

Importance-Performance Analysis and Student Satisfaction Index on Laboratory Services in the Faculty Mathematics and Natural Sciences, Universitas Jenderal Soedirman

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Importance-Performance Analysis and Student Satisfaction Index on Laboratory Services in the Faculty Mathematics and Natural Sciences, Universitas Jenderal Soedirman

W A Sidik, Sunardi, Supriyanto

Abstract. The laboratories in the Faculty of Mathematics and Natural Sciences (FMIPA) at Universitas Jenderal Soedirman (UNSOED) play important roles on development of learning and research in the fields of mathematics and applied sciences. The 11 laboratories the faculty are serving practical of subjects for FMIPA and some other faculties in the university. This study implements Importance-Performance Analysis (IPA) and Student Satisfaction Index (CSI) to assess the degree of importance and performance of the Critical Success Factors (CSF), from the perspective of students. This research presents an important contribution because it allowed us to identify the level of satisfaction of the students of the laboratories based on the performance, such study never been carried out before. The results show that the CSI is 72%, which means that the majority of students are satisfied with the performance of the service quality. Meanwhile, the results of IPA indicate that the improvement priorities have be carried out on un-adequate equipment for practicum; many equipment are not calibrated; un easy to have access to equipment and supply. There is no assurance on trust and safety in service. Students consider staff considered not friendly enough to students, do not provide enough information needed by the students. Some practical of subject from other faculties were terminated due to lack of relevancy between practical items and the subject syllabus. These attributes are the top priority because the importance level is high while the performance level is low

Keywords: Importance-Performance Analysis, Student Satisfaction Index, Critical Success Factor, Student perception

1. Introduction

Educational institutions are increasingly recognizing the importance of higher education as a service industry and placing greater emphasis to meet the expectations and needs of students. It is important for providers to understand the expectations of higher education and students' perceptions about the service quality in order to attract students and serve their needs [1]. This indicates that the need for higher education institutions continues to providing service quality and to satisfy customers in order to achieve sustainability of the business in the competitive service [2].

The value in measuring service quality in higher education lies in the identification of critical aspects of the service delivery [3]. However, this presumes a customer-led strategy, whereby the student, as the buyer of the service exchange, is regarded as the customer. Previous research on service quality in higher education often emphasizes on academic services like the quality of teachers, teaching resources, teaching mechanisms, assessment, and student involvement [4].

Universitas Jeneral Soedirman (UNSOED) has determined to implement high quality in its service units, including laboratories. Faculty of Mathematics and Natural Sciences (FMIPA) UNSOED has 11 (eleven) laboratories, namely Lab. Basic Chemistry, Lab. Physical Chemistry, Lab. Biochemistry, Lab. Analytical Chemistry, Lab. Inorganic Chemistry, Lab. Organic Chemistry, Lab. Computer, Lab. Core Physics and Materials, Lab. Computational Physics and Medical, Lab. Basic Physics and Lab. Electronics, Instrumentation and Geophysics. The laboratories are very important in the development



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of learning and research in the fields of mathematics, basic and applied sciences. Laboratory development is a necessity and a necessity to improve the quality of UNSOED as an educational institution.

This research aims to measure students' satisfaction on the laboratory services at FMIPA UNSOED. The expected results of this research are the level of expectations and student satisfaction on laboratory services in the faculty. The evaluation is useful to measure the performance of the laboratory. By knowing the level of expectation and real performance of service quality attributes will lead to improving the top attributes. Hence, management of the faculty can allocate resources effectively.

4 Importance performance analysis

Importance-Performance Analysis was first proposed and introduced by Martilla and James [5] as a means by which to measure client satisfaction with a product or service. The IPA approach recognizes satisfaction as the function of two components: the importance of a product or service to a client and the performance of a business in providing that service or product [5]. In this way, IPA examines not only the performance of an item [5], but also the importance of that item as a determining factor in satisfaction to the respondent [6]. The combined client ratings for those two components then provide an overall view of satisfaction with clear directives for management and where to focus agency resources.

This method has proven to be a generally applicable tool which is relatively easy to administer and interpret resulting in extensive use among researchers and managers in various fields, and is a way to promote the development of effective marketing programs, because it facilitates the interpretation of data and increases usefulness in making strategic decisions [6, 7, 8, 9, 7, 10].

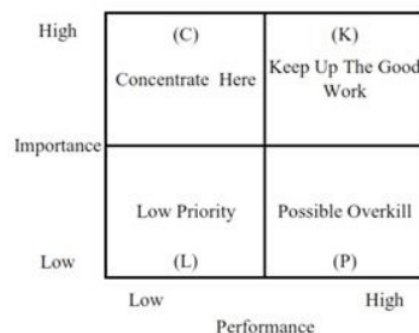


Figure 1. Importance-Performance Matrix [5].

3 The IPA consists of a pair of coordinate axis where the 'importance' (y-axis) and the 'performance' (x-axis) of the different elements involved in the service are compared (see Fig.1). Each of the quadrants combines the importance and the performance assigned by the customers/user given element of the service and possesses a different value in terms of management and the respective mean of self-stated raw importance and attribute performance data is the original point of this IPA matrix [5, 6, 8, 11, 12, 13, 14]. Each quadrant suggests a different marketing strategy.

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The four quadrants in importance-performance analysis are characterized as [5]:

- Quadrant C. Concentrate here - high importance, low performance: requires immediate attention for improvement and are major weaknesses;
- Quadrant K. Keep up with the good work - high importance, high performance: indicate opportunities for achieving or maintaining competitive advantage and are major strengths;
- Quadrant L. Low priority - low importance, low performance: are minor weaknesses and do not require additional effort;
- Quadrant P. Possible overkill - low importance, high performance: indicate that business resources committed to these attributes would be overkill and should be deployed elsewhere.

16 Methodology and Results

The methodology of the empirical research was articulated in three main steps: (i) selection of variables to be included in the Importance-Performance analysis according with the survey research; (ii) definition and execution of the survey; (iii) data-analysis.

3.1. Selection of Variables

The students' satisfaction is determined by on the following attributes [14,15,16]:

- Quality of General Aspects: it includes space for practicum; facilities, equipment for practicum; safety of service; access to equipment and supply; SOP and log book related to practicum; accessible to the tutor
- Quality of Tutorial: knowledge of rules, procedures, material; clarity and precision in the exposure of knowledge; accessible to the tutor
- Quality of Practical: knowledge of rules, procedures, material; clarity and precision in the exposure of knowledge; accessible to the assistant.
- Quality of Material supply: availability equipment and supply for practicum; access to equipment and supply; relevancy teaching material to the syllabus;
- Quality of Management: Simple procedures; Knowledge of rules and procedures Simple procedures; Interest in solving the problems of student; Trust and safety in service; Information service completion; Quick response and kindness of its staff;

3.2. Sample and Questionnaire

The survey was conducted during June and September of 2018, in 1st and 2nd semester of the 2017/2018 academic year. A total of 695 valid questionnaires were received, which represents 34% of total population (620 students). The sample size resulted in sampling error of 3,7%, assuming a 95% confidence level.

The instrument used was divided into two sections: section I collected the general demographic information of the student; while section II refers to students' perceptions of the importance and performance of key attributes and their satisfaction for these attributes. 40 attributes under

consideration are grouped into 5 categories, namely: General services, Tutorial services, Practicum services, Material supply services, Laboratory management services.

The data for this study were collected by applying a questionnaire on - line to the students who attend the undergraduate programs at the Faculty of Mathematics and Natural Sciences, UNSOED.

All the items were adapted from scales developed in similar studies [14, 15, 16] besides to evaluate the single factors, students were also asked to provide an overall evaluation of the overall perceived satisfaction. All the evaluations were measured through a five-point Likert scale (1=Strongly disagree; 2=Disagree; 3=Neither agree or disagree; 4=Agree; 5=Strongly agree).

A list of questions is prepared to see the performance level of service quality and the level of importance in the laboratories. It is symbolized as X and the level of importance as Y. Next, CSI and IPA will be analysed. The attributes of academic services can be seen in Table 1.

Table 1 The Attributes of Laboratory Services of FMIPA

No	Services	Attributes	Quality Dimensions
1	General	Adequate spaces for practicum	Tangible
2	General	Adequate equipment for practicum	Tangible
3	General	Trusted on safety of service	Tangible
4	General	Availability of safety procedure for practicum	Tangible
5	General	Easy access to equipment and supply	Responsiveness
6	General	Ability to use equipment and supply after classes	Responsiveness
7	General	Availability of SOP and log book related to practicum.	Tangibles
8	Tutorial	Tutors have adequate knowledge of rules and procedures	Assurance
9	Tutorial	Tutors have adequate knowledge on the material	Assurance
10	Tutorial	Clarity and precision in the exposure of knowledge	Assurance
11	Tutorial	Tutors give feedback toward assignment and task	Assurance
12	Tutorial	Tutors help students to understand the course material	Responsiveness
13	Tutorial	The suitability of tutorial activity and the schedule	Assurance
14	Tutorial	The quality of tutorial facilities	Assurance
15	Tutorial	The Ease of accessing the tutor	Responsiveness
16	Practical	Assistants have adequate knowledge of rules and procedures	Assurance

17	Practical	Clarity and precision in the exposure of knowledge	Assurance
18	Practical	Assistants have adequate knowledge on the material	Assurance
19	Practical	Assistants give feedback during the practicum	Assurance
20	Practical	Assistants help students to understand the course material	Assurance
21	Practical	The Ease of accessing the Instructors/assistants	Responsiveness
22	Practical	The suitability of the practical activity and the subject	Tangibles
23	Practical	Fair assessment	Assurance
24	Material supply	Availability of module in accordance with the subject	Tangibles
25	Material supply	Adequate equipment for practicum	Tangibles
26	Material supply	Adequate supply for practicum	Tangibles
27	Material supply	Easy access to equipment and supply	Responsiveness
28	Material supply	Availability of complete and easily understood module in accordance with the syllabus	Tangibles
29	Material supply	Relevancy teaching material to the syllabus	Assurance
30	Management	The administrative staffs provide a registration system	Responsiveness
31	Management	The administrative staffs provide information service completion	Reliability
32	Management	The administrative staffs know a lot of information needed by the students	Responsiveness
33	Management	Trust and safety in service	Assurances
34	Management	Warmth of its staff	Empathy

Four steps to measure CSI:

Step 1. Calculate the Mean Importance Score (MIS)

$$MIS = \frac{\sum_{i=1}^n Y_i}{n} \quad (1)$$

and Mean Satisfaction Score (MSS)

$$MSS = \frac{\sum_{i=1}^n X_i}{n} \quad (2)$$

Where Y_i is Importance value of i attribute, and X_i is Performance value of i attribute for $i = 1, 2, \dots, n$.

Step 2. Calculate Weight Factor (WF)

$$WF = \frac{MIS}{\sum_{i=1}^P MIS_i} \times 100\% \quad (3)$$

Where P is number of importance attributes, i = Service attribute. WF presents a percentage value of MIS in each attribute to the total MIS of all the attributes.

Step 3. Calculate Weight Score (WS).

$$WS_i = WFi \times MSS_i \quad (4)$$

Step 4. Calculate CSI value.

$$CSI = \frac{\sum_{i=1}^n WS_i}{5} \times 100\% \quad (5)$$

Customer satisfaction scale is commonly used to interpret the index scale of zero to one, or zero to one hundred.

Two steps to measure IPA:

Step 1. Calculate the average level of importance for each attribute i

$$\overline{Xi} = \frac{\sum_{i=1}^k Xi}{n} \quad (6)$$

and performance for each attribute i

$$\overline{Yi} = \frac{\sum_{i=1}^k Yi}{n} \quad (7)$$

Where n is number of respondents/samples.

Step 2. Calculate the average level of importance for the entire items

$$\overline{\overline{Xi}} = \frac{\sum_{i=1}^k \overline{Xi}}{p} \quad (8)$$

and performance for the entire items

$$\overline{\overline{Yi}} = \frac{\sum_{i=1}^k \overline{Yi}}{p} \quad (9)$$

Where P is number of items i

3.3. Findings and Discussion

The services that students mentioned as the most important are the practical and tutorial. Assistants and tutors are accessible and help students to understand the course material. They have adequate knowledge on the material and adequate knowledge rules and procedures. They have clarity and precision in the exposition of knowledge, the scientific capacity of instructors/assistants and assessing the student work fairly. And the other hand the attributes considered less important are related to general service, in particular ability to use equipment and supply after classes and relate to adequate spaces for practicum.

In evaluating the quality of services provided by FMIPA's laboratories, the variables that presented to have the best performance are practical and tutorial. the laboratories have modern facilities, clean and quality of tutorial and practical. Assistant and tutor considered to have the clarity and precision in the exposure of knowledge. The variables with the best performance in the services were the fact that tutors and assistants give feedback during the practicum and giving a fair assessment. In relation to the tutorial and practical service only one of this variable category

present a value below the average. Generally the aspects considered the most negative are related to the general and management services. Un easy access to the equipment and supply. The administrative staffs do not know a lot of information needed by the students. There is no assurance on trust and safety in service. Students consider staff considered not friendly enough to students. None of the these variables were higher than the global average.

Regarding the performance, the variables that showed significant values of discrepancy were: adequat⁷ equipment for practicum, kindness of the management ⁷aff and management staff interest in solving the problems of students in laboratory services. These results suggest that in general, students are satisfied with the performance of FMIPA's laboratories as the average of all aggregate variables are higher than the intermediate value.

In analysing the Importance-Performance matrix for a study with the values of intermediate scales [6], it is indispensable to do an an¹⁸ is based on the overall median values (Lynch *et al.* 1996, and 5]. These authors suggest that the median value¹⁷ the data reported to cross the axes should still be considered, based on the trend of responses, median values as a measure of central tendency are theoretically preferable to means because a true interval scale may not exist. The results are spread over 4 quadrants (Fig. 1).

- Quadrant C, concentrate here. The following attribute requires immediate attention for improvement and are major weaknesses of FMIPA's laboratory services: Un-adequate equipment for practicum; many equipment are not calibrated; un easy to have access to equipment and supply. There is no assurance on trust and safety in service. Students consider staff considered not friendly enough to students, do not provide enough information needed by the students. Some practical of subject from other faculties were terminated due to l¹⁹ of relevancy between practical items and the subject syllabus. These attributes are high importance but low performance.
- Quadrant K, keep up with the good work. The following attributes have a high importance and high performance: assistants and tutors are accessible and help students to understand the course material. They have adequ⁷ e knowledge on the material and adequate knowledge rules and procedures. They have clarity and precision in the exposition of knowledge, the ³ientific capacity of instructors/assistants and assessing the student work fairly. These indicate opportunities for achieving or maintaining competitive advantage and are major strengths;
- Quadrant L, low priority. The following attributes have low importance and low performance: ability to use equipment and supply after classes, easy access to

equipment and supply; availability of simple rules and procedures. These were considered as minor weaknesses but they do not require additional effort.

- Quadrant P, possible overkill. Big spaces for practicum for some laboratories with small number of equipment considered as low importance but high performance. It indicate that the space would be overkill and should be deployed elsewhere.

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References

- [1] Nadiri, H., Kandampully, J., & Hussain, K. Students' Perceptions of Service Quality In Higher Education. *Total Quality Management & Business Excellence*, 20(5), 2009. 523-535.
- [2] DeShields Jr, O, Kara, A., & Kaynak, E. Determinants of Business Student Satisfaction and Retention in Higher Education: Applying Herzberg's Two-Factor Theory. *International Journal of Educational Management*, 19(2), 2005. 128-139
- [3] Abdullah, F. (2006), "Measuring service quality in higher education: three instruments compared", *International Journal of Research Method in Education*, Vol. 29 No. 1, pp. 71-89
- [4] Seng, E. L. K., & Ling, T. P. (2013). A statistical analysis of education service quality dimensions on business school students' satisfaction. *International Education Studies*, 6(8), 136-146.
- [5] Martilla, J. and James, J. (1977), 'Importance-Performance Analysis', *Journal of Marketing*, 41(1), 77-79.
- [6] Silva, F. and Fernandes, O. (2010). Using Importance-Performance Analysis in Evaluating of Higher Education: A Case Study. ICEMT 2010 International Conference on Education and Management Technology. IEEE. ISBN: 978-1-4244-8617-5, 121-123.
- [7] Slack, N. (1994), 'The Importance-Performance Matrix as a Determinant of Improvement Priority', *International Journal of Operations & Production Management*, 14(5), 59-75.
- [8] Matzler, K., Sauerwein, E. and Heischmidt, K. (2003), 'Importance-performance analysis Revisited: the role of the factor structure of customer satisfaction', *The Service Industries Journal*, 23(2), 112-129.
- [9] Kitcharoen, K. (2004), 'The importance-performance analysis of service quality in administrative departments of private universities in Thailand', *ABAC Journal*, 24(3), 20-46.
- [10] Abalo, J., Varela, J. and Manzano, V. (2007), 'Importance values for Importance Performance Analysis: A formula for spreading out values derived from preference rankings', *Journal of Business Research*, 60(2), 115-121.
- [11] Bacon, D. (2003), 'A Comparison of Approaches to Importance-Performance Analysis', *International Journal of Market Research*, 45(1), 55-71.
- [12] Zhang, H. and Chow, I. (2004), 'Application of importance-performance model in tour guides' performance: evidence from mainland Chinese outbound visitors in Hong Kong', *Tourism Management*, 25(1), 81-91.
- [13] Go, F. and Zhang, W. (2008), 'Applying importance-performance analysis to Beijing as an international meeting destination', *Journal of Travel Research*, 35(1), 42-49..

- [14] Pike, S. (2004), 'The Use of Repertory Grid Analysis and Importance-Performance Analysis to Identify Determinant Attributes of Universities', *Journal of Marketing for Higher Education*, 14(2), 1-18.
- [15] Joseph, M. and Joseph, B. (1997), 'Employers' Perceptions of Service Quality in Higher Education', *Journal of Marketing for Higher Education*, 8 (2), 1-13.
- [16] Alves, H. (1998), O Marketing das Instituições de Ensino Superior: O caso da Universidade da Beira Interior, Master Thesis in Management. University of Beira Interior, Portugal.

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