Revealing student satisfaction related to academic information services using the Kano model

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Abstract. Information technology is one of the campus facilities. The information system department evaluates the use of information technology periodically by measuring user satisfaction. This study uses the Kano model to reveal student satisfaction related to the utilization and improvement of information technology in academic information services. Representation of the Kano quality category shows that the availability of conventional academic information services increases student satisfaction. The existence of an information technology that provides self-service practices without space and time constraints can further enhance student satisfaction.

1. Introduction
Technology and infrastructure can improve the teaching, learning, and research processes [1]. Information technology is a campus facility [2] that can realize efficiency in academic services and access to academic information [3]. Students access academic information through conventional or information technology-based academic services. Example of information technology in academic services such as digital libraries [4]. Example of information technology to access academic information such as academic information boards [5], websites, and other academic information channels [6]. Today the campus also applies the Internet of Things to create intelligent management and services [7].

Information technology is an important component of campus information systems. Information systems departments are available within the university to handle information technology infrastructure that includes layers of personnel, platforms, and services [8]. The information system department evaluates the improvement and success of information systems periodically by involving users [9]. User satisfaction can affect work productivity and utilization of information systems [10].

Evaluation of the success and effectiveness of information systems is an important aspect in information system research and practice [11]. The evaluation of information system improvement occurs in the maintenance phase, the last stage of the system development life cycle, where information system development is carried out by the results of consultations with users [12]. Evaluation of the success of information systems is an assessment of the quality of the system, which includes measuring the functioning of information systems in aspects of information use, the nature of transactions, and user services [11].

Previous studies have measured student satisfaction with campus facilities, but information technology is not included [13]. This study aims to measure student satisfaction with information technology. The scope of measurement is only related to academic information services, access to academic information, and the development of both.
2. Method

The measurement of user satisfaction in this study used the Kano model. Some previous studies used the Kano model to identify system features or needs that had the most influence or had an impact on user satisfaction [14,15].

2.1. Population and sample

The sample population is students from one of the universities in Indonesia. The sample elements are active students. The research units are active students from four departments, which include informatics, industrial engineering, civil engineering, and computer engineering. Determination of the number of samples using the following Slovin formula [16]:

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

Based on Slovin calculations, this study will use a sample (n) is 87 students for the population (N) of 670 students, and the error limit (e) is 10%. Sampling uses simple random sampling, where research units are chosen randomly so that all have the same opportunity to become a sample.

2.2. Research instrument

The communication model used in the survey is an impersonal relationship model with an intermediary tool in the form of a questionnaire. Each question is in pairs (functional and dysfunctional) [17] and closed questions with the following five alternative answers:

- Like (1): I like it very much;
- Must-be (2): I like it enough;
- Neutral (3): I am not affected either positively or negatively by it;
- Live with (4): I don't like that, but still can accept it; and
- Dislike (5): I can't accept that at all.

Measurements include attributes of student satisfaction (Ax) related to academic information services. The attributes will cover the following aspects of system information function: 1) Use of information (IA); 2) Nature of Transactions (TA); and 3) User Services (UA); with additional aspects of Speed of Submission (SA).

| Ax | Satisfaction Attribute | Aspect |
|----|------------------------|--------|
| **AVAILABILITY** | | |
| A1 | Availability of academic information | IA |
| A2 | Unlimited access to academic information | TA |
| A3 | Automated academic information services | TA |
| A4 | Conventional academic information services | UA |
| A5 | Availability of digital information boards | UA |
| A6 | Access to academic information through digital information boards | IA |
| A7 | Availability of short message service centres | UA |
| A8 | Access to academic information through a short message service centre | IA |
| A9 | Availability of websites | UA |
| A10 | Access to academic information through a website | IA |
| **ENHANCEMENT** | | |
| A11 | Additional types of academic information | IA |
| A12 | Fast process in adding academic information | SA |
| A13 | Access to academic information through various platforms | IA |
| A14 | Add new platform | UA |
| A15 | Fast process in adding platforms | SA |
| A16 | The platform according to student choice | UA |
Every attribute (Ax) has a pair of questions. For example, functional questions for A1, "What if academic information is available to you?" The dysfunctional question is, "What if academic information is not available to you?" Thus, there will be 16 pairs or 32 questions in the questionnaire.

2.3. Data analysis

After tabulating the survey, the next step is to determine the attribute category values of M, O, A, I, R, or Q for each answer pair attribute using Table 2. For example, if the answer value of the functional question is must-be (2) and dysfunctional is neutral (3), then the attribute category is Indifferent (I). The meaning of each category is as follows:

- Must-be (M), students are not satisfied if the campus does not provide it;
- One-dimensional (O), student satisfaction increases with increasing availability;
- Attractive (A), students feel satisfied if available, don't complain if otherwise;
- Indifferent (I), students do not care about their availability;
- Questionable (Q) occur when most respondents do not answer; and
- Reverse (R) occurs when most respondents choose a dysfunctional answer.

Table 2. Attribute category.

| Student Satisfaction | Dysfunctional |
|----------------------|---------------|
|                      | 1. Like  | 2. Must-be | 3. Neutral | 4. Live with | 5. Dislike |
| 1. Like              | Q       | A         | A          | A           | O          |
| 2. Must-be           | R       | I         | I          | I           | M          |
| 3. Neutral           | R       | I         | I          | I           | M          |
| 4. Live with         | R       | R         | R          | R           | Q          |

The survey tabulation, which includes 87 answers, is a reference for calculating the number of O, A, M, I, R, and Q for each attribute (A1-A16). Next, the following Blauth formula determines the grade of each Ax:

- If \((O + A + M) > (I + R + Q)\) then the grade is O, A, or M which is the most number
- If \((O + A + M) < (I + R + Q)\) then the grade is I, R, or Q which is the most number

Each attribute will appear on a two-dimensional diagram. Determination of X and Y coordinate points for each attribute uses the following formula:

- Worse (X) = - \((O + M) / (A + O + M + I)\)
- Better (Y) = \((A + O) / (A + O + M + I)\)

3. Results

Figure 1 shows the relationship between pairs of answers with the category values from some survey tabulations (Computer Engineering department). Overall the survey tabulation includes all departments and all attributes (from A1 to A16).
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Figure 1. Category conversion.

Table 3 shows most grades are attractive (13), and the rest are one-dimensional (3). Figure 2 presents a two-dimensional graph based on the attribute's coordinates.

Table 3. Grades and coordinate points.

| Ax | A | M | O | Total | R | Q | I | Total | Grade | Better | Worse |
|----|---|---|---|-------|---|---|---|-------|-------|--------|-------|
| A1 | 20| 1 | 52| 73    | 1 | 0 | 13| 14    | O     | 0.84   | -0.62 |
| A2 | 50| 1 | 20| 71    | 0 | 1 | 15| 16    | A     | 0.81   | -0.24 |
| A3 | 25| 15| 21| 61    | 1 | 1 | 24| 26    | A     | 0.54   | -0.42 |
| A4 | 18| 7 | 51| 76    | 2 | 2 | 7 | 11    | O     | 0.83   | -0.70 |
| A5 | 43| 2 | 29| 74    | 1 | 3 | 9 | 13    | A     | 0.87   | -0.37 |
| A6 | 37| 6 | 25| 68    | 0 | 2 | 17| 19    | A     | 0.73   | -0.36 |
| A7 | 49| 1 | 8 | 58    | 4 | 0 | 25| 29    | A     | 0.69   | -0.11 |
| A8 | 48| 2 | 8 | 58    | 3 | 1 | 25| 29    | A     | 0.67   | -0.12 |
| A9 | 41| 3 | 32| 76    | 1 | 1 | 9 | 11    | A     | 0.86   | -0.41 |
| A10| 44| 3 | 25| 72    | 2 | 0 | 13| 15    | A     | 0.81   | -0.33 |
| A11| 45| 1 | 31| 77    | 1 | 1 | 8 | 10    | A     | 0.89   | -0.38 |
| A12| 47| 2 | 28| 77    | 0 | 3 | 7 | 10    | A     | 0.89   | -0.36 |
| A13| 51| 5 | 11| 67    | 4 | 1 | 15| 20    | A     | 0.76   | -0.20 |
| A14| 38| 1 | 21| 60    | 2 | 0 | 25| 27    | A     | 0.69   | -0.26 |
| A15| 44| 1 | 27| 72    | 0 | 0 | 15| 15    | A     | 0.82   | -0.32 |
| A16| 28| 4 | 33| 65    | 2 | 2 | 18| 22    | O     | 0.73   | -0.45 |

Figure 2. Representation of quality categories of student satisfaction.
4. Discussion
Campus needs to pay attention to the availability of conventional services that involve staff as information providers. Conventional services are part of student services that must be available on campus [3]. The increasing availability of conventional services can increase student satisfaction. Meanwhile, the self-service is enough to satisfy students, even though they hardly care about it [6]. Students will be satisfied if the practice of self-service uses a variety of technology platforms without limitation of time and place.

Students will not complain if access to academic information is only available on campus using a single type of technology platform. Student satisfaction tends to increase when the campus provides a variety of technology platforms, such as academic information boards and websites. Students are little concerned about the existence of a short message service center, even though they will be satisfied if the technology platform is available. The existence of social media has decreased the use of short message services in Indonesia [18]. Thus, student satisfaction increases with the addition of technology platforms that provide a self-service experience.

Student satisfaction tends to increase if the campus adds the type of academic information and technology platforms quickly according to the choice of students. Students will not complain if the conditions are the opposite.

5. Conclusion
This study successfully revealed student satisfaction with information technology that supports academic information services. Student satisfaction will increase along with the addition of technology platforms that provide a self-service experience. The campus can avoid investing in platforms whose services are not widely used, such as short message service.

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