# Exploring Students' Acceptance of Google Classroom during the Covid-19 Pandemic by Using the Technology Acceptance Model in West Sumatera Universities

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**Abstract**: The learning process in West Sumatera, Indonesia, changed into an online-based system due to the Covid-19 pandemic, which involved educators and students using many platforms of e-learning for teaching and learning. Therefore, the purpose of this research is to evaluate the use of e-learning platforms among students at universities in West Sumatera, Indonesia, during the Covid-19 pandemic, particularly widely used Google Classroom. This research employs the Technology Acceptance Model (TAM) by considering relevant external factors related to the pandemic situation and examining their effects on the acceptance of Google Classroom. A questionnaire was distributed from December 11th to December 31st, 2020, to collect data via an online-based survey. Using Cochran's formula with a confidence level of 95%, 383 students were selected as samples, while Structural Equation Modeling (SEM) was applied as a method for data analysis. The result showed that the facility had made the learning process easy for students, which influenced its usefulness. The facility is related to the possession of the required tools and knowledge to utilize the technology, alongside the significant effect on ease of use and usefulness. When adequately provided, the ease and benefit of using Google Classroom are maximally felt when distance learning is ongoing. Consequently, the ease of use positively influenced the benefits of the platform as its features were simple and benefited the students during the learning process. The usefulness of Google Classroom also had a positive influence on attitude towards the platform, and this variable finally determined the intention to use, which was significantly influenced by the perceived usefulness of e-learning. Therefore, this study shows that factors that determine facility, such as the internet, devices used by students, or knowledge to use Google Classroom, are important in online learning during the Covid-19 pandemic.

**Keywords**: E-learning, Technology Acceptance Model, The Covid-19 Pandemic, Google Classroom, Structural Equation Modeling

## 1. Introduction

The Novel Coronavirus Disease 2019 (Covid-19) pandemic caused by Severe Acute Respiratory Syndrome Coronavirus - 2 (SARS-nCov-2) in Indonesia has led to many issues across various sectors, including education, since early 2020. Consequently, the government enforced physical distancing to prevent the viral spread and the learning process that was formerly implemented traditionally or via blended methods has totally changed into an online-based program. Many e-learning or Learning Management System (LMS) platforms, either free or paid, are available for educators and students to teach and learn during the pandemic. According to their situations, online learning offers advantages over the traditional method, mostly concerning accessibility, flexibility, and adaptability for working (Gallagher *et al*., 2005) (Al-Adwan, Al-Adwan and Smedley, 2013).

E-learning is a media that aims to increase the effectiveness of the learning process (Chao and Chen, 2009) and is designed to be applied remotely (Oztekin *et al*., 2013). One of such widely used platforms in Indonesia is Google Classroom, which, according to Appbrain.com, holds the first rank for the number of downloads in the country. (Appbrain.com, 2021). Similar results were also obtained from a survey conducted by Lembaga Arus Survei Indonesia (ASI) from October 7th to 11th, 2020, which showed that it was the most widely used e-learning platform for distance learning during the Covid-19 pandemic (ASI, 2020). Google Classroom is considered the best for improving educators' performance, as ideal for students (Iftakhar, 2016), and is very effective due to the support by various features that facilitate teaching and learning (Al-Maroof and Al-Emran, 2018). Therefore, using this platform can improve the quality of the learning process (Mafa, 2018). Also, Google Classroom is accessible by smartphones, an educator can create rooms for specific subjects consisting of all students in the class (Bhat *et al.*, 2018), and more than one teacher can share a classroom to manage the courses easily. It can also be effortlessly operated and adapted by students (Hussaini *et al*., 2020), which can facilitate distance learning (Shaharanee, Jamil and Rodzi, 2016).


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Although students can easily use this platform, the implementation of technology is not necessarily accepted by users. Acceptance and technology use are the main factors determining the platform's success (Davis, 1993), and failure leads to wasted resources and does nothing (Cowen, 2009). Consequently, various theoretical models to describe or evaluate technology acceptance have been developed by researchers, including the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), Unified Theory of Acceptance and Use of Technology (UTAUT), and Technology Acceptance Model (TAM). TRA is a model of psychological behavior by Fishbein and Ajzen (1975) to explain that a person's intention influences their behavior. The modification of TRA to TPB was implemented by Ajzen (1988) through the addition of perceived behavioral control. Then, Davis (1986) proposed the TAM model, which used TRA as the basis, to explain the acceptance of technology. UTAUT was developed by Venkatesh *et al*. (2003) to explain acceptance and use and it has four primary constructs related to behavioral intention, namely performance expectancy, effort expectancy, social influence, and facilitating condition. Performance and effort expectancies are represented by the constructs' usefulness and perceived ease of use in the TAM model, as UTAUT also includes this model's elements. Studies by Venkatesh *et al*. (2003) and Marchewka, Liu, and Kostiwa (2007) showed a slight difference between UTAUT in theory and on application to an academic environment.

Conversely, TAM is one of the most widely applied models to analyze technology acceptance in users (Renny, Guritno and Siringoringo, 2013). It is employed in accepting the use of technology that is flexible and can follow developments. Therefore, this research aims to evaluate the use of Google Classroom among college students in West Sumatera, Indonesia, during the Covid-19 pandemic. The Indonesian government decided to change every learning process to an online or learn from the home system due to the disease. Consequently, this research uses TAM for assessing the use of Google Classroom by considering the external factors, and the results are expected to be an evaluation for educators regarding the use of e-learning platforms during the -19 pandemic. It will also help the decision-makers in educational institutions to understand the effectiveness of using Google Classroom.

## 2. The Technology Acceptance Model (TAM)

Davis (1989) first developed the Technology Acceptance Model (TAM) to examine the acceptance of information technology. It was created based on the Theory of Reasoned Action (TRA), which explains a person's reactions and perceptions in taking action (Fishbein and Ajzen, 1975). TAM, which is shown in Figure 1, is a flexible technology acceptance model and is determined by two main constructs, namely Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Al-Maroof and Al-Emran, 2018). By adding other factors, many studies use this model as the basis for their research (Abdullah and Ward, 2006).

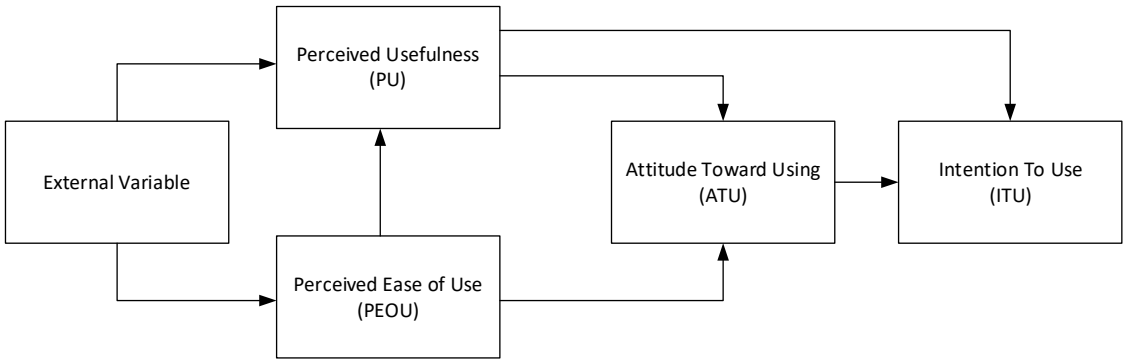


**Figure 1:** Technology Acceptance Model (Davis, 1989)

### *2.1.1 Perceived Ease of Use (PEOU)*

Perceived Ease of Use (PEOU) is "the degree to which a person believes that using a particular system would be free of effort within an organizational context" (Davis, 1989). This construct shows how a system makes users complete their work faster, increase productivity, and work efficiently without requiring much effort (Munoz-Leiva, Climent-Climent and Liebana-Cabanillas, 2017). The study by Angela et al. (2018) indicated that PEOU significantly influences the Perceived Usefulness (PU) of e-learning but not students' desire to use this system. Unlike this research, the study conducted by Budu, Yinping, and Mireku (2018) showed that PEOU affects the desire to use e-learning platforms in Ghana.

*2.1.2 Perceived Usefulness (PU)*

Perceived Usefulness (PU) is *"the degree to which a person believes that using a specific system will increase his or her job performance"* (Davis, 1989). This construct is influenced by PEOU, which eventually determines how helpful the information technology used will be. The research by Masrom (2007) showed that usefulness is a dominant factor that influences students to utilize e-learning systems in the university and recommended an increase in the ease-of-use factor by conducting e-learning training in this environment.

*2.1.3 Attitude Towards Using (ATU)*

Attitude is defined as *"a multidimensional construct, consisting of cognitive, affective, and conative or behavioral dimensions. The cognitive aspect comprises experiences, beliefs, and opinions, the affective or emotional entails feelings, emotions, and subjective evaluations, while the behavioral dimension involves the intention and respect to purchase, alongside the response to rejection"* (Fishbein and Ajzen, 1975). It correlates with Attitude Towards Using (ATU) in the TAM model, which, in classical TAM, is influenced by two main constructs, namely PEOU and PU (Davis, 1989).

*2.1.4 Facilitating Condition (FC)*

A Facilitating Condition (FC) is *"the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of a system"* (Venkatesh *et al.*, 2003). This construct was built due to the closeness of e-learning use to facilities and infrastructure, including the internet network, accessibility, and the devices used. Salloum *et al*. (2019) and Sun *et al*. (2019) showed that facilities affect PEOU and PU, while Kabir, Saidin, and Ahmi (2017) proposed a TAM model, which indicated a relationship between FC and intention to use.

*2.1.5 Price Value (PV)*

Price Value (PV) is the cost that must be paid to benefit from using technology (Dodds, Monroe and Grewal, 1991). E-learning requires fees, specifically the cost of using the internet, and Mehta *et al*. (2019) showed that this construct significantly influences the desire to use technology.

*2.1.6 Intention to Use (ITU)*

Intention to Use (ITU) is closely related to the user's attitude towards the technology (Davis, 1989) and is affected by exogenous constructs in TAM. The level of a person's desire to use technology affects their motivation in performing activities through this system. A high intention will increase the number of activities carried out through the platform and vice versa.

## 3. Method

Figure 2 shows the conceptual model used in this study and also represents 11 constructs that stated the hypothesis, namely:

1. H1: PEOU significantly influences ATU in using Google Classroom
2. H2: PU significantly influences ATU in using Google Classroom
3. H3: PEOU significantly influences PU in using Google Classroom
4. H4: PU significantly influences ITU in using Google Classroom
5. H5: ATU significantly influences ITU in using Google Classroom
6. H6: FC significantly influences ITU in using Google Classroom
7. H7: FC significantly influences PU in using Google Classroom
8. H8: FC significantly influences PEOU in using Google Classroom
9. H9: PV significantly influences PU in using Google Classroom
10. H10: PV significantly influences PEOU in using Google Classroom
11. H11: PV significantly influences ITU in using Google Classroom

The research used a questionnaire via Google Form for data collection, and it was distributed from December 11$^{th}$ to 31$^{st}$, 2020. Meanwhile, the population of students at universities in West Sumatera is 163,994 (BPS, 2017), hence, Cochran's formula with a confidence level of 95% was used to select 383 students as the sample. Three experts assessed the readability and validity tests of the questionnaire. Furthermore, a Likert Scale with a range of 1 (one) as strongly disagree to 5 (five) as strongly agree was used. This study's sample involves active students at the universities in West Sumatera, Indonesia, using Google Classroom during the Covid-19 pandemic.

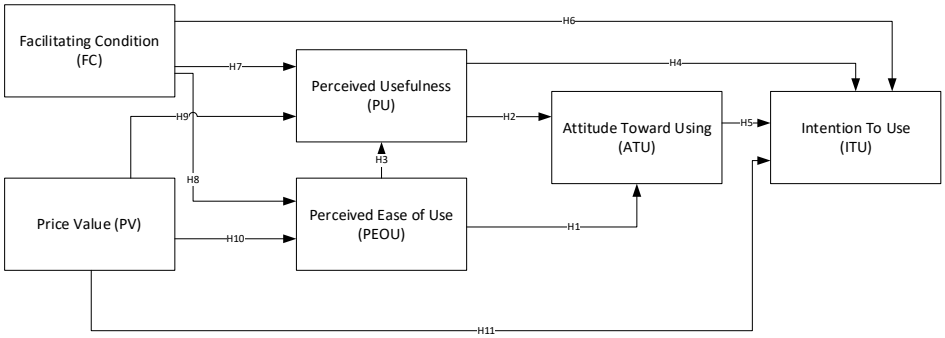


**Figure 2**: Conceptual Model (Proposed)

The questionnaire consisted of two sections, which comprised the user's demographic data and TAM. Subsequently, the demographic section entailed questions related to gender, educational background, and the internet providers used, while TAM discussed three PEOU and PU statements each, alongside two ATU, four FC, two PV, and four ITU statements, as shown in Table 1.

**Table 1**: Questionnaire

| Statement | Reference |
|---|---|
| The use of Google Classroom is easy for me to learn | Modified from (Davis, 1989) |
| It is easy for me to become proficient in using Google Classroom | Modified from (Davis, 1989) |
| Google Classroom is easy to use | Modified from (Davis, 1989) |
| Google Classroom makes my lecture activities, including information, material downloads, discussions, assignments, and other related things, easy | Modified from (Davis, 1989) |
| Google Classroom makes me more efficient than when I come to campus | Modified from (Davis, 1989) |
| Google Classroom helps my lecture process | Modified from (Davis, 1989) |
| I want to use Google Classroom for my next lecture | Modified from (Davis, 1989) |
| I want to use Google Classroom for other lectures | Modified from (Davis, 1989) |
| I will use Google Classroom for further lectures | Modified from (Davis, 1989) |
| I would suggest others use Google Classroom | Modified from (Davis, 1989) |
| Google Classroom makes my learning interest grow | Modified from (Davis, 1989) |
| I like using Google Classroom | Modified from (Davis, 1989) |
| I have the facilities needed to use Google Classroom | Modified from (Venkatesh, Thong and Xu, 2012) |
| I have the knowledge needed to use Google Classroom | Modified from (Venkatesh, Thong and Xu, 2012) |
| Google Classroom corresponds with the technology I use | Modified from (Venkatesh, Thong and Xu, 2012) |
| I get help from others when I have difficulty using the platform | Modified from (Venkatesh, Thong and Xu, 2012) |
| The cost of the internet for using Google Classroom is affordable | Modified from (Venkatesh, Thong and Xu, 2012) |
| The data package issued to access Google Classroom is relatively small compared to other online learning systems | Addition |

The analysis utilized Structural Equation Modeling (SEM) built on AMOS software (AMOS Version 22), as shown in Figure 3, where e1 to e24 are variances. SEM consists of latent and observed variables connected by paths and can solve multi-regression problems and factor analysis between the constructs that were determined based on theory (Carlsson and Hamrin, 2002).

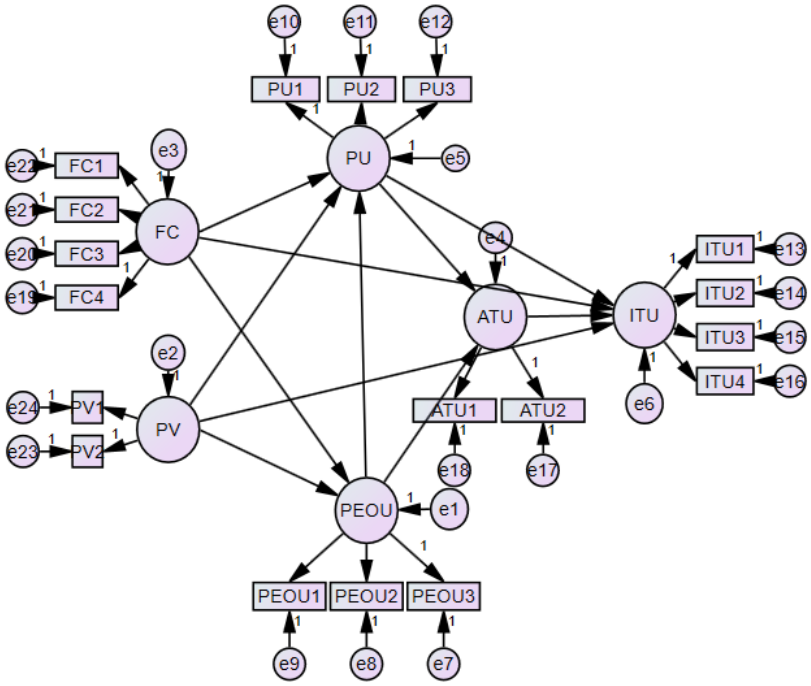


**Figure 3**: Modelling Using AMOS

## 4. Result

Table 2 shows the respondents' demographics, where 26% were male, 74% female, and the population was dominated by individuals of productive age taking the undergraduate program at the universities in West Sumatera. The most common provider used was Telkomsel, which is managed by the Indonesian government, and the internet quota spent in one month was between 10 to 30 GB. According to Ghazali (2017), an indicator is valid if the loading factor is > 0.5 (Ghazali, 2017), and Table 3 showed that each gave a value > 0.5 except for PV2, which produced a score of 0.484. Re-estimation was performed by eliminating the PV2, after which the loading factor for PV1 was calculated as 0.268, causing the PV variables to be removed. Consequently, the indicator used to build the acceptance model was valid. The reliability test was executed by evaluating the Average Variance Extracted (AVE) and Construct Reliability (CR), as shown in Table 4. According to Ghazali (2017), an indicator is reliable if AVE ≥0.5 and CR ≥0.7, hence, all the built constructs were valid and reliable.

**Table 2:** Demographics of Respondents

| Gender | |
|---|---|
| Male | 100 |
| Female | 283 |
| **Education Level** | |
| Vocational Program | 36 |
| Undergraduate Program | 342 |
| Master Program | 5 |
| **Internet Provider** | |
| 3 (Tri) | 40 |
| Im3 Ooredoo (Indosat) | 13 |
| Lainnya | 33 |
| Smartfren | 19 |
| Telkomsel | 229 |
| XL | 49 |
| **Internet Quota/Month** | |
| < 1 GB | 6 |
| 1 GB-5 GB | 50 |
| 5 GB-10 GB | 71 |
| 10 GB-20 GB | 143 |
| > 20 GB | 113 |

**Table 3:** Loading Factor of the Variable

| Variable | Indicator | Loading Factor |
|---|---|---|
| PEOU | PEOU1 | 0.865 |
| | PEOU2 | 0.807 |
| | PEOU3 | 0.730 |
| PU | PU1 | 0.755 |
| | PU2 | 0.626 |
| | PU3 | 0.760 |
| ATU | ATU1 | 0.786 |
| | ATU2 | 0.838 |
| ITU | ITU1 | 0.903 |
| | ITU2 | 0.888 |
| | ITU3 | 0.935 |
| | ITU4 | 0.785 |
| FC | FC1 | 0.620 |
| | FC2 | 0.769 |
| | FC3 | 0.777 |
| | FC4 | 0.807 |
| PV | PV1 | 0.762 |
| | PV2 | 0.484 |

**Table 4:** Validity and Reliability

| Variable | Indicator | Loading Factor | CR | AVE |
|---|---|---|---|---|
| PEOU | PEOU1 | 0.869 | | |
| | PEOU2 | 0.811 | 0.848392 | 0.652017 |
| | PEOU3 | 0.737 | | |
| PU | PU1 | 0.774 | | |
| | PU2 | 0.649 | 0.778988 | 0.541854 |
| | PU3 | 0.778 | | |
| ATU | ATU1 | 0.802 | 0.812008 | 0.683703 |
| | ATU2 | 0.851 | | |
| ITU | ITU1 | 0.911 | | |
| | ITU2 | 0.898 | 0.937782 | 0.790852 |
| | ITU3 | 0.941 | | |
| | ITU4 | 0.801 | | |
| FC | FC1 | 0.624 | | |
| | FC2 | 0.771 | 0.832688 | 0.556607 |
| | FC3 | 0.769 | | |
| | FC4 | 0.807 | | |

**Table 5:** Hypothesis Testing

| Relationship | β(Estimate) | C.R. | P | Status |
|---|---|---|---|---|
| PEOU<---FC | 0.781 | 9.293 | *** | Accepted |
| PU<---PEOU | 0.386 | 5.696 | *** | Accepted |
| PU<---FC | 0.743 | 8.211 | *** | Accepted |
| ATU<---PEOU | -0.258 | -2.236 | 0.025 | Not Significant |
| ATU<---PU | 1.418 | 10.87 | *** | Accepted |
| ITU<---PU | -0.426 | -1.088 | 0.277 | Not Significant |
| ITU<---ATU | 1.234 | 4.063 | *** | Accepted |
| ITU<---FC | -0.036 | -0.221 | 0.825 | Not Significant |

Note: *** P<0.001

Based on the significance level α=5%, the hypotheses H1, H4, and H6 were estimated to be insignificant. Meanwhile, FC is related to the possession of the tools and knowledge to use the technology (Zhou, 2011) and Table 5 shows that this construct has a significant effect on PEOU (β=0.781) and PU (β=0.743). Hence, the ease and benefit of using Google Classroom can be maximally felt during distance learning when these tools are adequately provided. An obstacle to using Google Classroom is the internet (Hussaini et al., 2020), and according to The Economist Intelligence Unit (EIU) study commissioned by Facebook, Indonesia places 57th among 100 countries on the inclusive internet index (EIU, 2020). Therefore, institutions' knowledge and infrastructure should be improved to benefit from this e-learning platform.

The table also showed that PEOU has a significant positive effect on PU, where PEOU indicates the ease of using Google Classroom, while PU describes students' benefits. Consequently, the result exhibited that the features of this platform are easy to use to benefit students during learning. This is similar to the research by Angela et al. (2018), Binyamin, Rutter, and Smith (2019), and Khan et al. (2020), although they used a different platform. A related study using TAM was also conducted by Masrom (2007), where a simple model was employed without considering external factors. The findings showed that perceived usefulness is the dominant factor that determines the use of an e-learning system. Additionally, the research by Farahat (2012) indicated that usefulness and ease of use are the dominant factors of students using e-learning.

Furthermore, Table 5 showed that PU positively influences ATU, meaning the benefit of Google Classroom affects students' attitudes, such as comfort and pleasure are highly experienced when greater levels of usefulness are felt during learning. Hence, the student's attitudes affect the intention to use the platform. The Intention to Use (ITU) is closely correlated with the consumer's attitude to the technology used, and the table showed that this construct was significantly affected by the Attitude Towards Using (ATU) of this platform. Therefore, usability is greatly affected by the ease of use and dictates the student's attitude, however, success occurs when students decide to learn and are willing to participate in related activities, including engagement with their peers and lecturers.

## 5. Conclusion

The benefits felt by students are impacted by the ease of using Google Classroom, which is affected by the facilities, such as the internet, help from others when experiencing difficulties, and the devices used. These facilities significantly affect the ease of use and usability during the learning process. Also, the usefulness of the platform influences students' attitudes, which, in turn, affects their intention to use it. Therefore, institutions need to improve their infrastructure and knowledge to obtain benefits from e-learning systems, especially Google Classroom.

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