International Journal of Management and Human Science (IJMHS), Volume 2, Issue 2, Pages 1-9, 2018
eISSN: 2590-3748
URL: http://www.ijmhs.org/index.aspx

Determinants of Student's Intention to Use Mobile Learning in Yemeni Public Universities: Extending the Technology Acceptance Model (TAM) with Anxiety

Ibrahim Alrajawy [a], Osama Isaac [b], Abhijit Ghosh [c], Mohammed Nusari [d], Ahmed Hamoud Al-Shibami [e], Ali Abdulbaqi Ameen [f]

[a] Faculty of Business and Accountancy, Lincoln University College, Selangor, Malaysia *(arajawy@yahoo.com)*
[b] *Faculty of Business and Accountancy, Lincoln University College*, Selangor, Malaysia (*osama2isaac@gmail.com*)
[c] *Faculty of Business and Accountancy, Lincoln University College, Selangor, Malaysia (abhijit@lincoln.edu.my)*
[d] *Faculty of Business and Accountancy, Lincoln University College, Selangor, Malaysia (nusari@lincoln.edu.my)*
[e] *Faculty of Business and Accountancy, Lincoln University College, Selangor, Malaysia (alshibami.academic@gmail.com)*
[f] *Faculty of Computer Science, Lincoln University College, Selangor, Malaysia (alibdulbaqi@lincoln.edu.my)*

Abstract

The aim of the study is to examine the direct effect of the anxiety on the intention to use mobile learning among university students in Yemen. It deploys Technology Acceptance Model (TAM) as underpinning and use the anxiety as the external variable, where Tam consider one of the best model can anticipate the intent to use technology. This study used the questionnaire as the main and the only tool to collect the data. Where the questionnaires were distributed among the degree students in three public universities namely Sana'a, Aden, and Dhamar. The Data were analyzed using Statistical Package for the Social Sciences (SPSS) and Structural Equation Modeling (SEM) using Partial least squares (PLS) software. The results indicated that anxiety directly affects negatively both perceived ease of use and perceived usefulness and perceived ease of use and perceived usefulness effect positively the intention to use mobile learning.

Keywords: Mobile learning; TAM; perceived ease of use; perceived usefulness; intention to use; anxiety; Yemen

1. Introduction

The widespread of the mobile device and the magnificent capabilities are given to that device sparked the researchers to study the ability of those gadgets to enhance the pedagogical context, where mobile learning is perceived as subsequent to e-learning and distance learning, (Aldholay, Isaac, Abdullah, & Ramayah, 2018; Georgieva & Trifonova, 2006; Milrad, 2003; Motiwalla, 2007) Furthermore, many researchers conducted many studies in order explore the importance of deploying the mobile as learning tools (ref). Where these gadgets can provide an easy way to deliver the contents regardless of the time and place (Trifonova & Ronchetti, 2007). Some of the researchers consider mobile learning as a new era in the maturation of computer support and distance learning (Georgieva & Trifonova, 2006). Further, mobile learning promotes exchange of information off-campus and enhance the interaction between students and instructors in the classroom (Lam, Wong, Cheng, Ho, & Yuen, 2011) , where it anticipated for mobile learning to be a key and effective means of delivering the contents materials of the higher education in the near future (El-Hussein & Cronje, 2010).

Furthermore, most of the research related to mobile learning has been done in developed countries with few conducted in the less developed, like the Republic of Yemen where the acceptance of the technologies will vary among the citizens in contrast countries. In addition, Wang, Wang, Lin and Tang, 2003 recommended in their study to focus more on the individual factors such as anxiety to be investigated in the future. Furthermore, because TAM's factors (perceived usefulness and perceived ease of use) do not fully explain student intention to use mobile learning, this study attempted to extend TAM by introduces anxiety as external factors.

2. Literature Review

2.1 Perceived Ease of Use (PEOU)

The significant effect of perceived ease of use on both perceived usefulness and intention to use was proposed by TAM theory (Davis, 1989), where both factors were considered as belief of users in the technology boosting intention to use and leading to actual use of the technology (Mutahar et al., 2018; Daud, Kassim, Said, & Noor, 2011). It defined as 'the degree to which a person believes that using a particular system would be free of effort' (Davis, 1989). The previous research proves there are strong effects of perceived ease of use on perceived usefulness and intention to use. Alrajawy, Daud, Isaac and Mutahar, (2016), found there are a positive effect of

perceived ease of use on both perceived usefulness and intention to use mobile learning in the Republic of Yemen. Consequently, the following two hypotheses are proposed:

H1. Perceived ease of use has a positive effect on perceived usefulness.

H2. Perceived ease of use has a positive effect on intention to use.

2.2 Perceived Usefulness (PU)

Perceived usefulness is one of the main factors which have formed TAM. It is defined as 'the degree to which a person believes that using a particular system would enhance his or her job performance' (F. Davis, Bagozzi, & Warshaw, 1989).There are many types of research showed the strong effect of perceived usefulness on intention to use, for instance, Alrajawy, Norzaidi, Isaac, and Mutahar, (2017) examined the factors that affect the intention to use mobile learning in Yemen, they found there was a significant effect of perceived usefulness on intention to use. Consequently, the following hypothesis is proposed:

H3. Perceived usefulness has a positive effect on intention to use.

2.3 Anxiety (ANX)

Anxiety defined as "the tendency of an individual to feel uneasy, apprehensive, or aversive at the prospect of using technology" (Igbaria & Iivari, 1995). Thus, the users with a higher percentage of anxiety might be poorer to use the technologies comparing to the users with no anxiety (Sam, Ekhsan, Othman, & Nordin, 2005). Moreover, in the previous studies, there are many researches study the direct effect of the anxiety on both perceived ease of use and perceived usefulness, these researches shows obviously the negative impact of anxiety on both factors or severally (Aggelidis & Chatzoglou, 2009; Chen & Tseng, 2012). Aggelidis and Chatzoglou (2009) found there is a negative effect of anxiety on usefulness, while Chen & Tseng (2012) findings reveal, there is a negative effect of anxiety on ease of use. Consequently, the following hypotheses are proposed:

H4. Anxiety has a positive effect on perceived usefulness.

H5. Anxiety has a positive effect on Perceived ease of use.

2.4 Intention to Use (INT)

Intention to use the technologies is on of the main factors which formed TAM, which consider as the best single predictor of the actual usage (Mutahar, Daud, Ramayah, Putit, & Isaac, 2018; Davis & Venkatesh, 1996). It defined as "a measure of the strength of one's intention to perform a specific behavior" (Fishbein & Ajzen, 1975)

3. Research Method

3.1 Overview of the Proposed Research Model

This study has developed a research model that investigates factors that influence intention to use Mobile Learning among students at public universities in Yemen based on TAM (Davis, 1989), using TAM as the underpinning theory, where perceived usefulness and perceived ease of use are considered as TAM constructs that mainly measure individual belief. As this study aims to examine the applicability of TAM to a new trend in educational technology (mobile learning in the context of Yemen), it will simultaneously add other factor like anxiety into the research model which have been found to significantly affect the intention to use technologies as discussed previously.

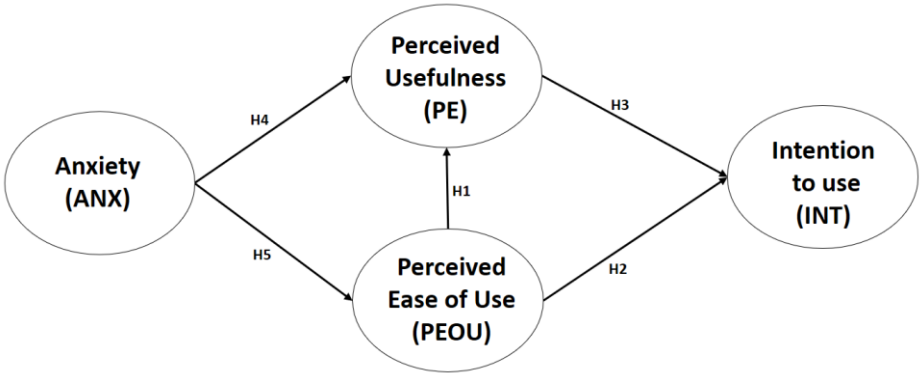


Figure 1: The proposed model

3.2. Development of Instrument and Data Collection

This study is quantitative in nature, and used a self-administered questionnaire to collect data from respondents as the tool to assess the proposed hypotheses The original questionnaire in English was translated into Arabic by the Translation Centre in Sana'a University, the only center certified by the Ministry of Higher Education. The questionnaire (please refer to Appendix A) was divided into five divisions to specifically address the hypotheses that were proposed for the study as follows:

- First division: five items capturing the demographic characteristics of the respondents such as gender, age, marital status, university name, mobile experience, and income.
- Second division: six items on perceived ease of use (Alenezi, 2011; Karaali et al., 2011)
- Third division: six items on perceived usefulness (Karaali, Gumussoy, & Calisir, 2011; Tarhini, Hone, & Liu, 2013).
- Fourth Division: six items measuring intention to use mobile learning (Hung & Chou, 2014; Park, Nam, & Cha, 2012)
- Fifth Division: seven items on anxiety (Sam, Ekhsan, Othman, & Nordin, 2005).

Variables were measured using a Likert scale (where 1 represents strongly disagree and 7 represents strongly agree) which recommended in the previous studies (Isaac, Abdullah, Ramayah, & Mutahar, 2017; Isaac, Abdullah, Ramayah, Mutahar, & Alrajawy, 2017; Isaac, Abdullah, Ramayah, & Mutahar Ahmed, 2017). The respondents of this study were undergraduate students at three public universities, namely: Sana'a, Dhamar, and Aden. 320 usable questionnaires were returned and analyzed using Structural Equation Modelling (SEM) via PLS software.

Table 1: Summary of Demographic Profile of Respondents

Demographic Item	Categories	Frequency	Percentage
Gender	1. Male	245	76.6
	2. Female	75	23.4
Age Group	1. Less than 20 years	22	6.9
	2. 20 - 29 years	235	73.4
	3. 30 - 39 years	63	19.7
	4. 40 years and above	0	0
Marital Status	1. Single	173	54.1
	2. Married	139	43.4
	3. Divorced	4	1.3
	4. Widowed	2	0.6
	5. Others	2	0.6
University Name	1. Sana'a University	128	40.0
	2. Dhamar University	104	32.5
	3. Aden University	88	27.5
Faculty Name	1. Computer Sciences l	75	23.4
	2. Education	57	17.8
	3. Management	51	15.9
	4. Dentistry	18	5.6
	5. Medicine	19	5.9
	6. Engineering	59	18.4
	7. Agriculture	8	2.5
	8. Pharmacology	10	3.1
	9. Science	12	3.8
	10. Linguistics	4	1.3
	11. Law	7	2.2
Education Level	1. Freshman	40	12.5
	2. Sophomore	51	15.9
	3. Junior	68	21.3
	4. Senior	71	22.2
	5. Others	90	28.1
Monthly Income in YER	1. Less than 10,000	49	15.3
	2. 10,000 – 20,000	57	17.8
	3. 20,001 –30,000	48	15.0
	4. 30,001 – 40,000	34	10.6
	5. 40,001 – 50,000	19	5.9
	6. 50,001 and above	113	35.3
Mobile Experience	1. Less than 1 year	14	4.4
	2. from 1 =< 3 years	72	22.5
	3. from 3 =< 5 years	107	33.4
	4. 5 years and above	127	39.7

4. Data Analysis and Results

Structural Equation Modeling was used to analyse the main data of this research using SmartPLS 3.0 software (Ringle, Wende, & Becker, 2015). The main reasons for choosing SEM as a statistical method for this study is that SEM offers a simultaneous analysis which leads to more accurate estimates (Isaac, Abdullah, Ramayah, & Mutahar, 2017a; Isaac, Abdullah, Ramayah, & Mutahar, 2017b; Isaac, Masoud, Samad, & Abdullah, 2016).

4.1 Descriptive analysis

Standard deviation and the mean are exhibited in table 2 which included each variable in the current research. The standard deviation and mean of the constructs comprised in this study were stated as follow: perceived ease of use (M= 4.75, SD= 1.47), perceived usefulness (M= 4.31, SD= 1.61), and intention to use mobile learning (M= 4.60, SD= 1.65). These suggest that the respondents have satisfied level about the easiness, usefulness as well as intention to use mobile learning.

4.2 Measurement Model Assessment

Construct reliability including convergent and discriminant was deployed to assess the measurement model of this research. Table 2 shows the results of the construct reliability, where Cronbach's alpha coefficients were greater than the recommended scores (Kannana & Tan, 2005; Nunnally & Bernstein, 1994). According to Kline (2010), the composite reliability (CR) values are accepted where they are higher than 0.7. As a conclusion the two tests results show that the construct reliability is fulfilled as shown in Table 2.

Factor loading was used to test *indicator reliability*. The *indicator reliability* test was used to indicate the factor loadings values in this research as shown in Table 2, where all the values found greater than the recommended value which is 0.50 except for items PU6 and ANX2 where they were deleted due to low loading values (J. F. Hair, Black, Babin, & Anderson, 2010).

The *convergent validity was tested using* average variance extracted (AVE), where the results indicated that all AVE values were greater than the recommended value of 0.50 (J. F. Hair et al., 2010).

Table 2: Standard Deviation , Mean, SV, loading, cronbach's Alpha, Composite Reliability and Average Variance Extracted

Constructs	Item	Loading (> 0.5)	M	SD	α (> 0.7)	CR (> 0.7)	AVE (> 0.5)
Perceived Ease of Use (PEOU)	PEOU1	0.858	4.754	1.467	0.942	0.954	0.775
	PEOU2	0.893					
	PEOU3	0.882					
	PEOU4	0.906					
	PEOU5	0.869					
	PEOU6	0.874					
Perceived Usefulness (PU)	PU1	0.912	4.296	1.614	0.938	0.953	0.801
	PU2	0.911					
	PU3	0.903					
	PU4	0.850					
	PU5	0.897					
	PU6	Deleted					
Intention to Use (INT)	INT1	0.907	4.606	1.653	0.914	0.932	0.697
	INT2	0.932					
	INT3	0.913					
	INT4	0.927					
	INT5	0.908					
	INT6	0.926					
Anxiety (ANX)	ANX1	0.798	3.253	1.311	0.963	0.970	0.844
	ANX2	Deleted					
	ANX3	0.886					
	ANX4	0.910					
	ANX5	0.875					
	ANX6	0.771					
	ANX7	0.756					

Key: PEOU: perceived ease of use, PU: perceived usefulness, INT: intention to use, ANX: anxiety.

heterotrait-monotrait ratio (HTMT), cross-loadings and Fornell-Larcker were used to check the discriminant validity of the measurement model. As exhibited in Table 3, the indicators outer loadings on a construct were higher than all its cross-loadings with other constructs (bold values) which indicate the cross loading criterion fulfilled (J. Hair et al., 2013).

Table 3: *Results of discriminant validity by the cross loading*

	PEOU	*PU*	*INT*	*ANX*
PEOU1	**0.858**	0.657	0.672	-0.126
PEOU2	**0.893**	0.723	0.716	-0.212
PEOU3	**0.882**	0.676	0.680	-0.226
PEOU4	**0.906**	0.753	0.715	-0.242
PEOU5	**0.869**	0.719	0.715	-0.222
PEOU6	**0.874**	0.685	0.664	-0.182
PU1	0.723	**0.912**	0.704	-0.234
PU2	0.705	**0.911**	0.680	-0.224
PU3	0.718	**0.903**	0.686	-0.204
PU4	0.655	**0.850**	0.557	-0.191
PU5	0.764	**0.897**	0.692	-0.269
INT1	0.704	0.669	**0.907**	-0.211
INT2	0.711	0.664	**0.932**	-0.244
INT3	0.733	0.664	**0.913**	-0.226
INT4	0.737	0.719	**0.927**	-0.340
INT5	0.730	0.671	**0.908**	-0.285
INT6	0.729	0.715	**0.926**	-0.298
ANX1	-0.172	-0.225	-0.226	**0.798**
ANX3	-0.220	-0.213	-0.292	**0.886**
ANX4	-0.218	-0.263	-0.284	**0.910**
ANX5	-0.248	-0.223	-0.277	**0.875**
ANX6	-0.080	-0.137	-0.128	**0.771**
ANX7	-0.155	-0.158	-0.191	**0.756**

Key: PEOU: perceived ease of use, PU: perceived usefulness, INT: intention to use, ANX: anxiety.

The Fornell-Larcker indicator was used to investigate the discriminant validity. In Table 4, the bolded values represent the square root of the AVEs are greater than the correlations values among the constructs, which fulfilled the discriminant validity criteria(Fornell & Larcker, 1981; Chin, 1998).

Table 4: *Results of discriminant validity by Fornell-Larcker criterion*

	Factors	*1*	*2*	*3*	*4*
		ANX	INT	PEOU	PU
1	ANX	**0.835**			
2	QUL	-0.292	**0.919**		
3	PI	-0.231	0.789	**0.880**	
5	PU	-0.252	0.745	0.798	**0.895**

Note: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations.
Key: PEOU: perceived ease of use, PU: perceived usefulness, INT: intention to use, ANX: anxiety.

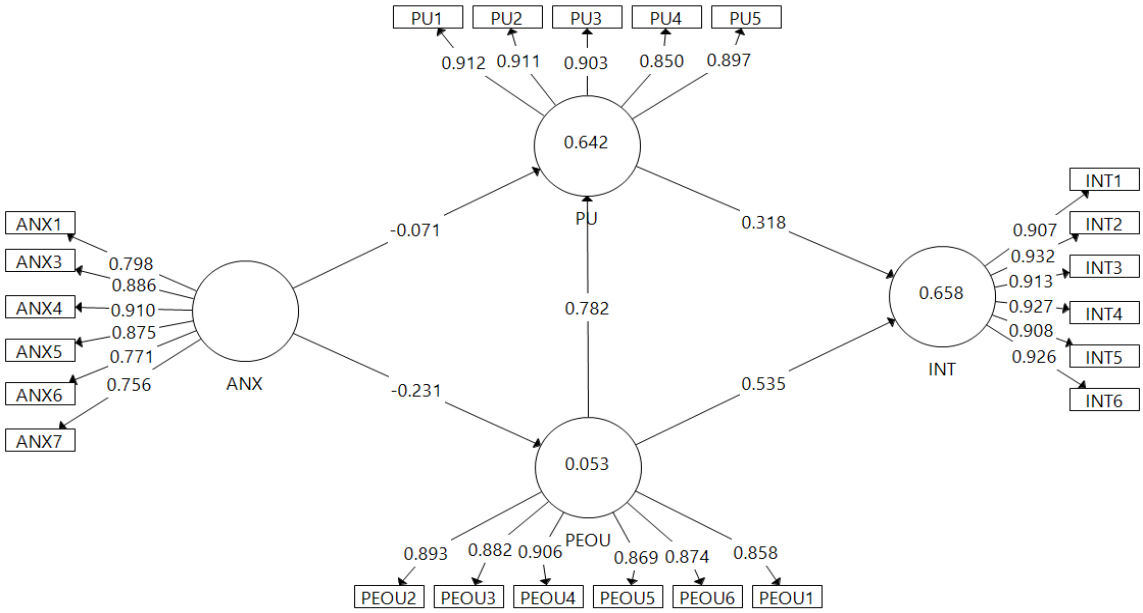
For more validity assessment, this research also examined the discriminant validity by using heterotrait-monotrait ratio (HTMT). Table 5 shows that all the HTMT values were lower than 0.85 (Kline, 2010), which indicate the discriminant validity criteria is fulfilled.

Table 5: *Results of discriminant validity by HTMT*

	Factors	*1*	*2*	*3*	*4*
		ANX	INT	PEOU	PU
1	ANX				
2	QUL	0.296			
3	PI	0.234	0.827		
4	PU	0.261	0.780	0.847	

Key: PEOU: perceived ease of use, PU: perceived usefulness, INT: intention to use, ANX: anxiety.

4.3 Structural Model Assessment



Key: PEOU: perceived ease of use, PU: perceived usefulness, INT: intention to use, ANX: anxiety.

Figure 2: PLS algorithm results

4.3.1 Direct Effect Hypotheses

The hypothesis testing of the structural model assessment is exhibited in Table 6 and Figure 2. Perceived ease of use significantly predicts perceived usefulness and intention to use mobile learning. Hence, H1 and H2 are accepted with ($\beta = 0.782$, t= 27.606, p <0.001) and ($\beta = 0.537$, t= 7.724, p <0.001) respectively. Likewise, perceived usefulness significantly predicts intention to use mobile learning. Hence, H3 is supported ($\beta = 0.318$, t=4.298, p <0.001). Anxiety negatively influence perceived usefulness and perceived ease of use. Hence, H4 and H5 are accepted with ($\beta = -0.071$, t= 1.813, p <0.05) and ($\beta = -0.231$, t= 4.282, p <0.001) respectively.

Perceived ease of use and perceived usefulness explains 66% of the variance in intention to use mobile learning, while perceived ease of use and anxiety explains 64% of the variance in perceived usefulness. In addition, anxiety explains 5% of the variance in perceived ease of use. According to Cohen (1988) and Chin (1998) the R^2 values scored an adequate level. Additional the f^2 results three relation with small size effect and one with medium effect size and one with large effect size as shown in Table 6. The blindfolding technique was deployed to examine the predictive relevance. In the finding of this research, the Q^2 value is greater than 0, which indicate there is predictive relevance for some endogenous construct(Hair et al., 2017). In term of multicollinearity, Table 6 exhibited VIF values less than 5, which is indicate that there is no evidence of significant.

Table 6: *Structural path analysis result*

Hypothesis	Relationship	Std Beta	Std Error	t-value	p-value	Decision	R^2	f^2	Q^2	VIF
H1	PEOU→PU	0.782	0.028	27.606	0.000	Supported	0.64	1.304	0.037	2.759
H2	PEOU→INT	0.535	0.069	7.724	0.000	Supported	0.66	1.619	0.518	1.056
H3	PU→INT	0.318	0.074	4.298	0.000	Supported		0.107		2.759
H4	ANX→PU	-0.071	0.039	1.813	0.035	Supported		0.013		1.056
H5	ANX→PEOU	-0.231	0.054	4.282	0.000	Supported	0.05	0.056	0.037	1.000

Key: PEOU: perceived ease of use, PU: perceived usefulness, INT: intention to use, ANX: anxiety.

5. Discussion

Table 6 exhibits the results of the structural path analysis of the model's variables of this study. The current study also found perceived ease of use has a positive significant effect in the relation bet on both perceived usefulness and intention to use mobile learning, and this is supported by previous studies (Alrajawy et al., 2016). Further, the result suggests that where students in Yemeni public universities perceive mobile learning as free of effort, flexible and understandable, indicating the more they feel the easiness of the mobile learning, the more they would feel the mobile learning is usefulness, this would help and facilitate their learning process.

Perceived usefulness was found to have a positive significant effect on intention to use mobile learning, and this is supported by previous literature (Alrajawy et al., 2017; Daud et al., 2011), where it is suggested that students in

Yemeni public universities would intend to use mobile learning if they could feel the usefulness, and this would help and facilitate their learning process.

Also, anxiety was found to have a negative effect on both perceived ease of use and perceived usefulness, and this was recorded in some earlier researches such as Aggelidis & Chatzoglou (2009) and Chen & Tseng (2012). This indicates that students who have more anxiety might be poorer to use the mobile learning compared to the users with no anxiety or have less feel of anxiety to use mobile learning. The training and practices will reduce the anxiety to use the technologies and will provide a better understanding about the benefits and features of the technologies (Lee, Lee, Olson, & Chung, 2010; Rajan & Baral, 2015)

6. Conclusion

This study aimed to examine the factors that affect the intention to use of Mobile learning, using TAM as an underpinning theory and anxiety as an external factor. The findings suggest that perceived usefulness and perceived ease of use predict intention to use mobile learning among public university students in Yemen. Moreover, the results indicate that perceived ease of use has an effect on both perceived usefulness and intention to use mobile learning, also, perceived usefulness found to have a positive effect on intention to use mobile learning. Additionally, anxiety has a negative effect on both perceived ease of use and perceived usefulness. This study provides brief recommendations for university's practitioners who demand to enable the usage of a mobile learning system in their universities.

Appendix

Appendix A

Instrument for varibles

Varible	Measure	Source
Perceived Ease of Use (PEOU)	PEOU1: Learning to operate the mobile 1earning would be easy for me. PEOU2: I would find it easy to get mobile learning to do what I want it to do. PEOU3: It would be easy for me to become skillful at using the mobile learning. PEOU4: My interaction using mobile learning would be easy and clear. PEOU5: I would find the mobile learning to be flexible for interacting with my lecturer. PEOU6: Overall, I would find mobile learning easy to use.	(Alenezi, 2011; Karaali et al., 2011)
Perceived Usefulness (PU)	PU1: Using the mobile learning will allow me to accomplish learning tasks more quickly PU2: Using the mobile learning will improve my learning performance PU3: Using the mobile learning will make it easier to learn course content PU4: Using the mobile learning will increase my learning productivity PU5: Using the mobile learning will enhance my effectiveness in learning PU6: I would find the mobile learning useful in learning	(Karaali et al., 2011; Tarhini et al., 2013).
Intention to Use (INT)	INT1: I intend to use mobile learning in my academic life. INT2: I intend to use mobile learning continuously in the future INT3: I intend to use mobile learning for more of my lives/job responsibilities. INT4: I would enjoy using mobile learning. INT5: I would recommend that others use mobile learning. INT6: I have the intention to perform mobile learning	(Hung & Chou, 2014; Park et al., 2012)
Anxiety (ANX)	ANX1: Learning through a mobile would make me very nervous ANX2: I get a sinking feeling when I think of trying to use a mobile as a learning tool ANX3: Learning through mobile make me feel uncomfortable ANX4: Learning through mobile make me feel uneasy and confused ANX5: I feel apprehensive about using mobile as a learning tool ANX6: It scares me to think that I could lose a lot of information using mobile ANX7: I hesitate to use mobile as a learning tool for fear of making mistakes I cannot correct.	(Sam, Ekhsan, Othman, & Nordin, 2005)

References

Aggelidis, V., & Chatzoglou, P. (2009). Using a modified technology acceptance model in hospitals. *International Journal of Medical Informatics*, *78*(2), 115–26. https://doi.org/10.1016/j.ijmedinf.2008.06.006

Alenezi, A. (2011). *An Adoption Of The TAM Model To Determine Factors Affecting Students' Acceptance Of E-Learning In Institutions Of Higher Education In Saudi Arabia. Doctoral Thesis*. Universiti Utara Malaysia.

Aldholay, A. H., Isaac, O., Abdullah, Z., & Ramayah, T. (2018). The role of transformational leadership as a mediating variable in DeLone and McLean information system success model : The context of online learning usage in Yemen. *Telematics and Informatics*, 1(1), 1–17. http://doi.org/10.1016/j.tele.2018.03.012

Alrajawy, I., Daud, N., Isaac, O., & Mutahar, A. (2016). Mobile Learning In Yemen Public Universities: Factors Influence Student's Intention To Use. In *The 7th International Conference on Postgraduate Education ICPE7* (pp. 1050–1065).

Alrajawy, I., Norzaidi, M. D., Isaac, O., & Mutahar, A. M. (2017). Examine Factors Influencing the Intention to use Mobile Learning in Yemen Public Universities. *Asian Journal of Information Technology*, *16*(2), 287–297.

Awang, Z. (2014). *Structural Equation Modeling Using AMOS*. Shah Alam.Malaysia: University Teknologi MARA Publication Center.

Bowerman, B. L. (1990). *Linear Statistical Models: An Applied Approach* (2nd ed.). New York, London: PWS-Kent Pub. Co.

Chen, H.-R., & Tseng, H.-F. (2012). Factors that influence acceptance of web-based e-learning systems for the in-service education of junior high school teachers in Taiwan. *Evaluation and Program Planning*, *35*(3), 398–406. https://doi.org/10.1016/j.evalprogplan.2011.11.007

Chin, W. W. (1998a). Issues and opinion on structural equation modeling. *MIS Quarterly*, *22(1)*, 7–16.

Chin, W. W. (1998b). *The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), Modern methods for business research (pp. 295-358). New Jersey: Lawrence Erlbaum Associates.* Mahwah, NJ: Lawrence Erlbaum.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, Lawrence Erlbaum Associates.

Daud, N., Kassim, N., Said, W., & Noor, M. (2011). Determining Critical Success Factors of Mobile Banking Adoption in Malaysia. *Australian Journal of Basic and Applied Sciences*, *5*(9), 252–265.

Davis, F. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–340.

Davis, F., Bagozzi, R., & Warshaw, P. (1989). User Acceptance of Computer Technology: a Comparison of Two Theoretical Models. *Management Science. Aug1989*, *35*(8), 982–1003. https://doi.org/10.2307/2632151

Davis, F. D. (1989). perceived Usefulness, Perceived ease of use, and User Acceptence of inforamtion technology, *13*(3), 319–340.

Davis, F., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: three experiments. *International Journal of Human-Computer Studies*, *45*(1), 19–45. https://doi.org/10.1006/ijhc.1996.0040

El-Hussein, M., & Cronje, J. (2010). Defining Mobile Learning in the Higher Education Landscape. *Educational Technology and Society*, *13*(3), 12–21. 10p. 2 Diagrams.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior : an introduction to theory and research*. Reading Mass.: Addison-Wesley Pub. Co.

Fornell, C., & Cha, J. (1994). *Partial least squares. In R. P. Bagozzi (Ed.), Advanced methods in marketing research (pp. 52–78)*. Cambridge: Blackwell.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39. https://doi.org/10.2307/3151312

Gefen, D., & Rigdon, E. E. (2011). An Update and Extension to SEM Guidelines for Administrative and Social Science Research. *MIS Quarterly*, *35*(2), 1–7.

Gefen, D., Straub, D., & Boudreau, M.-C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems*, *4*(1), 1–79.

Georgieva, E., & Trifonova, A. (2006). The Influence of the Usage of e-Learning on the Students' Expectations about m-Learning. In *Proceedings of the 3rd E-learning Conference*. Retrieved from http://dspace.ou.nl/handle/1820/835

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: an organizational capabilities perspective. *Journal of Management Information Systems*, *18*(1), 185–214.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). New Jersey: Pearson.

Hair, J., Hult, G. T. ., Ringle, C., & Sarstedt, M. (2013). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage Publications, CA.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *34*(1), 115–135.

Hung, C.-L., & Chou, C.-L. (2014). Examining The Cultural Moderation On The Acceptance Of Mobile Commerce. *International Journal of Innovation and Technology Management*, *11*(2).

Igbaria, M., & Iivari, J. (1995). The effects of self-efficacy on computer usage. *Omega*, *23*(6), 587–605.

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017). Internet usage, user satisfaction, task-technology fit, and performance impact among public sector employees in Yemen. *International Journal of Information and Learning Technology*, 34(3), 210–241. http://doi.org/10.1108/IJILT-11-2016-0051

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017a). Internet Usage and Net Benefit among Employees Within Government Institutions in Yemen: An Extension of Delone and Mclean Information Systems Success Model (DMISM) with Task-Technology Fit. *International Journal of Soft Computing*, 12(3), 178–198. http://doi.org/10.3923/ijscomp.2017.178.198

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar, A. M. (2017b). Internet Usage within Government Institutions in Yemen: An Extended Technology Acceptance Model (TAM) with Internet Self-Efficacy and Performance Impact. *Science International*, 29(4), 737–747.

Isaac, O., Abdullah, Z., Ramayah, T., Mutahar, A. M., & Alrajawy, I. (2017). Towards a Better Understanding of Internet Technology Usage by Yemeni Employees in the Public Sector: An Extension of the Task-Technology Fit (TTF) Model. *Research Journal of Applied Sciences*, 12(2), 205–223. http://doi.org/10.3923/rjasci.2017.205.223

Isaac, O., Abdullah, Z., Ramayah, T., & Mutahar Ahmed, M. (2017). Examining the Relationship Between Overall Quality, User Satisfaction and Internet Usage: An Integrated Individual, Technological, Organizational and Social Perspective. *Asian Journal of Information Technology*, 16(1), 100–124. http://doi.org/10.3923/ajit.2017.100.124

Isaac, O., Masoud, Y., Samad, S., & Abdullah, Z. (2016). The mediating effect of strategic implementation between strategy formulation and organizational performance within government institutions in Yemen. *Research Journal of Applied Sciences*, 11(10), 1002–1013. http://doi.org/10.3923/rjasci.2016.1002.1013

Kannana, V. R., & Tan, K. C. (2005). Just in time, total quality management, and supply chain management: understanding their linkages and impact on business performance. *Omega: The International Journal of Management Science*, *33*(2), 153–162.

Karaali, D., Gumussoy, C., & Calisir, F. (2011). Factors affecting the intention to use a web-based learning system among blue-collar workers in the automotive industry. *Computers in Human Behavior*, *27*(1), 343–354. https://doi.org/10.1016/j.chb.2010.08.012

Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.

Lam, P., Wong, K., Cheng, R., Ho, E., & Yuen, S. (2011). Changes in Student Mobile Learning Readiness – Comparison of Survey Data Collected Over a Nine-month Period. In *Global Learn* (Vol. 2011, pp. 180–189). Retrieved from http://www.editlib.org/p/37171/

Lee, D., Lee, S., Olson, D., & Chung, S. (2010). The effect of organizational support on ERP implementation. *Industrial Management & Data Systems*, *110*(2), 269–283. https://doi.org/10.1108/02635571011020340

Milrad, M. (2003). *Mobile Learning : Challenges , Perspectives and Reality*.

Motiwalla, L. (2007). Mobile learning: A framework and evaluation. *Computers & Education*, *49*(3), 581–596. https://doi.org/10.1016/j.compedu.2005.10.011

Mutahar, A. M., Daud, N. M., Ramayah, T., Putit, L., & Isaac, O. (2018). Predicting Perceived Value in Mobile Banking: Are Awareness and Perceived Risk Important? *Research Journal of Applied Sciences*, 13(2), 112–124. http://doi.org/10.3923/rjasci.2018.112.124

Mutahar, A. M., Daud, N. M., Thurasamy, R., Isaac, O., & Abdulsalam, R. (2018). The Mediating of Perceived Usefulness and Perceived Ease of Use : The Case of Mobile Banking in Yemen. *International Journal of Technology Diffusion*, 9(2), 21–40. http://doi.org/10.4018/IJTD.2018040102

Myers, R. H. (1990). *Classical and modern regression with applications* (2nd ed.). Boston: MA: Duxbury.

O'brien, R. M. (2007). A Caution Regarding Rules of Thumb for Variance Inflation Factors. *Quality & Quantity*, *41*(5), 673–690. https://doi.org/10.1007/s11135-006-9018-6

Park, S., Nam, M.-W., & Cha, S.-B. (2012). University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology*, *43*(4), 592–605. https://doi.org/10.1111/j.1467-8535.2011.01229.x

Rajan, C., & Baral, R. (2015). Adoption of ERP system: An empirical study of factors influencing the usage of ERP and its impact on end user. *IIMB Management Review*, *27*(2), 105–117. https://doi.org/10.1016/j.iimb.2015.04.008

Ringle, C. M., Wende, S., & Becker, J.-M. (2015). SmartPLS 3. Bonningstedt: SmartPLS.

Sam, H. K., Ekhsan, A., Othman, A., & Nordin, Z. S. (2005). Computer Self-Efficacy , Computer Anxiety , and Attitudes toward the Internet : A Study among Undergraduates in Unimas. *Educational Technology & Society*, *8*(4), 205–219.

Sullivan, G. M., & Feinn, R. (2012). Using Effect Size - or why the p Value is not enough. *Journal of Graduate Medical Education*, *4*(3), 279–282.

Tarhini, A., Hone, K., & Liu, X. (2013). Factors Affecting Students' Acceptance of e-Learning Environments in Developing Countries:A Structural Equation Modeling Approach. *International Journal of Information and Education Technology*, *3*(1), 54–59. https://doi.org/10.7763/IJIET.2013.V3.233

Trifonova, A., & Ronchetti, M. (2007). Mobile Learning: Is Anytime + Anywhere = Always Online? In *Sixth IEEE International Conference on Advanced Learning Technologies (ICALT'06)* (pp. 702–706). IEEE. https://doi.org/10.1109/ICALT.2006.1652539

Wang, Y.-S., Wang, Y.-M., Lin, H.-H., & Tang, T.-I. (2003). Determinants of user acceptance of Internet banking: an empirical study. *International Journal of Service Industry Management*, *14*(5), 501–519. https://doi.org/10.1108/09564230310500192

Werts, C. E., Linn, R. L., & Jöreskog, K. G. (1974). Intraclass reliability estimates: Testing structural assumptions. *Educational and Psychological Measurement*, *34*(1), 25–33.