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I have to buy iPad Mini: The UTAUT Perspective

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Abstract

Since 2015 new students at Faculty of Economics, Atma Jaya Yogyakarta University (FEUAJY) have to purchase iPad Mini and eBooks as part of their admission package. This study looks at the acceptance of iPad Mini for supporting academic activities when the purchase is compulsory rather than voluntary. This study used the original UTAUT model but dropped moderating variables of Age and Voluntariness. A survey was employed to gather data from class of 2015 and 2016 FEUAJY undergraduate students. The result of the survey was analysed using PLS-SEM. The results show that the original UTAUT model could explain the acceptance of iPad Mini, which is consistent with the findings of previous studies on the same population. However, the low ability of the model to explain the acceptance required further exploration.

Keywords: gadget, e-books, iPad Mini, classroom, UTAUT.

1. INTRODUCTION

The use of technology for teaching and learning has been common for quite some time. Various technologies such as personal computers and laptop, computer projectors, multimedia devices, computer networks, internet, etc. have been used to enhance, supplement, and even provide new mode of learning such as online classroom. Recent development in mobile technologies, electronic content (including e-books), and various e-learning platform has also been adopted quite extensively and intensively. The use and development of technology in classroom has been the subject of many research by scholars such as Brennan and Johnson (2000), Brill and Galloway (2007), Underwood (2001), Mandl, Kohane, McFaden .(2014), Raaij and Schepers (2008), Halonen, Acton, Golden and Conboy, (2009), among others.

At Faculty of Economics, Atma Jaya Yogyakarta University (FEUAJY) in Indonesia it has been a requirement for new undergraduate students to purchase a set of English language textbook (mostly from US publishers and authors) when they enrol into the university. The books are intended for five compulsory first year subjects for all undergraduate students from three departments within FEUAJY (namely accounting, management, and economics). The subjects are Introduction to Business, Introduction to Accounting, Introduction to Information Systems, Business Mathematics, and Introduction to Economic Theory. This practice has been implemented since early 2000. Beginning 2015, FEUAJY changed the policy and adopted e-books to replace physical books. Along with the change, FEUAJY also made it compulsory for undergraduate students to buy iPad Mini Wifi 16 GB (iPad Mini) for delivering the e-books. The policy means an increase in the fee paid by new undergraduate students to cover both e-books and iPad Mini, whereas previously new undergraduate students only had to pay for printed textbooks. Pramudita (2017) investigated the use of e-books and iPad Mini among FEUAJY students using DeLone and McLean Information Systems Success Model (W. Delone & McLean, 1992; W. H. DeLone & McLean, 2003; Halonen et al., 2009). DeLone and McLean model assess the success of an information systems (in this case the e-books and iPad Mini) by the proxy of net benefit. The result is quite positive, where FEUAJY students believe using iPad Mini was a success.

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2.   UTAUT AND THE USE OF MOBILE DEVICE FOR LEARNING

This section would provide theoretical basis for the use of UTAUT and the use of mobile devices (i.e. tablets) for learning in university environment. The discussion starts with the use of mobile technology for teaching and learning. The second part discusses UTAUT and justification for using its original model. This section would be ended by the development of hypotheses.

2.1   Using mobile technology for teaching and learning

The use of information and communication technology for learning has been studied quiet extensively. For example Yuen, Law, and Wong (2003) found that ICT innovation adopted by schools in Hong Kong has been affected by schools' objectives, perception of ICT's role in education as well as the understanding of teaching and learning and the part played by teachers and students. The impact of ICT adoption toward first year university students has been studied and the findings showed that familiarity with ICT is one of the key to successful adoption (Verhoeven, Heerwegh, & De Wit, 2010). Akbar (2013) confirmed that familiarity with ICT influences the success of adoption of ICT for students.

As part of adopting ICT into teaching and learning, various elements have been adopted such as e-learning systems, Learning Management Systems (LMS), and even mobile learning. Mobile learning is defined as the delivery of learning to students anytime and anywhere through the use of wireless Internet and mobile devices such as computer tablet (Wang, Wu, & Wang, 2009). Siau, Lim, and Shen (2001) explained some of the limitation of using mobile devices such as small screen size, resolutions, underperformed compared to personal computers, battery life, and graphical limitation. Arguably some of the limitations of mobile device currently has been overcome (for example battery life, screen size, and screen resolutions), yet the performance of computer tablet such as iPad Mini is still far away from the personal computers. For example, a scan of Apple App Store in iPad Mini could not find the equivalent of statistical package such as SPSS for tablet. Looking at the common usage tablet among FEUAJY students, the use of iPad Mini for teaching and learning is currently limited to information gathering (including e-books and web browsing) and communications and collaborations (email, chat, instant messaging, social media). For serious data analysis and report writing, students still need a personal computer (desktop or laptop).

Limited capability and capacity of iPad Mini along with relatively expensive price (therefore low price to performance ratio compared to some laptop) make the decision to adopt seemed problematic. The price of iPad Mini is equivalent with some laptop having Intel Core i3 processors, 4 GB RAM, and 1 TB storage. A laptop has lower mobility score compared to iPad Mini but have much bigger raw computing power. Pramudita (2017) started his study into the net benefit of using iPad Mini among FEUAJY students based on the premises of iPad Mini has higher price tag and lower raw computing power. Pramudita (2017) investigate the use of e-books and iPad Mini using DeLone and McLean Information System Success Model (W. Delone & McLean, 1992; W. H. DeLone & McLean, 2003; Halonen et al., 2009). DeLone and McLean model assess the success of an information systems (in this case the e-books and iPad Mini) by the proxy of net benefit. Net Benefit is influenced by Use and User Satisfaction which in turn influenced by Systems Quality, Information Quality, and Service Quality(W. H. DeLone & McLean, 2003). Pramudita conducted a survey to 253 students of the 2015 and 2016 classes. The results are Information Quality influenced both Use and User Satisfaction, Systems Quality influenced both Use and User Satisfaction, Service Quality influenced User Satisfaction, Service Quality did not influence Use, Use influenced User Satisfaction and Net Benefit, and User Satisfaction influenced Net Benefit.

DeLone and McLean model only look at the actual use, user satisfaction, and net benefit of an information systems to judge the success. It does not look into the acceptance of the information systems itself. This article reports the findings of study into the acceptance of iPad Mini by FEUAJY undergraduate students from the class of 2015 and 2016. The study is deemed necessary to look into the acceptance of FEUAJY policy where new undergraduate students have to pay additional fee on top of other entrance fees for buying iPad Mini. The study use the unified theory of acceptance and use of technology (UTAUT) originally proposed by Venkatesh, Morris, G. Davis, and F. Davis (2003).

2.2   UTAUT

UTAUT was originally proposed by Venkatesh, Morris, G. Davis, and F. Davis (2003) refinement and improvement of various previous user acceptance of technology models. The UTAUT model can be seen in Fig 1.
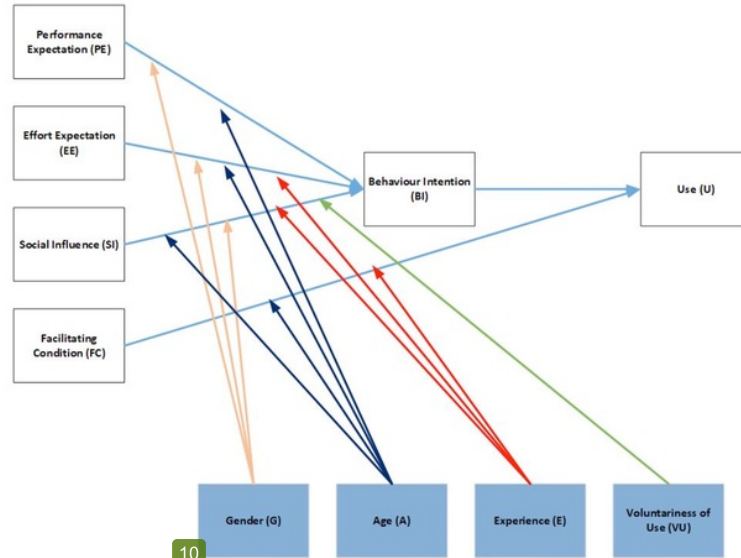
Fig. 1. The original model of Unified Theory of User Acceptance of Technology or UTAUT (Venkatesh et al., 2003)

The acceptance of a technology is shown by the use of the technology (U). U is influenced by Behavioural Intention (BI) and Facilitating Conditions (FC). BI itself is influenced by Performance Expectancy (PE), Effort Expectancy (EE), and Social Influence (SI). UTAUT also use moderating variables for the relationship between variables. Gender (G) is moderating variable for PE, EE, and SI influences toward BI. Age (A) is moderating variable for PE, EE, SI influences toward BI and FC influence toward U. Experience (E) is moderating variable for EE, SI influences toward BI and FC influence toward U. Voluntariness of Use (VU) is moderating variable for SI influence toward BI.

UTAUT is an integration of eight different models of technology acceptance theory (Venkatesh et al., 2003). UTAUT use four core constructs to explain and predict user acceptance of a new technology: PE (equivalent to perceived usefulness), EE (equivalent to perceived ease of use), FC, and SI (Raaij & Schepers, 2008). UTAUT has been extensively used for various research such as to investigate mobile banking adoption (Tan & Lau, 2016), investigating students acceptance of technology in Qatar (Akbar, 2013), acceptance of course management software (Marchewka, Liu, & Kostiwa, 2016), and acceptance of hospital information systems (Sharifian, Askarian, Nematolahi, & Farhadi, 2014) among others.

In this paper, the original UTAUT was slightly modified by eliminating Age and Voluntariness of Use, which can be seen on Fig 2. Age as moderating variable is eliminated due the fact that the participants were from the class of 2015 and 2016. They are only having less than 2 years age difference. The age difference is deemed as not significant enough to show any difference. Voluntariness of Use as moderating variable is eliminated due to the fact the use of iPad Mini is mandatory for new students at FEUAJY. Therefore, the moderating variables are only Gender (G) and Experience (E) in using or owning tablet computers and not only iPad Mini (Brill & Galloway, 2007; Mandl et al., 2014; Venkatesh et al., 2003).

The use of original UTAUT is deemed sufficient. Previous study by Pramudita (2017) on the same population have used DeLone and McLean IS success model (W. H. DeLone & McLean, 2003; Halonen et al., 2009) with variables such as Information Quality, System Quality, Service Quality, User Satisfaction, Intention to Use (Use), dan Net Benefits. This study try to find if Pramudita's result can be complemented using other model, in this case UTAUT. Beside, UTAUT has been deemed as robust model, with up to 70% constructs could explain usage intention (Raaij & Schepers, 2008). In this study, the original UTAUT is deemed sufficient due to its explanation power suggested by Raaij and Schepers (2008).
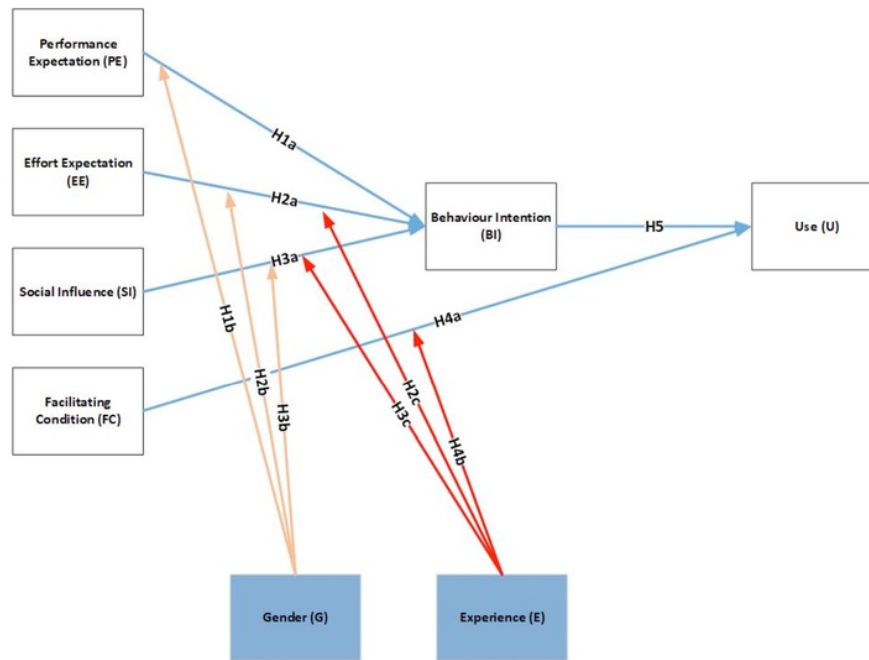
Fig. 2. The research model, modified UTAUT.

2.3 Hypotheses Development

27 is the extent of a student believes that the task performance would be improved by using particular technology (Venkatesh et al., 2003). In this study, PE is measured by asking students their perception on how the iPad Mini would help them in their lectures/classes, finishing their assignments faster, increasing their productivity, and as the result gaining better marks (Akbar, 2013; Marchewka et al., 2016; Venkatesh et al., 2003). Therefore:

H1a Students' PE would influence students' BI to use iPad Mini
H1b PE influence toward BI would be moderated by Gender (G)

EE is the extent of effort needed by a student to use iPad Mini for their academic activities (Tan & Lau, 2016; Venkatesh et al., 2003). Therefore:

H2a Students' EE would influence students' 9 to use iPad Mini
H2b and H2c EE influence toward BI would be moderated by Gender (G) and Experience (E)

SI is the degree of perception of a student on how the other students, lecturers, facu 21 and other people think that the students should use the i 21 Mini (Akbar, 2013; Brennan & Johnson, 2000; Venkatesh et al., 2003). SI is the subjective norm that might influence the intention of use a particular technology (Tan & Lau, 2016).

H3a Students' SI perception would influenc 9 tudents' BI to use iPad Mini
H3b and H3c SI influence toward BI would be moderated by Gender (G) and Experience (E)

FC is the 5 degree to which a student believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh et al., 2003). In this study, FC is measured by looking at resources to support students in using iPad Mini, iPad Mini compatibility with the other gadgets owned by students, students' knowledge, and technical support provided by the faculty and vendor (Akbar, 2013).

H4a FC would influence students Use of iPad Mini (U)
H4b FC influence toward U would be moderated by E

BI would influence the use of technology (Marchewka et al., 2016; Raaij & Schepers, 2008; Venkatesh et al., 2003).

H5 BI would influence the Use of iPad Mini by students (U).

3. RESEARCH METHOD

The survey was developed based on the original UTAUT model (Venkatesh et al., 2003) and modifying it by eliminating Voluntariness and Age questions. The survey used Likert Scale with range of 1 to 5, where 1 is represents strongly disagree and 5 represents strongly agree. The population of FEUAJY students who have to purchase iPad Mini is 1400 from the intake of year 2015 and 2016. We prepared a survey questionnaire adopted from the original UTAUT and eliminated questions that represent Age and Voluntariness of Use variables. The survey was conducted in the second half of 2016-2017 academic year[1]. We distributed the questionnaires to Introduction to Accounting 2 classes for class of 2016 and Information Systems Management Classes for class of 2015. As many as 450 questionnaires were distributed. We asked the lecturer for each class to distribute the questionnaires to their students and also to gather the responses. We received 371 filled questionnaires but further examination revealed that only 349 were usable. The respondents profile could be seen in table 1 below.

Table 1. Respondents' Profile

		Number	Percentage
Gender	*Male*	120	35%
	Female	229	66%
Previous tablet ownership	*Yes*	131	38%
	No	218	62%
Department	*Accounting*	161	46%
	Management	103	30%
	Economics	6	2%
	No Answer	79	22%

For data analysis, we used Structural Equation Modelling or SEM using Partial Least Square or PLS (Kline, 2011; Westland, 2015). We utilised SmartPLS software for by SmartPLS version 3 (Ringle, 2015).

4. DATA ANALYSIS

For SEM, the analysis using SmartPLS version 3 started by examining Outer Model (Kline, 2011; Ringle, 2015; Westland, 2015). Outer Model Output for SmartPLS consist of evaluating Convergent Validity, Discriminant Validity, Composite Reliability, Average Variance Extracted (AVE), and Cronbach's Alpha.

The result for Outer Model test for the model can be seen on Table 2 and Table 3 below.

Table 2. Outer Loading Result 1

	BI	EE	E	FC	G	ME1	ME2	ME3	ME4	ME5	ME6	PE	SI	U
EE * E									0.993					
EE * G							1.016							
FC * G											0.995			
PE * G						1.002								
Q1												0.807		
Q13													0.631	
Q14													0.403	
Q15													0.820	
Q16													0.874	
Q17				0.782										
Q18				-0.063										
Q19				0.743										
Q2												0.831		
Q20				0.714										
Q29	0.967													
Q3												0.848		
Q30	0.966													
Q31	0.971													
Q32														0.954
Q33														0.948
Q4												0.781		
Q5		0.644												

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[1] In Indonesia, academic year for schools and universities is started mid-year (around July for schools and August/September for universities).

Q6	0.765				
Q7	0.802				
Q8	0.788				
G		1.000			
SI * E				0.993	
SI * G			1.042		
E	1.000				

Table 3. Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
BI	0.966	0.967	0.978	0.937
EE	0.743	0.755	0.838	0.566
EE	1.000	1.000	1.000	1.000
FC	0.399	0.602	0.671	0.419
G	1.000	1.000	1.000	1.000
ME1	1.000	1.000	1.000	1.000
ME2	1.000	1.000	1.000	1.000
ME3	1.000	1.000	1.000	1.000
ME4	1.000	1.000	1.000	1.000
ME5	1.000	1.000	1.000	1.000
ME6	1.000	1.000	1.000	1.000
PE	0.835	0.846	0.889	0.668
SI	0.677	0.781	0.788	0.499
U	0.893	0.896	0.949	0.904

As a rule of thumb Convergence Validity value should be greater than 0.7, AVE greater than 0.5, and Cronbach Alpha should be greater than 0.6. Therefore, we decided to delete Q13, Q14, and Q18 which has Outer Loading value less than 0.7. The result after dropping those questions can be seen in table 4 and 5 below.

Table 4. Outer Loading after dropping questions

	BI	EE	E	FC	G	ME1	ME2	ME3	ME4	ME5	ME6	PE	SI	U
EE * E									0.979					
EE * G							1.024							
FC * E											0.995			
PE * G					1.002									
Q1												0.807		
Q15													0.869	
Q16													0.941	
Q17				0.782										
Q19				0.743										
Q2												0.831		
Q20				0.714										
Q29	0.967													
Q3												0.848		
Q30	0.966													
Q31	0.971													
Q32														0.953
Q33														0.948
Q4												0.781		
Q6		0.776												
Q7		0.852												
Q8		0.809												
G					1.000									
SI * E										0.987				
SI * G								1.054						
E			1.000											

Table 5. Construct Reliability and Validity after dropping questions

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
BI	0.966	0.967	0.978	0.937
EE	0.745	0.752	0.854	0.661
EE	1.000	1.000	1.000	1.000
FC	0.603	0.603	0.791	0.558
G	1.000	1.000	1.000	1.000
ME1	1.000	1.000	1.000	1.000
ME2	1.000	1.000	1.000	1.000
ME3	1.000	1.000	1.000	1.000
ME4	1.000	1.000	1.000	1.000
ME5	1.000	1.000	1.000	1.000
ME6	1.000	1.000	1.000	1.000
PE	0.835	0.846	0.889	0.668
SI	0.789	0.871	0.902	0.821
U	0.893	0.896	0.949	0.904

Next step is to test the hypotheses. On SmartPLS version 3 the hypotheses testing is using Bootstrap. The bootstrap result can be seen below in table 6 and table 7.

Table 6. Path Coefficients

	Original Sample (O)	Sample Mean (M)	STDEV	T Statistics (|O/STDEV|)	P Values
BI -> U	0.509	0.509	0.051	9.994	0.000
EE -> BI	0.257	0.261	0.061	4.194	0.000
E -> BI	0.022	0.021	0.047	0.470	0.639
E -> U	-0.003	-0.002	0.065	0.065	0.948
FC -> U	0.146	0.151	0.050	2.914	0.004
G -> BI	0.061	0.066	0.047	1.308	0.191
ME1 -> BI	-0.059	-0.059	0.062	0.949	0.343
ME2 - > BI	-0.041	-0.039	0.061	0.669	0.504
ME3 -> BI	0.022	0.019	0.056	0.390	0.697
ME4 -> BI	0.014	0.017	0.051	0.274	0.784
ME5 -> BI	-0.053	-0.050	0.050	1.043	0.297
ME6 -> U	0.018	0.019	0.046	0.399	0.690
PE -> BI	0.263	0.264	0.064	4.113	0.000
SI -> BI	0.160	0.158	0.055	2.887	0.004

By looking at the results we can determine the results of hypotheses testing. A hypothesis would be supported if the original sample value is in the same way as the hypothesis and T Statistics value greater than 1.64 (two tailed test) and P Values less than 0.05 (Kline, 2011; Ringle, 2015; Westland, 2015). The hypotheses testing result are

- H1a PE would influence the students' BI to use iPad Mini is supported by the findings (Original Value 0.263, T Statistic 4.113, and P Value 0.000)
- H1b PE influence toward BI is moderated by G (ME1 in the table 6) is not supported by the findings (Original Value -0.059, T Statistic 0.949, and P Value 0.343)
- H2a EE would influence students' BI to use iPad Mini is supported by the findings (Original Value 0.257, T Statistic 4.194, and P Value 0.000)
- H2b EE influence toward BI is moderated by G (ME2 in the table 6) is not supported by the findings (Original Value -0.041, T Statistic 0.669, and P Value 0.504)
- H2c EE influence toward BI is moderated by E (ME4 in the table 6) is not supported by the findings (Original Value 0.014, T Statistic 0.274, and P Value 0.784)
- H3a SI would influence the students' BI to use iPad Mini is supported by the findings (Original Value 0.160, T Statistic 2.887, and P Value 0.004)
- H3b SI influence toward BI is moderated by G (ME3 in the table 6) is not supported by the findings (Original Value 0.022, T Statistic 0.390, P Value 0.697)
- H3c SI influence toward BI is moderated by E (ME5 in the table 6) is not supported by the findings (Original Value -0.053, T Statistic 1.043, and P Value 0.297)
- H4a FC would influence the students' Use of iPad Mini is supported by the findings (Original Value 0.146, T Statistic 2.914, P Value 0.04)
- H4b FC influence toward U would be moderated by E (ME6 in the table 6) is not
- H5 BI would influence the students' use of iPad Mini is supported by the findings (Original Value 0.590, T Statistic 9.994, and P Value 0.690)

Table 7 shows the result of Adjusted R Square which shows the ability of the independent variables to explain dependent variables.

Table 7. R Square Adjusted

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
BI	0.262	0.291	0.045	5.844	0.000
U	0.323	0.335	0.055	5.913	0.000

The results of original UTAUT model with moderating variables Gender and Experience only show that BI have 26.2% (even after eliminating the moderating variables). Therefore 73.8% of Use is explained by other variables which are not included in the original UTAUT Model used in this research.

5.   CONCLUSION AND FURTHER WORKS

The hypotheses testing for original UTAUT model to test the acceptance of involuntary iPad Mini used among two group of first year students at FEUAJY has shown that the original UTAUT model can explain the acceptance. However, the hypotheses testing shown that the moderating variables of Gender and Experience are not supported by the findings. The probable explanation for these findings can be explained as follows: Using computer equipment for supporting our daily activities is not a strange thing for these students. In fact, in Indonesia, elementary and even kindergarten students have been introduced on how to use computers and gadgets like smartphones and tablets. Both female and male students received the same training, embedded into local school's curriculum. We guess that this is the reason why Gender has no effect anymore as moderating variable toward acceptance of iPad Mini. Experience as moderating variable in using tablet (either iPad family or others) is also not supported since most students have experience in using various computing devices. The most prevalent device we observed at FEUAJY is smartphones. Tablet computer is similar in operations to most smartphones. The difference would be the size which could affect ergonomic rather than familiarity. We guess that this is the reason why Experience in owning tablet before entering FEUAJY has no effects toward acceptance.

The results of this study complement the result from Pramudita's study (2017). The same population has been tested using two different tools, which are DeLone and McLean IS success model (W. H. DeLone & McLean, 2003; Halonen et al., 2009; Pramudita, 2017) and the original UTAUT (Akbar, 2013; Raaij & Schepers, 2008; Venkatesh et al., 2003). Both studies show that iPad Mini is accepted and perceived as a success (by providing Net Benefit) to FEUAJY students.

Despite the positive result, we were intrigued by the ability of original UTAUT to explain the acceptance only at 26.2%. As Raaij and Schepers (2008) explain that UTAUT's high R^2 is only achieved when moderating the key relationships with up four variables (gender, age, experience and voluntariness) in order to yield more significant coefficient. In this study, two of the moderating variables (age and voluntariness) were eliminated. Nevertheless, the other variables need to be explored further to find a satisfying explanation on this phenomenon. Future works should try to include other variables outside DeLone and McLean model and the original UTAUT.

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