

Assessing the Relationship between TAM Constructs, Technology Characteristic, and Behavioral Intention to Use E-Learning

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Abstract— E-learning is a popular teaching method in institutions of higher education including Universiti Teknologi MARA. This teaching method solves the problems of time, space, and cost in learning. Despite its importance and popularity, the usage of e-learning is not fully utilized by the students. Due to that, the objective of this study is to assess the relationship between technology acceptance model (TAM) construct, technology characteristic, and intention behavior to use e-learning in Universiti Teknologi MARA, Pahang, Malaysia. A modified TAM was applied in this study. A questionnaire was adapted and used to gather information from 142 Bachelors' degree students. IBM SPSS (version 24) was used to analyze the data. The reliability, correlation, and regression analysis were applied on four variables, namely perceive ease of use, perceive usefulness, attitude toward using e-learning, and technology characteristic. The result shows that all the variables have significant influence towards the intention behavior to use e-learning. The technology characteristic is the variable that influences the most towards the intention to use e-learning. The result is expected to contribute to the university and academicians to improve e-learning system for students' benefits. In addition, this study hopes to contribute in literature as an effort to improve the usage of e-learning in institutions of higher education.

Keywords— e-learning; technology acceptance model; behavioral intention; attitude; technology characteristic

I. INTRODUCTION

The rapid growth of technology changes the traditional teaching method to the digital method. The traditional teaching method needs the students to attend lectures in class and involve in face-to-face discussions with the classmates. However, the technology innovation solves all the constraints by introducing online learning (e-learning). The development in the education is in line with the requirement of Industrial Revolution 4.0 to transform the workplace from tasks-based characteristics to human-centered characteristics. Human-centered characteristics need collaborative relationships across the university to develop solutions and plans that meet the needs of current or future students, faculty, staff, or administrative units. Most importantly, the needs of student in learning must be identified and fulfilled. The learners nowadays are the digital generation who were born after 1980. This generation grows up with YouTube and smartphones development. They have the ability to multitask and utilize technological devices. These digital learners prefer to learn using digital tools in digital learning environments such as numerous media and simulation-based environments (Howard, 2011), interactive learning environments (Dede, 2004), and active learning approaches (Price, 2009; Wilson & Gerber, 2008).

E-learning is the teaching method that uses internet connection to improve the delivery of teaching materials, communication, and collaboration between learners and instructors in a virtual environment (Ibrahim, Leng, Yusoff, Samy, Masrom, & Rizman, 2017). Ally (2004) clarifies e-learning in a broader meaning which is referring to educating strategy that uses internet. The learners need internet connection to access learning materials, interact with the other users to get more information and new knowledge, and for motivational purposes. In general, e-learning can be referred as the teaching and learning method that needs internet access for interaction and knowledge sharing. In developed countries, the application of e-learning is widely accepted particularly among the young generation due to the capability of the system to connect everyone around the world to share knowledge.

E-learning enables students to use an online system that manages courses, materials, discussion, assignments, and tests through the internet (Poonam, 2016). The internet provides fast and vast access to learning resources. Furthermore, e-learning has many types of medium like text, graphics, audio, and video that make learning an interesting process for students. E-learning system also permits learners to choose time and place to study at their convenience. Educators can update the study materials anytime, anywhere and the latest information can be included to upgrade students' knowledge. A large number of students can be educated at a comparatively low cost as long as the internet infrastructure is available.

Despite all these benefits, the usage of e-learning in universities particularly in developing countries remains low. The transformation to digital learning is facing various challenges and it needs the improvement of technological skills among learners and educators (Al-Adwan & Smedley, 2012). The nature of e-learning requires students to be independent in managing their own learning environment, pace, and progress. This introduces issues and challenges for students, including self-motivation, time management, and technical problems. Students' failure to manage these challenges could contribute to the low e-learning usage. User acceptance is crucial to be examined to measure the effectiveness and success of any new system. Therefore, in the case of e-learning, it is important to identify the students' intention to use this system to indirectly measure the acceptance. The developers and management team must understand students' perception to upgrade e-learning system (Kohang & Durante, 2003). Moreover, the management team can improve and find ways to entice students' intention to use e-learning by assessing the factors that affect their intention to accept e-learning (Park, 2009).

A. Development of E-Learning in Malaysia

Universities in Malaysia are keeping up with the growing of digital learning system. E-learning in Malaysia started in 1972, when the Ministry of Education (MOE) set up the Educational Technology Division. At the beginning, the electronic gadgets such as projector, video cassette, television broadcasting, CD-ROM, and telephone (for teleconferencing) were used as the channels of e-learning. The technologies were applied by Universiti Sains Malaysia (USM) and Universiti Teknologi MARA (UiTM) to offer the off-campus programs in all branches around Malaysia. By using these channels, the learning materials are used to show the illustrations, and explain and demonstrate the concepts and process to students. There was no internet network in that period.

The introduction of the internet technology in 1990s drove the rapid development of e-learning. In 1998, the first university launched an online course was Universiti Malaya (UM), followed by Universiti Tun Abdul Razak (UNITAR), Multimedia University (MMU), and Open University of Malaysia (OUM) in 2001. The e-learning system enables the universities to run online courses without the attendance in class. Minimal face-to-face meetings are needed between educators and students for the whole process of learning. The evolution of e-learning moves from the off campus to electronic based and digital based, and now continues with mobile learning.



Source: Supyan, (2006)

FIGURE 1. DEVELOPMENT OF E-LEARNING AT UNIVERSITY IN MALAYSIA

II. LITERATURE REVIEW

The digital generation spends more time on technology tools and they are considered as information technology (IT) savvy to use the tools in their lives including in education. The implementation of e-learning should get the attention from the digital generation compared to the traditional learning method because it refers to the learning methods that deliver the learning contents via the internet (Trombley & Lee, 2002). E-learning is a learning process conducted in the environment which employs electronic technology via the internet network and independent network (Supyan, 2008). Poonam (2016) refers the e-learning system as the unique strategy of learning that combines technologies and specially designed learning materials. Universities are facing challenges in implementing e-learning due to the high cost, lack of ICT infrastructure, and low adoption among educators and students. Most of the universities implementing the e-learning are facing the problem of low adoption among students and educators (Ibrahim et al., 2017). It shows that it is important to investigate the factors that contribute to the problem. According to Montazemi & Qahri-Seremi (2015), adoption rate of technology can be increased if the factors that affect users' adoption are properly managed. Previously, many studies were carried out to assess the variables that affected the intention and usage of this innovative learning system. Behavioral intention is referred to the willingness, plan, and effort towards the achievement of an objective (Ajzen, 1991; Bandura, 1997). The intention will drive corresponding change in the actual behavior and continue to take the action.

There are several theoretical models created from the findings of previous studies related to the technology acceptance, namely technology acceptance model (TAM), theory of reasoned action (TRA), theory of planned behavior (TPB), unified theory of acceptance and use of technology (UTAUT) model, and technology–organization–environment model (TOE). Among all the theories, TAM is prominent in exploring issues that affect users' acceptance of a new technology (Marangunic & Granic, 2015). TAM was initiated by Fred Davis in 1986 from the expansion of Ajzen and Fishbein's TRA. The objective of TAM is to delineate determinants that influence technology acceptance and technology usage behavior (Bertrand & Bouchard, 2008). TAM provides a concise model to show the effect of external variables on peoples' beliefs, attitudes, and intentions. External variable for this study is referred to the technology characteristic. Selim (2007) recommended one of the factors that

contributed to the successful of e-learning which is technology characteristic. Meanwhile, a few scholars found that students' attitude is one of the additional factors that is important in contributing to the intention to use e-learning (Zuhail, 2016; Berteau, 2009; Shen, Laffey, Lin, & Huang, 2006). Thus, the integration of the e-learning technologies, the students' perceptions, attitude, and intention to use the e-learning become so important to be assessed (Ozdamli & Uzunboylu, 2014).

The causal factors of technology acceptance and user behavior in TAM consists of perceived ease of use (PEU) and perceived usefulness (PU) (Ducey, 2013). Davis (1989) defined PU as the degree of individual belief that by using a particular system would improve his or her performance. PU is utilized to measure the level of an individual belief that using an electronic system would improve the results of his or her study. Previous studies revealed that PU needs to be considered because of the influences towards attitude and intention to use the technology (Lee, Cheung, & Chen, 2005; Ibrahim et al., 2017). PU is considered as one of the foremost vital components that impacts the technology acceptance in previous studies (Yeh & Teng, 2012).

Free from difficulties or effortless can be referred to ease of use. Davis (1989) noted that PEU of a specific system particularly, if related to the new technology, would be uncomplicated and hassle free. Thus, a system that is perceived to be effortless to use will be utilized and preferred by more people. Nanthida (2011) addressed certain determinants that may give effect on the ease of use of technology which are usage experience, features of information resources, hardware, and support. Other factors that can be considered in accessing PEU are technology literacy, perception of external control, technology anxiety, perceived enjoyment and objective, usability, and behavioral intention to use (Oluwole, 2016). The study conducted by Ibrahim et al. (2017) found that PEU significantly influenced students' intention to use e-learning.

Attitude could also influence students' intention and adoption of e-learning. Attitude refers to individual characteristics either positive or negative behavior and reflection of feeling and knowledge to certain concept or subject (Triandis, 1971). Findings from previous studies concluded that attitude has an important role to influence students' learning (Hussein, 2015; Malathi & Rohani, 2011; Bruess, 2003; Ahmed, Kamal, Nik Suryani, & Tunku, 2011). Most of the previous studies concluded that attitude is an important variable that can drive the intention to use technology (Ahmed et al., 2011; José Carlos & Ana Maria, 2011; Sujeet & Jyoti, 2013; Altawallbeh et al., 2015). Specifically, in previous studies related to e-learning adoption, attitude was proposed as an important determinant (Liu, Liao, & Pratt, 2009; Tosuntas, Karadag, & Orhan, 2015).

Other than social, individual, and organizational characteristics, technology characteristic also influences the technology acceptance (Agarwal & Prasad, 1999). There are many technology characteristics that could affect technology acceptance such as relative advantage, visibility, image, compatibility (Venkatesh, Morris, Davis, & Davis, 2003), information quality (Sami, 2014), functionality, interactivity, and fast response time (Pituch & Lee, (2006). Even though many studies conducted to investigate the e-learning adoption (usage or intention) but there is limited study in examining the technology characteristic of the system itself particularly e-learning (Selim, 2003). Technology acceptance could be raised from the effect of technology characteristic in the system and user requirement (Carswell & Venkatesh, 2002; Moore & Benbasat, 1991; Davis et al., 1989;).

III. METHOD

The data in this study were collected from the Bachelor's degree students in Universiti Teknologi MARA (UiTM) Pahang. There were 150 questionnaires distributed and 142 students answered and returned the questionnaires. The convenience sampling technique was applied in the data collection. The respondents were given options to complete the questionnaires or not. Clarifications were sought immediately when the questions provided were not clear. The three TAM constructs PU, PEU, and attitude were modified from Davis (1989). In assessing the technology characteristic, the questions were constructed by the researchers. All the questions utilized a five-point Likert scale to identify the agreed level from "strongly disagree" to "strongly agree". The demographic profile of the respondents was analyzed by using descriptive analysis. The correlation and multiple regression analysis were conducted via SPSS version 22.0 to assess the relationship between TAM construct, technology characteristic, and intention behavior to use e-learning.

IV. FINDING AND DISCUSSION

The respondents' demographic profiles were analyzed to conduct the descriptive analysis (Refer Table I). Most of the students (69.7%) are female and 43 (30.3%) are male. Among all respondents, 87 were from Bachelor of Science (61.0%) and 55 from Bachelor of Furniture Technology (39.0%). Majority (93.7%) of the respondents have experiences in using e-learning. Priorities usage of e-learning among the respondents were for assignments at 62.7% (89), followed by for teaching notes at 27.5% (39), for discussions at 3% (11), and for test at 2.1% (3). The reliability analysis was conducted, and all the variables have the Cronbach's Alpha values of more than 0.8 without any deleted items.

TABLE I. DESCRIPTIVE ANALYSIS

<i>No</i>	<i>Items</i>	<i>Frequency</i>	<i>Percentage (%)</i>
1	Gender:		
	Male	99.0	69.7
	Female	43.0	30.3
2	Program of study:		
	Bachelor of Science	61.0	87.0
	Bachelor of Wood Technology	39.0	55.0
3	Experience in using e-learning:		
	Yes	133.0	93.7
	No	9.0	6.3
4	Usage of e-learning:		
	Assignment	89.0	62.7
	Teaching notes	39.0	27.5
	Discussion	11.0	3.0
	Test	3.0	2.1

In measuring the correlation between TAM constructs, attitude towards using e-learning, technology characteristic, and intention behavior to use e-learning, Pearson correlation coefficient was applied. Table II shows that PEU, PU, attitude toward using e-learning, and technology characteristic have a significant influence towards the intention behavior to use e-learning. The relationship between PEU, PU, and attitude towards using e-learning is positive moderate and significant as the correlation ranged between 0.544 and 0.597 ($p = 0.000, < 0.01$). The technology characteristic has a positive strong (0.633) and significant influence towards the intention behavior to use e-learning ($p = 0.00, < 0.01$). This result shows that UiTM students perceived that technology characteristic is the most important element to use e-learning especially in saving time to get feedback for problem solving in learning.

TABLE II. MATRIX CORRELATIONS

	<i>Intention</i>	<i>PEU</i>	<i>PU</i>	<i>Technology Characteristics</i>	<i>Attitude</i>
Intention	1				
PEU	0.597**	1			
PU	0.591**	0.619	1		
Technology Characteristic	0.633**	0.505	0.577	1	
Attitude	0.544**	0.600	0.571	0.434	1

Note: ** Correlation is significant at 0.01 level (two-tailed)

Table III shows a positive relationship between the TAM construct, attitude toward using e-learning, technology characteristic, and intention behavior to use e-learning. All independent variables have influences towards the behavior intention to use e-learning as $p < 0.05$ except for PU. PU was found to be not statistically significant because the p -value; 0.076 ($\beta = 0.194$) which is greater than the common alpha level of 0.05. From this finding, PU shows no influenced towards the intention to use e-learning. This is due to the usage of the e-learning system which is not helping them much for performance improvement. Most of the students use e-learning as a medium to submit the assignment. Technology characteristic is the most important factor that contributes to the behavior intention to use e-learning with $\beta = 0.313$ ($p = 0.000, < 0.005$). The value of the correlation coefficient ($R = 0.736$) indicates a strong correlation between the independent and dependent variables. The R^2 value of 0.541 indicates that the independent variables have the ability to explain 54 per cent of the change in the behavior intention to use e-learning.

TABLE III. COEFFICIENT

<i>Model</i>		<i>Unstandardized coefficients</i>		<i>Standardized coefficients</i>	<i>t</i>	<i>Sig.</i>
		β	<i>Std. error</i>			
1	(Constant)	.009	.325		.027	.978
	PEU	.289	.107	.219	2.699	.008
	PU	.194	.109	.149	1.786	.076
	Attitude	.171	.077	.171	2.228	.027
	Technology characteristics	.313	.063	.363	4.970	.000
Model Summary						
<i>Model</i>	<i>R</i>	<i>R2</i>	<i>Adjusted R2</i>	<i>Std. error of the estimate</i>	<i>Model</i>	<i>R</i>
1	0.736	0.541	0.528	0.40517	1	0.736

v. CONCLUSIONS

The results reveal that PEU, technology characteristic, and students' attitude play a vital role towards the students' intention to use e-learning. Among the three variables, technology characteristic is the most significant on the intention to use e-learning. This result is supported by previous studies on the technology characteristic (Agarwal & Prasad, 1999; Davis et al., 1989; Moore & Benbasat, 1991; Carswell & Venkatesh, 2002). This is maybe due to the ability of the e-learning technology in Universiti Teknologi MARA that provides flexible access to various types of instructional and attractive assessment media. Furthermore, with the technology advancement, e-learning allows students to access anytime, anywhere. In addition, with the technology, the e-learning system enables the students to interact with lecturers, classmates, and friends through electronic mail, bulletin board, and chat room. This finding also shows that PU has no significant impact on e-learning adoption because the students normally use the e-learning system to submit assignments. They did not fully utilize the uses of e-learning as the sources of knowledge and as the medium for interaction with lecturers and friends to solve their problem in learning. Therefore, they perceived that the uses of e-learning could not improve their performance.

In a nutshell, by understanding the factors that influence the intention to use e-learning, it is vital for the educators and management team to improve the e-learning system for students and university benefits. All parties must play their role to fully implement e-learning in university. Lecturers should encourage students to use e-learning by uploading teaching materials, posting questions to be solved, and apply game-based learning. Lecturers need to be creative to create the content to encourage students to use e-learning. The university management needs to ensure the internet connection is stable to provide fast response time to make learning easy and fun.

References

- Agarwal, R., & Prasad, J. (1999). Are Individual Differences Germane to The Acceptance of New Information Technologies? *Decision Sciences*, 30, 361–391.
- Ahmed, T.S., Kamal, M.B., Nik Suryani, A. & Tunku, B.T.A. (2011). 'Investigating Students' Attitude and Intention to Use Social Software in Higher Institution of Learning in Malaysia', *Multicultural Education and Technology Journal*, 5 (3). 194–208.
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. doi: 10.1016/0749-5978(91)90020-T.
- Al-Adwan, A. & Smedley, J. K. (2012). "Implementing E-Learning in The Jordanian Higher Education Systems: Factors Affecting Impact". *International Journal of Education and Development using Information and Communication Technology*, 8 (1), 121-135.
- Ally, M. (2004). Foundations of Educational Theory for Online Learning. In: Anderson, T. & Elloumi, F. (Eds.) *Theory and Practice of Online Learning*, 3-31.
- Altawallbeh, M., Soon, F., Thiam, W. and Alshourah, S (2015). "Mediating Role of Attitude, Subjective Norm and Perceived Behavioural Control in The Relationships Between Their Respective Salient Beliefs and Behavioural Intention to Adopt E- Learning Among Instructors in Jordanian Universities". *Journal of Education and Practice*, 6(11), 152-159.
- Bandura, A. (1997). *Self- Efficacy: The Exercise of Control* (1st ed.). New York: Worth Publishers.
- Berteau, P. (2009). *Measuring Students' Attitudes Towards E-Learning: A Case Study*. Paper presented at the 5th international science Conference eLearning and Software for Education, Bucharest.
- Bertrand, M and Bouchard, S (2008). Applying the Technology Acceptance Model to VR With People Who are Favorable to Its Use. *Journal of Cyber Therapy & Rehabilitation*. 1(1).
- Carswell, A. D., & Venkatesh, V. (2002). Learner Outcomes in An Asynchronous Distance Education Environment. *International Journal of Human-Computer Studies*, 56, 475–494.
- Davis, F. D. (1989). "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology". *MIS Quarterly* 13 (3), 319-339.
- Ducey, Adam J. (2013). "*Predicting Tablet Computer Use: An Extended Technology Acceptance Model*" (2013). Graduate Theses and Dissertations.
- Dede C. (2004). *Enabling Distributed-Learning Communities Via Emerging Technologies*, Proceedings of the 2004. Conference of the Society for Information Technology in Teacher Education (SITE) (Charlottesville, Va.: American Association for Computers in Education, 2004), 3–12.
- Howard E.A (2011). *How Do Millennial Engineering and Technology Students Experience Learning Through Traditional Teaching Methods Employed In The University Setting?* (Degree Theses. Department of Computer Graphics Technology)
- Hussein, Z. (2015). Explicating Students' Behaviors Of E-Learning: A Viewpoint of the Extended Technology Acceptance. *International Journal of Management And Applied Science*, 1 (10).
- Ibrahim R., Leng N.S, Yusoff R. C. M., Samy G. N., Masrom S. & Risman Z. I. (2017). E-learning Acceptance Based on Technology Acceptance Model (TAM). *Journal of Fundamental and Applied Sciences*. Vol 9(4S), 871-889.
- José C. M. R. P & Ana Maria S. (2011). Examining the Technology Acceptance Model in The Adoption of Social Networks. *Journal of Research in Interactive Marketing*, 5 (2/3),116-129.
- Koohang, A. & Durante, A. (2003). "Learners' Perceptions Toward the Web-Based Distance Learning Activities/Assignments Portion of an Undergraduate Hybrid Instructional Model". *Journal of information technology Education* 2, 105-113.
- Lee, M. K. O., Cheung, C. M. K., & Chen, Z. (2005). Acceptance of Internet-Based Learning Medium: The Role of Extrinsic and Intrinsic Motivation. *Information & Management*, 42, 1095–1104.
- Liu, S. H., Liao, H. L., & Pratt, J. A. (2009). Impact of Media Richness and Flow On E-Learning Technology Acceptance. *Computers and Education*, 52(3), 599-607.
- Malathi, L. & Rohani, T. (2011). 'Assessing the intention to use e-book among engineering undergraduates in Universiti Putra Malaysia, Malaysia', *Library Hi Tech*, 29 (3), 512–528.
- Marangunic, N. & Granic, A. (2015). Technology Acceptance Model: A Literature Review from 1986 to 2013. *University Access Information Society*. 14,81–95.

- Montazemi AR, & Qahri-Saremi H (2015). Factors Affecting Adoption of Online Banking: A Meta-Analytic Structural Equation Modeling Study. *Inf Manag* 52(2), 210–226.
- Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research*, 2, 192–222.
- Nanthida J. B. (2011) Altering user perceptions of applications: how system design can impact playfulness and anxiety. Retrieved 16/07/2018, from https://ideals.illinois.edu/bitstream/handle/2142/24139/Barranis_Nanthida.pdf?sequence=1
- Oluwole O.D. (2016). Technology Acceptance Model as a predictor of using information system' to acquire information literacy skills. *Library Philosophy and Practice* (e-journal). 1450.
- Ozdamli, F., & Uzunboylu, H. (2014). M-learning and Perceptions of Students and Teachers in Secondary Schools. *British Journal of Educational Technology*.
- Park, S. (2009). "An Analysis of The Technology Acceptance Model in Understanding University Students' Behavioural Intention to Use E-Learning". *Education Technology & Society*. 12(3), 150-162.
- Poonam G., (2016). *Research Trend in E-Learning. Media Communique*, 1 (1), 29-41.
- Price C. (2008). Why Don't My Students Think I'm Groovy? The New "Rs" For Engaging Millennial Learners. *The Teaching Professor*, 1, 1–6.
- Sami M. A., (2014). System Characteristic Facilitates the Acceptance of Information Technology in Middle East Culture. *International Journal of Business and Social Science*, 6(1), 64-69.
- Selim H M. (2007). Critical Success Factors for E-Learning Acceptance: Confirmatory Factor Models. *Journal of Computers and Education*, 49(2), 396-413.
- Shen, D., Laffey, J., L., Y. & Huang, X. (2006). Social Influence for Perceived Usefulness and Ease-Of-Use of Course Delivery Systems. *Journal of Interactive Online Learning*, 5 (3).
- Sujeet, K.S. and Jyoti, K.C. (2013) 'Technology Acceptance Model for The Use of Learning Through Websites Among Students in Oman', *International Arab Journal of E-Technology*, 3 (1), 44–49.
- Supyan H. (2006). *Online forum in ELT training Program: Constraints or Problems?* Proceedings of 6th Annual Southeast Asian Association for Institutional Research SEEAIR 2006 Conference: transforming Higher Education for the Knowledge Society. Kuala Lumpur: SEEAIR-OUM, 438 – 446.
- Supyan H., (2008). Creating a bigger Z.P.D for ES learners via online forum. *The College Teaching Method and Styles Journal*. 4(11): 1-9 ISSN 1548-9566.
- Supyan H. & Mohd F. S., (2008). *E-Learning education in Malaysia*.
- Tosuntas S.B., Karadag, B. E., & Orhan, S. (2015). The Factors Affecting Acceptance and Use of Interactive Whiteboard Within the Scope of FATIH Project: A Structural Equation Model Based on The Unified Theory of Acceptance and Use of Technology. *Computers & Education*, 81, 169-178.
- Triandis H.C (1971). *Attitude and Attitude Change*. New York: John Wiley and Sons. Inc.
- Trombley, B. K., & Lee, Y-C (2002). Web-based Learning in Corporations: Who Is Using It and Why, Who Is Not and Why Not? *Journal of Educational Media*, 27 (3), 137-146.
- Venkatesh, V., Morris, M. G., Davis, F. D., & Davis, G. B. (2003). User Acceptance of Information Technology: Towards A Unified View. *MIS Quarterly*, 27, 425–478.
- Wilson M. & Gerber L.E (2008). How Generational Theory Can Improve Teaching: Strategies for Working with Millennials. *Currents in Teaching and Learning*, 1 (1), 29-44.
- Yeh, R. K and Teng T.C.(2012). Extended conceptualization of perceived usefulness: empirical test in the context of information system use continuance. *Behavior & Information Technology*. 31 (5).
- Zuhal Hussein (2016). Leading to Intention: The role of attitude in relation to Technology Acceptance Model in e-learning. *Procedia Computer Science* 105, 159 – 164.