Measurement of quality services in the laboratory

N Nugraha*, D S Mulyati, I Bachtiar and C Nursagita
Department of Industrial Engineering Faculty of Engineering, Universitas Islam Bandung, Bandung, Indonesia
*Nugraha692016@gmail.com

Abstract. The problem in this study is complaints about the quality of laboratory services in the Faculty of Engineering which were delivered by students through a pre-research questioner. This problem needs to be corrected by measuring the quality of laboratory services so that it can increase satisfaction from students. The purpose of this research is to find out student satisfaction with the quality of services in the Faculty of Engineering laboratory. The method used in this study is the Service Quality (SERVQUAL). The results of the research obtained using the SERVQUAL model, the lowest values for each dimension were obtained. Tangible; laboratory room are clean, comfortable and spacious in accordance the standard national laboratory. Empathy; Assistants the Laboratory gives attention and prioritizes. Responsiveness; Assistants provide services quickly and precisely. Reliability; The assessment process is an objective and transparent. The Assurance; Assistant has the ability to answer all practical questions. The conclusion of the research that The priority to improve service quality the dimensions of tangible; laboratory room are clean, comfortable and spacious in accordance the standard national laboratory.

1. Introduction
The process of learning at university not only in class but also in the laboratory. The laboratory is a place for students to conduct education, training and research to develop theories that have been obtained previously in class. The laboratory has an important place in student’s ability to analyze, work and think scientifically. Therefore, universities need to improve and develop laboratory quality to create student satisfaction so that students' learning abilities are better so that the quality of graduates is higher

Faculty of Engineering has 12 laboratories in 3 study programs. The industrial engineering study program consists of 4 laboratories; work design and ergonomics analysis laboratory, production systems laboratory, quality management and decision information systems laboratory. The mining engineering study program consists of 4 laboratories; geology laboratory, mine laboratory, simulation laboratory and mine planning and exploration laboratory. The regional and city planning study program; studio laboratory, mapping laboratory, Planning and Design System Room Laboratory, energy and environmental laboratory.

The problem in this study, the students often complain about the quality of laboratory services in the Faculty of Engineering. The method used in this study is the Service Quality (SERVQUAL). The purpose of this research is to develop a service quality measurement to increase student satisfaction so as to improve the quality of services in the laboratory.

The Service quality is defined as the difference between perceptions and expectations on items that represent specific performance areas for service. Service quality is an important factor for service
companies to position themselves strongly in a competitive environment [1]. Meanwhile, according to the Fitzsimmons explained that service quality is something complex, and guests will assess service quality through the five principles of service dimensions as a measure; reliability, responsiveness, assurance, empathy and tangible [2]. Laboratory types are divided into [3];

- The laboratories Type I are basic science laboratories located in schools at secondary education level, or technical implementing units that organize education and equipment for category I and II, and managed materials are general category materials to serve activities educational or training with student education support facilities.
- The laboratories Type II are basic science laboratories that are available at universities (semester I, II), or technical implementing units that carry out education and / or training with equipment supporting facilities for categories I and II, and managed materials are general category materials for serving student activities.
- The laboratories Type III are scientific field laboratory located in a department or study program, or a technical implementation unit that organizes education and / or training with equipment supporting facilities for categories I, II, and III, and the material being managed is general category material and specifically for serving activities education, and research for students and lecturers.
- The laboratories Type IV are integrated laboratories located in the study centers of faculties or universities, or technical implementing units that carry out education and / or training with equipment supporting facilities for categories I, II, and III, and managed materials are general and special category materials to serve research activities, and community service, students and lecturers.

Permatasari in his journal that the SERVQUAL (service quality) method is measuring service quality through gap analysis that is used as a reference in marketing research, introduced by Valarie Zeithaml, A. Parasuraman, and Leonard L. Berry [4]. The SERVQUAL dimension can be used as a tool to measure the gap between the services received and the services expected by students because services are intangible (which cannot be measured, but are related to the feelings of the customer). SERVQUAL includes five dimensions of service quality:

- Tangibles, describe the physical facilities, equipment, and appearance of personnel and the presence of users.
- Reliability, refers to the ability to provide the promised service accurately and reliably.
- Responsiveness, the willingness to help customers and provide appropriate attention.
- Assurance, is a polite and knowledgeable employee who gives a sense of trust and confidence.
- Empathy, includes caring and individual attention to users.

2. Method
The following are procedures and steps in research aimed at obtaining a systematically structured stage namely;

2.1. Designing instrument
Designing Instrument in this study the questionnaire was used as a data collection tool. The questionnaire is composed of predetermined research variables.

2.2. Determining sample size
The sample of respondents was determined based on the population of students of the Faculty of Engineering Unisba.
2.3. Test validity and reliability
Test validity and reliability are to determine the extent to which a measuring device measures what you want to measure. Thus, the validity test can be defined as a measure of how strong or accurate a measuring device performs its measuring function. Then proceed with testing reliability carried out to determine the consistency or constancy of a measuring device in measuring the same symptoms.

2.4. Data processing
Calculation or data processing is using the SERVQUAL development method

3. Results and discussion

3.1. Data of active student at Faculty Engineering
Data on the number of active students at the Faculty of Engineering Bandung Islamic University which is divided into 3 Study Programs, mining engineering 614 students, industrial engineering 666 students, urban and regional planning engineering 516 students so that the total population is 1796 students.

3.2. Calculation of sample size (n)
The following is a sample calculation from Faculty of Engineering student population:

\[ n = \frac{N}{1 + Ne^2} \]

\[ n = \frac{1796}{1 + 1796 \times 0.05^2} \]

\[ n = 327.14 \approx 328 \text{ orang respondent} \]

3.3. Data testing results
Data testing is performed to determine the data used and processed is valid and reliable.

3.3.1. Validity test. Based on the validity test that has been done, all attributes in the questionnaire are obtained as shown in the following table.

| Attribute | r Calculation | r Table | Result |
|-----------|---------------|---------|--------|
| 1         | 0.636         | 0.1203  | Valid  |
| 2         | 0.630         | 0.1203  | Valid  |
| 3         | 0.598         | 0.1203  | Valid  |
| 4         | 0.640         | 0.1203  | Valid  |
| 5         | 0.777         | 0.1203  | Valid  |
| 6         | 0.783         | 0.1203  | Valid  |
| 7         | 0.685         | 0.1203  | Valid  |
| 8         | 0.824         | 0.1203  | Valid  |
| 9         | 0.817         | 0.1203  | Valid  |
| 10        | 0.798         | 0.1203  | Valid  |
| 11        | 0.763         | 0.1203  | Valid  |
| 12        | 0.713         | 0.1203  | Valid  |
| 13        | 0.641         | 0.1203  | Valid  |
| 14        | 0.713         | 0.1203  | Valid  |
| 15        | 0.773         | 0.1203  | Valid  |
| 16        | 0.755         | 0.1203  | Valid  |
| 17        | 0.735         | 0.1203  | Valid  |
| 18        | 0.814         | 0.1203  | Valid  |
| 19        | 0.803         | 0.1203  | Valid  |
| 20        | 0.690         | 0.1203  | Valid  |
3.3.2. Reliability test. The following are the results of processing for the reliability test using the SPSS application. Cronbach Alpha value of 0.946 which shows that the 20 statements are reliable.

3.4. Research results for each dimension (TERRA)

3.4.1. Dimension tangible. The results of measurements through the distribution of questionnaires obtained.

**Table 2.** Measurement dimension tangible.

| Attribute Description                                      | Weight Value |
|------------------------------------------------------------|--------------|
| Practicum facilities Complete and adequate                  | 3.36         |
| Textbooks and modules are in accordance with practicum material | 4.14         |
| The quality and quantity of practicum tools is in accordance with the needs of the practicum process | 3.36         |
| Laboratory room that is clean, comfortable and spacious in accordance with the standard national laboratory | 3.32         |

Based on table 2, shows that the attribute of priority for quality improvement is seen from the lowest value, which is "Laboratory room that is clean, comfortable and spacious in accordance with the the standard national laboratory." With a weighting of 3.32.

3.4.2. Dimension empathy. The results of measurements through the distribution of questionnaires obtained.

**Table 3.** Measurement dimension empathy.

| Attribute Description                                      | Weight Value |
|------------------------------------------------------------|--------------|
| Practical are allowed to choose the practicum schedule in accordance with the schedule determined by the assistant | 4.14         |
| The assistant has concern for practical participants        | 4.03         |
| Assistants the Laboratory gives attention and prioritizes to practical | 3.87         |

Table 3, it can be seen that the attribute that prioritizes quality improvement is seen from the lowest value, "Assistants the Laboratory gives attention and prioritizes to practical" With a weighting of 3.87.

3.4.3. Dimension responsiveness. The results of measurements through the distribution of questionnaires obtained.

**Table 4.** Measurement dimension responsiveness.

| Attribute Description                                      | Weight Value |
|------------------------------------------------------------|--------------|
| Assistants are serve guidance in accordance with the time specified in the rules and agreements | 4.11         |
| The assistant accepts criticism and suggestions submitted by the practitioner | 3.89         |
| Assistant providing services quickly and precisely          | 3.86         |
| Assistants respond to every practical needs                 | 3.92         |

Table 4. explains that the attribute of priority for quality improvement is seen from the lowest value, "Assistant providing services quickly and precisely." With a weighting of 3.86.
3.4.4. Dimension reliability. The results of measurements through the distribution of questionnaires obtained.

**Table 5.** Measurement dimension reliability.

| Attribute Description                                      | Weight Value |
|------------------------------------------------------------|--------------|
| The assessment reports are well managed and documented     | 4.03         |
| The assessment process is an objectively and transparently | 3.97         |
| The material presented in the practicum is in accordance with the lecture material | 4.11         |
| Practicum starts and finishes according to a predetermined schedule | 4.03         |

Table 5 shows that the attribute of priority for quality improvement is seen from the lowest value, namely "The assessment process is an objectively and transparently." With a weighting of 3.97.

3.4.5. Dimension assurance. The results of measurements through the distribution of questionnaires obtained.

**Table 6.** Measurement dimension assurance.

| Attribute Description                                      | Weight Value |
|------------------------------------------------------------|--------------|
| Assistants can create a conducive atmosphere during practical activities | 4.10         |
| Assistant behaves politely to practical                    | 4.01         |
| Assistants have knowledge and can be trusted in delivering material | 4.02         |
| Assistant has the ability to answer all practical questions | 3.92         |
| Assistants provide accurate information about the stages and technical implementation of the practicum | 4.09         |

Table 6 shows that the attribute of priority for quality improvement seen from the lowest value is "The assistant has the ability to answer all practical questions." With a weighting of 3.92.

4. Conclusion

The results of the study it can be concluded:

- Based on the SERVQUAL dimension model (tangible, empathy, responsiveness, reliability, assurance) that there are several priority improvements to the laboratory: laboratory room are clean, comfortable and spacious in accordance the standard national laboratory. Assistants the laboratory gives attention and prioritizes. Assistants provide services quickly and precisely. The assessment process is an objective and transparent. Assistant has the ability to answer all practical questions.

- The attribute of priority for quality improvement is seen from the lowest value, which is "Laboratory room that is clean, comfortable and spacious in accordance with the standard national laboratory." With a weighting of 3.32.

Acknowledgments

Thank you to the research institute and community service (LPPM) of the Bandung Islamic University for funding the research and all parties who have helped in this research.

References

[1] Banga G, Kumar B and Maurya K K 2013 Service Quality Assessment of Food-Based Superstores *Indian Management Studies Journal* 17 1-16
[2] Fitzisimmons, James A and Fitzisimmons M J 2011 *Service Management: Operation, Strategy, Information Technology 7th edition* (New York: The McGraw Hill International Editions)

[3] Regulation of the Minister of State for Administrative Reform (PERMENPAN) 2010 number 3 concerning Functional Position of Educational Laboratory institution

[4] Permatasari N 2016 Analysis of Service Quality Using the Servqual Method in the New Student Reception Section of the Darmajaya Institute of Informatics and Business, Bandar Lampun. *J. Magister Manajemen* **02**(01)