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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.

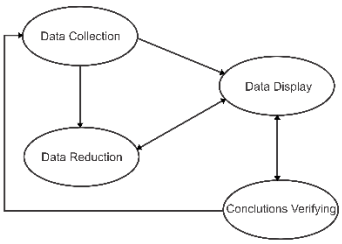

Figure 2.3.1 Model analysis of Miles and Huberman

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

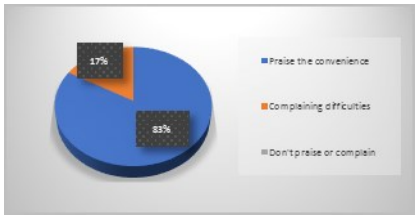

Figure 3.1.1 observation results of ease perception of schoology students

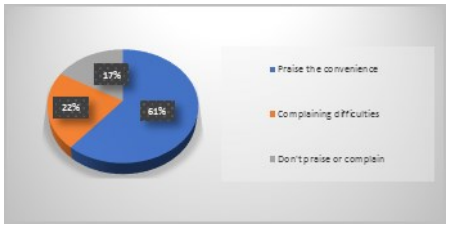

Figure 3.1.2 observation results of ease perception from moodle student

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.

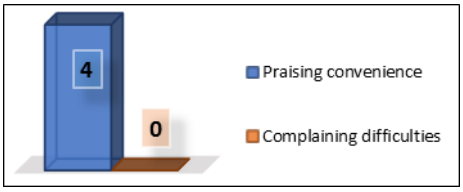

Figure 3.1.3 observation of perceptions of convenience from the teacher

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.

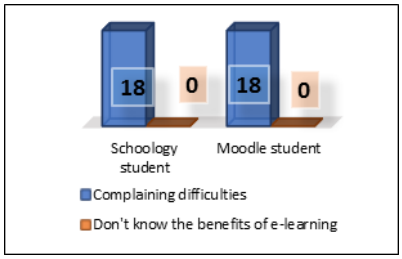

Figure 3.1.4 observation of perceptions of the benefits of students

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

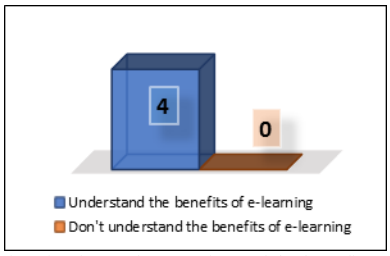

Figure 3.1.5 inquiry form of perceptions of the benefits of the teacher

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

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

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

Type of informant	Perception
Teacher	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
	Moodle e-learning is easier than Edmodo and its features are easier to learn
	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.
	The e-learning feature should be complete such as evaluation, material giving, discussion, task management and report (results report)

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

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

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.

TABLE IV. RESULTS OF TEACHER INTERVIEWS ABOUT THE FUNCTIONS OF E-LEARNING

Type of informant	Perception
Teacher	The function of e-learning is first as a medium of personal communication or in groups between teachers and students without meeting, in the implementation of eg teachers do not come directly learning can be done remotely.
	The function of e-learning in Oil Palm Vocational Schools is only limited to supporting conventional learning and has not been able to become our core learning because of limited knowledge and unprepared human resources.
	The e-learning function transfers knowledge that we provide to students with e-learning transfer process students can study material without having to meet the teacher
	The function of e-learning helps learning, for students to facilitate their work.

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

TABLE V. RESULTS OF STUDENT INTERVIEWS ABOUT THE USE OF E-LEARNING IN SCHOOLS

Type of informant	Schoology students	Moodle students
Students with E-learning	Need to be used because it increases students' knowledge about technology (6/18)	Need to be used because it can add knowledge to the progress of the times and technology, especially e-learning (7/18)
	Need to be used because it eases students' work such as recording material (4/18)	Need to be used because if the teacher is not present in the class the material is still delivered to students through e-learning (4/18)
	Need to be used to make it easier for students to carry out and collect tasks (5/18)	Need to be used to make it easier for students to carry out and collect tasks (5/18)
	Need to be used because it is easy to access and learning in Palm Vocational School to be conducive to not empty class hours (2/18)	Need to be used because it eases the work of students such as recording material and permission to the teacher that they cannot attend
	-	Need to be used because it is more time efficient

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.

TABLE VI. RESULTS OF TEACHER INTERVIEWS ABOUT THE USE OF E-LEARNING IN SCHOOLS

Type of informant	Perception
Teacher	It needs to be implemented because programs from Palm Oil N 1 that support industry needs such as learning by using e-learning (visual) are expected to be more attractive to students because learning is more modern by implementing IT.
	It needs to be implemented, before we started in 2016 by creating e-learning itself but many obstacles faced such as constraints of servers that did not have support, secondly there was a need for training or HR training because at that time many HR were old, all three were facility problems the internet with a limited number of computers even though the number of cellphone usage is more and with other reasons that until now has not been conditioned but gradually here we will try until the e-book is created.
	It needs to be implemented because nowadays the majority of activities use digital and almost students have cellphones (android / IOS), with applied e-learning assignments and task collection do not have to meet students directly, can be done at any time and monitor student work, provide material to explain and question and answer with students.
	It is very necessary not to be left behind by the changing times and introduce students to technology.

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.

TABLE VII. RESULTS OF STUDENTS INTERVIEWS

Type of informant	Perception
Students with E-learning	It's the same (3/35)
	His attitude is happy with easy access and tasks that have been done so that it adds motivation to diligently study (10/35)
	Still trying to adapt to e-learning or technology learning
	It is possible for uncontrolled students to open e-learning to study because there is no supervision from the teacher (2/18)
	More often open a laptop and smartphone to study (12/35)
	His attitude becomes less familiar with teachers and friends (5/35)
	Make students individualistic and less creative

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 methods that have been going on for a long time. This can increase the familiarity between the teachers and students because not only they can meet in the classroom but also when they can communicate through e-learning media even if they are in different places.

As the students' acceptance on e-learning technology is very good, the policy of using e-learning should be prepared by facilitating the tools. For example, the internet connection should be prepared in the school. In addition, there should be training for the students and the teachers related to the features of e-learning.

Based on the research results on the implementation of e-learning by using Technology Acceptance Model (TAM) as a model to determine the students' acceptance of e-learning technology as well as based on the results of descriptive analysis adopted from Miles & Huberman models, some conclusions are obtained:

a. The application of e-learning is acceptable since it has an effect on the students' perception related to the learning activity which is considered fun and easily accessible. It also helps facilitating the works of the students and teachers in learning such as receiving material, providing learning task and exercise, and submitting the tasks.
b. The application of e-learning can be accepted by the students. For example, it facilitates them to collect the tasks, learn material and communicate with the teachers even though they are not in the same place, provide knowledge about e-learning technology, increase the students' learning motivation, improve the students' discipline towards assignments due to system boundary deadlines, make the students focus on a subject, and improve the students' material understanding.
c. E-learning is considered to have an effect on improving the students' attitudes and behavior, such as getting more disciplined in collecting tasks and getting more diligent in learning. Because of the perception, e-learning needs to be used in learning at Vocational High School 1 Sawit Boyolali. However, first, the school must prepare a local e-learning system and prepare the teachers by providing a training related to e-learning.

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