Analysis of E-Learning Implementation at Vocational High School Using Technology Acceptance Model

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Abstract—The aims of this research are to determine the perception of students’ acceptance on the implementation of e-learning technology, and analyze effect of e-learning application on school policies using the Technology Acceptance Model (TAM). In detail, this research discusses e-learning schoology and moodle that have been implemented for six months. The research method used is a qualitative research method as well as descriptive approach. The populations in this research are 71 students and 4 teachers with details of 36 students with the implementation of e-learning, 35 students without the implementation of e-learning and 4 teachers in the network engineering department who employ e-learning. The research subjects are chosen through purposive sampling technique, which is taking conditional samples that meet the criteria that have been determined to be taken. The data analysis uses descriptive analysis and analysis from Miles and Huberman. The results show that the respondents received e-learning from perceptions ease of use and benefits. E-learning is considered to be able to influence the attitudes and behavior of students. For example, they are more disciplined in collecting assignments and more diligent in learning. Therefore, e-learning needs to be used as a support for conventional learning at Vocational High School by preparing e-learning first and preparing teachers by doing training or introduction to e-learning.

Keywords: e-Learning, schoology, moodle, Technology Acceptance Model, TAM, traditional learning

I. INTRODUCTION

Education in Indonesia is considered low in term of quality. According to the report of the Human Development Index (HDI) of the United Nations Development Program (UNDP) in 2018 Indonesia is ranked 116 out of 189 countries, Chancellor of Multimedia Nusantara University (UMN), Dr. Ninok Leksono said that education is experiencing a shock in facing the challenges of the industrial revolution era 4.0 in a press conference welcoming the National Education Day at the UMN Newsroom [1]. Government shows some efforts in improving the quality of learning by applying Ministerial Regulation Number 16 of 2009 concerning Teacher's Functional Position and Credit Score. The quality of learning can be seen from the activities and creativity of students after learning [2]. In this situation, teachers must have a strong influence on the quality of learning because educators are directors and actors in the learning process [3]. Choosing the right learning media used in the learning process is one of the important reasons for the good quality of learning.

Technological developments that begin to enter into education can affect students in the learning process, for example using internet as an additional learning media. In this case, the teachers in the school can use electronic learning (e-learning), which is an independent learning process supported by the use of information and communication technology [4]. Schoology and Moodle are examples of e-learning web application programs. According to the Information and Communication Technology Development and Training Center (BPPTIK) of the Ministry of Communication and Information in 2015, Moodle and Schoology are included in the 12 best open source e-learning [5].

The extent of user acceptance of a technology can be measured through a technology adoption model, one of which is the Technology Acceptance Model (TAM) [6]. Technology Acceptance Model (TAM) is presented as a model of acceptance with two main constructs, namely perceived ease of use and perceived usefulness. Specifically, substantial theoretical and empirical supports have been accumulated in supporting the Technology Acceptance Model (TAM) [7]. According to Szajna [8], the instrument from Davis has sufficient predictive validity because of the dependent variable, selection, and extending previous research through a test of predictive validity.

For students, the school is the most important place to get knowledge. Vocational High School 1 Sawit Boyolali
is one of the pilot schools for referrals in 2016. The definition of a referral school is a school that is a role model for nearby schools [9]. Therefore, Vocational High School 1 Sawit Boyolali has a contribution and a great responsibility to help improving the quality of education in Indonesia. To analyze the readiness of Vocational High School 1 Sawit Boyolali as an educational institution that can determine the policy of using e-learning learning models, an analysis needs to be done.

II. METHODOLOGY

A. Method

The research method used is qualitative research method. In other words, the research tries to find, investigate, describe and explain the quality of social influences that cannot be explained and measured through quantitative approaches [10]. The research also uses a descriptive approach that functions as a research procedure to produce descriptive data in a form of written sentences or oral sentences from various individuals and observed behaviors of phenomena that occur [11]. Descriptive research method aims to collect concrete data in detail that describes existing phenomena, make comparisons, and analyze experiences.

B. Sample

This study uses subject retrieval techniques with purposive sampling technique, namely conditional sampling. It means that samples that meet the predetermined criteria will be taken [12]. This study took grade X (ten) as a population due to time constraints and researchers. The researchers have determined the criteria for each informant, namely classes based on basic programming subjects. This is due to the fact that in basic programming subjects, the students have more time using computers and the internet in supporting e-learning model. Then, the respondents taken by the researchers in this study were 71 students and 4 teachers in the network engineering department Vocational High School Sawit Boyolali as data amplifiers. With the details of 36 students with the implementation of e-learning, 35 students without the implementation of e-learning and 4 teachers in the network engineering department were using e-learning.

C. Data Analysis Technique

The data in this study are qualitative data from the results of inquiry form and interviews. Processing and analysis of data use descriptive statistical analysis for inquiry form data, namely statistical method which is used to analyze data by describing the data obtained without intending to make generally accepted conclusions [13]. Analysis from Miles & Huberman is used to analyze interview data containing perceptions of ease and benefits of e-learning from respondents. The most important and risky issue in qualitative data analysis is because the analysis technique has not been well formulated. Therefore, Miles and Huberman [14] made a data analysis model for qualitative data. Consequently, this study uses a model from Miles and Huberman like Figure 2.3.1 that has three components, namely data reduction, data presentation and conclusion drawing.

III. RESULT

A. Observations Result

The results of observation made for students and teachers with the implementation of e-learning on the ease of use are illustrated in Figure 3.1.1, Figure 3.1.2 and Figure 3.1.3.

Out of 36 students, 18 students use Schoology. It is found that based on Figure 3.1.1, 83% or as many as 15 students praised the convenience and 17% or as many as 3 students complained of difficulty. Meanwhile, based on Figure 3.1.2, there were 18 students use Moodle with the results of 61% or 11 students praised convenience, 22% or 4 students complained of difficulties and 17% or as many as 3 students did not praise or complain. It is evident that the majority of respondents can use e-learning because of its ease.

Based on Figure 3.1.3 of the 4 teachers who implemented e-learning, 100% praised the ease of e-learning. This proves that the teacher has opinion that e-learning is easy to use in the learning process.
The results of observation made for students and teachers related to the benefits of using e-learning in the learning process are illustrated in Figure 3.1.4 and Figure 3.1.5.

Based on Figure 3.1.4, all 36 students or 100% are aware of the e-learning benefits.

Based on Figure 3.1.5, all teachers are aware of the e-learning benefits after using it with the students.

**B. Interview Result**

The results of interviews about e-learning features that have been conducted on 36 students and 4 teachers are presented in the form of table I and table II.

### TABLE I

**RESULTS OF STUDENT INTERVIEWS ABOUT E-LEARNING FEATURES**

<table>
<thead>
<tr>
<th>Type of informant</th>
<th>Schoology students</th>
<th>Moodle students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students with E-learning</td>
<td>Easy to understand or use (12/18) and complete and userfriendly</td>
<td>Easy to understand or use (11/18) and complete</td>
</tr>
<tr>
<td>The features are easy to use such as sending assignments and downloading material (3/18)</td>
<td>The feature is confusing (4/18)</td>
<td></td>
</tr>
<tr>
<td>E-learning Schoology is rather difficult to use</td>
<td>It’s easy</td>
<td></td>
</tr>
<tr>
<td>There are still many features (2/18) because they use English</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Based on table I, there are 4 perceptions of the students about Schoology features and 3 perceptions of the students about Moodle. From the data obtained, it is found that the Schoology features are easy to understand even its features are considered confusing and difficult to be used.

### TABLE II

**RESULTS OF TEACHER INTERVIEWS ABOUT E-LEARNING FEATURES**

<table>
<thead>
<tr>
<th>Type of informant</th>
<th>Perception</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>E-learning schoology is quite good or fairly complete as the application integration application features into the e-learning. The feature is quite easy because I have tried even though I had time to ask when I started using the interface for me, it was clear enough</td>
</tr>
<tr>
<td>Teacher</td>
<td>Moodle e-learning is easier than Edmodo and its features are easier to learn</td>
</tr>
<tr>
<td>Current and future learning or programs are better if the child's preference is to open e-learning by displaying existing features so that students, especially the teacher, are interested in learning.</td>
<td></td>
</tr>
<tr>
<td>The e-learning feature should be complete such as evaluation, material giving, discussion, task management and report (results report)</td>
<td></td>
</tr>
</tbody>
</table>

Based on table II, the teachers who have been interviewed assert that the e-learning features are quite good, easy to learn, and quite complete in providing the evaluation, material, discussion, task management and students’ reports.

The results of interviews on 36 students and 4 teachers related to e-learning implementation and function are presented in table III and table IV.

### TABLE III

**RESULTS OF STUDENT INTERVIEWS ABOUT THE FUNCTIONS OF E-LEARNING**

<table>
<thead>
<tr>
<th>Type of informant</th>
<th>Schoology students</th>
<th>Moodle students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students with E-learning</td>
<td>As a media placement material such as uploading and downloading as well as workmanship and collection of tasks (15/18)</td>
<td>As a media placement material such as uploading and downloading as well as workmanship and task collection or quizzes in learning (17/18)</td>
</tr>
<tr>
<td>Media communicates with friends and teachers (2/18)</td>
<td>As a medium to interact between students and teachers when not in class</td>
<td></td>
</tr>
<tr>
<td>To facilitate students in learning (2/18)</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Based on table III, there are three opinions of the students about Schoology's function and two opinions of the students about Moodle's function. The obtained data are used to determine the students' opinions about the functions of e-learning that have been used within the learning activity. The majority of the students say that e-learning functions as a medium for managing materials, such as uploading and downloading as well as managing tasks, such as assigning and collecting tasks.
Based on table IV of the four teachers interviewed had an opinion about the function of e-learning, e-learning as a communication medium for teachers and students, as a supporting media for conventional learning, as a medium for providing material, and facilitating the tasks of teachers and students.

The results of interviews on 36 students and 4 teachers related to the use of e-learning in schools are presented in the form of table V and table VI

Based on table V, there are four opinions of the students about the use of Schoology and five opinions of the students about the use of Moodle in schools. All of the 36 students thought that e-learning needs to be used in schools for different reasons.

Based on table VI, the teachers have been interviewed about the use of e-learning in schools. All teachers said that e-learning needs to be applied within the learning process of Vocational High School 1 Sawit based on various reasons.

The interview results of the students' perceptions related to the students' attitudes and behaviors after using e-learning are presented in table VII.

Based on table VII, there are seven opinions of the students about the attitudes and behavior of the students after using e-learning. Through the above research data, it can be concluded that e-learning is accepted because it helps in facilitating the students and teachers in learning, such as in the reception of learning materials and assignment. Additionally, it is easy to use the features of e-learning. This conclusion is supported by the research of Dalimunthe & Wibisono [15] and Park [16] which state that the
implementation of e-learning technologies affects the ease of e-learning.

It can be concluded that e-learning are beneficial in facilitating assignments, learning the material, providing the knowledge about e-learning technology, increasing the students’ learning motivation, improving the students’ discipline towards assignments, and improving the students' material understanding. This is reinforced by the results of inquiry form of category 3 which can be seen in Figure 3.1.4 and 3.1.5. It is displayed that as many as 36 students and 4 teachers who use e-learning are aware to the benefits of e-learning. This conclusion is also supported by the results of research from Dalimunthe & Wibisono [15] and Park [16] which stated that the implementation of e-learning technology in learning influences the perception on the use of e-learning. It is also supported by Asiyah [17] who asserts that the implementation of e-learning affects the students’ learning motivation.

E-learning has an influence on the students’ attitudes and behavior. For example, they are increasingly disciplined in gathering assignments and are increasingly diligent in learning. Since the impression of e-learning is considered necessary to be used in learning at Vocational High School Sawit Boyolali, first, it is important to prepare the teachers by carrying out a training about e-learning. This conclusion is supported by the results of research from Wijaya [18] that suggests for the schools to integrate e-learning within the learning activity. It is also necessary to prepare the tools since the research from Soomro, Soomro, & Imtiaz [19] states that learning organizers must prepare the tools such as servers, bandwidth, and storage capacity to carry out blended learning.

IV. DISCUSSION AND CONCLUSION

Results of the analysis uncover the ease and the convenience provided by e-learning in the learning process. For example, the learning activities are able to continue effectively due to the easy access the internet everywhere. The ease of giving and downloading material, collecting assignments and communicating between teachers and students makes the students become more interested and happy in learning. The implementation of Schoology and Moodle is essential as a supporting media to conventional learning. This conclusion is supported by the results of research from Soomro, Soomro, & Imtiaz [19] that suggests for the schools to integrate e-learning within the learning activity. It is also necessary to prepare the tools since the research from Soomro, Soomro, & Imtiaz [19] states that learning organizers must prepare the tools such as servers, bandwidth, and storage capacity to carry out blended learning.

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