A study of virtual learning environments (VLEs) adoption: an information system approach

Winarto1*, Jamaluddin1, K M N Nadapdap1, R Gultom1 and A M H Pardede2

1Universitas Methodist Indonesia, Medan, Sumatera Utara, Indonesia
2STMIK Kaputama, Binjai, Sumatera Utara, Indonesia

*Corresponding author’s e-mail: winarto.zip@gmail.com

Abstract. The study aims to examine students’ adoption towards a Virtual Learning Environment (VLE). Using the Technology Acceptance Model (TAM) as the theoretical framework, the study mainly focuses on the degree that perceived usefulness, and perceive ease of use has influence on students’ adoption towards Easy Class as the Virtual Learning Environment. The research used a quantitative approach. A questionnaire has been employed as an instrument to gather data from 2 classes in a private university in North Sumatera. The research found that perceived usefulness and perceived ease of use have a significant effect on the students’ adoption. At the end of the paper, the implications as well as the suggestion for future study are explained.

1. Introduction
The Information and Computer Technologies (ICTs) brings many advantages for teaching and learning. Virtual Learning Environments (VLEs) is one of the technologies which have been widely used and incorporated for teaching and learning as the supplement for traditional or face-to-face learning. In fact, teachers and students may stop to use technology for teaching and learning because they do not fully accept and adopt with it [1]. As a result, the advantages of VLEs for teaching and learning such as the reduction of the barrier of place, and improve the learning effectiveness and collaborative learning [2] can not be fully experienced.

Over decades, researchers have closely examined factors that affect Information System adoption. They have developed a model for investigating users’ experiences to adopt with a new technology. The Technology Acceptance Model (TAM) is a model which helps to identify the intention to use of a technology based on perceived usefulness and perceived ease of use. A research suggests that measuring user acceptance and adoption towards Virtual Learning Environments is important to prevent the failures and improve the effectiveness of information technology for teaching and learning [3].

Virtual Learning Environments (VLEs) is commonly defined as a web-based communication platform in which allows students and teachers to access different learning tools, for instance program information, course content, teacher assistance, discussion board, document sharing system and learning resources, without any limitation of time and place [4]. The increasing use of VLEs has been perceived as a fundamental change. The VLEs become the medium of teaching and learning where teachers and students interact, and it can be used in either online learning or blended learning [5].
Both blended learning and online learning in virtual learning environment needs Learning Management Systems (LMSs). LMSs are enterprise-wide and internet-based systems, such as Blackboard and Moodle that integrate a wide range of pedagogical and course administration tools [5]. The role of an LMS is to communicate, deliver and manage the instructional content and learning materials [6]. Educational institutions must set up the learning management system such as Moodle, Blackboard as the information and technology infrastructure for either an online learning or a blended learning. Teachers on their own initiatives and individual level can use an online learning management system which is free and open source for example Easy Class, which will be the focus of the research.

The purpose of this research is to investigate the effect of perceived usefulness and perceived ease of use on students’ adoption towards Easy Class as the learning management platform. The research may be valuable for policy makers, researchers, educators and instructors. They will gain empirical-based information on factors influencing students’ adoption with a Virtual Learning Environment.

2. Literature Review

The growth of online learning and blended learning in educational institutions may give the students feelings of distress, frustration and confusion [7], that makes them less satisfied with their virtual learning environment [8]. Consequently, the benefits of the technology cannot be transferred to the users (teachers and students). The use of Information and Communication Technology (ICT) in virtual learning environments requires students to feel comfortable to work with computer applications and computer tools in order to reduce distress.

Information System researchers have explored the factors influencing students’ adoption with Virtual Learning Environments. The Technology Acceptance Model; consists of 2 dimensions perceived usefulness and perceived ease of use; is one of the models which has been used to measure users’ acceptance and adoption towards information systems. It is based on the Theory of Reasoned Action (TRA) and theory of planned behavior, that seeks to explain behavior intention to use information system [9].

Previous research found that perceived usefulness and perceived ease of use significantly influenced the adoption towards Virtual Learning Environments [1], [10]. This model has been widely used by information system researchers because of its understandability and simplicity [11], although the model also has drawbacks. As a result, there are some modified or extended models that have been developed to fully understand the information system adoption, for example the unified theory of acceptance and use of technology (UTAUT) model [12].

The learning management systems integrate a wide range of pedagogical and course administration tools and offer a virtual learning environment for teaching and learning activities [5], [13]. In this study, Easy Class is used as the Virtual Learning Environments in a blended learning setting. The blended learning approach has become more and more frequent in both research and practices. By definition, blended learning is referring to particular forms of teaching with technology, the mixing of e-learning with traditional learning, and as online learning combined with face-to-face [14].

Figure 1 below depicts the research framework based on the two dimensions of the Technology Acceptance Model.

![Figure 1. The Research Framework based on the Technology Acceptance Model](image-url)
Based on the figure above, this research has two hypotheses. The first hypothesis (H1) is perceived usefulness has a positive and significant effect on intention to use/adopt VLEs. Secondly, perceived ease of use has a positive and significant effect on intention to use/adopt VLEs.

3. Methods
The study has been conducted in 2 classes in a private university in North Sumatera. The students were from the second and third year level. The lecturer uses Easy Class as a learning management platform besides face-to-face teaching in the classroom. It means that the lecturer uses a blended learning approach to combine its face-to-face learning. The platform can be accessed online via www.easycalss.com, where users can freely register either as instructors/teachers/lecturers or students. Figure 2 illustrates the homepage of Easy Class where users can choose to register either as instructors or students.

![Figure 2. the Homepage of Easy Class](image)

During the first meeting of the classes, the lecturer introduced Easy Class to the students. The students mentioned that they have not heard and worked yet with Easy Class before. The lecturer also gave the training to the students as well as delivered a short guidance to work with Easy Class. Then the lecturer asked the students to register in Easy Class using their own smartphones and laptops. The lecturer shared an access code to the students, and asked them to join in the online classes which have been prepared by the lecturer. Figure 3 below illustrates an example of online classroom in Easy Class.

![Figure 3. An Example of Online Classroom in Easy Class](image)
The lecturer explained to the students that the lecturer would store the class materials, deliver assignments, quizzes, announcements, or create a topic for class discussion in Easy Class. On the students’ side, they have to proactively log in Easy Class to download and read the class materials, work on the assignments and quizzes then send them online via Easy Class, and join in the group discussion. The lecturer will actively use Easy Class for teaching and learning during the whole semester.

Furthermore, the students have been asked by the lecturer about their experiences work with Easy Class at the mid semester. The students were asked to fill out a questionnaire. The questionnaire was filled out by 90 students, of which 87 questionnaires are completed seriously, these are processed for analysis.

Specifically, the respondents have been asked to fill out 3 sections in the questionnaire with regards the perceived usefulness, perceive ease of use, and intention to use/adopt VLEs. The items were adapted from [1] with some minor wording changes. The original items are in English; after the translation, the respondents answered the questionnaire in Bahasa Indonesia. Examples items regarding the scales are; for perceived usefulness (4 items) are using Easy Class would improve students’ performance, using Easy Class would enhance my productivity; for perceived ease of use (4 items) are it would be easy for me to become skillful at using Easy Class, learning to operate Easy Class would be easy for me); for intention to use/adopt (6 items) are I enjoy using Easy Class in this course, If I had an opportunity to take another course via Easy Class, I would gladly to do so. Those scales were measured by 1-5 Likert scales ranging from strongly disagree, disagree, neutral, agree to strongly agree.

4. Result and Discussion
This part presents the data analysis and results of the research based on the quantitative analysis. Table 1 below shows the characteristics of the respondents.

| Gender | Year Level | Numbers |
|---|---|---|
| Male | 2nd year | 34 |
| Female | 3rd year | 53 |
| Total | Total | 87 |

Based on Table 1, the number of male students is 34 students (39%), while the number of female students is 53 students (61%). Furthermore, the number of 2nd year students on the research is 21 students (24%), while the number of 3rd year students is 66 students (76%).

Validity analysis of each items has been tested using item-to-total correlations in order to find out how well an item fits in a scale. The analysis showed that all items fit in their respective scale with the correlation scores ($R_i$) vary from 0.44 to 0.90. Furthermore, Table 2 below depicts the reliability analysis based on the Cronbach Alpha. A reliability scale above 0.70 may be considered to be an accepted level.

| Variables | Number of Questions | Cronbach Alpha |
|---|---|---|
| Perceived usefulness | 4 items | 0.84 |
| Perceived ease of use | 4 items | 0.80 |
| Intention to use/adopt | 6 items | 0.75 |
Following the reliability analysis, the multiple linear regression analysis results will be explained based on the questionnaire which has been answered by the students. In order to test the relations as being hypothesized in the research model, a multiple linear regression analysis was done, for which, the normality, multicollinearity, and heteroscedasticity assumptions were tested. Table 3 summarizes the finding of the multiple linear regression analysis.

| Table 3. The Result of Regression Analysis | B   | SE  | p-value |
|-------------------------------------------|-----|-----|---------|
| Constant                                  | 1.05| 0.15| 0.00    |
| Perceived usefulness                      | 0.45| 0.07| 0.00    |
| Perceived ease of use                     | 0.33| 0.05| 0.00    |
| $R^2$: 67%                                |     |     |         |

In Table 3 the result of this regression analysis is displayed. The dependent variable is intention to use/adopt with VLEs. The variables perceived usefulness, and perceived ease of use are best predicting the intention to use/adopt with VLEs. Based on the $R^2$, both variables contribute 67% to explain the variation of the dependent variable; intention to use/adopt with VLEs.

To test the first hypothesis, p-value of perceived usefulness is 0.00, less than alpha 5%. It means that the first hypothesis is accepted. The same with the first hypothesis, the second hypothesis is also accepted, because p-value of perceived ease of use is less than alpha 5%. It can be concluded that these variables significantly influence intention to use/adopt with Easy Class as the learning management platform. This result supports the expectation.

5. Conclusion
The purpose of the research is to examine the effect of two dimensions of the Technology Acceptance Model; perceived usefulness and perceived ease of use; on intention to use/adopt with Easy Class as the online learning management. A multiple linear regression shows that perceived usefulness and perceived ease of use has a positive and significant effect on intention to use/adopt with Easy Class as the online learning management.

These findings are in line previous research [1], that both perceived usefulness and perceived ease of use significantly influence intention to use/adopt with the technology. Students tend to stop, reject or accept new technology applications based on their perception of technology usefulness and ease of use. When they believe that Virtual Learning Environments is useful and easy to use, it is expected to be easier for the students assign to the learning materials, interact in the forum discussion and use other VLEs facilities.

The students are new users of Easy Class, but they quickly adopt with the platform. The reason could be that they are millenial generations who are native users and very active on using technology and the Internet. In addition, the teacher also be active using the learning management platform, and explain the students about the usage of the platform. This will help to strengthen the students perception that Virtual Learning Management is useful, and easy to use.

The research has several limitations. First, the research measured the two dimensions of the Technology Acceptance Model and adoption once which was in the mid semester. The next research is suggested to measure the constructs for several times, such as at the beginning, mid and at the end of semester. Secondly, the research did not measure the time duration and the activities that students did when using Easy Class. Thus, future research can add those aspects which will enrich the analysis. Thirdly, the research used 2 dimensions of the Technology Acceptance Model. For the next research, it is suggested to use an extended model and add more constructs such as perceived risks, perceived trusts, and perceived flexibility which possibly influence intention to use/adopt with Virtual Learning Environments.
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