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Exploring Student's Perceptions of Computer based Testing for University Entrance Examination By Using Technology Acceptance Model: Case Study State University of Malang, Indonesia

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Abstract

The computer based Testing (CBT) implementation in higher education has been increasing recently. State University of malang, Indonesia initiated to conduct CBT in 2015 for University Entrance Examination. Technology acceptance model (TAM) was used to explore the students' perception in using CBT. The objective of this research was to examine the relationship between Perceived Ease of Use, Perceived Usefulness, and Attitude towards Behavioral Intention in using Computer based Testing for University Entrance Examination in State University of Malang, Indonesia. The research findings had proven the previous studies' theory that perceived ease of use has a positively influences on perceived usefulness, while both perceived ease of use and perceived usefulness have the direct effects on attitude toward usage. Furthermore, attitude affects to behavioral intention.

Keywords: computer based testing, technology acceptance model

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Introduction

The introduction of computer in the early 1970s is milestone for the computer based testing (CBT) as well, it means the CBT has been growth over the past four decades where the computer have been reshaping the method of assessment. During the popularity of the computer usage over last decade, the CBT is widely accepted for testing solution and becomes very popular for substituting paper based testing. The effective and efficiency of test administration is one of the reasons why Computer-based testing has been developing quickly (Akdemir & Oguz, 2008).

The CBT implementation in higher education has been increasing recently. Since CBT could potentially increase testing flexibility, authenticity, efficiency, and accuracy, in addition to the development of infrastructure, such as hardware and software which related to CBT, making CBT become more popular. There are several advantages of CBT compared to conventional test methods, namely minimize opportunity for cheating between test taker, speed of judgment and accurate scoring (Bahr & Bahr, 1997), reduce test-administration times (Shermis et al., 1996), and it is green strategy testing because it enables to reduce paper consumption (Yan Piaw, 2011). Due to a computer is equipped with multimedia features, therefore the CBT could be designed also for disabilities test takers which physical disabilities, such vision, hearing, and mobility impairments.

According to the report of CBT model review of Luecht & Sireci (2011), there are five ways to implement The CBT: (1) on a stand-alone personal computer (PC); (b) in dedicated CBT centers; (c) at temporary test centers; (d) in multipurpose computer labs; or (e) using a PC, laptop, netbook, tablet, or hand-held device connected to the Internet, possibly remotely proctored.

In Indonesia, there are some popular tests which particularly using CBT such as foreign language proficiency test, pre-employment test, National Examination for Grade 12 high school students, and University entrance examination. The implementation of CBT in Indonesia generally utilizes temporary test center and multipurpose computer labs.

State University of malang, Indonesia initiated to conduct CBT in 2015 for University Entrance Examination under the category "Jalur Mandiri". In the future, the implementation of CBT in higher education in Indonesia especially in State University of Malang will become popular. Therefore this research objective was to explore the test takers' acceptance of CBT, after they passed the exam they would be the students of State University of Malang. In the future, CBT method will be an alternative way to deliver a test in State University of Malang. The research findings will give descriptions of students' perception of the CBT implementation.

Theoretical Framework

Technology acceptance model (TAM) is model which designed for investigating and predicting the user acceptance of technology. It is developed to explore computer-usage behaviour and factors associated with acceptance of technology. This theory was developed by Davis(1989), it adopted the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) dan the theory of planned behaviour (TPB) (Ajzen, 1991). TRA is widely used to predict behavioral intent, and TPB is an extension of TRA. Both of these theories have been used to predict many types of behavior, but have been less successful in predicting technology acceptance, this led to the development of the TAM. The TAM can be used to predict both behavioral intention to use the technology and also actual use after implementation (Willis, 2008).

According to TAM, the behavior of technology usage is mainly explained by behavioral intention which related to future behavior as a result of conscious decision-making processes. The behavioral intention was directly determined by attitude and two belief factors, namely, perceived usefulness (PU) and perceived ease of use (PEOU). Hu et al. (1999) argued that many factors influence acceptance of technology, the predominant factors are perceived ease of use and perceived usefulness. These factors would play a greater role in user acceptance.

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RESEARCH OBJECTIVE

The objectives of this research was to examine the relationship between Perceived Ease of Use, Perceived Usefulness, and Attitude towards Behavioral Intention in using Computer based Testing for University Entrance Examination in State University of Malang, Indonesia.

HYPOTHESES

In this research the Technology Acceptance Model Framework was used to construct hypotheses as shown in Figure 1. The TAM Model is composed by four factors variables, there are Perceive Ease of Use (PEOU), Perceived Usefulness (PU), Attitude (ATT), Behavioral Intention (BI).

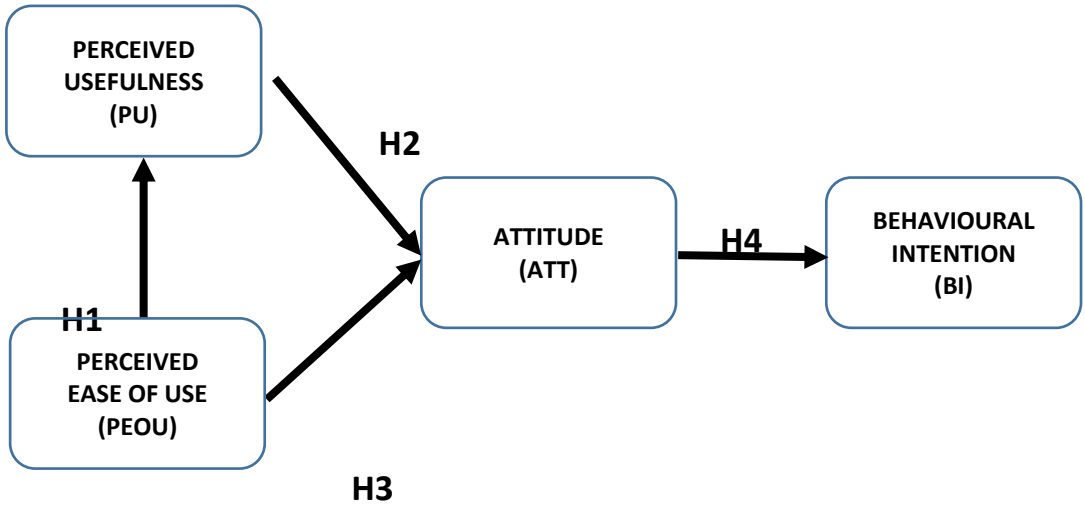

Figure 1. Technology Acceptance Model (adapted from Davis et al., 1989)

H1 : Perceived ease of use (PEOU) will have a significant influence on perceived usefulness (PU)

H2 : Perceived usefulness (PU) will have a significant influence on attitude (ATT) toward usage

H3 : Perceived ease of use (PEOU) will have a significant influence on attitude (ATT) toward usage

H4 : Attitude (ATT) toward usage will have a significant influence on behavioral intention (BI)

RESEARCH METHODOLOGY

There were 89 participants which being involved in this research in 2015. The participants were the test takers of university entrance examination which being held in State University of Malang, Indonesia. The participants were asking to answer the questionnaire after having the CBT.

The type of TAM questionnaire were open ended question which use 5 lickert scale. Another type of question such closed ended question was delivered to the participants in order to collect more data. After data collection preparation, the reliability testing was done to test the validity and consistency of the items in the questionnaire. Then, the correlation analysis was measured in order to investigate convergent of the questionnaire items.

Normality and homogeneity test were required before hypotheses testing. When the normality and homogeneity of variance assumption were normal, the hypotheses test were being tested by using Linear Regressing model. The statistical analysis used Statistical Package for Social Sciences (SPSS) version 20.0 for windows.

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FINDINGS AND DISCUSSION

Instrument Reliability

The instrument reliability was intended to measure and evaluate internal consistency of measurement instruments (Kimberlin & Winterstein , 2008). The item of the questionnaire for the each variable of CBT usage were judged to be well reliable measurement instrument with the Cronbach's alpha scores were all above 0.7 (Nunnally , 1978). The result of reliability test as shown in Table 1.

Table 1. Reliability Instrument

Variables	**Items**	**Conbach's Alpha**
PU	**4**	**0.778**
POEU	**2**	**0.829**
ATT	**4**	**0.783**
BI	**2**	**0.766**

Correlation Analysis

The aim of the correlation analysis is to measuring and describing the strength of the relationship between variables. Pearson correlation coefficient is a measure to describe association between variables, Evan(1996) suggest the absolute value of r.

- 0.00-0.19 "very weak"
- 0.20-0.39 "weak"
- 0.40-.059 "moderate"
- 0.60-.79 "strong"
- 0.80-1.0 "very strong"

Table 2. Pearson Correlation Coefficient

Correlations

		Perceived Usefulness (PU)	Perceived Ease Of Use (PEOU)	Attitude (ATT)	Behaviora Intention (BI)
Perceived Usefulness (PU)	Pearson Correlation	1	.604**	.597**	.524**
	Sig. (2-tailed)		.000	.000	.000
	N	89	89	89	89
Perceived Ease Of Use (PEOU)	Pearson Correlation	.604**	1	.708**	.576**
	Sig. (2-tailed)	.000		.000	.000
	N	89	89	89	89
Attitude (ATT)	Pearson Correlation	.597**	.708**	1	.579**
	Sig. (2-tailed)	.000	.000		.000
	N	89	89	89	89
Behavioral Intention (BI)	Pearson Correlation	.524**	.576**	.579**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	89	89	89	89

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 shows the correlation between variables. The relationship between variables that will be tested in hypothesis are described as follows:

- Correlation between PEOU and PU are significant due to the sig (2-tailed) 0.00 < 0.05 and the Pearson coefficient r is 0.604 which means the relationship is strong.

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- Correlation between PU and ATT are significant due to the sig (2-tailed) 0.00 < 0.05 and the Pearson coefficient r is 0.597 which means the relationship is moderate.
- Correlation between PEOU and ATT are significant due to the sig (2-tailed) 0.00 < 0.05 and the Pearson coefficient r is 0.708 which means the relationship is strong.
- Correlation between ATT and BI are significant due to the sig (2-tailed) 0.00 < 0.05 and the Pearson coefficient r is 0.579 which means the relationship is moderate.

Hypotesis Testing

a. H1 Testing

H1: Perceived ease of use (PEOU) will have a significant influence on perceived usefulness (PU)

Table 3. Predictor: PEOU and Dependent: PU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.604[a]	.365	.358	.42435

a. Predictors: (Constant), PerceivedEaseOfUse

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.018	1	9.018	50.079	.000[b]
	Residual	15.666	87	.180		
	Total	24.684	88			

a. Dependent Variable: PerceivedUsefulness

b. Predictors: (Constant), PerceivedEaseOfUse

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.763	.347		5.085	.000
	PerceivedEaseOfUse	.581	.082	.604	7.077	.000

a. Dependent Variable: PerceivedUsefulness

According to Davis(1989), PU and PEOU are behavioral belief that can be considered as cognitive factors. David argues PEOU Perceived ease of use (PEOU) refers to the degree to which a person believes that using a particular system would be free of effort. Teo et al (1999) also states if the users perceive something easier to use and less complex will increase the likelihood of its adoption and usage. Davis also states that '… making a system easier to use, all else held constant, should make the system more useful. The converse does not hold however" (Davis, 1993, p.478).

Table 3 displayed the findings of this research. PEOU accounted for 36.5% influenced the PU, the remains were affected by external variables which not being measured in this research. According to the data as shown in Table 3, F-test > F-table which signed a significance result. The linear regression equation was constructed as Y = 1.763 + 0.581X. It showed PEOU has positively related and affected to PU. It indicated PEOU had a significant influence on PU.

b. H2 Testing

H2 **:** Perceived usefulness (PU) will have a significant influence on attitude (ATT) toward usage

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Table 4 Predictors: PU and Dependent: ATT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.597[a]	.357	.350	.48563

a. Predictors: (Constant), PerceivedUsefulness

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	11.392	1	11.392	48.303	.000[b]
	Residual	20.518	87	.236		
	Total	31.910	88			

a. Dependent Variable: Attitude

b. Predictors: (Constant), PerceivedUsefulness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.087	.413		2.630	.010
	PerceivedUsefulness	.679	.098	.597	6.950	.000

a. Dependent Variable: Attitude

Davis (1989) concluded that Perceived Usefulness is referred to as the degree to which a person believes that using a particular system would enhance his/her job performance, and Attitude refers to an individual's personal affection towards the technology. It is the perception of how useful the technology may be in terms of the increase in productivity and accomplishment that it will bring (Wong, 2015).

Table 4 showed PU accounted for 35.7% influenced the ATT, the remains were affected by external variables which not being measured in this research. Table 4 showed F-test > F-table which signed a significance result. The linear regression equation was constructed as Y = 1.087 + 0.679X. It showed PU has positively related and affected to ATT. It might be concluded that PU had significant influence on attitude (ATT) toward usage. This findings was supported by many empirical studies which had founded the relationship between PU and user acceptance (Davis,1989; Pikkarainen et al., 2004; Eriksson et al,2005) . Eriksson et al (2005) implied that the individual belief on usefulness is affected by an individual trust.

c. H3 Testing

H3 **:** Perceived ease of use (PEOU) will have a significant influence on attitude (ATT) toward usage

Table 5 Predictors: PEOU and Dependent: ATT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.708[a]	.501	.495	.42792

a. Predictors: (Constant), PerceivedEaseOfUse

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.979	1	15.979	87.260	.000[b]
	Residual	15.931	87	.183		
	Total	31.910	88			

a. Dependent Variable: Attitude

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b. Predictors: (Constant), PerceivedEaseOfUse

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.699	.350		2.000	.049
	PerceivedEaseOfUse	.773	.083	.708	9.341	.000

a. Dependent Variable: Attitude

Table 5 showed PEOU accounted for 50.1% influenced the ATT, the remains were affected by external variables which not being measured in this research. Table 5 showed F-test > F-table which signed a significance result. The linear regression equation was constructed as Y = 0.699 + 0.773X. It showed PEOU has positively related and affected to ATT. It indicated that PEOU had significant influence on attitude (ATT) toward usage. Therefore, this findings underpinned the perceived ease of use predicts attitude towards usage that had been proposed by Davis et al (1989) .

d. H4 Testing

H4 **:** Attitude (ATT) toward usage will have a significant influence on behavioral intention (BI)

Table 6 Predictors: PEOU and Dependent: ATT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.579[a]	.335	.327	.63229

a. Predictors: (Constant), Attitude

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.499	1	17.499	43.772	.000[b]
	Residual	34.782	87	.400		
	Total	52.281	88			

a. Dependent Variable: BehavioralIntention

b. Predictors: (Constant), Attitude

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.994	.446		2.229	.028
	Attitude	.741	.112	.579	6.616	.000

a. Dependent Variable: BehavioralIntention

Behavioral intention refers to conation in the trilogy, which denotes an individual's intention to perform a particular behavior (Fishbein & Ajzen, 1975), it originated from Theory of Planned Behavior (TPB).

Table 6 showed ATT accounted for 33.5% influenced the BI, the remains were affected by external variables which not being measured in this research. Table 6 showed F-test > F-table which signed a significance result. The linear regression equation was constructed as Y = Y = 0.699 + 0.773X. It showed ATT has positively related and affected to BI. It revealed that ATT toward usage will have a significant influence on BI. Therefore, this findings underpinned the perceived ease of use predicts attitude towards usage that had been proposed by Davis et al (1989) and also strengthening the findings of Teo (2009) which found attitude had direct effect on intention.

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CONCLUSIONS

Participants of this research were accustomed to utilize the personal computer nevertheless they were not familiar with computer based testing. Most of them were their first experience when had the entrance examination in State University of Malang, Indonesia. Thus, they could not recognize it yet more about the benefits of CBT. It impacted on all variables of Technology Acceptance Model that constructed the hypotheses. For example, relation between perceived ease of use and attitude toward usage had gained the biggest R square=0.501 compared to perceived ease of use and perceived usefulness, perceived usefulness and attitude toward usage, and attitude toward usage and behavioral intention with R square 0.365, 0.357, 0,335, respectively.

Generally, this research findings had proven the previous studies' theory that perceived ease of use has a positively influences on perceived usefulness, while both perceived ease of use and perceived usefulness have the direct effects on attitude toward usage. Furthermore, attitude affects to behavioral intention. The variables which influence the research participants for accepting computer based testing as testing model in the future were strongly affected by external variables which were not considered in this research.

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