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The effect of perceived risks and perceived cost on using online learning by high school students

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Abstract

As Covid19 Pandemic hit all over the world, Indonesian high schools are struggled to cope with the sudden and forced switch to fully online learning. This study employed an online survey of Indonesian high school students to understand their behaviour in using online learning. The survey gathers data from 462 respondents who resided in 24 provinces. Theory of Planned Behaviour extended with Perceived Risks and Perceived Costs is used as the theoretical framework. Perceived Risks are used to accommodate concerning security-related news that might affect online activities. Perceived Costs is used to address complaints regarding additional financial burden due to fully online learning, namely cost to access and cost to acquire equipment. SmartPLS version3 is used as the main data analysis tools. The result showed that the Theory of Planned Behaviour is indeed able to explain the use of online learning by Indonesian high school students. Perceived Risks are considered as an influence but only have minimal impact. Perceived Costs does not have any influence on online learning. This might be because Indonesian is quick to act and counter the negative impact of the Covid19 Pandemic. One of the Indonesian Government's efforts is to subsidise Internet costs for students and teachers.

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1. Introduction

In the first week of March 2020, the first case of Covid19 was announced by the Indonesian Government. It was immediately followed by the spread of the disease to all over 34 provinces in Indonesia by early April 2020. By the end of March 2020, many control measures have been implemented by the government to limit the spread of Covid19. The central government and provincial as well as local regency governments implemented Covid19 transmission control protocol such as the closure of public places, cancellation of public events, and urging citizens to stay home while practicing health protocols. Schools and universities are no exception. Many schools and universities were forced to closed and switch almost all academic and administrative activities from offline to online and using information technology extensively and intensively [1][2].

Using information technology for online learning along with changing from conventional classrooms to fully online comes with various issues (Bouilheres et al., 2020; Khodabandelou et al., 2014; Nilsson et al., 2012). Many of the students were returning to their hometown that spread across all over Indonesia. The immediate problem was the cost of communication and the cost of equipment. For example, a typical one-hour video meeting session could use up to 500 megabytes of data. A student could have between 5 to more than 10 hours of video meeting sessions. They could look at 4-5 gigabytes of data per week just for video meetings. Those are not including downloading materials, assignment preparation and submissions, online quizzes, and online exams. A typical mobile internet package that accommodates such a need would cost a student about US\$ 8 per month and a cable internet package would cost around US\$ 20 per month. For comparison, the typical minimum wage in Indonesia in 2020 is between US\$ 127 - US\$ 225 per month. Some students also relied on equipment and facilities provided on campus for accessing online learning. Returning to their hometown means they could no longer have access to the facilities and equipment on campus. Some of them need to obtain the equipment (such as smartphone, laptop, tablet computer, etc.) themselves.

Just when the forced switched to a fully online classroom was on the way, Zoom was hit by security problems [3]. Zoom is arguably one of the most popular video meeting apps to be used alongside Google Meet and Microsoft Teams. Video meeting is deemed as the closest alternative to a traditional face-to-face meeting. Another security incident came from one of the most popular electronic marketplaces in Indonesia, Tokopedia. Tokopedia was hacked and have its data compromised [4]. Both incidents were quite discouraging for all the people who must work from home and switched to mostly online activities.

This study is exploring high school student's usage of online learning forced by Covid 19 Pandemic schools' closure. The students' intention to use eLearning tools during forced online class sessions are explored using Theory of Planned Behaviour or TPB [5]–[7]. The security incidents were deemed to have an impact on the students' behaviour and so did cost. This study extends TPB using Perceived Risks [8][9] and Perceived Cost [10], [11], [12]. TPB has been used for investigating acceptance, intention, and behavior of individuals in certain environment [13][14].

High school students are selected due to few facts. First high school students as other level of schooling have regular class schedule every weeks unlike a flexible class university students. Second, high school students are having more maturity compared to junior high and primary schools so they might have more freedom in learning with minimum parental supervision and intervention.

2. Theory of planned behaviour and online learning

Theory of Planned Behavior (TPB) was developed by Icek Ajzen as an improvement of Theory of Reasoned Action or TRA [5]–[7], [15], [16], [17]. In TPB, an individual's intention influence behavior. The intention is influenced by attitude toward behavior, subjective norms, and perceived behavioral control [6], [7], [15], [18], [19]. The core components of TPB are [5], [7], [15], [18]–[20]:

- Attitude Toward Behavior is the value perceived by an individual for committing a behavior.
- Subjective Norm is a perception of social pressure in committing a behavior.
- Perceived Behavioral Control is a perception ability to conduct a behavior.
- The intention is an individual's preparedness to engage in a behavior.
- Behavior is defined as an observable form of intention and influenced by Perceived Behavioral Control.
- Actual Behavioral Control is defined as everything needed by an individual to conduct a certain behavior.

TPB has been used in many academic publications in various disciplines such as health, technology adoption, environmental behavior, etc.

As mentioned in the introduction, the cost is one of the common immediate constraints faced by high school students when switching to a fully online classroom. The cost was seen by students and their parents as an additional financial burden since they already have paid their tuition fees. Internet connection costs were not a problem during the pre Covid19 academic years. Students could use an Internet connection on campus and schools' computing facilities. When the schools are closed due to Covid19 some students that were depending on schools' computing facilities are forced to find alternative computing equipment. This too has put an additional burden financially on students. We defined cost in this study as the cost to acquire equipment (if not previously available or owned) and the cost of subscribing to Internet service for accessing online learning.

Cost or perceived cost factors have been included in many studies utilizing TPB. A study in mobile commerce in Malaysia found that perceived cost has a negative influence on intention [12]. Perceived cost is also having a negative influence on intention to use viral mobile marketing in the USA among young consumers [21]. This study used Perceived Cost as antecedents of Perceived Behavioral Control and Behavior [5]–[7], [18]. High cost could affect behavior, which is using online learning.

Risk is defined as uncertainty that is usually associated with a decision-making process [8], [22], [23], [24]. The perceived risk would negatively influence the usage of any online applications, including online learning [24], [25], [26], [27]. The higher the risk, the lower users' intention to use online learning. Risk Perception is influencing Attitude Toward Behaviour [8], [22], [27]. Risk Perception is not only influencing Attitude Toward Behaviour but also Subjective Norms [8], [28] and Perceived Behavioral Control [8], [28]. Our complete research model can be seen in (Fig. 1).

Based on the literature, the following hypotheses were developed

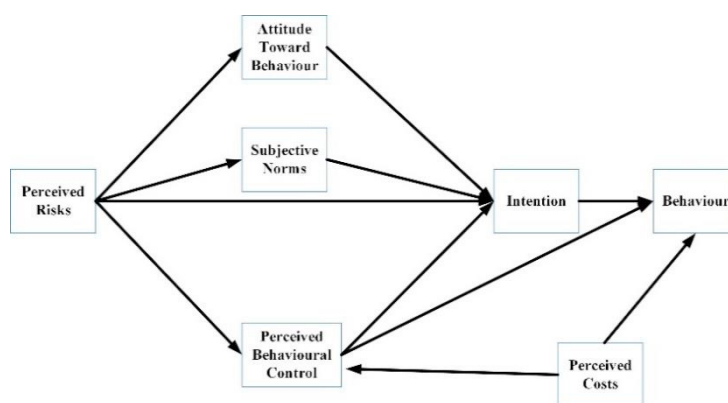


Fig. 1. Research model – TPB with perceived risks and perceived costs.

- H1 Attitude Toward Behaviour would positively affect Intention.
- H2 Subjective Norms would positively affect Intention.
- H3 Perceived Behavioural Control positively would affect Intention.
- H4 Perceived Behavioural Control positively would affect Behavior.
- H5 Intention to use Online Learning positively would affect Behavior.
- H6 Perceived Risks would negatively affect Attitude Toward Behavior.
- H7 Perceived Risks would negatively affect Subjective Norms.
- H8 Perceived Risks would negatively affect Perceived Behavioral Control.
- H9 Perceived Risks would negatively affect Intention to use Online Learning.
- H10 Perceived Costs would negatively affect Perceived Behavioral Control.
- H11 Perceived Costs would negatively affect Behavior.

Data analysis for testing hypotheses, Structural Equation Modeling (SEM) is used, particularly using Partial Least Square (SEM-PLS). SEM PLS is used for predicting key target constructs or identifying key 'driver' constructs and exploratory or an extension of an existing structural theory, select PLS-SEM [29]–[32].

3. Research methods

Based on the research model in (Fig. 1), an online questionnaire was developed. The questionnaire employed a 7-point Likert scale. The answers range from 1 (strongly disagree) to 7 (strongly agree). Due to physical and social distancing and to reach a wider sample, the questionnaire is build using Google Forms.

This study deliberately chose students from three private high schools in Yogyakarta. Apart from the existing access and relation, the author believes that the selection could represent Indonesia. In Indonesia, private schools often accept students from outside their home base. State schools must make a priority for admission to students who have official residential close to school (zonation). As a result, most state schools admitted the majority of local students.

In the selected private high schools, more than 50% of students come from outside Yogyakarta. The total student body in 2020 is 1986. All the students were invited to participate from December 2020 to January 2021. In the end, 462 responses were received, or a 23.26% response rate. The respondents are in 24 provinces all over Indonesia. Table 1 showed the demographic information for the respondents.

For data analysis, this study used Structural Equation Modelling (SEM) specifically Partial Least Square (PLS) path modeling [29], [31], [32], [33], [34]. SEM PLS analysis was done by utilising SmartPLS version 3 software [35]. The step-by-step analysis was done as suggested by Hair et.al [30].

Table 1. Demographic information.

Criteria	Sub Criteria	Amount	Percentage
Gender	Male	260	56.28%
	Female	202	43.72%
Class	X	262	56.71%
	XI	143	30.95%
	XII	57	12.34%
Discipline	Science and Math	237	51.30%
	Social Science	154	33.33%
	Language and Culture	71	15.37%

4. Data analysis, result, and discussion

The first step in SEM PLS data analysis is to test the reflective indicators' reliability by using PLS Algorithm feature in SmartPLS version 3 [29]–[31], [35]. The result from the first run showed that few indicators were not considered reliable due to having an Outer Loading value less than 0.70. The unreliable indicators had to be dropped, which are one indicator for Attitude Toward Behavior, two indicators for Perceive Behavioral Control, and four indicators for Behaviour. The second run confirmed that all the remaining indicators are having an Outer Loading Value above 0.70.

The next step is to test internal consistency reliability, convergent validity, and discriminant validity [30]. The second run PLS Algorithm already provides various reports to see them. In SmartPLS version 3, the result can be found in Construct Reliability and Validity and Discriminant Validity [36]. Internal consistency reliability should be above 0.70, Average Variance Extracted (AVE) should be above 0.50, and Heterotrait-Monotrait (HTMT) values should be below 0.85 [30]. All constructs in this study are satisfying those criteria.

Lastly, the structural model is tested for collinearity. The result can be found in Collinearity Statistics (VIF) as Inner VIF Values report. The VIF value should be below 5 [29][30]. All VIF values are below 5, therefore there are no collinearity issues in the structural model.

Once the reflective indicators and the structural model has passed all the reliability and validity test, the next step is to test hypotheses. In SmartPLS version 3, this is done by using Bootstrapping feature [30]. The result of the

hypotheses testing can be seen in Table 2. A hypothesis would be supported if the T Statistics value is greater than 1.96 (two-tailed test) and P-Value is less than 0.05 [29], [30], [35]. The hypotheses testing shown that only H7, H8, H10, and H11 are rejected.

Table 2. Result of hypotheses testing.

	Hypotheses	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values	Result
H1	Attitude Toward Behaviour -> Intention	0.147	0.146	0.052	2.814	0.005	Supported
H2	Subjective Norms -> Intention	0.418	0.416	0.051	8.223	0.000	Supported
H3	Perceived Behavioural Control -> Intention	0.284	0.288	0.043	6.567	0.000	Supported
H4	Perceived Behavioural Control -> Behaviour	0.533	0.536	0.042	12.572	0.000	Supported
H5	Intention -> Behaviour	0.307	0.305	0.043	7.090	0.000	Supported
H6	Perceived Risks -> Attitude Toward Behaviour	-0.137	-0.140	0.060	2.297	0.022	Supported
H7	Perceived Risks -> Subjective Norms	0.049	0.048	0.054	0.905	0.366	Rejected
H8	Perceived Risks -> Perceived Behavioural Control	-0.025	-0.026	0.057	0.434	0.665	Rejected
H9	Perceived Risks -> Intention	0.068	0.067	0.032	2.119	0.034	Supported
H10	Perceived Cost -> Perceived Behavioural Control	0.000	0.005	0.062	0.008	0.994	Rejected
H11	Perceived Cost -> Behaviour	0.046	0.044	0.032	1.406	0.160	Rejected

The structural model confirms that TPB could explain the Intention and the Behavior of Indonesian high school students in using Online Learning. It confirms that the use of Online Learning (the behavior) is influenced by Intention to use Online Learning and Perceived Behavioral Control [5][7]. Intention to use Online Learning is influenced by Attitude Toward using Online Learning, Subjective Norms, and Perceived Behavioral Control [5], [7], [13], [21], [36].

The data analysis results are not showing any influence of Perceived Costs toward neither the Behaviour nor Perceived Behavioral Control. The result is not consistent with the literature [12][21]. To combat the negative effect of control measures implemented to combat the Covid19 Pandemic, the Indonesian government provided many subsidies and assistance including subsidizing the costs of communication [37]. The subsidies proved to be able to eliminate cost concern [38] and the data analysis result of this study confirmed it.

Perceived Risks are proven to negatively influence Attitude toward online learning and Intention to conduct online learning, however, it is not proven to influence Perceived Behavioral Control and Subjective Norms. The result seemed to indicate that our respondents were able to differentiate that the applications or companies having security problems are not the ones they use for online learning. In general, our respondent is still concern on risks related to online activities. The negative influence of Perceived Risks toward Intention and Attitude toward online learning is the evidence.

Table 3. Structural model's explanatory power.

	R ²	Adj R ²
Attitude Toward Behaviour	0.019	0.017
Behaviour	0.582	0.579
Intention	0.544	0.540
Perceived Behavioural Control	0.001	-0.004
Subjective Norms	0.002	0.000

The explanatory power of the structural model can be seen using R² values [29]–[31]. Table 3 shown the R² values in this study. Both Intention and Behavior have quite powerful explanatory power with 54.4% and 58.2% respectively.

The explanatory power of Perceived Risks is quite small toward all the impacted constructs, mostly less than 2%. This confirmed our conclusion concerning Perceived Risks influence which is small.

5. Conclusion

Our study is exploring the use of Online Learning by students from three private high schools in Yogyakarta. Although the students went to three private high schools in Yogyakarta, during the Covid19 Pandemic they all return to their hometown which spread across 24 provinces in Indonesia. The conditions can be seen as representing Indonesia and not only Yogyakarta where the schools are located.

Data from the survey were analyzed and the result concluded that Theory of Planned Behavior could explain the use of Online Learning by Indonesian high school students. The Behavior of Indonesian high school students in using Online Learning is influenced by Intention to use Online Learning and Perceived Behavioral Control [5][7]. Intention to use Online Learning is influenced by Attitude Toward using Online Learning, Subjective Norms, and Perceived Behavioural Control [5], [7], [13], [21], [36]. The result is also concluded that the initial complaint regarding the cost to access and obtaining equipment required for online learning is not supported by data. Perceived Risks although minimally considered and influencing the Intention to use online learning do not have an impact on the use of online learning. The respondent does not think online learning is risky despite some discouraging news related to the security of well-known video meeting app and popular electronic marketplace provider. They might be able to differentiate between the troublesome apps and companies which are not the one they usually use. (Fig. 2) showing the final model as the result of this study.

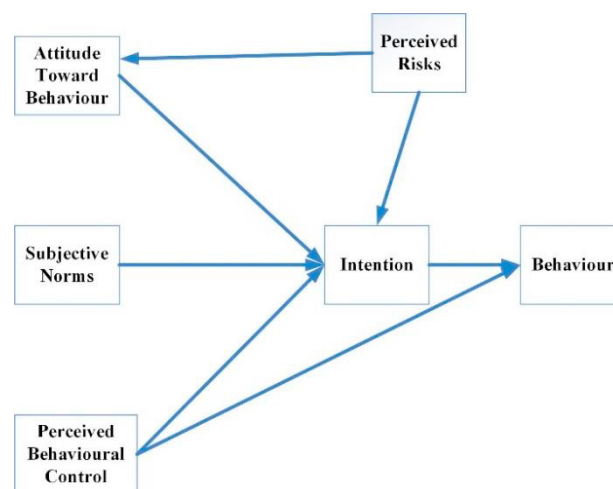


Fig. 2. Final structural model.

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