Implementation of utaut model to understand the use of virtual classroom principle in higher education

B R Aditya$^1$ and APermadi$^2$

$^1$ School of Applied Science, Telkom University, Bandung, Indonesia
$^2$ Center of E-learning Development, Padjadjaran University, Sumedang, Indonesia

E-mail: $^1$bayu@tass.telkomuniversity.ac.id, $^2$aditya@unpad.ac.id

Abstract. This paper describes implementation of Unified Theory of Acceptance and User of Technology (UTAUT) model to assess the use of virtual classroom in support of teaching and learning in higher education. The purpose of this research is how virtual classroom that has fulfilled the basic principle can be accepted and used by students positively. This research methodology uses the quantitative and descriptive approach with a questionnaire as a tool for measuring the height of virtual classroom principle acception. This research uses a sample of 105 students in D3 Informatics Management at Telkom University. The result of this research is that the use of classroom virtual principle are positive and relevant to the students in higher education.

1. Introduction
Internet technology today has all the advantages, the education sector with e-learning is an advantage to facilitate and enhance learning through computer and information technology. The use of e-learning as a tool can vary, from the simplest and isolated activities or the online exam. A comprehensive approach by educational institutions in general the use of e-learning software to support the overall learning activities as much as possible. In the current e-learning trend, learning can take place inside / outside the classroom, students can be online / offline [1][2]. This learning model creates ideas and assets that are not visible [1]. Knowledge can be readily accessed and shared to form students' intellectual acceleration through a virtual learning environment [1].

Virtual classroom is a synchronous teaching and learning process in internet-based. The teacher and the students interact with each other over the computers [3][4]. Virtual classroom is a powerful media for learning [5]. Challenges in virtual classroom utilization in higher education still exist ease of use [6]. Beside that, a lot of learning process that does not pay attention to the basic principles that must be done when implementing a virtual classroom [7][8]. Implementation of virtual classroom must be fulfill the basic principle of virtual classroom technology [5]. Integrating basic principles into a virtual classroom is important when preparing effective virtual classroom [5].

The purpose of this study is how virtual classroom that has fulfilled the basic principle of virtual classroom can be accepted and used by students positively. This research result will be used sustainably to support effective virtual classroom at higher education level. For the method of measuring factors
that affect student acceptance of virtual classroom, authors use the acceptance model of Unified Theory Technology of Acceptance and User of Technology (UTAUT).

2. Virtual Classroom Principle
Virtual classroom as instructor-led synchronous computer learning environments attended by participants online at the same time but in different locations [5]. Virtual classroom has more multimedia contents, functions of queries, transmissions and data integrations when compared with traditional classroom [4] offers synchronous tools for the activities of teaching, discussing, reading and testing [9] [10]. According to Clark and Kwinn [5], the basic principles for virtual classroom success can be divided into seven principles, that are:

- Pre-engineering lesson.
  Preliminary planning and preparation of all key elements including slide content, teaching video scenarios, interactions (storyboards), participant handouts, e-learning media use manuals for students and facilitators. In this principle, authors create a storyboard for multimedia teaching video, teaching slide and technical guidebook for student.

- Include diverse media: diverse delivery media complement one another.
  Learning goals are best served by a blended approach. In this principle, synchronous learning that used is online chat in Edmodo Learning Management System (LMS), Whatsapp Messenger, and Skype. Teaching materials consist of slide and teaching video.

- Good virtual events are explicitly relevant job.
  This principle means the ritual event in the teaching topic must be in accordance with the semester learning plan / RPS (The institutions call it RPS) or syllabus that can be combined with the use of asynchronous learning events. In this principle, authors add technical guidance in the learning media column in the standard syllabus / RPS. Because the needs and learning media have evolved, the instructional designer has positioned itself as an important player in the design and delivery of learning experiences.

- Learning is interactive.
  Open interaction is essential to learn new knowledge and skill, the virtual classroom environment offers many facilities for student interactivity. In this principle, authors use free interactive media for quiz activity in Kahoot game based learning (https://kahoot.it/#!/).

- Social presence promotes learning.
  Discussion-based learning activities, group work, group assignments. If this feature is well managed it will increase students' opportunities for interaction that can improve learning. In this principle, authors use the group tools on Edmodo LMS (https://edmodo.com).

- Appropriate visual and verbal modalities.
  The appropriate visual and verbal use makes learning effectively. Appropriate visualization described (audio) can effectively improve learning by more than 80% compared to relying on textual explanations only. People learn better from words and pictures than from words alone, People learn better when the narration in multimedia lessons is spoken in a friendly human voice rather than a machine voice. In this principle, authors create multimedia content in some learning topics.

- Cognitive load must be managed in all instructor-led events.
  Every interactivity in the event (tools, features, teaching content, e-learning manuals and help-desk support) should be manageable so that the learning process becomes easy to be understood and used by students. In this principle, authors make all things related to the interactivity of the learning process into a content that is very easily understood by students to create a guide book and to socialize to students in the classroom at the first meeting.

3. Research Methodology
This research is a kind of quantitative descriptive research. Quantitative descriptive method is a method that only provides an overview or description of the variables of a phenomenon studied.
3.1. Learning Process Scenario
In this research, three classes with different course were chosen to case study with flex model blended learning. Each class had 16 meetings in one semester with the following scenario details were 3 meetings (with 2 topics for knowledge learning concept and facts, and 1 topic for learning evaluation that was interactive quiz based on kahoot.it) were conducted fully online distance learning.

3.2. Research sample
Measuring of learning experiences through virtual classroom principles was made to 105 students of D3 Informatics Management at Telkom University. The number of students who participated in this research can be seen in Table 1 and Figure 1.

Table 1. Percentage of participant by courses.

| Courses                        | N  | %  |
|--------------------------------|----|----|
| ICT Literacy                   | 35 | 34 |
| Professional Ethics            | 34 | 32 |
| Information System Audit       | 36 | 34 |

Figure 1. Percentage of participants by class.

3.3. Instrument and procedures
The questionnaire in this research was designed to measure the acceptance level of virtual classroom using 4 dimensions according to UTAUT model that are:

- Performance Expectancy
- Effort Expectancy
- Social Influence
- Facilitating Condition

The design of the questionnaire was done by several stages:

- Making preliminary questionnaire: the preliminary questionnaire was designed by the research team with the aim of describing the structure and content of the questionnaire. The structure of the questionnaire referred to the four dimensions of the previously mentioned UTAUT. The content of each structure was designed in the likert-scale form. Variables of each dimension can be shown in Table 2.
### Table 2. Variable of each UTAUT dimensions.

| 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                                      |

- Testing validity: validity test was conducted to ensure that the questionnaire (preliminary questionnaire) is accurate and appropriate to measure the level of student acceptance of virtual classroom technology. Validity test was conducted on 15 respondents and processed by using spreadsheet software. Based on the validation test, the results showed that the whole question items were valid (corrected item-total correlation > 0.4973).
- Testing reliability: reliability test was performed to determine the level of accuracy (reliability) of the questionnaire made (preliminary questionnaire). Reliability test used split-half technique. Based on reliability test, the results showed value of reliability coefficient of 0.8868 (very high reliability).
- Finalizing the questionnaire: based on the results of validity and reliability test of the preliminary questionnaire, it could be concluded that the questionnaire was really ready to be used as a data collecting tool in this research.

### 4. Research Result

The results obtained from the assessment of the implementation of virtual classroom in 105 students based on four dimensions of UTAUT can be seen in Figure 2.
Interpretation of measurement results using Likert scale as shown in Table 3.

Table 3. Interpretation of Likert Scale.

| Scale | Information           |
|-------|-----------------------|
| 5     | Strongly Agree        |
| 4     | Agree                 |
| 3     | Neutral               |
| 2     | Disagree              |
| 1     | Strongly Disagree     |

For an average value based on the courses and dimensions of UTAUT can be seen in Figure 3.

![Figure 3](image)

**Figure 3.** The average value based on courses and dimensions of UTAUT.

Two Way ANOVA test result to test the difference of mean value between courses and dimensions of UTAUT can be seen in Table 4 and Table 5.

Table 4. Descriptive analysis of UTAUT and course variables

| Summary                | Count | Sum   | Average  | Variance   |
|------------------------|-------|-------|----------|------------|
| UTAUT Dimensions       |       |       |          |            |
| Performance Expectancy | 3     | 12,08497 | 4,028322 | 0,008158   |
| Effort Expectancy      | 3     | 12,09043 | 4,030143 | 0,008624   |
| Social Influence       | 3     | 12,00717 | 4,002391 | 0,025972   |
| Facilitating Condition | 3     | 12,28534 | 4,095114 | 0,000311   |
| Course                 |       |       |          |            |
| Professional Ethics    | 4     | 16,55098 | 4,137745 | 0,001334   |
| Information System Audit | 4   | 15,97407 | 3,993519 | 0,006375   |
| ICT Literacy           | 4     | 15,94286 | 3,985714 | 0,006138   |
Table 5. Anova analysis between UTAUT and course variables

| Source of Variation | SS     | df | MS      | F       | P-value | F crit  |
|---------------------|--------|----|---------|---------|---------|---------|
| Course              | 0,014044| 3  | 0,004681| 1,021564| 0,446742| 4,757063|
| UTAUT Dimensions    | 0,058634| 2  | 0,029317| 6,397517| 0,032533| 5,143253|
| Error               | 0,027495| 6  | 0,004583|         |         |         |
| Total               | 0,100174| 11 |         |         |         |         |

5. Discussion and Conclusion
This research has assessed the use of virtual classroom in a sample at D3 Management of Informatics at Telkom University. The assessment were made by using questionnaires that have been evaluated through validity and reliability tests using four dimensions of UTAUT.

Our findings indicate that the average value for each dimensions of UTAUT in a pilot sample is above four, this indicate that the virtual classroom has been positively accepted by class of 2014 and class of 2016. In addition, based on each course, we get the average value for each dimensions of UTAUT is around 4, this means that virtual classroom can be accepted in three different courses that are sampled in this study.

Additionally, through detailed analysis with Two-Way ANOVA test using spreadsheet application, some interesting conclusions were drawn on the outputs, obtained p-value for course dimensions of 0.4467 and p-value for UTAUT dimensions of 0.0325. Since the desired level of confidence in this study is 95%, the significance level is 100-95 = 5% or 0.05. So for the course variables, because p-value> 0.05, it means that there is no significant difference among the average count of the three courses.

In sum, we conclude that the use of classroom virtual are positive and relevant to the students in higher education with the high acceptance value of each dimension of UTAUT namely performance expectancy, effort expectancy, social influence and facilating condition. We have also observed that success in the use of classroom virtual depends on how the basic principle in virtual classroom is fulfilled.

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