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Assessing student acceptance of virtual classroom in higher education using the UTAUT

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Abstract
In the era of e-learning, assessing student acceptance of virtual classroom technology is becoming increasingly important. This paper describes findings from a study of the acceptance of virtual classroom on Telkom University students, especially in D3 Informatics Management. Students from three different classes were surveyed to capture their perceptions regarding their current virtual classroom systems. The assessment framework is based on UTAUT dimensions: performance expectancy, effort expectancy, social influence and facilitating condition, which consists of 14 variables. The conclusion of the study is that the use of the virtual classroom has been accepted in their learning activity, but with different levels of acceptance. This paper provides information that will be of interest to universities that are developing e-learning.

1. Introduction
The shift towards distance education has been seen everywhere for various reasons such as convenience and equal opportunity. This is certainly due to the rapid development of technology in supporting the implementation of distance education [1]. Therefore the Indonesian Ministry of Education has given a policy that every higher education can do distance learning [2]. Even though the traditional class method is the most effective and efficient teaching methodology, but its own limitation when implementing in large number student and in different locations [3]. One solution to solve the problem and to support the academic community in an effort to improve the effectiveness of teaching and learning is the application of virtual classroom [4][5]. The virtual classroom is an internet-based technology that is used as a medium of interaction between teachers and students in learning and teaching activities [6]. However, in its application, not all students have the experience and confidence to use a virtual class technology [7][8]. Therefore, it is important to know the extent of student acceptance of the application of a virtual classroom in the learning process.

This paper presents the results of assessing the levels of acceptance on virtual classroom used in higher education level. The framework used in this research is a model of user acceptance developed by Venkantest et al (2003), namely the unified theory technology of acceptance and user of technology (UTAUT). Based on the adaptation of this framework [9], the acceptance criteria include 4 perceived dimensions and 14 variables. This research result will be of interest to universities that are developing virtual classroom.
2. Methods
This study uses a quantitative descriptive approach by giving a general description of a phenomenon under study. The survey questionnaire was conducted on Telkom University students, especially in D3 Informatics Management to assess students acceptance of the virtual classroom that has been used in the learning activity. The design of the questionnaire was carried out with reference to the UTAUT framework, which consists of 4 dimensions and 14 variables as shown in Table 1 [10].

| Dimensions                  | Variables                                   |
|-----------------------------|---------------------------------------------|
| Performance Expectancy      | Improved achievement                       |
|                             | Motivation to learn                         |
|                             | Compatibility in learning                   |
|                             | Improved way of learning                    |
|                             | Learning outcomes                           |
| Effort Expectancy           | The effort required                         |
|                             | Complexity                                  |
|                             | Ease of learning                            |
| Social Influence            | The necessity of using ICT media            |
|                             | Habit or culture                            |
|                             | Social status                               |
| Facilitating Condition      | Self-efficacy                               |
|                             | Condition of resources                      |
|                             | Experience                                  |

The questionnaire was presented to 131 students and 100 were returned. Therefore, 100 questionnaires, 33 from class A, 32 from class B, and 35 from class C were included in the analysis. The questionnaire was designed using the Likert scale (1-5) and have been tested for validity and reliability [9]. The test results show that the questionnaire can be used to assess the level of student acceptance of the virtual classroom technology. For statistical analysis, this paper used Chi-square Goodness of Fit Test to estimate how closely an observed distribution matches an expected distribution.

In this study, the development of the virtual classroom is carried out based on seven principles of success for a virtual classroom [11][9]:

- Pre-engineering lesson:
  Storyboard for multimedia teaching video, teaching slide and technical guidebook for the student was prepared for preliminary planning.
- Include diverse media:
  Edmodo, WhatsApp, and Skype are used for media synchronous learning.
- Be job relevant:
  Technical guidance was added to the syllabus.
- Be interactive:
  Kahoot game-based learning was used for interactive media.
- Consider social presence:
  Edmodo was used for the group tools.
- Combine the visual and verbal:
  Use a multimedia content.
- Manage cognitive load:
  Socialize a guidebook to students.
3. **Result**

A full overview of the acceptance of the dimensions is shown in Figure 1.

![Figure 1. Dimension Acceptance.](image)

The acceptance criteria for measurement results can be seen in Table 2.

| Score    | Criteria          |  
|----------|-------------------|
| 4.21-5.00| Very Good         |  
| 3.41-4.20| Good              |  
| 2.61-3.40| Acceptable        |  
| 1.81-2.60| Poor              |  
| 0-1.80   | Very Poor         |  

For an acceptable level for each variable can be seen in Table 3. The fourth column in Table 3 presents the status of the acceptance.

| Dimensions                  | Variables                           | Acceptance | Status   |  
|-----------------------------|-------------------------------------|------------|----------|
| Performance Expectancy      | Improved achievement                | 3.93       | Good     |  
|                             | Motivation to learn                 | 4          | Good     |  
|                             | Compatibility in learning            | 4.23       | Very Good|  
|                             | Improved way of learning             | 3.97       | Good     |  
|                             | Learning outcomes                    | 3.9        | Good     |  
| Effort Expectancy           | The effort required                  | 4.23       | Very Good|  
|                             | Complexity                           | 4.06       | Good     |  
|                             | Ease of learning                     | 3.86       | Good     |  
| Social Influence            | The necessity of using ICT media     | 4.11       | Good     |  
|                             | Habit or culture                     | 3.98       | Good     |
Social status 3.92 Good
Facilitating Condition
Self-efficacy 4.04 Good
Condition of resources 4.14 Good
Experience 4.12 Good

For the Chi-square Goodness of Fit Test result for each dimension can be seen in Table 4 to Table 7, which shows the values for each variable that is related to each dimension of the student acceptance.

Table 4. Chi-square values and relative numerical distribution of performance expectancy

| Variables | Strongly agree | Agree | Neutral | Disagree | Strongly disagree | Chi-Square | Relative weight | Rank |
|-----------|----------------|-------|---------|----------|-------------------|------------|-----------------|------|
| PE01      | 18             | 61    | 17      | 4        | 0                 | 117.5      | 78.6            | 4    |
| PE02      | 20             | 60    | 20      | 0        | 0                 | 120        | 80              | 2    |
| PE03      | 32             | 59    | 9       | 0        | 0                 | 129.3      | 84.6            | 1    |
| PE04      | 20             | 58    | 21      | 1        | 0                 | 110.3      | 79.4            | 3    |
| PE05      | 19             | 55    | 23      | 3        | 0                 | 96.2       | 78              | 5    |

Table 5. Chi-square values and relative numerical distribution of effort expectancy

| Variables | Strongly agree | Agree | Neutral | Disagree | Strongly disagree | Chi-Square | Relative weight | Rank |
|-----------|----------------|-------|---------|----------|-------------------|------------|-----------------|------|
| EE01      | 30             | 63    | 7       | 0        | 0                 | 145.9      | 84.6            | 1    |
| EE02      | 22             | 63    | 14      | 1        | 0                 | 132.5      | 81.2            | 2    |
| EE03      | 18             | 54    | 24      | 4        | 0                 | 91.6       | 77.2            | 3    |

Table 6. Chi square values and relative numerical distribution of social influence

| Variables | Strongly agree | Agree | Neutral | Disagree | Strongly disagree | Chi-Square | Relative weight | Rank |
|-----------|----------------|-------|---------|----------|-------------------|------------|-----------------|------|
| SI01      | 26             | 59    | 15      | 0        | 0                 | 119.1      | 82.2            | 1    |
| SI02      | 21             | 58    | 19      | 2        | 0                 | 108.5      | 79.6            | 2    |
| SI03      | 18             | 60    | 18      | 4        | 0                 | 113.2      | 78.4            | 3    |

Table 7. Chi square values and relative numerical distribution of facilitating condition

| Variables | Strongly agree | Agree | Neutral | Disagree | Strongly disagree | Chi-Square | Relative weight | Rank |
|-----------|----------------|-------|---------|----------|-------------------|------------|-----------------|------|
| FC01      | 20             | 64    | 16      | 0        | 0                 | 137.6      | 80.8            | 3    |
| FC02      | 24             | 66    | 10      | 0        | 0                 | 151.6      | 82.8            | 1    |
| FC03      | 25             | 63    | 11      | 1        | 0                 | 135.8      | 82.4            | 2    |

Table 4 to Table 7 show the values for each variable related to the dimension of student acceptance.

4. Discussion and Conclusion

Assessment of student acceptance of virtual classroom technology was conducted using a sample of 100 students at Telkom University, especially in D3 Informatics Management. The participants were asked to rate the acceptability of all variables.

Summarized the result shows that all variables are accepted. The analysis of the results also showed that the variable of compatibility in learning on performance expectancy dimension and variable of the effort
required on effort expectancy dimension was seen as the most acceptance variables. The acceptance of these two variables was even seen higher than others.

In the Chi-square Goodness of Fit Test performed using spreadsheet software, it can be seen that the Chi-square values for each student acceptance variable are higher than chi-square table with α = 5% and 4 degrees of freedom. This show that there is a significant difference between expected and actual for each student acceptance variable.

As a conclusion, All of the students have a good level of acceptance of the virtual classroom technology, with mean scores between 3,86 and 4,23, and the acceptance of the relative range is 77,2%-84,6% with all variables above 70%. Related to all variables, the result indicates that all of the students feel that they have been able to accept the virtual classroom technology well, but with different levels of acceptance. Thus, it appears that the use of the virtual classroom has had accepted on their learning activity. This result shows that the virtual classroom can be developed for a future learning activity in higher education.

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