Design of user satisfaction evaluation instrument of informatics engineering education graduates, faculty of engineering and vocational, universitas pendidikan ganesha

I G B Subawa¹, I N E Mertayasa², KAgustini³ and D S Wahyun³

¹,²,³,⁴Department of Informatics and Engineering Education, Faculty of Engineering and Vocational, Universitas Pendidikan Ganesha 81116, Indonesia

Abstract-This research was a design stage of an instrument used to evaluate the satisfaction of the users of the graduates of the Informatics Engineering Education Study Program. This research was aimed at producing an instrument in the form of a proper questionnaire. The questionnaire creation was based on seven indicators as a reference namely, ethics, expertise in accordance with the field, foreign language skills, the ability to use information technology (IT), communication skills, teamwork, self-development. The seven indicators were broken down into 20 statement items to a questionnaire draft. There were several tests carried out on the questionnaire draft, the Gregory test involving 2 experts in the field of evaluation, the validity of the items using Pearson Product Moment correlation, and the reliability test using the Cronbach alpha formula. The result of the Gregory test is the coefficient value of the content validity of the instrument being tested (0.85), which is categorized as high. Based on the item validity test, 17 questions were valid. The reliability test results in a Cronbach Alpha value of 0.973. Based on the results of the tests carried out, the questionnaire instrument fits for measuring user satisfaction of the Informatics Engineering Education study program graduates.

1. Introduction

Higher education as a formal educational institution has the responsibility to create quality human resources who are able to face global demands [1]. Higher education is the final foundation for all levels of education and as a vehicle for the scholars’ formation who have a noble character, carry out cultural values, advance life, and form knighthood pinandita [2]. Higher education can be in the form of an academy, polytechnic, high school, institute, or university in which is an institution that obliged to organize higher education, and the Tridarma of higher education, as well as produce graduates or scholars who have excellent competence and personality. Service as an activity to meet the needs and desires of an individual or group [3]. Service quality is service which meets customer need or expectation.

The study program of the Informatics Engineering Education, Universitas Pendidikan Ganesha has a vision of "Becoming an Excellent Study Program in the field of Information Technology based on the Tri Hita Karana Philosophy in Asia in 2045" which is in line with the university’s vision of becoming an excellent university based on the Tri Hita Karana philosophy in Asia in 2045. One way to achieve this vision is by organizing education and teaching in the field of Information Technology Education to produce excellent human resources (competitive, collaborative, characterized) based on the philosophy of Tri Hita Karana. For this reason, the first goal of the Informatics Engineering Education Study
Program is to produce excellent human resources (competitive, collaborative, well-character) based on the *Tri Hita Karana* philosophy of the Technology Education field.

Until 2019, the number of graduates of the Informatics Engineering Education Study Program was 823 people. Each graduate is spread across various work environments ranging from state agencies (schools and state-owned enterprises), private agencies, and entrepreneurs. The institution where the graduates work is a new environment for them to implement all the knowledge, competencies, and experiences gained on campus. To find out their performance and quality, an evaluation is necessary. So far, the Study Program of Informatics Engineering Education has never evaluated the quality of the graduates. What has been done so far is tracking alumni in tracer studies (http://tracerstudy.undiksha.ac.id and https://goo.gl/forms/LwI3nVOi7P0M1p22).

For this reason, it is necessary to conduct an evaluation to know the quality of the graduates in work institutions. One thing that can be done to find out their quality is by conducting evaluations related to the satisfaction of the graduates’ users (stakeholders) themselves. The quality of the graduates will be directly proportional to the level of user/stakeholder satisfaction. The importance of conducting evaluations related to graduate user satisfaction is as follows.

1. Knowing the performance of the graduates in the workplace
2. Knowing the user satisfaction with the graduate performance
3. Feedback to the study programs related to the quality of the graduates produced.

Based on this, the researcher wants to evaluate the satisfaction of the graduate users (stakeholders) in the Study Program of Informatics Engineering Education.

### 2. Literature Review

#### 2.1. Graduates User

Stakeholder is any group inside or outside a company that has a role in determining the success of the company. The stakeholder can also mean everyone who has risked their life in the company. Customers are all people who demand an institution or company to meet a certain standard or quality because it will affect the performance of the institution [4]. User satisfaction is the user's response to the evaluation of the perceived suitability of expectations before and after using a product [5].

The term “Stakeholder” is a phrase formed from two words, namely "stake" and "holder". In general, the word "stake" can be translated as "interest", while "holder" means "holder". Broadly speaking, the concept of stakeholders can be defined as "individuals or organizations or groups of both profit and non-profit who have an interest in the company so that they can influence or be influenced by the achievement of company goals. In general, stakeholders are categorized into two parts, namely internal stakeholders and external stakeholders. Internal stakeholders are public within the organization. Internal stakeholders are relatively easy to control and the work for internal communication can be delegated to other departments such as Human Resources Department, or directly by the top executive. The elements of internal stakeholders consist of: shareholders, managers, employees, workers, students, and student families. External stakeholders are those who have an interest in the company and are outside the company. For example, consumers, government, private agencies, the press, state agencies, and others. Basically, every stakeholder has different needs. Yet for services, all stakeholders have the same needs, that is expecting to be served honestly, openly, responsibly, properly, with quality and fairly. Company managers must be professional to give the best for the interests of their stakeholders.

#### 2.2. Satisfaction Evaluation

Evaluation is an activity to collect information about the work of something, which is then used to determine the right alternative in decision making [6]. Evaluation is also research to collect, analyze, and present useful information about the object of the evaluation. The level of satisfaction is a function of the difference between perceived performance and expectations. There are three levels of satisfaction: When performance falls short of expectations, the customer is not satisfied. The data obtained from the measurement results will be used as a situation analysis for the next program [7]. If the performance is comparable to expectations, the customer is satisfied, and if the performance exceeds expectations, the
customer is very satisfied or happy [8]. The next process of evaluation is to evaluate and compare it with evaluation indicators. Finally, the results are used to make decisions regarding the evaluation object [9].

There are several objectives of evaluation including [9]:

1. Assessing whether the object of the evaluation has been implemented according to plan.
2. Measuring whether the implementation of the evaluation object meets the standard.
3. Object evaluation can identify and determine the deficiencies of the object of the evaluation.
4. User development of the object being evaluated.
5. Making decisions about the object being evaluated.
6. Accountability.
7. Providing suggestions to the users.
8. Developing evaluation theory and evaluation research.

3. Methodology

3.1. Research Design

The research design of this study is as shown in Figure 1.

![Figure 1. Research Design.](image)

3.2. Determining Population and Sample

Population is the entire research or analysis unit that has certain characteristics which are used as the research object. The population in this study were all of alumni stakeholders.

The sample in this study was part of the population to be studied. The sample is a part of a particularly concerned population. Based on initial searches of 586 IEE alumni until the end of 2019, there were only 184 alumni who were successfully registered. Those 184 alumni were the samples of this study.

3.3. Creating Instrument/Questionnaire

After conducting a study related to evaluation instruments arrangement, the researchers created the instrument draft. The first stage done in this activity was determining the indicators that are wanted to be evaluated. The next stage was making questions and statements related to the determined indicators.

3.4. Testing Instrument/Questionnaire

The next step after compiling the draft of the instrument was testing it. It aimed at assessing the appropriateness of the instrument for use. The tests conducted were validity and reliability test. The validity test is carried out to know the accuracy of an instrument to measure what is supposed to be measured [10]. The validation done was content validation that was assessed by experts in their fields. An instrument is valid if the expert has not provided suggestions or input on the contents of the instrument anymore [11].

A reliability test was used to measure the consistency of the results of the instruments. The instrument is reliable if the Cronbach’s alpha reliability coefficient is more than 0.90 ($\alpha <0.9$) [12].

3.5. Distributing Instrument/Questionnaire

After the instruments were tested valid and reliable, the next activity was distribution. The target respondents for this evaluation were users of the graduates of the Informatics Engineering Education Study Program. Comparison process of the segmentation method were spreaded to obtain the optimal segmentation method. The comparisons between the instruments were made online using google form.
3.6. Data Collection
The data collection process referred at this stage is to collect/reamp the results of the respondents’ answer. The data were combined and presented into a summary table before the analysis.

4. Result and Discussion
The indicators used in constructing the statement items of the questionnaire evaluating graduates’ user satisfaction include:
1. Ethics
2. Expertise in accordance with the field
3. Foreign language skills
4. Ability to use information technology (IT)
5. Communication skills
6. Teamwork
7. Self-development

Based on the predetermined indicators, the questions for each indicator were arranged. Then, 20 questions were obtained which represent all the indicators that become a draft instrument/questionnaire. This study collected the answers to the questionnaire from 184 alumni as respondents. The data description contains the average percentage of the number of respondents which included the average percentage of respondents choosing strongly agree (SA), agree (A), less agree (LA), and disagree (D) to measure the category of user satisfaction level of each indicator. Of all the research samples that have been determined, the percentage results were obtained for each variable of the evaluation heuristic method.

1. Result of Gregory Test
The content validity test was calculated using the Gregory formula by involving 2 experts. As the results, 17 questions were declared relevant so the coefficient of the content validity of the instrument being tested was 0.85 which is categorized as high. The instruments deemed irrelevant have been corrected so that all instruments can be tested. The 2x2 cross tabulation table is presented in Table 1

|        | Less Relevant | Very Relevant |
|--------|---------------|---------------|
| Expert 1 |               |               |
| Less Relevant | A (0)         | B (18,20)     |
| Expert 2 |               |               |
| Very Relevant | C (7)         | D (1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19) |

2. Result of Validity Test
Testing construct validity for the instrument was done using the Pearson Product Moment correlation formula. In this study, the questionnaire was tested on 20 respondents outside the research sample. The result calculation used Microsoft Excel 2013. The instrument items tested were 20 items. As the result, 3 questions were invalid and 17 items were valid. The minimum requirement for the instrument to be considered valid is the validity index value> 0.444. Therefore, all questions that correlate 0.444 were declared invalid, and the invalid questions were not corrected and not retested but were immediately eliminated. The results of the item validity test are presented in Table 2.
3. Result of Reliability Test
Reliability test was carried out to test the degree of consistency or stability of the instrument at certain intervals. The calculation of the reliability test used SPSS 20 application. Based on the testing of the instrument to 20 respondents, the results of the reliability calculation using the Alpha Cronbach formula were 0.973 out of 17 questions in which categorized as very high. After going through the validity and reliability test, the questionnaire was ready to be distributed. The results of the reliability test are presented in Table 3.

### Table 2. Validity test of instrument items.

| Respondent | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 1          | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 5 | 4  | 4  | 4  | 4  | 5  | 4  | 5  | 5  | 5  | 4  | 5  | 5  |
| 2          | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 4  | 5  | 4  | 4  | 5  | 4  | 4  | 4  | 5  | 4  | 4  | 4  |
| 3          | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  |
| 4          | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5  | 5  | 5  | 5  | 4  | 5  | 4  | 4  | 4  | 4  | 4  | 5  |
| 5          | 4 | 4 | 4 | 4 | 2 | 5 | 5 | 4 | 4 | 5  | 4  | 5  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 2  |
| 6          | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4  | 4  | 4  | 5  | 5  | 4  | 5  | 4  | 5  | 5  | 5  | 4  |
| 7          | 4 | 5 | 5 | 5 | 2 | 5 | 4 | 4 | 4 | 5  | 4  | 4  | 4  | 5  | 4  | 4  | 4  | 4  | 4  | 4  | 4  |
| 8          | 4 | 4 | 4 | 5 | 2 | 4 | 4 | 4 | 4 | 4  | 5  | 4  | 5  | 5  | 4  | 4  | 2  | 5  | 4  | 4  | 4  |
| 9          | 4 | 4 | 4 | 4 | 2 | 2 | 5 | 4 | 4 | 5  | 4  | 5  | 4  | 4  | 5  | 4  | 5  | 4  | 5  | 5  | 5  |
| 10         | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 2  | 2  | 5 | 4 | 4 | 4 | 4 | 4 | 2  | 4  | 5 | 5  |
| 11         | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 2 | 5 | 4  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4  | 4  | 4  | 4  |
| 12         | 4 | 2 | 5 | 5 | 4 | 2 | 4 | 4 | 4 | 2  | 4  | 2 | 4  | 4 | 4 | 4 | 2  | 4  | 2  | 4  | 4  |
| 13         | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 4  | 4 | 4 | 4 | 2 | 5 | 4 | 5 | 4  | 5  | 4  | 5  |
| 14         | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 2 | 4  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4  | 2  | 4  | 4  |
| 15         | 5 | 4 | 2 | 4 | 4 | 2 | 5 | 4 | 4 | 4  | 4 | 2 | 4 | 2 | 4 | 4 | 4 | 4  | 4  | 4  | 4  |
| 16         | 4 | 4 | 4 | 5 | 2 | 5 | 4 | 4 | 4 | 4  | 4 | 4 | 2 | 4 | 2 | 4 | 4 | 4  | 4  | 4  | 4  |
| 17         | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 2  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4  | 2  | 2  | 4  |
| 18         | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 5  | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 5  | 4  | 5  | 4  |
| 19         | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5  | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 5  | 4  | 4  | 4  |
| 20         | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5  | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5  | 4  | 5  | 5  |

Correlation:

|          | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|          | 0.7 | 0.6 | 0.6 | 0.6 | 0.4 | 0.5 | 0.5 | 19  | 0.5 | 0.4  | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
|          | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 69  | 34  | 23  | 85  | 90  | 0.0 | 34  | 5   | 5   | 89  | 46  | 7   | 6   | 34  | 5   | 5   |
|          | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 44  | 0.4 | 0.4 | 0.4  | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 44  | 0.4 | 0.4 | 0.4 | 44  |
|          | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44   | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  |
|          | D   | D   | D   | D   | D   | D   | D   | D   | D   | D     | D   | D   | D   | D   | D   | D   | D   | D   | D   | D   | D   |

Validity:

|          | AL | AL | AL | AL | AL | AL | AL | O  | AL | AL | AL | AL | AL | AL | O  | AL | AL | AL | O  | AL | O  |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|          | ID | ID | ID | ID | ID | ID | ID | P  | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | ID | P  | ID | ID | P  |
Table 3. Instrument of reliability test.

| Respon dent | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 18 | 19 |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1           | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 |
| 2           | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 |
| 3           | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 4 |
| 4           | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 |
| 5           | 4 | 4 | 4 | 4 | 2 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 2 | 5 | 4 | 4 |
| 6           | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 |
| 7           | 4 | 5 | 5 | 5 | 2 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 4 |
| 8           | 4 | 4 | 4 | 5 | 2 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 2 | 4 | 4 |
| 9           | 4 | 4 | 4 | 4 | 2 | 2 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 4 |
| 10          | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 2 | 2 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 |
| 11          | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 12          | 4 | 2 | 5 | 5 | 4 | 2 | 4 | 4 | 4 | 2 | 4 | 2 | 4 | 4 | 4 | 4 | 2 | 4 |
| 13          | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 5 | 4 | 5 | 2 | 4 | 4 | 4 |
| 14          | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 |
| 15          | 5 | 4 | 2 | 4 | 4 | 2 | 5 | 4 | 4 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 16          | 4 | 4 | 4 | 5 | 2 | 5 | 4 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 2 | 4 | 4 | 4 |
| 17          | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 18          | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 2 | 4 | 4 | 4 | 5 | 4 |
| 19          | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 4 |
| 20          | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 |

k = 8

| Sum Var     | 96.042 |
|-------------|--------|
| Var         | 0.4    |
| 0.6         | 0.7    |
| 0.5         | 1.2    |
| 1.2         | 0.5    |
| 0.8         | 0.8    |
| 0.8         | 1.0    |
| 0.9         | 0.9    |
| 0.6         | 1.0    |
| 0.8         | 0.6    |
| 0.8         | 0.8    |
| 0.9         |        |
| ΣVar        | 14.258 |
| α           | 0.973  |

5. Conclusion
The instrument for evaluating user satisfaction of graduates of the Informatics Engineering Education Study Program was designed with 7 indicators, namely ethics, expertise in accordance with the field, foreign language skills, the ability to use information technology (IT), communication skills, teamwork, and self-development. Based on those seven indicators, a draft instrument with 20 statement items was made. The draft of the instrument was tested for its validity and reliability to 20 respondents. The final result was an instrument with 17 statement items that are suitable for evaluating user satisfaction of the graduates of the Informatics Engineering Education Study Program.

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