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Modification of the technology acceptance model in the use of Google classroom in the COVID-19 Era: A case studies in junior high schools

Aditya Pratama [a] *, Universitas Negeri Jakarta, Department of Economic Education, Jakarta 13220, Indonesia
https://orcid.org/0000-0001-8275-5439

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Abstract
The purpose of this research was to measure the acceptance of Google Classroom use by junior high school students using variables such as habits, satisfaction, knowledge, and skills. To achieve the set objective, it adopted the TAM, which measures technology usability and ease of use. TAM also provides a theoretical basis for measuring students' perceptions concerning the use of Google Classroom in online learning during the COVID-19 pandemic. Based on this, a questionnaire was used to collect data through an online survey involving a sample of 306 students at the junior high school level. The data obtained was analyzed using exploratory and confirmatory factor analyses to obtain valid and reliable measuring instruments. AMOS was used to measure, assess the structural model based on the goodness of fit standard and test hypotheses. as many as 84.3% of students had never used Google Classroom until the COVID-19 pandemic struck.

Keywords: TAM, Habit, Satisfaction, Knowledge, and skill;

* ADDRESS FOR CORRESPONDENCE: Aditya Pratama, Universitas Negeri Jakarta, Jl. Rawamangun Muka Jakarta Timur, Jakarta 13220, Indonesia
E-mail address: adityapratama@unj.ac.id / Tel.: +62856-5886-7175

1. Introduction

Many sectors of life have been impacted by the COVID-19 pandemic, including education (Abidah et al., 2020; Burgess & Sievertsen, 2020; Hill & Fitzgerald, 2020; Owusu-Fordjour et al., 2020). Before the pandemic, education was conducted conventionally, where teachers and students met face-to-face in the classroom. However, the Republic of Indonesia government, through the Kementerian Pendidikan dan Kebudayaan, directed that class should be conducted online. These changes were made to ensure learning continues to run smoothly and avoid negative impacts on cognitive development.

Online learning began after the first case of the COVID-19 virus was reported in Indonesia in early March 2020. At the beginning of its implementation, many technological adjustments were required. Junior high school students who had never been exposed to online learning had to adapt to the new way of acquiring education immediately. However, the biggest challenges that faced online learning included lack of knowledge and students' skills in the use of e-learning, as well as only a few students, could access devices and internet connections (Kauffman, 2015; Mailizar et al., 2020).

Online learning presents a unique challenge since students have to shoulder more responsibility on their own than in many traditional classes (Rakes & Dunn, 2010). Additionally, effective online learning may help develop student's time management and self-study skills, which are important components of successful online learning (Bambara et al., 2009; Bork & Rucks-Ahidiana, 2013; Eisenberg & Dowsett, 1990; Xu & Jaggars, 2013; Tezer & Soykan, 2017). With the continued use of online learning media, it is expected that students will gain satisfaction besides increasing their skills and knowledge.

A survey was conducted in 34 Indonesian provinces where 1,000 samples were interviewed with a margin error of +/- 3.1% at a confidence level of 95% (Kamil, 2020). An overview of the number of online learning media used in educational activities was given from the data collected. Google Classroom came first in the list of most used platforms when conducting online learning at 26.1%, followed by Ruang guru and Rumah Belajar at 17.1 % and 15.2 %, respectively, while platforms have presentations below 10%. The use of online learning media in the form of video call has significantly increased with the majority of people using Zoom app (57.2 %), followed by GMeet (18.5 %), CisWebex (8.3 %), U-Meet-Me (5.0 %), MS-Teams (2.0 %). The remaining 6.9% did not know or chose not to answer the questions asked. From the results, the use of technology in education can produce more effective learning methods and tools (Bulman & Fairlie, 2016).

1.1 Technology Acceptance Model

The usability and ease of use of technology were measured with the Technology Acceptance Model (TAM) approach (Davis, 1985, 1989). TAM time development experienced some as an example of changes. Al-Gahtani (2001) added behavioral intention and actual system use, while Venkatesh *et al*. (2002) modified TAM by adding intrinsic motivation and extrinsic motivation. Furthermore, Levy *et al*. (2009) added variables on TAM to show that the satisfaction variable impacts habits.

TAM is also used to apply technology in education, for example, Kumar and Bervell (2019) adopted the Unified Theory of Acceptance and Use of Technology2 (UTAUT2) to investigate the initial perception of students regarding Google Classroom as an online learning platform. The results from Al-Maroof and Al-Emran (2018) prove that usability and ease of use have a positive effect on behavioral intentions, which in turn affects the usage of the actual Google Classroom. Hussaini et al. (2020) demonstrated that Google Classroom effectively improves students' access and attention to learning, knowledge, and skills. The platform makes learners active with the help of Digital Tools and provides them with meaningful feedback. Based on the above facts, this research tested whether TAM consisting of PU, PEOU and BI developed with the addition of habit, satisfaction, knowledge, and skills as the variables have a connection with each other, especially for junior high school students.

1.2 Google Classroom

Google Classroom is an application that can be used as a means of interacting in learning activities between students and teachers (Hussaini et al., 2020). It is only available for Google Apps for Education accounts (Bell, 2015; Mafa, 2018).

Here are the benefits of using Google Classroom for teaching and learning

a. Teachers can post class materials on Google Classroom and encourage students to answer or express their opinions.
b. Google Classroom connects with Google Drive and emails to provide notifications and store data in folders.
c. Google Classroom is accessible at any time using any personal computer or gadget with an internet connection.
d. Google Classroom can be used in hands-on learning even when students and teachers are in different regions.
e. Google Classroom enables the creation of private classes and groups, allowing participants to present their classwork and submit assignments both individually and in groups.

The teacher can invite parents to google classroom to keep an eye on their children's performance and get email notifications related to their children's learning.

1.3 Habit

Habits are defined as sequences of actions that unconsciously become automatic responses to certain situations, which can function in obtaining certain goals (Verplanken et al., 1997). According to Limayem et al. (2007), habit is a repeated behavior, which becomes automatic as a result of previous learning. Therefore, creating a habit requires repetitive activities (Orbell et al., 2001).

There are three ways of interacting to achieve a planned goal. First, habits are formed when a person performs the same activities repeatedly to achieve certain goals. Second, as outlined in the computational model, habits and deliberate goal pursuits guide actions synergistically, even though the habit is the efficient default response mode. Third, people tend to deduce from the frequency of habit implementation that such behavior must be referred to (Wood & Rünger, 2016). Therefore, it can be concluded that habit directly affects the use of technology (Viswanath Venkatesh et al., 2012).

1.4 Satisfaction

Student satisfaction is the result of an action that has been felt directly. It incorporates several elements such as student-defined questions, satisfaction and interest ratings, and management information for actions. Student satisfaction portrays a picture of the quality of education offered in a given institution. Educational services such as learning activities, facilities, and availability of qualified teachers in educational institutions determine student satisfaction.

Additionally, Student satisfaction is an assessment that arises from the results of the experience gained by students during learning activities. According to Annamdevula & Bellamkonda (2016), satisfaction is shaped by repeated experiences in school life. For a student to be satisfied, several factors come into play, including learning value, instructor enthusiasm, relationships, organization, interaction, coverage, and assessment. Furthermore, student interaction and communication, assignments, active and involved learning, and cooperation among classmates contribute to levels of satisfaction students experience (Shaharanee et al., 2016).

1.5 Knowledge and Skills

While many people use knowledge and skills interchangeably due to their close relationship, the two terms do not have a similar meaning. Knowledge involves information, facts, and skills, acquired by an individual through education or experience (Pavese, 2016). Notably, the explanation describes

knowledge in terms of skill and, therefore, skill is knowledge itself or at least can be defined in terms of knowledge.

Knowledge and skills can be gained from the learning process and digital technology allows students to explore more extensively (Hussaini et al., 2020). Online learning is capable of imparting knowledge and skills to students. The knowledge obtained explains that the learning process cannot stop due to the pandemic. Online learning has resulted in acquiring skills on how to use online education tools. The continuous use of the learning media results in the creation of new habits and, at the same time, trains the learners on new skills of using tools to support online education.

1.6 Design Research Model and Hypothesis

The variables include PU, PEOU, BI, satisfaction, knowledge, and skill in reference to Google Classroom as an online learning medium. The research model can be seen in the image below.

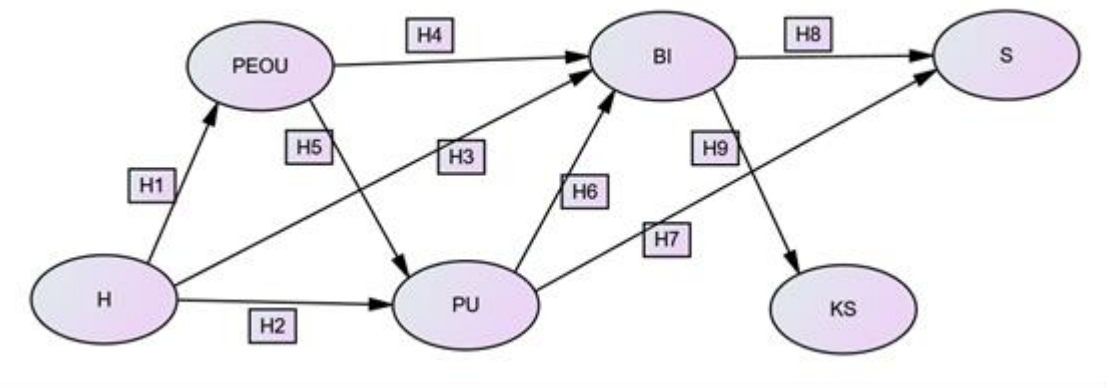

Figure 1. Research model

H1 : Habit affects PEoU
H2 : Habit affects PU.
H3 : Habit influence affects BI to Google Classroom.
H4 : PEoU affects BI to Google Classroom.
H5 : PEoU affects Perceived usefulness.
H6 : PU affects BI to Google Classroom.
H7 : PU affects Satisfaction.
H8 : BI to Google Classroom affects Satisfaction.
H9 : BI to Google Classroom affects knowledge and skills.

2. Method

2.1 Respond

The survey drew a sample of 306 students from junior high school. The survey was conducted online with the help of a questionnaire using a Likert scale. The profile of participants showed that 113 participants were boys while 193 were female. Grade VII had a total of 137 students (44.8%), grade VIII 63 students (20.6%), grade IX 106 students (34.6%). Their ages included 11 years old were 3 (1 %), 12 years had 57 (18.6%), 13 years comprised of 94 (30.7%), 14 years had 97 (31.7%), 15 were 49 (16%), 16 had 5 (1,6%), and 17 years had 1 (0.3%). From the sample size, 48 students had used Google classroom for learning before the COVID-19 pandemic, while the rest had not used it.

Table 1. Statistic Respondents

Item	Value	Frequency	Percentage
Gender	Male	113	36,92%
	Female	193	63.07%
Age	11	3	1%
	12	57	18,6%
	13	94	30,7%
	14	97	31,71%
	15	49	16%
	16	5	1,6%
	17	1	0,3%
class	VII	137	44,8%
	VIII	63	20,6%
	IX	106	34,6%
Use of Google Classroom (before the COVID-19 Pandemic)	yes	48	15,69%
	do not	258	84,31%

Source: Author (2021)

2.2 Instrument Development

The instrument used in this research was adapted from literature in the field of Education:

1. Custom indicator adapted from Kumar and Bervell (2019)
2. Indicator perceived usefulness, perceived ease of use, dan Behavioral intention were adapted from Al-Maroof dan Al-Emran (2018)
3. Indicator Satisfaction adapted from Shaharanee et al. (2016)
4. Indicator knowledge and skill adapted from Hussaini et al. (2020)

2.3 Data Analysis

The data for this research was first tested for validity and reliability. Also, the proposed model was evaluated through Goodness of Fit (GoF) criteria using Chi-Square, Probability, CMIN/DF, GFI, AGFI, CFI, TLI, NFI, RMSEA, RMR using predetermined cut-off value.

3 Findings

3.1 Validity and Reliability

The Exploratory Factor Analysis (EFA) method is used to test the data validation of each indicator and group the indicators into dimensions. The resulting factor loading value is a calculation from the EFA, which reviews the measurement of each item. Furthermore, Cronbach's Alpha coefficient was used to test reliability. The measurement is reliable when the value of Cronbach's Alpha (α) > 0.70. The factor loading and reliability values obtained from each variable were as shown below.

3.1.1 Habit

The habit variable had four indicators with a loading factor value of 0.672 - 0.760 and a reliability value of 0.823

3.1.2 Perceived Usefulness (PU)

The PU variable had seven indicators, out of which five indicators had a loading factor value of 0.658 - 0.867, and the remaining two indicators had low values of 0.006 and -0.78. The reliability value of the PU variable was 0.875.

3.1.3 Perceived Ease of Use (PEoU)

The PEoU variable had six indicators, whereby five had a value of 0.734 - 0.818 while the remaining had a low value of 0.337. The reliability value of the PEoU variable was 0.871.

3.1.4 Behavioral Intention (BI) to Google Classroom

The BI to Google Classroom variable consisted of three indicators with a loading factor value of 0.593 - 0.767 and reliability of 0.719.

3.1.5 Satisfaction

The Satisfaction variable consisted of four indicators with a loading factor value of 0.705 - 0.874 and reliability of 0.844.

3.1.6 Knowledge and Skills

The knowledge and skills variable consisted of four indicators with a loading factor value of 0.689 - 0.823 and reliability of 0.840.

3.2 Hypothesis Testing

3.2.1 Research model

In this research, testing of the hypothesis was conducted using SEM. The testing of the model was conducted continuously to obtain the goodness of fit criteria through confirmatory factor analysis, where several items were removed to achieve the right model.

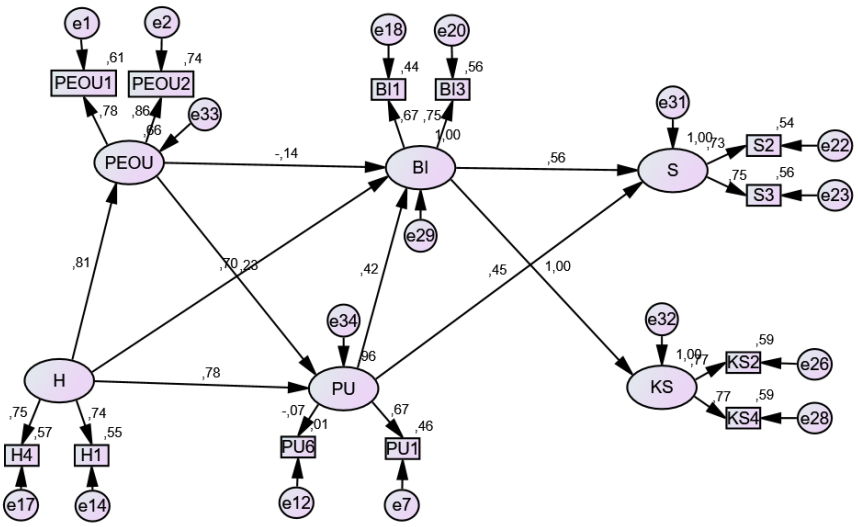

Figure 2. Structural model of the modified model fit

Figure two shows that the research model has undergone changes that have been adjusted to the goodness of fit model parameters. Modifications to the structural model in Figure 2 are summarized in table 2 to prove that the modifications that have been made to the research model meet the goodness of fit criteria.

Table 2. Goodness of Fit Model

Criteria	CMIN/DF	P	Chi Square	NFI	TLI	CFI	RMSEA	GFI	AGFI
Results	1,322	0,063	66,083	0,964	0,988	0,991	0,032	0,964	0,940
	<	≥	<	>	>	>	≤	≥	≥
Cut-off	2.00	0,05	64,001	0,95	0,95	0,95	0,08	0,90	0,90
conclusion	Fit	Fit	Fit	Fit	Fit	Fit	Fit	Fit	Fit

Source: Author (2021)

Based on Table 1, the Chi-Square value is 66,083, which showed it had the fit model, and the P-value of 0.063, which was greater than 0.05, confirms the model as fit. The CMIN/DF value is 1,322 ≤ 2.00,

while the overall NFI, TLI, CFI value ≥ was 0.95. GFI and AGFI values have a value of ≥ 0.90, while RMSEA ≤ 0.08 is 0.032. The criteria of goodness fit qualified the model for testing the research hypotheses.

The hypothesis testing was conducted by comparing the value of the Critical Ratio (CR) and probability. For the hypothesis to be fulfilled, the CR value ≥ should be 1.96 and the P-value ≤ 0.05. The results of the CR value and the probability of the research hypothesis can be seen in Table 3 below.

Table 3. Conclusion Hypothesis Test

	Hypothesis			Estimate	SE.	CR.	P	Result
H_1	H	→	PEOU	,757	,084	8,989	***	Accepted
H_2	H	→	PU	,225	,113	1,984	,047	Accepted
H_3	H	→	BI	,583	,117	4,964	***	Accepted
H_4	PEOU	→	BI	,023	,122	,192	,848	Rejected
H_5	PEOU	→	PU	,630	,123	5,118	***	Accepted
H_6	PU	→	BI	,307	,131	2,346	,019	Accepted
H_7	PU	→	S	-,093	,166	-,561	,575	Rejected
H_8	BI	→	S	1,196	,201	5,950	***	Accepted
H_9	BI	→	KS	1,116	,099	11,289	***	Accepted

Source: Author (2021)

Based on the table above, it can be concluded that the two hypotheses do not meet the criteria. Hypothesis H4 is rejected because it has a CR value of 0.192 and a probability value of 0.848. Also, Hypothesis H7 was rejected because the CR value was 0.561 and the probability value was 0.575. Hypotheses H1, H2, H3, H5, H6, H8 and H9 have a CR value of 1.984 - 11.289 and a probability of 0.000 - 0.047. The lowest CR and probability values are in H2, while the highest CR and probability values are in H9. Based on these values already meet the accepted standards.

3.2.2 Discussion

The first, second, and third hypotheses relate to Habit. From the results, it was found that habit positively affects PEOU, PU, and BI. The association of habit with PEOU and PU is reinforced by previous research conducted by Rafique et al. (2020) and Alsharo et al. (2020). Additionally, Chang et al. (2019) the relationship between Habit and BI is strengthened by previous research conducted. The perceived ease of use of Google Classroom is determined by the habits of use in learning activities since activities carried out continuously become a habit. Therefore, the habit of using technology depends on the conditions of the facilities, which will encourage the user to develop a habit of using technology for learning activities (Rafique et al., 2020).

The fourth and fifth hypotheses relate to PEOU. Based on Table 3, PEOU had a significant positive effect on PU but no effect on BI. These results are reinforced by previous research conducted by Zhang & Li (2005). From the survey, 84.3% of the students have never used Google Classroom before, making them think the system is too difficult to use even when they know that the program is useful. The influence of PEOU on PU is in line with Rafique et al. (2020), Al-Debei (2014), and Abdullah et al. (2016), who stated that PU is determined by PEOU, which means higher PEOU results to an increase in PU.

The sixth and seventh hypotheses relate to PU are seen in Table 3, where PU had a significant positive influence on BI. These results correspond with Verma &Sinha (2018) and Al-Debei (2014). stating that PU determined BI, where the higher the PU, the higher the BI would be. This implies that users will have behavioral intentions after considering certain tools or systems to determine whether they are useful to facilitate learning activities. It was also noted that PU does not affect satisfaction, implying that an increase in the PU value does not influence satisfaction. The research conducted by Daneji et al (2019) supports this assertion.

The eighth and ninth hypotheses relate to BI using Google Classroom, which confirmed that it had a significant positive influence on satisfaction. These results are in line with Shaharanee et al. (2016) and Hussaini et al. (2020) which found that BI had a significant positive influence on knowledge and skills. Google Classroom is an interesting learning medium that makes students active throughout the lesson, and this brings satisfaction to the users (Hasanah &Dewi, 2019; Mafa, 2018; Shaharanee et al., 2016). The attitude of students who have been introduced to Google Classroom media confirms that it impacts students' knowledge and skills.

4 Conclusion

The COVID-19 pandemic brought matters to a standstill across the world, including learning in Indonesia. However, learning has to continue amidst the pandemic, which means other learning methods have to be implemented. Online learning is the major avenue towards realizing academic success. Therefore, choosing easy and cheap online learning media such as Google Classroom need to be embraced. It is one of the online learning media that is easy to use with many advantages. The survey indicated that out of the 306 students, 84.3% of students had never used Google Classroom until the onset of the pandemic. From the analysis, habituation was found to be the primary factor influencing PEOU, PU, and BI. Furthermore, PEOU has no direct influence on BI, but it influences PU. BI can also be influenced by PU as much as PU doesn't influence satisfaction. Finally, BI is a factor that influences satisfaction and knowledge, and skills.

5 Limitations

The results could be generalized because the samples used were drawn from junior high school students only. Therefore, it is necessary to expand the research sample to make it more inclusive. Additionally, since there were no moderator variables used, it is not known if there was any variation in the sample regarding the use of Google Classroom. Fundamentally, this research carries the opinion of students without considering the teachers' input in the learning activities.

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