mahasiswa pada Pembelajaran Online,” J. Din. Vokasional Tek. Mesin, vol. 4, no. 2, pp. 111–116, 2019, doi: 10.21831/dinamika.v4i2.27394.

[5] M. Aparicio, F. Bacao, and T. Oliveira, "Grit in the path to e-learning success," Comput. Human Behav., vol. 66, pp. 388–399, 2017, doi: 10.1016/j.chb.2016.10.009.

[6] O. Oludare Jethro, A. Moradeke Grace, and A. Kolawole Thomas, "E-Learning and Its Effects on Teaching and Learning in a Global Age," Int. J. Acad. Res. Bus. Soc. Sci., vol. 2, no. 1, pp. 2222–6990, 2012.

[7] T. A. Prasetya and C. T. Harjanto, "Improving Learning Activities And Learning Outcomes Using The Discovery Learning Method," VANOS J. Mech. Eng. Educ., vol. 5, no. 1, pp. 59–66, 2020, [Online]. Available: http://jurnal.untirta.ac.id/index.php/vanos/article/view/8221/5663.
[8] M. Asoodar, S. Vaezi, and B. Izanloo, "Framework to improve e-learner satisfaction and further strengthen e-learning implementation," *Comput. Human Behav.*, vol. 63, pp. 704–716, 2016, doi: 10.1016/j.chb.2016.05.060.

[9] D. Al-Fraihat, M. Joy, R. Masa'deh, and J. Sinclair, "Evaluating E-learning systems success: An empirical study," *Comput. Human Behav.*, vol. 102, no. August 2019, pp. 67–86, 2020, doi: 10.1016/j.chb.2019.08.004.

[10] R. Nor and F. M. Yamin, "Satisfaction of Learning Management System using EUCS Model," *Int. Conf. e-Commerce, e-Administration, e-Society, e-Education, e-Technology*, pp. 513–522, 2015.

[11] M. J. Fitriantoro and N. Husnah, "The Implementation of the End-User Computing Satisfaction Model into SCeLE: A Study of the Undergraduate Program of the Accounting Department in Universitas Indonesia," vol. 55, no. Iac 2017, pp. 151–155, 2018, doi: 10.2991/iac-17.2018.27.

[12] P. Kotler and G. Armstrong, *Principles of Marketing, Seventeenth Edition*. New Jersey: Pearson Prentice Hall, 2018.

[13] T. A. Prasetya and C. T. Harjanto, “Pengaruh Mutu Pembelajaran Online Dan Tingkat Kepuasan Mahasiswa Terhadap Hasil Belajar Saat Pandemi Covid-19," *Pendidik. Teknol. dan Kejurur.*, vol. 17, no. 2, pp. 188–197, 2020.

[14] A. K. S. Sukumaran, "End user computing satisfaction instrument for a university website in India," *Int. J. Bus. Inf. Syst.*, vol. 20, no. 4, pp. 496–508, 2015, doi: 10.1504/IJBIS.2015.072744.

[15] W. J. Doll and G. Torkzadeh, “End-User Computing,” *MIS Q.*, vol. 12, no. 2, pp. 259–274, 1988.

[16] N. Puspitasari, R. Lestari, M. Taruk, and E. Maria, "Website Testing Analysis Using PIECES and EUCS Method," *ICEEIE 2019 - Int. Conf. Electr. Electron. Inf. Eng. Emerg. Innov. Technol. Sustain. Futur.*, pp. 298–302, 2019, doi: 10.1109/ICEEIE47180.2019.8981417.

[17] U. Sekaran and R. Bougie, *Research Method for Business Textbook: A Skill Building Approach*, 7th ed. UK: John Wiley & Sons Ltd., 2016.