

# Learning Effectiveness Through Utilization Of Technology Acceptance Model (Tam)-Based Google Classroom

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**Abstract** The purpose of this study was to find out the influence of google classroom by using the Technology Acceptance Model (TAM) on learning effectiveness. This study used a quantitative non-experimental approach with path analysis. The sample of this study was 300 higher education students in West Java. Data collection used online questionnaires in the form of a Likert scale. The data analysis technique used descriptive and inferential statistics by using SmartPLS Ver. 3.0. The results of the study showed that the utilization of TAM-based Google Classroom for students showed high learning flexibility, while for lecturers, the utilization of TAM-based Google Classroom facilitated self-development (independent research) that was used to increase knowledge and control and evaluate the learning process. Thus, the utilization of TAM-based Google Classroom can increase learning effectiveness which can improve the quality of academic services in higher education.

**Keywords** learning effectiveness, google classroom, Technology Acceptance Model.

## INTRODUCTION

The rapid development of science, technology, and information marks the era of the industrial revolution 4.0 that requires basic capital development namely quality human resources (Herman, et al., 2016; Irianto, 2017). Of course, efforts to prepare quality human resources can only be performed through quality education, this is in line with Law Number 20 of 2003 Article 3 on the National Education System which contains the objectives of education in Indonesia.

The meaning of the national education system is renewal in the field of education and learning must always continue to be stopped (never-ending process). Competency-based education and learning are examples of change with the aim of improving the quality of education and learning in a country.

Easy access to technology has been used by teachers to improve the quality of education. Keengwe & Georgina (2012) stated that technological development provides changes to the implementation of teaching and learning. Information technology can be accepted as a medium in conducting educational processes, including

teaching and learning, which also involves searching for references and sources of information (Wekke & Hamid, 2013; Rosen, et al., 2013).

In response, the use of the internet (information technology) in Indonesia is growing rapidly every year. The internet has been used in various fields, especially education. The internet plays a role in the field of education because many students use the internet to support the learning process. The number of internet users is dominated by millennials.

A 2017 APJII (Indonesian Internet Service Provider Association) survey informed the internet users by age, where the ages of 19 to 34 years dominated the use of the internet of 49.52 percent in Indonesia. This proves that the millennial generation is the spearhead of internet penetration in Indonesia. This is because this generation was born at a time of rapid development of technology and the internet. This generation wants to get all information easily and can be accessed wherever and whenever using a gadget. The rapid flow of information and communication technology development has a significant influence on the world of education. Many

academics now use e-learning as a learning process for students and as a support for communication and information between lecturers and students.

Kim, et al (2012) defined e-learning as a learning method that facilitates teaching and learning activities, especially in universities that require professionalism from the instructors, in this case, lecturers. So in this case, e-learning is an information technology-based learning method with the support of an internet connection that can be applied in the field of education.

Google is one of the e-learning media that is often used in all fields, including education. In 2014, Google launched its newest application called Google Apps For Education (GAPE). Google Apps For Education (GAPE) is a technology provided and designed for the world of education that prioritizes the use of information technology with online collaboration, where Google Classroom is one of the facilities available in Google Apps For Education (GAPE) (Wang, et al, 2012; Iftakhar, 2016).

The use of Google Classroom makes it easier for lecturers and students in the learning process because it can save time (Vandenhouten, et al., 2014). This is because Google Classroom can be accessed anywhere and at any time by using an internet network connection, either using a PC or through mobile phones and tablets based on Android and iOS. The use of google classroom will make lecturers and students digitally connected, of course, this makes it easier for lecturers to provide material and assignments to students and vice versa. Google Classroom provides many advantages where students can have online discussions either with lecturers or other students, so the use of google classroom provides high flexibility.

Meanwhile, the teaching methods at several higher education institutions in West Java still use traditional teaching methods, namely lecturer-centered learning. Where the lecturer uses visual media in the form of presentation slides, blackboards, and visualizers. This certainly does not provide contemporary learning experiences (adaptive technology) for students. So that students feel they have no satisfaction (bored) in learning, which results in less effective learning activities in class. Therefore, the use of traditional learning methods used today does not provide

satisfaction for learning in the classroom, and certainly not practical if higher education has classes for employees.

The use of google classroom as described above can increase high flexibility so that it will have an impact on the effectiveness of student learning. For this reason, a review is needed on the use of google classroom in higher education in West Java to measure the effectiveness of learning in the classroom. In this study, researchers used TAM (Technology Acceptance Model) by Davis, et al (1989) to analyze the effectiveness of learning with google classroom.

## LITERATURE REVIEW

### a. E-Learning

E-Learning is a web-based learning method that utilizes technology and information that can be accessed remotely so that learning is not only fixed in the classroom and in certain hours but can be performed anywhere and anytime (Tellep, A. & Tellep , 1995; Welsh, et al., 2003; Yucel, 2006). The characteristics of e-learning, namely: 1) relevant content and in accordance with the learning objectives; 2) instructional methods which mean the presentation of examples and exercises aimed at improving learning; 3) delivery of material using media elements such as the use of interactive words and images; 4) independent learning (asynchronous e-learning) and teacher-centered (synchronous e-learning); 5) build understanding and skills both individually and in groups that can improve learning performance (Pituch & Lee, 2006; Seok, 2008; Wu, et al., 2008; Folley, 2009; Donnelly & McSweeney, 2009; Grigoraş, Dănciulescu, & Sitnikov, 2014).

E-learning is a learning innovation as a trend in education (Hošková-Mayerová & Rosická, 2015). This is because e-learning is able to address the shortcomings of education carried out conventionally (education in general) including the limitations of space and time in the conventional education process.

### b. Google Classroom

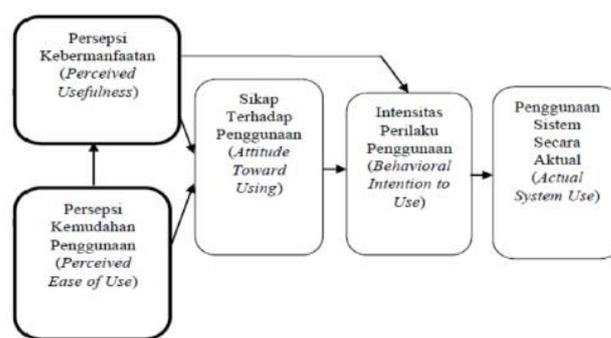
Google Classroom is a virtual application provided by Google in the e-learning system (Reinke, et al., 2014; Hemrungrrote, et al., 2017). Google Classroom is

designed to assist lecturers in providing paperless material and assignments to students (Gallagher, 2005; Rahmad, et al., 2019), where service users must have a Google account. In addition, another feature provided in the Google Classroom service is that lecturers can create assignments that can be performed online with a predetermined time limit, and if there are students who are late in collecting assignments, it will be seen from the collection history in the assignment wall. This shows that google classroom is able to overcome the limitations of space and time in conventional processes. Google classroom also makes it easier for lecturers to evaluate the learning activities carried out by students. In addition, Google classroom can help in monitoring activities in order to solve problems so that learning becomes more effective and efficient (Kristen, 2014; Jakkaew, et al., 2017)

### c. Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) is a model for users developed by Davis (1989: 319-339). This model was developed based on the Theory of Reasoned Action (TRA) model of factors that influence or encourage users to use technology. According to Davis (1989), there are two factors in the behavior of technology users towards the acceptance (adopters) of the technology, namely perceived ease of use and perceived usefulness. Both of these factors are believed to jointly influence the intention of users in using the system or technology (Moon & Kim, 2001; Ma & Liu, 2004; Kim & Chang, 2007; Al-Busaidi, et al., 2010).

Thus the TAM model has been tested as a measure of technology acceptance based on the perception of its users. The basis for evaluating user behavior based on this TAM model can be explained in detail in the following figure:



**Figure 1.** Platform for Evaluating User Behavior Based on the TAM Model

Based on the figure above, it is clear that technology users will have an interest in using technology if they feel that the system or technology used is useful and easy for the user. This is certainly a measurement of technology users with TAM that can improve the performance of a person or group (organization) and provide convenience for its users in completing a job (Dasgupta, 2002: 87-100).

#### a. Perceived Ease of Use

Perceived ease of use is when individuals feel confident that using an information technology system requires no effort (Lucyanda, et al., 2010; Wijaya, 2016). In this study, the context of ease shows whether TAM-based google classroom users can easily learn, understand, use, and technology can meet the needs of users.

#### b. Perceived Usefulness

According to Tal and Gross (2014), perceived usefulness is a measure of someone on the system or technology used to improve performance at work. In this study, perceived usefulness relates to the use of google classroom, and how Google Classroom can change the subjective view of a person from conventional learning methods to TAM-based google classroom.

#### d. Learning Effectiveness

Effectiveness is defined as a measure of accuracy in a planned work. Effectiveness is also interpreted as a concept that includes a variety of factors inside and outside oneself (Jo Allan, et al., 2009; Hunt, et al., 2016). Effectiveness is not only seen from the results but also

in terms of perception and attitude and as a measure of satisfaction achieved by someone at work.

Learning effectiveness is defined as the ability of a person or several people to manage and design an organization to motivate students to be creative and innovative in carrying out tasks (Zhang, et al., 2006; Ling, 2007; Toro & Joshi, 2012; Umoh & Ekemini, 2014). In addition, Dodun et al (2015) explained that learning effectiveness is a measure of the level of success of a learning process. Thus, learning can be said to be effective if learning can be carried out in accordance with a predetermined time, and achieved all the objectives of learning are as expected, and allows students to be able to learn easily and fun (Ronald, 2005; Hunt, et al., 2016).

## METHOD

This study used a non-experimental quantitative approach by using the path analysis method (Hair, et al., 2006; Ghozali, 2013). The population of this study was students in higher education in West Java with a sample of 300 respondents. Data collection used a closed questionnaire with the use of online questionnaires through the Google form application with a Likert scale. This study used descriptive statistics containing demographic data of Google Classroom users and inferential statistics to determine the outer model and inner models and hypotheses, in which the SmartPLS ver 3.0 application was used.

### a. The Influence of Perceived Ease of Use on Utilization of TAM-based Google Classroom

Perceived ease of use on utilization of TAM-based google classroom shows that someone who is confident using TAM-based google classroom does not need to make efforts in using the Google-based TAM classroom. According to Cech and Bures (2004), the successful implementation of online learning requires three main things, namely user, processes, and technology. Users relate to the ability of students and lecturers to use TAM-based google classroom accompanied by motivation to use the TAM-based google classroom. The process is related to the implementation of google classroom in learning activities. Technology is related to the selection of

TAM-based google classroom and infrastructure for its use (such as gadget/PC/tablet). With the existence of these 3 things to the perceived ease of use on utilization of TAM-based google classroom, it is assumed that the intention of students to use TAM-based google classroom will be higher.

H1: Perceived ease of use has an influence on utilization of TAM-based Google Classroom

### b. The Influence of Perceived Usefulness on Intention to Use TAM-Based Google Classroom

Perceived usefulness is the level of trust in certain information systems or technologies so as to improve life performance or work performance. Lucyanda (2010) explained that the usefulness measurement is based on the frequency of use and diversity of applications used. So it can be said, the higher the usefulness of a system on performance, the higher the usefulness of a system. In this case, the system used is TAM-based Google Classroom.

H2: Perceived usefulness has an influence on utilization of TAM-based Google Classroom.

### c. The Influence of Utilization of TAM-based Google Classroom on Learning Effectiveness

Priambodo & Prabawani (2016) defined intention to use the system as an interest. This shows that interest is defined as the intention to use, the intention to always try to use, and the intention to continue to use in the future. In this study, the intention to use TAM-based Google Classroom is expected to help a learning process to be effective. Thus, the higher the intention of students to use the TAM-based Google Classroom, the higher the learning effectiveness. This means that the utilization of TAM-based Google Classroom is a process of learning activities that can be performed anywhere and anytime as the intention so that the learning process becomes effective.

H3: Utilization of TAM-based Google Classroom has an influence on Learning Effectiveness.

## RESULT

### a. Descriptive statistics

The sample shows responses collected from 310 students in higher education in West Java. However, the response can be used after removing online respondents that were incomplete in answering the questionnaire, so that the data received was only 300 respondents. In addition, Table 1 shows the demographic information of the respondents. From the data obtained, there were 50.6% female students and 49.4% male students. In addition, 79% of students were aged between 18 and 22 years. Based on the department, 41% of students were from the management department; 35% from the education department, 17% from the information technology department, and 7% from the midwifery and

nursing department. Based on the year of study, 37% of students were in the 1st year of study, 31% of students were in the 2nd year of study, and 16% were in the 3rd and 4th year of study. In utilizing Google classroom, 66% of students had 3 months of experience in using Google classroom in their education. In addition, 75% of students used Google classroom in the pedagogical process. Furthermore, the results showed that 59% of students preferred both (learning with google classroom and conventional learning), 21% of students preferred learning google classroom, and 20% of students preferred conventional learning.

**Table 1. Demographic Information**

Item	Values	Frequency	Percentage (%)
Gender	Female	152	50.5
	Male	148	49.4
Age	18 to 22	237	79
	23 to 28	36	12
	Above 28	27	9
Department	Education	105	35
	Management	123	41
	Information Technology	51	17
	Midwifery and Nursing	21	7
Year of study	1 <sup>st</sup> year	111	37
	2 <sup>nd</sup> year	93	31
	3 <sup>rd</sup> year	48	16
	4 <sup>th</sup> year	48	16

### b. Measurement Model Assessment

The measurement model or outer model is an evaluation model that explains the relationship between latent variables and indicators. This outer model evaluation evaluates the validity and reliability of the model by using the SmartPLS ver 3.0 application (Ghozali & Latan, 2015, 74).

According to Hair et al (2014), to assess the validity and reliability using an application can be seen from the

Average Variance Extracted (AVE) value. The AVE value must be greater than 0.50 and the loading factor value for each indicator variable must be more than 0.70. This means that the indicators used can be explained and reliable. In summary, the results of data processing for the outer model in this study can be seen in the following table:

**Table 2. Measurement Model Results**

Constructs	Items	Cronbach's Alpha	Composite reliability	Average Variance Extracted
Exogenous Variable → Perceived eas of use (X <sub>1</sub> )	X <sub>1.1</sub>	0.868	0.880	0.599
	X <sub>1.2</sub>	0.858		
	X <sub>1.3</sub>	0.832		
	X <sub>1.4</sub>	0.864		
	X <sub>1.5</sub>	0.845		
	X <sub>1.6</sub>	0.473		
	X <sub>1.7</sub>	0.570		
Exogenous Variable → Perceived Usefulness (X <sub>2</sub> )	X <sub>2.1</sub>	0.840	0.920	0.714
	X <sub>2.2</sub>	0.862		
	X <sub>2.3</sub>	0.850		
	X <sub>2.4</sub>	0.860		
	X <sub>2.5</sub>	0.767		
	X <sub>2.6</sub>	0.886		
Mediating Variable → Utilization of TAM-based Google Classroom (Y <sub>1</sub> )	Y <sub>1.1</sub>	0.893	0.873	0.797
	Y <sub>1.2</sub>	0.894		
	Y <sub>1.3</sub>	0.891		
Endogenous Variable → Learning Effectivess(Y <sub>2</sub> )	Y <sub>2.1</sub>	0.912	0.814	0.843
	Y <sub>2.2</sub>	0.924		

Based on Table 2, all items were reliable and met the specified criteria, but for X<sub>1.6</sub> and X<sub>1.7</sub> had Cronbach's Alpha value of under 0.7 so that, X<sub>1.6</sub> and X<sub>1.7</sub> were removed from the construction structure. As for composite reliability values, all constructs had composite reliability values > 0.70, which means all variables were reliable. In addition, AVE (Average

Variance Extracted) value for each variable was above 0.50. This shows that variations in indicators in the variables were homogeneous and can be used.

While the factor loading value for each indicator was above 0.70. This can be seen in Table 3:

**Table 3. Cross Loading Results**

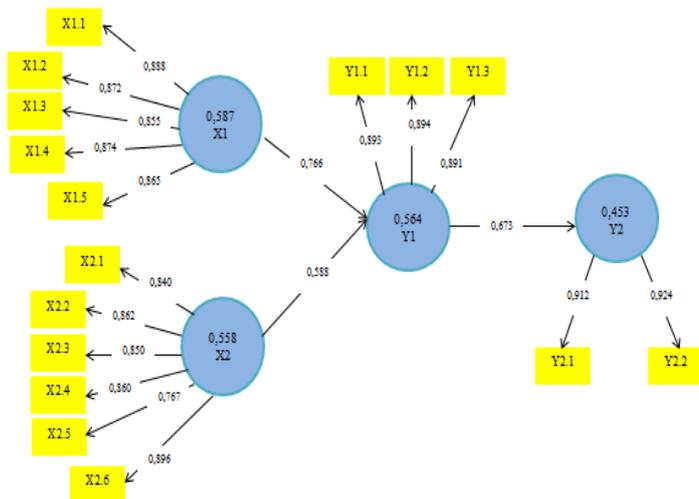
	Y2	Y1	X1	X2
Y <sub>2.1</sub>	<b>0.912</b>	0.597	0.559	0.507
Y <sub>2.2</sub>	<b>0.924</b>	0.637	0.567	0.573
Y <sub>1.1</sub>	0.558	<b>0.893</b>	0.651	0.597

<b>Y<sub>1,2</sub></b>	0.642	<b>0.894</b>	0.659	0.622
<b>Y<sub>1,3</sub></b>	0.600	<b>0.891</b>	0.672	0.605
<b>X<sub>2,1</sub></b>	0.492	0.667	<b>0.840</b>	0.639
<b>X<sub>2,2</sub></b>	0.574	0.603	<b>0.862</b>	0.664
<b>X<sub>2,3</sub></b>	0.556	0.665	<b>0.850</b>	0.649
<b>X<sub>2,4</sub></b>	0.528	0.609	<b>0.860</b>	0.674
<b>X<sub>2,5</sub></b>	0.411	0.536	<b>0.767</b>	0.603
<b>X<sub>2,6</sub></b>	0.540	0.664	<b>0.886</b>	0.684
<b>X<sub>1,1</sub></b>	0.542	0.607	0.698	<b>0.868</b>
<b>X<sub>1,2</sub></b>	0.513	0.575	0.642	<b>0.858</b>
<b>X<sub>1,3</sub></b>	0.480	0.547	0.683	<b>0.832</b>
<b>X<sub>1,4</sub></b>	0.498	0.588	0.667	<b>0.864</b>
<b>X<sub>1,5</sub></b>	0.447	0.539	0.645	<b>0.845</b>

**c. Structural Model Assessment**

The inner model evaluation aims to see whether there is a relationship between exogenous and endogenous variables and is able to answer the proposed hypothesis. Inner model evaluation (structural model assessment) can be seen through the coefficient of determination analysis ( $R^2$ ) and path coefficient analysis.

Based on Figure 2, the coefficient of determination ( $R^2$ ) for each variable, namely  $R^2$  value of 58.7% for perceived ease of use variable,  $R^2$  value of 55.8% for perceived usefulness variable,  $R^2$  value of 56.4 % for utilization of TAM-based Google Classroom, and  $R^2$  value of 45.3% for learning effectiveness variables.



**Figure 2. Path Analysis Results**

In addition, path coefficient analysis was carried out to see the influence of each exogenous variable on

endogenous variables. Where the path analysis is able to answer the proposed hypothesis in the following table:

**Table 4. Hypotheses Test Results**

Hypothesis	Path	Path Coefficient	p-value	Remarks
H1	$X_1 \rightarrow Y_1$	0.766	0.000	Accepted
H2	$X_2 \rightarrow Y_1$	0.588	0.000	Accepted
H3	$Y_1 \rightarrow Y_2$	0.673	0.000	Accepted

The results of the hypothesis testing of this study found that all proposed hypotheses were accepted.

## DISCUSSION

### a. The Influence of Perceived Ease of Use on Utilization of TAM-based Google Classroom

Perceived Ease of Use had an influence on Utilization of TAM-based Google Classroom. This is in line with a study by Cech and Bures (2004) which showed that the successful implementation of online learning requires three main things, namely user, processes, and technology. Users relate to the ability of students and lecturers to use TAM-based google classroom accompanied by motivation to use the TAM-based google classroom. The process is related to the implementation of google classroom in learning activities. Technology is related to the selection of TAM-based google classroom and infrastructure for its use (such as gadget/PC/tablet). In this case, the perceived ease of use on the utilization of TAM-based Google Classroom had those three things. So it can be said that perceived ease of use can increase the utilization of TAM-based Google Classroom for students in higher education in West Java. This is because the TAM-based Google Classroom makes it easier for lecturers and students in the lecture process. The advantage for lecturers is the ease of conveying assignments, information, and material to students. While the advantage for students is the ease of getting information quickly

### b. The Influence of Perceived Usefulness on TAM-based Google Classroom

Perceived Usefulness had an influence on the utilization of TAM-based Google Classroom. Of course, the utilization of TAM-based Google Classroom can

provide benefits for lecturers and students in the lecture process. The utilization of TAM-based Google Classroom is believed to provide benefits for the delivery of learning information so that it can improve work performance (Lucyanda, 2010; Wijaya, 2016). With increasing performance, it can be said that the system or information technology (TAM-based Google Classroom) is effective and can increase the desire to use an information system or technology. Thus, the utilization of TAM-based Google Classroom can increase lecture productivity and it can be said that google classroom is very effective in the lecture process at higher education.

### c. Utilization of TAM-based Google Classroom on Learning Effectiveness

Utilization of TAM-based Google Classroom had an influence on Learning Effectiveness. This is in line with a study which stated that the intention to use system (TAM-based Google Classroom) as an interest. This shows that interest is defined as the intention to use, the intention to always try to use, and the intention to continue to use in the future (Noesgaard & Rikke, 2015; Priambodo & Prabawani, 2016; Tulinayo, 2018; Zammel, et al., 2018).

Of course, this means that the intention to use Google classroom can be a solution for learning to be effective. So that the utilization of google classroom is recommended in the lecture process as a solution for learning to be effective. This is in line with several studies by Kizzy (2018), Enrique, et al (2019), Kumar (2019), Abdul Syukur, et al (2020), and Untari, et al (2020), which explained that the utilization of google classroom can make learning in higher education more effective and efficient. This is because the utilization of google classroom accelerates the delivery of communication and information faster without having

to meet face to face in class. Thus, if in the learning process lecturers and students use TAM-based Google Classroom, the learning process is more effective.

## CONCLUSION

Based on the analysis, it can be concluded that the perceived ease of use and perceived usefulness positively influenced the utilization of TAM-based Google Classroom. The higher the perceived ease of use and perceived usefulness, the higher the utilization of TAM-based Google Classroom. This shows that learning in higher education in West Java using TAM-based Google Classroom has a high appreciation, for example in terms of ease of use, students get information related to the material and assignment of lectures carefully and quickly. While in terms of usefulness, the use of google classroom can improve work performance. So, in the end, the utilization of TAM-based Google Classroom is able to make student learning effective. With the increasing effectiveness of student learning through the utilization of TAM-based Google Classroom, it will have an impact on improving the quality of higher education academic services. Thus, the next research is expected to include other variables such as the performance of Google classroom or the use of e-management to the quality of student academic services by using different research methods.

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