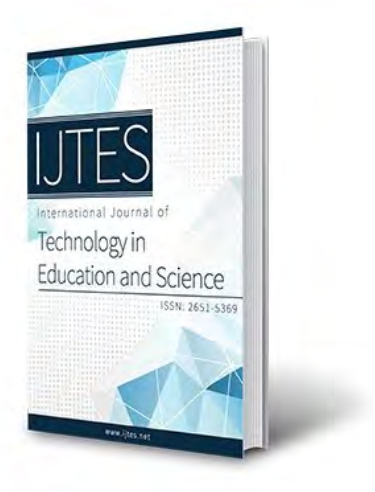

Determinants of Online Assessment Adoption in a Technical College

Caleb Chin Poh Or
University of Western Australia, Australia

Elaine Chapman
University of Western Australia, Australia

www.ijtes.net

To cite this article:

Or, C. C. P. & Chapman, E. (2021). Determinants of online assessment adoption in a technical college. *International Journal of Technology in Education and Science (IJTES), 5*(4), 601-619. https://doi.org/10.46328/ijtes.291

IJTES
International Journal of Technology in Education and Science
2021, Vol. 5, No. 4, 601-619 https://doi.org/10.46328/ijtes.291

Determinants of Online Assessment Adoption in a Technical College

Caleb Chin Poh Or, Elaine Chapman

Article Info

Article History

Received:
21 April 2021
Accepted:
24 September 2021

Keywords

Technology acceptance
Online assessment
UTAUT
Unified Theory of Acceptance of Use of Technology

Abstract

Higher education institutions have switched from the traditional paper-based assessment to online assessment in the last decade, and it is worthwhile to examine how the users have perceived such a change. While many technology acceptance studies focused on students as participants, this study examines the lecturers' perception of online assessment. The Unified Theory of Acceptance and Use of Technology model (UTAUT) has been widely adapted for technology acceptance studies, and it is suitable for the study on online assessment systems. Unlike the findings from the original UTAUT model, performance expectancy did not have a significant effect on behavioral intention. A new relationship was found between Social Influence and Use Behavior. The UTAUT was extended with Usability, Learnability and Attitude as additional constructs. An essential aspect of this study ascertained that attitude, a construct that was absent in the original model, has a significant effect on behavioral intention.

Introduction

Pen-and-paper examinations have remained the traditional approach to student assessment in education institutions over the last few decades. Despite these enduring habits, the widespread availability of learning management systems and technology has increased the popularity of online assessment approaches in more recent years (Amasha et al., 2018; Choi & McClenen, 2020; Gamage et al., 2019; Krusche & Seitz, 2018; Liu et al., 2019; Xu & Mahenthiran, 2016; Way et al., 2020). Online assessment has the potential to enhance the process of evaluating student learning in myriad ways. For example, this approach can: increase testing reliability with machine marking; improve impartiality in assessment; permit the use of diverse question styles that incorporate interactivity and multimedia (Boyle & Hutchison, 2009; James et al., 2002); and increase lecturers' ability to test a wide variety of topics within a single test, in a short time period (Brady, 2005).

With features like automated marking and feedback, online assessment is viewed as efficient, fast and reliable, making it useful where large numbers of students are being tested. Online assessment may not only reduce the instructional and administrative costs of teaching a large class, but indirectly, affect the amount of student learning that takes place in courses by lowering the costs associated with administering more frequent assessments. Online assessment has the potential to support and even improve student learning with properly designed assessment tasks. Moreover, higher-order assessment tasks can also be assessed through online approaches.

Studies have shown that in general, students respond well to online assessment approaches, particularly if the assessment results are counted towards their final marks (Appiah & Van Tonder, 2018). However, it is the lecturers who must first prepare and then deliver these online assessment tasks. This group, therefore, will have a key influence on how successfully an online assessment system is used within an institution. While numerous studies on lecturers' acceptance of online learning systems have appeared within the literature, studies that have focused on their acceptance of online assessment systems are relatively scarce. The present study focused on exploring the factors that predict lecturers' acceptance of one specific online assessment system used within an institute of technical education in Singapore. The central model used to explore lecturers' acceptance of this system was an extended version of the Unified Theory of Acceptance and Use of Technology proposed by Venkatesh et al. (2003).

Venkatesh et al. (2003) consolidated various previous Technology Acceptance Model (TAM) theories (Davis, 1989; Taylor & Todd, 1995) and models (Ajzen, 1991; Compeau et al., 1999; Fishbein & Ajzen, 1975; Moore & Benbasat, 1991; Thompson et al., 1991) in developing the Unified Theory of Acceptance and Use of Technology (UTAUT). In the UTAUT, four constructs play a significant role as direct determinants of behavioral intentions (BI) and use behaviors (UB) with respect to any technology-based system: (1) performance expectancy (PE), (2) effort expectancy (EE), (3) social influence (SI); and (4) facilitating conditions (FC) (Figure 1). PE is the degree to which a user believes that using the system will help him or her to attain gains in his or her job performance and has been found to be a determinant of behavioral intentions in most situations. EE is the degree of ease with which the system can be used. SI is the extent to which a user perceives that 'important others' think that he or she should use the system. FC is the extent to which a user believes that there are existing organizational and technical structures to support their system usage. Finally, BI is defined as the individual's intention to use the technology, while UB is their actual usage behavior.

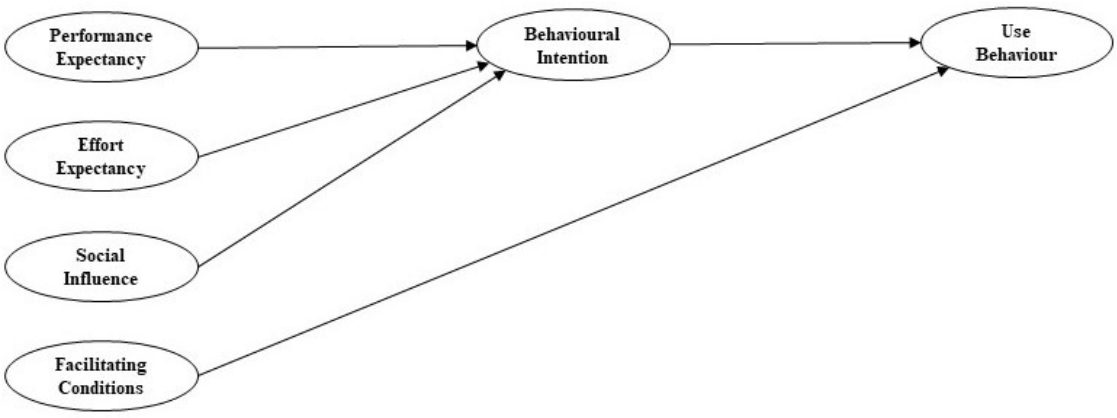

Figure 1. Unified Theory of Acceptance and Use of Technology Model

While the UTAUT has been found to have a high level of predictive power in explaining users' acceptance of various information systems (Venkatesh et al., 2003), the original developers acknowledged that the model could be extended for use in specific contexts. As a result, an extended UTAUT model has been proposed by the first author as depicted in Figure 2. As indicated, in the extended model, PE, SI and FC have all been retained, because these have been shown to be powerful predictors of technology acceptance in previous research

(Venkatesh et al., 2003). However, two additional constructs (usability and learnability) have been added as potential influences on BI, given that these factors have been identified as important predictors in studies outside the UTAUT literature (Burney et al., 2017; Chiou et al., 2009; Holden & Rada, 2011; Jeng, 2005; Juarez Collazo et al., 2014; Lah et al., 2020; Lin, 2013; Tsakonas & Papatheodorou, 2008; Zbick et al., 2015). The construct of attitude has also been added, as this factor has been found in various previous studies, including UTAUT extension studies, to be a significant predictor of both BI and UB (Botero et al., 2018; El-Gayar and Moran, 2006; El-Gayar et al., 2011; Jairak et al., 2009; Khechine, & Augier, 2019; Moran et al., 2010; Nassuora, 2012; Shuhaiber, 2015; Thomas et al., 2013).

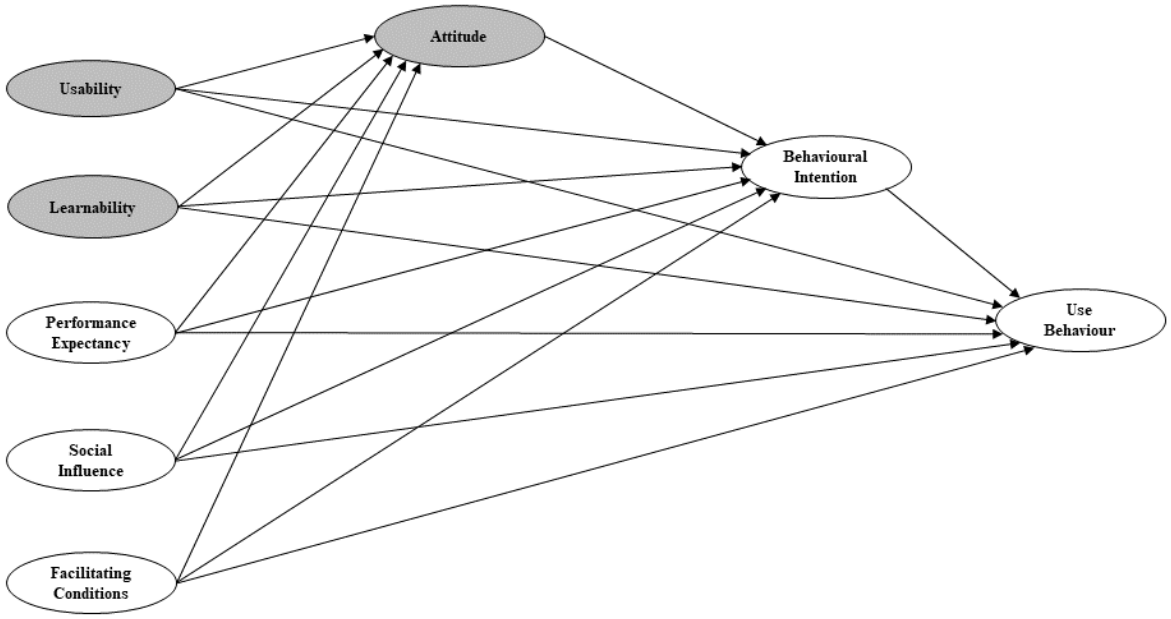

Figure 2. Extended Unified Theory of Acceptance and Use of Technology Model

In the extended model, usability is defined as the ease with which a system can be adopted to achieve given objectives with effectiveness and efficiency (Bevan et al., 2015; Jokela et al., 2003; Shackel, 2009). Learnability refers to the speed with which users can become familiar with the features and capabilities of a system and will depend heavily on the quality of the system interfaces (Jeng, 2005; Nielsen, 1994). Both usability and learnability have yet to be evaluated as constructs in a UTAUT study, though these variables have been explored in past technology acceptance research. For example, Lin (2003) found that learnability (as an element of usability) was a significant predictor of intentions to use an eCampus learning system with a personal digital assistant (PDA), while Zbick et al. (2015) found that learnability was a significant predictor of intentions to use a mobile learning system in a university-level setting.

Attitudes (i.e., users' overall subjective thoughts or feelings about an object), which first appeared in the earlier TAM model but was not incorporated as a construct in the final UTAUT model, been re-introduced in the extended version proposed. According to the Theory of Reason Action, individuals' attitudes towards a given object or situation combine with subjective norms to shape their behavioral intentions, which also influence their actual behaviours (Ajzen & Fishbein, 1980). In the UTAUT extension studies on tablet PC adoption by El-

Gayar and Moran (2006), Moran et al. (2010) and El-Gayar et al. (2011), attitudes toward using technology were found to significantly influence BI. Attitudes have also been found to influence BI in studies of mobile learning adoption (Nassuora, 2012; Thomas et al., 2013), virtual lecturing systems, mobile-assisted language learning systems and social learning platforms (Botero et al., 2018; Khechine & Augier, 2019; Shuhaiber, 2015).

In the extended UTAUT model, user acceptance is still operationalized by two of the constructs from the original UTAUT (BI and UB). Both of these have been incorporated in the model, though many later UTAUT researchers only considered BI as an outcome variable in technology acceptance studies. For example, Wong et al. (2013) did not include UB when studying student teachers' acceptance of interactive whiteboards using the original UTAUT model. In another extended UTAUT study, Bouznif (2017) excluded UB in the exploring business students' continued intentions to use a learning management system. Although Dwivedi et al. (2019) argued, based on various UTAUT studies, that the influence of BI on UB might not be particularly strong or predictable, users' actual behaviors (whether assessed directly from records such as computer logs, or through a self-report survey) are an important indicator of overall acceptance levels. UB is, therefore, included as an endogenous variable in the extended UTAUT model.

While we recognized that in the original UTAUT model, the influence of the four primary factors (i.e. PE, EE, SI and FC) on BI and UB might be moderated by factors such as gender, age, experience and voluntariness, these factors are not typically included in empirical studies on the UTAUT. As a result, the extended model evaluated here does not include reference to these potential moderating variables. Further empirical studies that adopt the extended model could, however, include these as additional factors.

The goal of the present study was to explore lecturers' acceptance of one online assessment system (the Integrated Assessment System, or IAS) in the context of an institute of technical education (ITE) in Singapore. In the study, 213 lecturers completed an online survey based on the extended UTAUT model. A path analysis was then conducted to examine relationships between the constructs in the extended model. The following hypotheses regarding relationships between the constructs in the extended UTAUT model were tested in the study:

- Usability has a significant positive effect on attitude, BI and UB
- Learnability has a significant positive effect on attitude, BI and UB
- PE has a significant positive effect on attitude, BI and UB
- SI has a significant positive effect on attitude, BI and UB
- FC has a significant positive effect on attitude, BI and UB
- Attitude has a significant positive effect on BI
- BI has a significant positive effect on UB

The research model and its hypotheses are also shown in Figure 3. It should be noted here that there were no explicit hypotheses formed for indirect effects within the model, because previous studies have not focused upon these. As a result, there was no basis on which to form such predictions. However, these also were tested

and interpreted in the study. Furthermore, it should be noted that as effort expectancy was not included in the instrument, it was not possible to do a direct comparison of the strength of prediction from the extended model and the original UTAUT. As a result, this difference was not tested in the research.

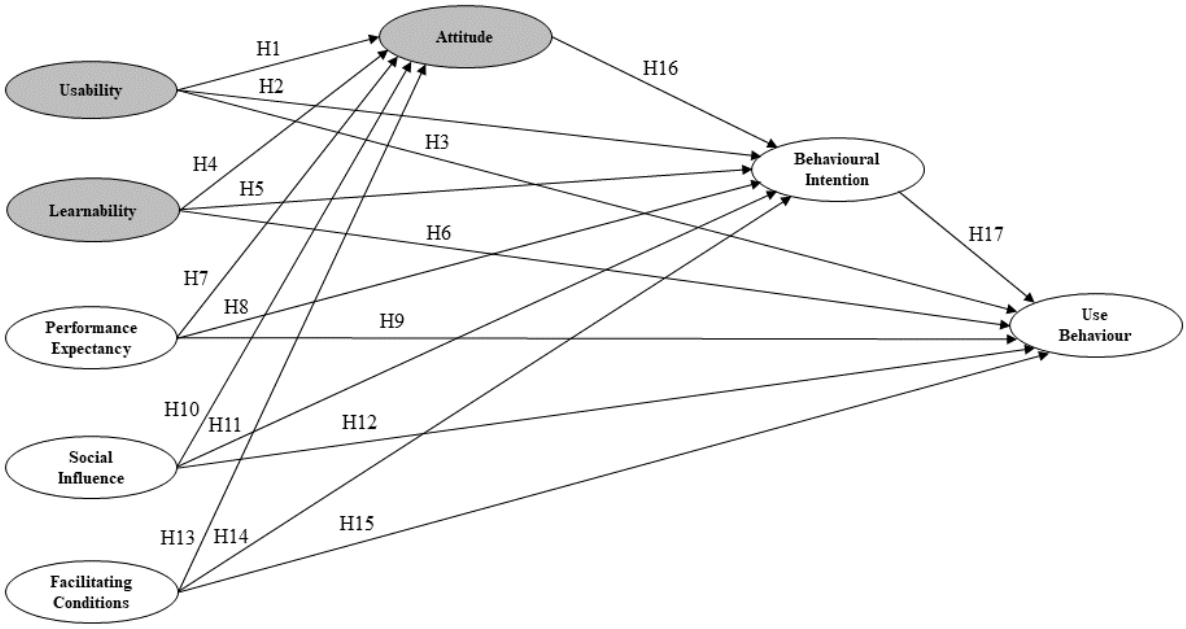

Figure 3. Hypotheses of Extended UTAUT Research Model

Method

Participants

An online questionnaire was used to obtain information from participants who had used the IAS at least on one occasion. From the email invitations sent out to 469 potential participants, 213 participants completed the online questionnaire. The online questionnaire response rate was 45.42%. Among the participants who responded to the online questionnaire, 62.0% were males, and 38.0% were females. Most of the participants were from the age group of 41 to 50 years (39.4%), with a small group of participants from the age group of 21-30 years (1.4%). In terms of online assessment experience, 77.5% of the participants rated themselves at least "5" and above, and 0.9% of the participants responded that they did not have any experience.

Instrument

The instrument used in the study included 20 items and utilized a 7-point bipolar rating scale (see Table 1). Bipolar rating scales have been found to reduce bias and produce better model fits in instrument analyses (Friborg et al., 2006). In the instrument, each bipolar item contains two full statements to ensure meaningful responses and avoid ambiguity (see Appendix A-Data Collection Tool). As indicated, in this study, it was not possible to study actual usage behaviors, because permission to access these data could not be obtained. As a result, the measure of UB relied upon participants' self-reports of the frequency with which they used the IAS.

Table 1. Extended UTAUT Questionnaire (20 Items)

Construct	**Statement**		
Performance Expectancy (PE) (Venkatesh et al., 2003)	Using IAS slows me down in accomplishing tasks	←→	Using IAS enables me to accomplish tasks quickly
	Using IAS decreases my productivity terribly	←→	Using IAS increases my productivity greatly
Social Influence (SI) (Venkatesh et al., 2003)	My supervisor thinks that I should not use IAS	←→	My superior thinks that I should use IAS
	My colleagues think that I should not use IAS	←→	My colleagues think that I should use IAS
	In general, the organization has been unsupportive in the use of IAS	←→	In general, the organization has been supportive in the use of IAS
Facilitating Conditions (FC) (Venkatesh et al., 2003)	I do not have any resource available to use IAS	←→	I have all the resources available to use IAS
	IAS is incompatible with systems I use	←→	IAS is compatible with all other systems I use
	No specific person (or group) is available for assistance with IAS difficulties	←→	A specific person (or group) is easily and readily available for assistance with IAS difficulties
Usability (Brooke, 1996)	I think IAS is extremely difficult to use	←→	I think IAS is extremely easy to use
	I think the various functions in IAS are not integrated	←→	I think the various functions in IAS are well-integrated
	I think there are too many inconsistencies in IAS	←→	I think there is overall consistency in IAS
Learnability (Brooke, 1996)	I need the support of a technical person to be able to use IAS	←→	I am able to use IAS on my own without any help
	I need to learn a lot of things before I could get going with IAS	←→	I need not learn new things before I could get going with IAS
Behavioral Intention (BI) (Venkatesh et al., 2003)	Given a choice, in the next 6 months:		
	I do not intend to use IAS	←→	I intend to always use IAS
	I do not plan to use IAS	←→	I plan to always use IAS
Attitude (Davis, 1989)	All things considered, using IAS is:		
	Bad	←→	Good
	Unfavorable	←→	Favorable
	Negative	←→	Positive
Use Behavior (UB) (Venkatesh et al., 2003)	I seldom use IAS	←→	I always use IAS
	I spend little time on IAS	←→	I spend great amount of time on IAS

Procedures

Following the receipt of approval both from the participating institution and the University of Western Australia Human Research Ethics Committee, the questionnaire was completed online, hosted on the Qualtrics platform. Given the busy schedules of the lecturers, it was left open for three months to ensure that all participants had the opportunity to complete the survey. The objectives of the study were shared in an invitation email, and on the landing page of the online questionnaire. Participation was voluntary and anonymous.

Results

Descriptive statistics and bivariate correlations for the path analysis are shown in Table 2. All initial screening analyses performed suggested that the use of path analysis was tenable, indicating no significant violations of assumptions in terms of non-normality, non-linearity, or extreme scores.

Table 2. Descriptive Statistics and Bivariate Correlations

Construct	*M*	*SD*	1	2	3	4	5	6	7	8
1. Usability	4.814	1.104	--	.515**	.733**	.653**	.650**	.669**	.723**	.468**
2. Learnability	4.146	1.340		--	.458**	.505**	.511**	.515**	.442**	.465**
3. Performance Expectancy	4.880	1.190			--	.664**	.630**	.676**	.752**	.464**
4. Facilitating Conditions	5.452	1.088				--	.688**	.777**	.731**	.649**
5. Social Influence	4.967	1.048					--	.701**	.680**	.602**
6. Attitude	5.143	1.186						--	.828**	.684**
7. Behavioral Intentions	5.355	1.147							--	.593**
8. Usage Behaviors	4.862	1.324								--

* Significant at .05 level; ** Significant at .01 level

The path analysis using IBM SPSS AMOS version 26.0 indicated that usability had a highly significant positive effect on attitude (β= .294; p< .001) (see Figure 4), while Learnability had a significant positive effect on BI (β= .138; p< .05) and UB (β = .163; p< .05). PE had a significant positive effect on attitude (β= .476; p< .001) but did not have a significant effect on BI, a departure from common UTAUT findings that have suggested that PE is the strongest predictor of BI. SI was found to have positive effect on attitude (β= .391; p< .001); BI (β= .389; p< .001) and UB (β= .362; p< .001).

Also, FC was found to have a significant positive effect on attitude (β= .232; p< .001), BI (β= .198; p< .001) and UB (β= .290; p< .001). Attitude emerged as the strongest predictor of BI (β= .523; p< .001). Similar to the original UTAUT findings, BI had a significant effect on UB (β= .393; p< .001). The test results for the variables are summarized in Table 3.

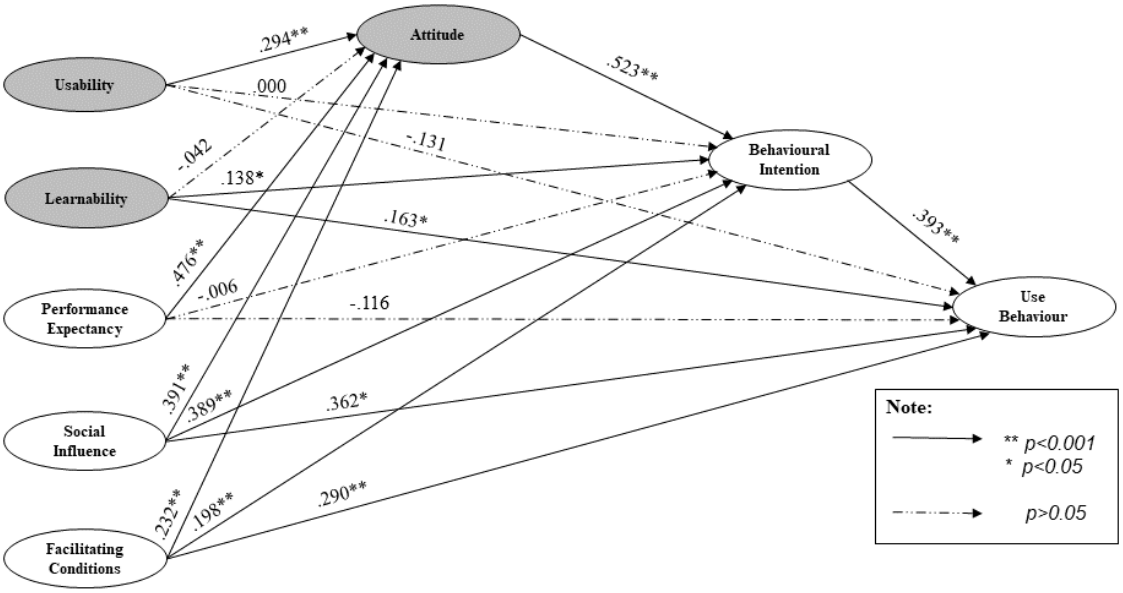

Figure 4. Extended Unified Theory of Acceptance and Use of Technology Structural Model

Table 3. Path Coefficients of extended UTAUT Model

Hypothesis	Path	Unstandardized Estimate	Standardized Estimate	S.E.	C.R.	*P*	Result
H1	Usability→Attitude	.268	.294	.051	5.263	***	Significant
H2	Usability→BI	.000	.000	.049	.004	.997	Not Significant
H3	Usability→UB	-.139	-.131	.072	-1.933	.053	Not Significant
H4	Learnability→Attitude	-.031	-.042	.042	-.741	.459	Not Significant
H5	Learnability→BI	.104	.138	.039	2.653	.008	Significant
H6	Learnability→UB	.141	.163	.061	2.297	.022	Significant
H7	PE→Attitude	.348	.476	.040	8.705	***	Significant
H8	PE→BI	-.005	-.006	.044	-.109	.913	Not Significant
H9	PE→UB	-.099	-.116	.058	-1.691	.091	Not Significant
H10	SI→Attitude	.311	.391	.044	6.984	***	Significant
H11	SI→BI	.314	.389	.048	6.544	***	Significant
H12	SI→UB	.334	.362	.090	3.703	***	Significant
H13	FC→Attitude	.192	.232	.047	4.062	***	Significant
H14	FC→BI	.166	.198	.046	3.612	***	Significant
H15	FC→UB	.279	.290	.078	3.587	***	Significant
H16	Attitude→BI	.531	.523	.076	7.005	***	Significant
H17	BI→UB	.450	.393	.127	3.546	***	Significant

In assessing the extent to which each independent variable has an impact on the dependent variables, the standardized direct effects, indirect effects, total indirect effects and total effects associated with each of the five variables were examined. A coefficient linking one construct to another in the UTAUT model represents the direct effect of a determinant on a dependent variable. An indirect effect indicates the impact which a

determinant has on a target variable through its effect on other intervening variables in the model. A total indirect effect on a given variable is the product of the indirect effects, while a total effect is the sum of the respective direct and indirect effects. According to Cohen (1988), effect sizes of 0.2 are considered small, those with 0.5 are medium, and values with 0.8 and above are considered large. These effects are summarized in Table 4. As indicated, Usability, PE, SI and FC all had significant indirect effects on BI, while SI and FC also had significant indirect effects on UB. These results indicate that, in addition to attitude having a significant direct effect on BI, it also acted as a significant mediator in the indirect effects of Usability, PE, SI and FC on BI (e.g., Usability → Attitude → BI). Attitude was also a significant mediator in the indirect effects of SI and FC on UB, via BI (e.g., Usability → Attitude → BI → UB).

Table 4. Direct, Indirect and Total Effects Implied in Path Model (Standardized Coefficients)

	Direct Effects			**Indirect Effect**			**Total Effect**		
	Attitude	**BI**	**UB**	**Attitude**	**BI**	**UB**	**Attitude**	**BI**	**UB**
Usability	.294*	.00	-.131	-	.154*	.061	.294*	.154*	-.071
Learnability	-.042	.138*	.163*	-	-.022	.046	-.042	.116*	.209*
PE	.476*	-.006	-.116	-	.249*	.095	.476*	.242*	-.021
SI	.391*	.389*	.362*	-	.204*	.233*	.391*	.593*	.595*
FC	.232*	.198*	.290*	-	.121*	.125*	.232*	.319*	.416*

Note: ** $p < 0.05$; standardized indirect effects were computed for each of 500 bootstrapped samples.*

Discussion

Attitude has appeared inconsistently in tested UTAUT models within the literature, more recently, being excluded by most UTAUT researchers in line with the original UTAUT model (Venkatesh et al., 2003). However, results of the present study suggest that lecturers' attitude towards online assessment is an important predictor of both lecturers' BI and UB, and in fact, was emerged as the strongest predictor of lecturers' BI amongst all of the UTAUT predictors. This result is consistent with the findings of most of the previous studies in which attitude has been included (i.e., in a TAM or UTAUT extension study) (Bervell et al., 2020; Botero et al., 2018; Dulle & Minishi-Majanja, 2011; El-Gayar & Moran, 2006; El-Gayar et al., 2011; Khechine & Augier, 2019; Moran et al., 2010; Nassuora, 2012; Shuhaiber, 2015; Šumak et al., 2010; Thomas et al., 2013).

The path analysis also showed that there were significant indirect effects of the online assessment system usability, the lecturers' PE and SI, and the organization's FC on lecturers' BI through lecturers' attitude. Such mediation analysis has only been a focus of one prior UTAUT study thus far. In this study, Bervell et al. (2020) explored the intended use of blended learning in an LMS application among 267 distance tutors in Africa and found significant indirect effects of PE and FC on BI, via attitude. Such a result is also consistent with the TAM model by Davis (1989). The former study cited also found that when attitude was added to the model, the direct effect of FC on BI was not significant, and that only an indirect of FC (via attitude) was significant. These previous results, coupled with those from the present study, underscore the important role that attitude can play in predicting both users' intentions and their self-reported usage behaviors in relation to technology-based

systems.

The new construct, online assessment system usability, was theorized to have a significant positive direct effect on lecturers' attitude, BI and UB. This prediction was not upheld, with results indicating no direct effects of this construct on either lecturers' BI or UB. The fact that usability had no direct effects on users' intentions was somewhat surprising but is consistent with results reported by Chiou et al. (2009) and Lew et al. (2019). Despite this, the results affirmed the importance of usability as a predictor of BI, because this construct had a significant positive indirect effect on BI, via attitude. Therefore, these results suggest that usability will first affect the lecturers' attitudes towards online assessment, and through lecturers' attitude, will have a significant impact on lecturers' BI. The notion of attitude being an important mediator for behavioral intentions is not new (Bervell et al., 2020), but these constructs have not previously been incorporated in the context of the UTAUT model.

In contrast to the findings for usability, learnability of the online assessment system did not have a significant direct effect on the lecturers' attitude but did have significant positive direct effects on both lecturers' BI and UB. This result aligns with past studies that have shown learnability to be an important factor in system usability assessments (Alshehri et al., 2019; Thowfeek & Salam 2014). Learnability has previously been studied in the context of UTAUT extension studies, but only as an attribute within an overall usability construct (Lin 2003; Zbick et al., 2015). The findings of the present study, therefore, affirm the influence of learnability in technology acceptance. Furthermore, the disparate effects observed for usability and learnability in the study underscore the importance of decoupling these constructs in future UTAUT extension studies.

The study findings also indicated that lecturers' PE had a significant positive direct effect on the lecturers' attitude towards online assessment, but not on BI and UB. The findings are similar to those of past studies that have examined the relationship between PE and attitude (Bervell et al., 2020; Botero et al., 2018; El-Gayar et al., 2011; Shuhaiber, 2015; Šumak et al., 2010), but are inconsistent with the predictions of the original UTAUT model. Traditionally, PE has always been proposed and found to be the strongest predictor of BI (Liao et al., 2004; Prasad et al., 2018; Salloum & Shaalan, 2018; Venkatesh et al., 2003), with a few notable exceptions (Mtebe & Raisamo, 2014; Yueh et al., 2015). It is possible that the findings of the present study were influenced by the fact that the use of the online assessment system was non-voluntary. As such, most of the lecturers were likely to deem that the system would help them to improve their job performance, because, in effect, they could not perform their functions fully without making use of it.

From the findings, lecturers' SI also had a significant positive direct effect on lecturers' attitude, which aligns with results of past studies that have incorporated attitude as a construct (Botero et al., 2018; Nassuora, 2012; Shuhaiber, 2015; Šumak et al., 2010). SI among the lecturers had a significant positive direct effect on their intentions to use the online assessment system, which is also consistent with the findings of many previous UTAUT studies (e.g., Al-Adwan & Al-Adwan, 2018; Alasmari & Zhang, 2019; Ali & Arshad, 2018; Kim & Lee, 2020; Radovan & Kristl, 2017; Salloum & Shaalan, 2018; Shah et al., 2020; Wan et al., 2020; Zhang et al., 2020). In the present study, however, a new relationship between SI and UB was also identified, where SI had a significant positive direct effect on UB. The latter effect suggests a particularly strong influence of social

influences in this context. Thus, within the participating ITE, the views of others (i.e., peers, supervisors, and students) are likely to have a significant impact in lecturers' overall acceptance of any new online assessment system.

The relationship between FC and attitude has seldom been explored in past UTAUT studies. In the only two studies identified in which this relationship has been explored, Nassuora (2012) and Bervell et al. (2020) both found that FC had a positive influence on attitude. A similar result was obtained in the present study. The mediation analysis also revealed that there were significant indirect effects of SI and FC on UB, via BI. This result is consistent with the findings of one previous study, which focused on teachers' acceptance of communication technology by Shah et al. (2020). In this former study, it was also found that PE, SI and FC had significant indirect effects on UB through BI as a mediator.

As has been reported in various prior UTAUT studies, FC in the present study had a significant positive direct effect on UB (Alshehri et al., 2019; Liao et al., 2004; Mahande & Malago, 2019; Oh & Yoon, 2014; Prasad et al., 2018; Salloum & Shaalan, 2018; Shah et al., 2020). Typically, however, the relationship between FC and BI is not tested. In the present study, FC within participating ITE was also found to have a significant positive direct effect on the lecturers' BI. In the two studies that have also tested this relationship to date, Mtebe and Raisamo (2014) found that FC had a positive effect on BI in a study of students' behavioral intentions to adopt and use mobile learning, while Mahande and Malago (2019) reported a similar effect in their study of e-learning acceptance in a postgraduate degree program. Therefore, the results of the present study have highlighted new relationships among the original and new constructs in the extended UTAUT model, which could provide useful directions for future research in which this model is adopted.

Conclusion

Since its introduction, the UTAUT has been highly regarded as a robust model with a high level of predictive power in technology acceptance studies. Venkatesh et al. (2003), however, acknowledged that across different contexts, extensions to the original UTAUT could be considered. The present study added usability, learnability and attitude to the UTAUT model, and examined their relationships in predicting acceptance of a form of technology that has thus far been under-researched in the UTAUT literature (online assessment systems).

The study results suggest that the new constructs introduced could enrich and expand explanations of the factors that influence users' intentions and usage in such settings. The new relationships amongst traditional elements of the UTAUT model also suggest a promising line for future studies to explore. The results suggested in particular that the introduction of attitude in extended models could enhance the efficacy with which user's intentions to engage with online assessment systems can be predicted. This result also underscores the need for institutions to take steps to improve lecturers' attitudes towards the use of relevant technology systems in efforts to enhance their intentions and actual usage behaviors.

While the results from this study confirmed many predictions that were a part of the original UTAUT model,

and identified new relationships amongst the UTAUT constructs, it was not possible to incorporate potential moderators in the study. Such a study would require a very large and diverse sample. The examination of moderators could, therefore, be explored in future studies with respect to the new constructs introduced in this study. It was also, as noted, not possible within the study to obtain direct evidence of usage behaviors, which could be explored in future studies. These studies could also test the relevance of the extended UTAUT model in other contexts, for instance, examining its predictive power with respect to other types of technology.

One other possible direction for future UTAUT research within education contexts is the study of links between organizational culture and technology acceptance, and how this factor contributes to influence lecturers' intentions and use behaviors. The prominent role played by SI in this study suggests that this line could prove fruitful for enhancing overall acceptance levels. Furthermore, past studies have shown that there is a strong relationship between organizational culture and technological innovation (Huang & Teo, 2019; Zhu, 2015). The addition of new variables like organizational culture to the existing UTAUT model could further enrich our understandings of how users respond to the introduction of new technological innovations within institutions of higher education.

References

Abu-Al-Aish, A., and Love, S. (2013). Factors influencing students' acceptance of m-learning: an investigation in higher education. *The International Review of Research in Open and Distributed Learning*, *14*(5). https://doi.org/10.19173/irrodl.v14i5.1631

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I., and Fishbein, M. (1980). Understanding attitudes and predicting social behaviour.

Alasmari, T., and Zhang, K. (2019). Mobile learning technology acceptance in Saudi Arabian higher education: an extended framework and A mixed-method study. *Education and Information Technologies*, 1-18. https://doi.org/10.1007/s10639-019-09865-8

Albright, J. J., and Park, H. M. (2009). Confirmatory factor analysis using Amos, LISREL, Mplus, SAS/STAT CALIS. https://pdfs.semanticscholar.org/887d/174122f76e2a232ba313866cb1b191bd15ad.pdf

Ali, R. A., and Arshad, M. R. M. (2018). Empirical Analysis on Factors Impacting on Intention to Use M-learning in Basic Education in Egypt. *The International Review of Research in Open and Distributed Learning*, *19*(2). https://doi.org/10.19173/irrodl.v19i2.3510

Al-Adwan, A. S., Al-Adwan, A., and Berger, H. (2018). Solving the mystery of mobile learning adoption in higher education. *International Journal of Mobile Communications*, *16*(1), 24-49. http://www.academia.edu/download/57080624/IJMC_161_Paper2.pdf

Alshehri, A., Rutter, M., and Smith, S. (2019). Assessing the Relative Importance of an E-Learning System's Usability Design Characteristics Based on Students' Preferences. *European Journal of Educational Research, 8*(3), 839-855. https://doi.org/10.4018/IJDET.2019070101

Amasha, M. A., Abougalala, R. A., Reeves, A. J., & Alkhalaf, S. (2018). Combining Online Learning & Assessment in synchronization form. *Education and Information Technologies*, *23*(6), 2517-2529. https://10.1007/s10639-018-9728-0

Appiah, M., & Van Tonder, F. (2018). E-Assessment in Higher Education: A Review. *International Journal of Business Management & Economic Research, 9*(6). https://www.ijbmer.com/docs/volumes/vol9issue6/ijbmer2018090601.pdf

Bervell, B., and Umar, I. N. (2017). Validation of the UTAUT Model: Re-Considering Non-Linear Relationships of Exogeneous Variables in Higher Education Technology Acceptance Research. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(10), 6471-6490.

Bervell, B., Nyagorme, P., and Arkorful, V. (2020). LMS-Enabled Blended Learning Use Intentions among Distance Education Tutors: Examining the Mediation Role of Attitude Based on Technology-Related Stimulus-Response Theoretical Framework. *Contemporary Educational Technology, 12*(2), ep273. https://www.ejmste.com/download/validation-of-the-utaut-model-re-considering-non-linear-relationships-of-exogeneous-variables-in-5041.pdf

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*(2), 238. https://doi.org/10.1037//0033-2909.107.2.238

Bentler, P. M., and Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588. https://doi.org/10.1037/0033-2909.88.3.588

Bevan, N., Carter, J., & Harker, S. (2015, August). ISO 9241-11 revised: What have we learnt about usability since 1998?. *In International Conference on Human-Computer Interaction* (pp. 143-151). Springer, Cham. https://doi.org/10.1007/978-3-319-20901-2_13

Bervell, B., Nyagorme, P., and Arkorful, V. (2020). LMS-Enabled Blended Learning Use Intentions among Distance Education Tutors: Examining the Mediation Role of Attitude Based on Technology-Related Stimulus-Response Theoretical Framework. *Contemporary Educational Technology, 12*(2), ep273. https://www.ejmste.com/download/validation-of-the-utaut-model-re-considering-non-linear-relationships-of-exogeneous-variables-in-5041.pdf

Bervell, B., and Umar, I. N. (2017). Validation of the UTAUT Model: Re-Considering Non-Linear Relationships of Exogeneous Variables in Higher Education Technology Acceptance Research. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(10), 6471-6490. https://www.ejmste.com/download/validation-of-the-utaut-model-re-considering-non-linear-relationships-of-exogeneous-variables-in-5041.pdf

Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods and Research*, *17*(3), 303-316. https://doi.org/10.1177/0049124189017003004

Botero, G. G., Questier, F., Cincinnato, S., He, T., and Zhu, C. (2018). Acceptance and usage of mobile assisted language learning by higher education students. *Journal of Computing in Higher Education*, *30*(3), 426-451. https://doi.org/10.1007/s12528-018-9177-1

Bouznif, M. M. (2018). Business students' continuance intention toward Blackboard usage: An empirical investigation of UTAUT model. *International Journal of Business and Management*, *13*(1), 120. https://doi.org/10.5539/ijbm.v13n1p120

Boyle, A., & Hutchison, D. (2009). Sophisticated tasks in e- assessment: what are they and what are their benefits? *Assessment & Evaluation in Higher Education, 34*(3), 305-319. https://doi.org/10.1080/02602930801956034

Brady, A. M. (2005). Assessment of learning with multiple-choice questions. *Nurse Education in Practice, 5*(4), 238-242. https://doi.org/10.1016/j.nepr.2004.12.005

Bukie, O. F. (2014). Understanding technologies for e-assessment: A systematic review approach. *Journal of Emerging Trends in Computing and Information Sciences*, *5*(12), 936-947. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.680.6028&rep=rep1&type=pdf

Chiou, W. C., Perng, C., and Lin, C. C. (2009, July). The relationship between technology acceptance model and usability test-case of performing E-learning task with PDA. *In 2009 WASE International Conference on Information Engineering* (Vol. 1, pp. 579-582). IEEE. https://doi.org/10.1109/ICIE.2009.207

Choi, Y., & McClenen, C. (2020). Development of Adaptive Formative Assessment System Using Computerized Adaptive Testing and Dynamic Bayesian Networks. *Applied Sciences*, *10*(22), 8196. https://10.3390/app10228196

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*, *2nd Edition*. Hillsdale, NJ: L. Erlbaum Associates.

Compeau, D., Higgins, C. A., and Huff, S. (1999). Social cognitive theory and individual reactions to computing technology: A longitudinal study. *MIS quarterly*, 145-158. https://doi.org/10.2307/249749

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297-334. https://doi.org/10.1007/BF02310555

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340. https://doi.org/10.2307/249008

Dulle, F. W., and Minishi-Majanja, M. K. (2011). The suitability of the Unified Theory of Acceptance and Use of Technology (UTAUT) model in open access adoption studies. *Information development*, *27*(1), 32-45. https://doi.org/10.1177/0266666910385375

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, *21*(3), 719-734. https://doi.org/10.1007/s10796-017-9774-y

El-Gayar, O., Moran, M., and Hawkes, M. (2011). Students' acceptance of tablet PCs and implications for educational institutions. *Journal of Educational Technology and Society*, *14*(2). https://search-proquest-com.ezproxy.library.uwa.edu.au/docview/2139143267?accountid=14681

El-Gayar, O. F., and Moran, M. (2006). College students' acceptance of Tablet PCs: An application of the UTAUT Model. *Dakota State University*, *820*, 2845-2850. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.120.2667&rep=rep1&type=pdf

Fishbein, M., and Ajzen, I. (1975). Belief, attitude, intention and behavior: An introduction to theory and research.

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50. https://doi.org/10.1177/002224378101800104

Friborg, O., Martinussen, M., & Rosenvinge, J. (2006). Likert-based vs semantic differential-based scorings of positive psychological constructs: A psychometric comparison of two versions of a scale measuring resilience. *Personality and Individual Differences, 40*(5), 873 - 884. https://doi.org/10.1016/j.paid.2005.08.015.

Gamage, S. H., Ayres, J. R., Behrend, M. B., & Smith, E. J. (2019). Optimising Moodle quizzes for online assessments. *International Journal of STEM Education*, *6*(1), 27. https://doi.org/ 10.1186/s40594-019-0181-4

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., and Tatham, R. L. (2006). Multivariate data analysis. Uppersaddle River.

Hair, J. F., Anderson, R. E., Babin, B. J., and Black, W. C. (2010). Multivariate data analysis: A global perspective (Vol. 7).

Holden, H., and Rada, R. (2011). Understanding the influence of perceived usability and technology self-efficacy on teachers' technology acceptance. *Journal of Research on Technology in Education, 43*(4), 343-367. https://doi.org/10.1080/15391523.2011.10782576

Huang, F., and Teo, T. (2019). Influence of teacher-perceived organisational culture and school policy on Chinese teachers' intention to use technology: an extension of technology acceptance model. *Educational Technology Research and Development*, 1-21. https://doi.org/10.1007/s11423-019-09722-y

James, R., McInnis, C., & Devlin, M. (2002). Assessing learning in Australian universities. *Melbourne: The University of Melbournjenge Centre for the Study of Higher Education.* http://www.ntu.edu.vn/Portals/96/Tu%20lieu%20tham%20khao/Phuong%20phap%20danh%20gia/assessing%20learning.pdf

Jeng, J. (2005). Usability assessment of academic digital libraries: effectiveness, efficiency, satisfaction, and learnability. *Libri*, *55*(2-3), 96-121. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.106.1655&rep=rep1&type=pdf

Jokela, T., Iivari, N., Matero, J., & Karukka, M. (2003, August). The standard of user-centered design and the standard definition of usability: analyzing ISO 13407 against ISO 9241-11. *In Proceedings of the Latin American conference on Human-computer interaction* (pp. 53-60). https://doi.org/10.1145/944519.944525

Khechine, H., & Augier, M. (2019, January). Adoption of a social learning platform in higher education: an extended UTAUT model implementation. In *Proceedings of the 52nd Hawaii International Conference on System Sciences*. https://scholarspace.manoa.hawaii.edu/bitstream/10125/59446/1/0006.pdf

Kim, J., and Lee, K. S. S. (2020). Conceptual model to predict Filipino teachers' adoption of ICT-based instruction in class: using the UTAUT model. *Asia Pacific Journal of Education*, 1-15. https://doi.org/10.1080/02188791.2020.1776213

Kline, R. B. (2005). Methodology in the social sciences.

Krusche, S., & Seitz, A. (2018, February). ArTEMiS: An automatic assessment management system for interactive learning. In *Proceedings of the 49th ACM Technical Symposium on Computer Science Education* (pp. 284-289). https://10.1145/3159450.3159602

Lew, S. L., Lau, S. H., and Leow, M. C. (2019). Usability factors predicting continuance of intention to use cloud e-learning application. *Heliyon, 5*(6), e01788. https://doi.org/10.1016/j.heliyon.2019.e01788

Liao, Q., Shim, J. P., and Luo, X. (2004). Student acceptance of web-based learning environment: An empirical investigation of an undergraduate IS course. *AMCIS 2004 Proceedings*, 377. https://pdfs.semanticscholar.org/08a6/61f75a828e418911ecc5e7bb5a28455cc58a.pdf

Lin, C. C. (2013). Exploring the relationship between technology acceptance model and usability test. *Information Technology and Management, 14*(3), 243-255. https://doi.org/10.1007/s10799-013-0162-0

Liu, J., Guo, X., Gao, R., Fram, P., Ling, Y., Zhang, H., & Wang, J. (2019). Students' learning outcomes and peer rating accuracy in compulsory and voluntary online peer assessment. *Assessment & Evaluation in Higher Education*, *44*(6), 835-847. https://10.1080/02602938.2018.1542659

Mahande, R. D., and Malago, J. D. (2019). An E-Learning Acceptance Evaluation through UTAUT Model in a Postgraduate Program. *Journal of educators online, 16*(2), n2. https://files.eric.ed.gov/fulltext/EJ1223779.pdf

McDonald, R. P., and Ho, M. H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, *7*(1), 64. https://doi.org/10.1037/1082-989X.7.1.64

Moore, G. C., and Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research*, *2*(3), 192-222. https://doi.org/10.1287/isre.2.3.192

Moran, M., Hawkes, M., and Gayar, O. E. (2010). Tablet personal computer integration in higher education: Applying the unified theory of acceptance and use technology model to understand supporting factors. *Journal of Educational Computing Research*, *42*(1), 79-101. https://doi.org/10.2190/ec.42.1.d

Mtebe, J., and Raisamo, R. (2014). Investigating students' behavioral intention to adopt and use mobile learning in higher education in East Africa. *International Journal of Education and Development using ICT*, *10*(3). https://search-proquest-com.ezproxy.library.uwa.edu.au/docview/1561442025?accountid=14681

Nassuora, A. B. (2012). Students acceptance of mobile learning for higher education in Saudi Arabia. *American Academic and Scholarly Research Journal*, *4*(2), 24-30. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.402.6814&rep=rep1&type=pdf

Nielsen, J. (1994). *Usability engineering*. Morgan Kaufmann.

Oh, J. C., and Yoon, S. J. (2014). Predicting the use of online information services based on a modified UTAUT model. *Behaviour and Information Technology*, *33*(7), 716-729. https://doi.org/10.1080/0144929x.2013.872187

Prasad, P. W. C., Maag, A., Redestowicz, M., and Hoe, L. S. (2018). Unfamiliar technology: Reaction of international students to blended learning. *Computers and Education*, 122, 92-103. https://doi.org/10.1016/j.compedu.2018.03.016

Radovan, M., & Kristl, N. (2017). Acceptance of Technology and Its Impact on Teachers' Activities in Virtual Classroom: Integrating UTAUT and CoI into a Combined Model. *Turkish Online Journal of Educational Technology-TOJET*, *16*(3), 11-22. https://search-proquest-com.ezproxy.library.uwa.edu.au/docview/1953141374?accountid=14681

Salloum, S. A., and Shaalan, K. (2018, September). Factors Affecting Students' Acceptance of E-Learning System in Higher Education Using UTAUT and Structural Equation Modeling Approaches. *In International Conference on Advanced Intelligent Systems and Informatics* (pp. 469-480). Springer, Cham. https://doi.org/10.1007/978-3-319-99010-1_43

Shah, S. N. A., Khan, A. U., Khan, B. U., Khan, T., & Xuehe, Z. Framework for teachers' acceptance of information and communication technology in Pakistan: Application of the extended UTAUT model. *Journal of Public Affairs*, e2090. https://doi.org/10.1002/pa.2090

Shackel, B. (2009). Usability–Context, framework, definition, design and evaluation. *Interacting with computers*, *21*(5-6), 339-346. https://doi.org/10.1016/j.intcom.2009.04.007

Shuhaiber, A. H. (2015). Students' Willingness to Accept Virtual Lecturing Systems: An Empirical Study by Extending the UTAUT Model. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, *9*(4), 11531157. https://pdfs.semanticscholar.org/7869/ae3f1c2378bac6b1c1501de1c5f0df409a6c.pdf

Šumak, B., Polancic, G., & Hericko, M. (2010, February). An empirical study of virtual learning environment adoption using UTAUT. In *2010 Second international conference on mobile, hybrid, and on-line learning* (pp. 17-22). IEEE. https://doi.org/10.1109/eLmL.2010.11

Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate behavioral research, 25*(2), 173-180. http://www.statpower.net/Steiger%20Biblio/Steiger90b.pdf

Tan, P. J. B. (2013). Students' adoptions and attitudes towards electronic placement tests: A UTAUT analysis. *American Journal of Computer Technology and Application*, *1*(1), 14-23. http://www.ajcta.com/Vol.%201,%20No.%201,%20February%202013/This%20is%20my%20final%20revision(A)t_2013_2_22.pdf

Thomas, T., Singh, L., and Gaffar, K. (2013). The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana. *International Journal of Education and Development using ICT*, *9*(3). https://search-proquest-com.ezproxy.library.uwa.edu.au/docview/1491114969?accountid=14681

Taylor, S., and Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information systems research*, *6*(2), 144-176. https://doi.org/10.1287/isre.6.2.144

Thompson, R. L., Higgins, C. A., and Howell, J. M. (1991). Personal computing: toward a conceptual model of utilization. *MIS quarterly*, 125-143. https://doi.org/10.2307/249443

Thowfeek, M. H., and Salam, M. N. A. (2014). Students' assessment on the usability of E-learning websites. *Procedia-Social and Behavioral Sciences, 141*, 916-922. https://doi.org/10.1016/j.sbspro.2014.05.160

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478. https://doi.org/10.2307/30036540

Wan, L., Xie, S., & Shu, A. (2020). Toward an Understanding of University Students' Continued Intention to Use MOOCs: When UTAUT Model Meets TTF Model. *SAGE Open, 10*(3), 2158244020941858. https://doi.org/10.1177/2158244020941858

Wang, Y. S., Wu, M. C., and Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British journal of educational technology*, *40*(1), 92-118. https://doi.org/10.1111/j.1467-8535.2007.00809.x

Way, K. A., Burrell, L., D'Allura, L., & Ashford-Rowe, K. (2020). Empirical investigation of authentic assessment theory: An application in online courses using mimetic simulation created in university learning management ecosystems. *Assessment & Evaluation in Higher Education*, 1-19. https://10.1080/02602938.2020.1740647

Wong, K. T., Teo, T., and Russo, S. (2013). Interactive whiteboard acceptance: Applicability of the UTAUT model to student teachers. *The Asia-Pacific Education Researcher*, *22*(1), 1-10. https://doi.org/10.1007/s40299-012-0001-9

Xu, H., & Mahenthiran, S. (2016). Factors that influence online learning assessment and satisfaction: Using Moodle as a Learning Management System. *International Business Research*, *9*(2), 1-18. https://doi.org/10.5539/ibr.v9n2p1

Yakubu, M. N., & Dasuki, S. I. (2019). Factors affecting the adoption of e-learning technologies among higher education students in Nigeria: A structural equation modelling approach. *Information Development*, *35*(3), 492-502. https://doi.org/10.1177/0266666918765907

Yueh, H. P., Huang, J. Y., and Chang, C. (2015). Exploring factors affecting students' continued Wiki use for individual and collaborative learning: An extended UTAUT perspective. *Australasian Journal of Educational Technology*, *31*(1). https://doi.org/10.14742/ajet.170

Zbick, J., Nake, I., Milrad, M., & Jansen, M. (2015, July). A web-based framework to design and deploy mobile learning activities: Evaluating its usability, learnability and acceptance. In *2015 IEEE 15th International Conference on Advanced Learning Technologies* (pp. 88-92). IEEE. https://core.ac.uk/download/pdf/192383918.pdf

Zhang, Z., Cao, T., Shu, J., & Liu, H. (2020). Identifying key factors affecting college students' adoption of the e-learning system in mandatory blended learning environments. *Interactive Learning Environments*, 1-14. https://doi.org/10.1080/10494820.2020.1723113

Zhu, C. (2015). Organisational culture and technology-enhanced innovation in higher education. *Technology, Pedagogy and Education, 24*(1), 65-79. https://doi.org/10.1080/1475939x.2013.822414

Author Information

Caleb Chin Poh Or
https://orcid.org/ 0000-0002-0509-0338
University of Western Australia
35 Stirling Hwy, Crawley WA 6009
Australia
Contact e-mail: *caleb.chin.poh.or@gmail.com*

Elaine Chapman
https://orcid.org/ 0000-0001-5861-1179
University of Western Australia
35 Stirling Hwy, Crawley WA 6009
Australia

Appendix A. Data Collection Tool

1	I think IAS is extremely difficult to use	1	2	3	4	5	6	7	I think IAS is extremely easy to use
2	I think the various functions in IAS are not integrated	1	2	3	4	5	6	7	I think the various functions in IAS are well-integrated
3	I think there are too many inconsistencies in IAS	1	2	3	4	5	6	7	I think there is overall consistency in IAS
4	I need the support of a technical person to be able to use IAS	1	2	3	4	5	6	7	I am able to use IAS on my own without any help
5	I need to learn a lot of things before I could get going with IAS	1	2	3	4	5	6	7	I need not learn new things before I could get going with IAS
6	Using IAS slows me down in accomplishing tasks	1	2	3	4	5	6	7	Using IAS enables me to accomplish tasks quickly
7	Using IAS decreases my productivity terribly	1	2	3	4	5	6	7	Using IAS increases my productivity greatly
8	My supervisor thinks that I should not use IAS	1	2	3	4	5	6	7	My superior thinks that I should use IAS
9	My colleagues think that I should not use IAS	1	2	3	4	5	6	7	My colleagues think that I should use IAS
10	In general, the organization has been unsupportive in the use of IAS	1	2	3	4	5	6	7	In general, the organization has been supportive in the use of IAS
11	I do not have any resource available to use IAS	1	2	3	4	5	6	7	I have all the resources available to use IAS
12	IAS is incompatible with systems I use	1	2	3	4	5	6	7	IAS is compatible with all other systems I use
13	No specific person (or group) is available for assistance with IAS difficulties	1	2	3	4	5	6	7	A specific person (or group) is easily and readily available for assistance with IAS difficulties
	Given a choice, in the next 6 months:								
14	I do not intend to use IAS	1	2	3	4	5	6	7	I intend to always use IAS
15	I do not plan to use IAS	1	2	3	4	5	6	7	I plan to always use IAS
	All things considered, using IAS is:								
16	Bad	1	2	3	4	5	6	7	Good
17	Unfavorable	1	2	3	4	5	6	7	Favorable
18	Negative	1	2	3	4	5	6	7	Positive
19	I seldom use IAS	1	2	3	4	5	6	7	I always use IAS
20	I spend little time on IAS	1	2	3	4	5	6	7	I spend great amount of time on IAS