

Investigating Students' Acceptance of Online Courses at Al-Ahliyya Amman University

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Abstract—Online courses allow students to access the course materials anytime and anywhere. Those courses are meant to enhance and improve the learning processes. Unfortunately, by analyzing data of an online course in Al-Ahliyya Amman University, it was found that only 51% of enrolled students accessed the animated course material. This study proposed a model to understand the factors which affect students' intention to use an online course by extending the Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology Acceptance Model (TAM). The proposed research model investigated the effects of experience, perceive usefulness, awareness, effort expectancy, cost, subjective (social) norms, and behavioral intentions to use online courses on students' adoption of online courses. Besides, the model investigated the effects of moderators, such as: college, college level, personal computer ownership, an internet access, and an online course enrollment on the relations. A questionnaire was distributed and then a structural equation modeling (SEM) approach was used to analyze the responses using SmartPLS.

Keywords—TAM; UTAUT; online learning; e-learning

I. INTRODUCTION

To improve a process, including a learning process, using a computer-based solution such as online courses, the organization should encourage users to use the computer-based solution. Therefore, teaching institutions embedded many computerized solutions in the learning process, such as learning management system (LMS) [1, 2], assessment management system (AMS) [3], and online learning contents [4]. Those technologies can help in improving the learning process.

An online content is very important in order to encourage students to access it. The content provides an e-learning environment use, which is widely used to provide internet-based courses with different methods such as animation, graphic, text, and video streaming [5]. The better the content is, the higher the acceptance of the online courses is by the user [6]. Unfortunately, developing an interactive and animated content does not guarantee students' access to it. Al-Ahliyya Amman University offers some online courses. By analyzing the Remedial Computer Skills course, it was found that only 68% of the enrolled students accessed the LMS website of the course to view the syllabus, announcements, and blogs. Only 51% of the enrolled students viewed the course modules which are animated contents. Only 24% of the students attempted to practice the quizzes.

There are many studies that measured and analyzed the determinants that affect the efficient use of technologies, such as Technology Acceptance Model (TAM) [7] and Unified Theory of Acceptance and Use of Technology (UTAUT). Later, researches extended TAM and UTAUT to understand the acceptance of technology in education. [8-10]. However, those factors depend on the environment, culture, and other local criteria [8].

The primary objective of this study is to extend UTAUT to investigate students' intentions in adopting online courses. Section 2 presents the background and related work. Section 3 introduces the research model and the hypotheses. Section 4 shows the research methodology and the analysis. Finally, the paper is concluded by presenting the importance of the findings.

II. BACKGROUND AND RELATED WORK

Davis, et al. [11] proposed the Technology Acceptance Model (TAM) to explain the factors that affect user's acceptance of an information system. The two primary factors of the model are: perceived usefulness (U) and perceived ease of use (EOU). These two factors determine the attitude toward using the system (A). Both (A) and (U) determine the behavior intention to use the system (BI). As a result, (BI) would affect and determine the actual use of the information system.

The Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh, et al. [12]. UTAUT was composed based on a review of eight models, which explained user's acceptance of technology. These eight models are: social cognitive theory (SCT) [13], TAM [7], theory of planned behavior (TPB) [14], innovation diffusion theory (IDT) [15], theory of reasoned action (TRA) [16], the model of PC utilization (MPCU) [17], the combined theory of planned behavior/ technology acceptance model (C-TPB-TAM) [18], and the motivational model (MM) [19]. UTAUT is based on four factors, which determine user's acceptance and behavior toward technology: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). In addition, UTAUT is based on four moderators: gender, age, experience, and voluntariness of use.

Liu, et al. [5] integrated TAM and Flow Theory to predict student's acceptance of online-materials in MIS department in Christian University, Taiwan. The study found that text-audio-video materials in web-based proved more usefulness than other web-based materials. The study also showed that the easy

use of the web-based material affects directly on its usefulness and on learner's intentions. The intention to use the web-based learning is affected by three factors perceive of usefulness, perceive of easy use, and concentration.

Massive open online courses (MOOCs) are free-online courses. Gameel [6] studied learner's satisfaction of using MOOC. As a result of that, flexibility, content and perceived usefulness of MOOC had effects on learning acceptance of it, while learner's interaction with other learners or instructors had no effects on the acceptance of MOOC.

Many studies used UTAUT to understand students' acceptance of online courses. For instance, Liao, et al. [9] applied the UTAUT model, omitting the moderator effects, to understand the adoption of web-based learning. The study found that the effort expectancy was not significant on the use acceptance of web-learning, while performance expectancy, social influence, and facilitating conditions were significant.

General Extended Technology Acceptance Model for E-Learning (GETAMEL) [20] extended TAM. GETAMEL took into consideration five external variables: experience, subjective norms, enjoyment, computer anxiety, and self-efficacy. The study found that experience had significant effects on perceive ease of use, but no significant relation was found between experience and perceive usefulness.

III. THE RESEARCH MODEL

The proposed research model extends UTAUT [12]. Like UTAUT, the proposed model adapts three of the four core determinants: perceive usefulness (PU), effort expectancy (EE), and social subjective norms (SN); but instead of the facilitating conditions determinant, perceive cost (COST) is adapted in the research model. Like GETAMEL [20, 21], experience (EXP) is used as a determinant; however, we distinguished between two kind of experience the computer literacy (EXP CL) and information technology experience (EXP2). The final determinant in the research model is awareness. Although awareness was considered in the acceptance of m-banking [22], we believe it would be significant in enrolling in online courses. The proposed model considers five moderators: college, college level, an internet connection, a personal computer ownership, and involvement in online courses. The factors considered in the research model are described as follows.

Experience with using information technology is how much time the user spends using the technology [12, 20, 22]. In this study, experience is divided into two sets: computer literacy (EXP CL) and Technical Knowledge (EXP2). EXP CL measures user's general knowledge of using computers for different purposes, while EXP2 measures user's capabilities in managing files skillfully. Awareness (AW) means that a learner has the knowledge of online courses, the availability and the use of technology in learning [23]. In respect of the awareness factor, the study offered that some courses should be compulsory, while other ones should be elective, which may not be taken. Awareness measures students' knowledge of the availability of online courses and their environment. Perceive Usefulness (PU) was introduced by Davis [24]. PU means the

degree to which a student believes that online courses would enhance his/her learning process. Effort Expectancy (EE) means that learning based on using online courses are free of effort [11, 20]. Perceive Cost of Use means the direct and indirect cost of using the technology [22] such as fees, hardware costs, software costs and operation costs. Subjective Norm (SN) means the influence of people on students to use the online courses [20]. The final factor is Behavioral Intention to Use (BI). BI is the decision to adopt the online learning.

A. The Research Hypotheses

Ten hypotheses illustrated in Fig. 1 were developed in this study to analyze the factors that affect student's adoption of online courses.

- H1: EXP CL influences PU
- H2: EXP2 influences EE
- H3: SN influences BI
- H4: COST influences BI
- H5: The influence of PU on BI is moderated by COLLEGE
- H6: The influence of PU on BI is moderated by Enrolled Online
- H7: The influence of EE on BI is moderated by Enrolled Online
- H8: The influence of EE on BI is moderated by PC
- H9: The influence of EE on BI is moderated by INTERNET_CONNECTION
- H10: The influence of AW on BI is moderated by STUDENT_LEVEL

B. Methodology

Quantitative method was utilized, in the form of a non-structured survey questionnaire with closed questions, using a 5-point Likert-type scale. Prior to the survey, a pilot study was conducted to assure the reliability and validity of the questionnaire. The entire instrument demonstrated acceptable reliability; Cronbach's alpha was 0.979. The questionnaire was randomly distributed to Al-Ahliyya Amman University students. The final accepted questionnaire for analysis was 385 out of 395 from the response rate. The data were analyzed using SPSS version 25 and SmartPLS3.

C. Data Analysis

The colleges were classified into three groups: Faculty of Engineering and Faculty of Information Technology (Eng&IT); Faculty of Pharmacy, Faculty of Medical Sciences and Faculty of Nursing (Med); and Business School, Faculty of Law, Faculty of Arts & Sciences and Faculty of Architecture & Design (Humanities). The responses according to the college were as following: Med (34%), Eng. & IT (41%) and Humanities (25%) (see Table I).

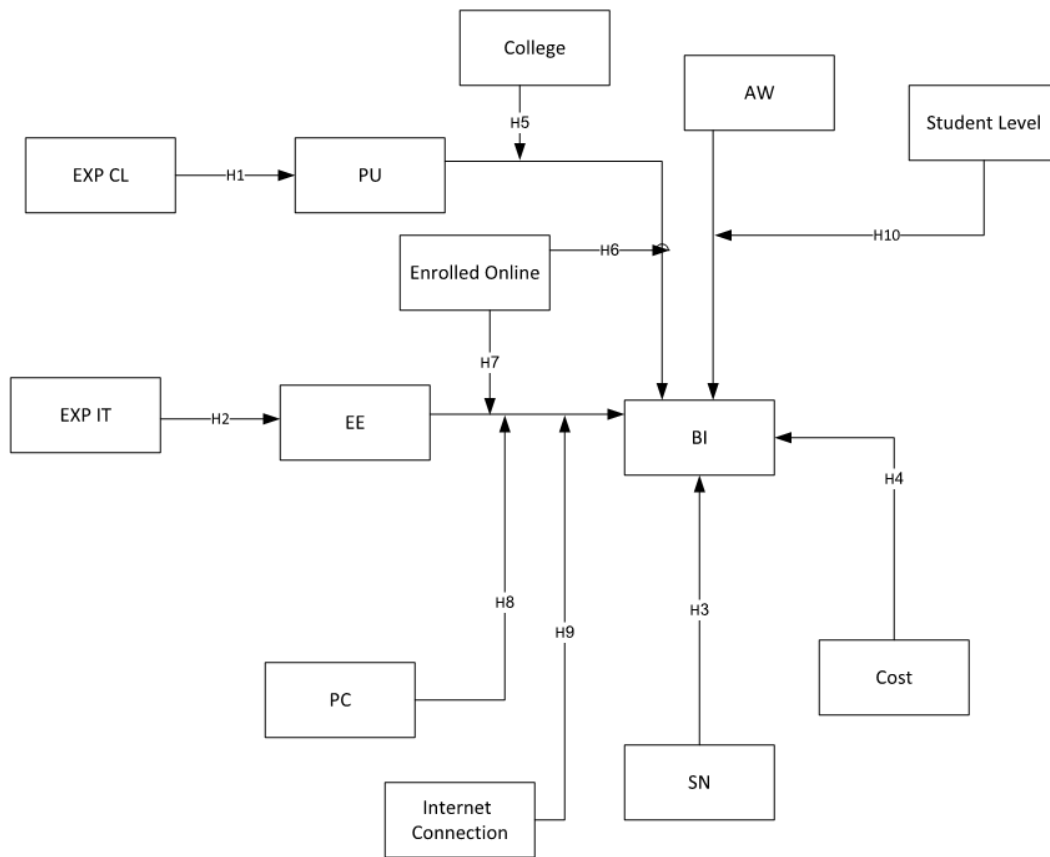


Fig. 1. The Research Model.

TABLE I. STUDENT DISTRIBUTION OVER COLLEGES

College	Frequency	Percent
Med	131	34
Eng. & IT	158	41
Humanities	96	25
Total	385	100

College levels are categorized into a 4 year-program for humanities, nursing, Information Technology, and medical sciences, while engineering and pharmaceutical sciences programs are a 5-year program. The responses according to college levels were as following: first year student (23.1%), second year student (26.0%), third year student (24.4%), fourth year student (23.4%), fifth year student (3.1%) (see Table II).

338 students (87.7% of the sample) own personal computers while 48 students (12.2% of the sample) did not. Most of the students had fast internet connection (90.4%) while only 37 students (9.6% of the sample) did not have. Only 64 students (16.6%) have never enrolled in online courses while the others have, as shown in Table III.

From Fig. 2 and Table V, all item factor loadings are (> 0.50) which are acceptable [25, 26]. All the results are shown in details in Table V.

D. Hypotheses Testing

The direct effects were analyzed using SmartPLS3, and the results are shown in Fig. 2.

TABLE II. STUDENT DISTRIBUTION OVER COLLEGE LEVELS

Level	Frequency	Percent	Valid Percent	Cumulative Percent
1	89	23.1	23.1	23.1
2	100	26	26	49.1
3	94	24.4	24.4	73.5
4	90	23.4	23.4	96.9
5	12	3.1	3.1	100
Total	385	100	100	

TABLE III. STUDENT ENROLMENT IN ONLINE COURSES

Number of Online Courses	Frequency	Percent	Valid Percent	Cumulative Percent
0	64	16.6	16.6	16.6
1	90	23.4	23.4	40
2	97	25.2	25.2	65.2
3	56	14.5	14.5	79.7
4	28	7.3	7.3	87
5	21	5.5	5.5	92.5
6	9	2.3	2.3	94.8
7	5	1.3	1.3	96.1
9	15	3.9	3.9	100
Total	385	100	100	

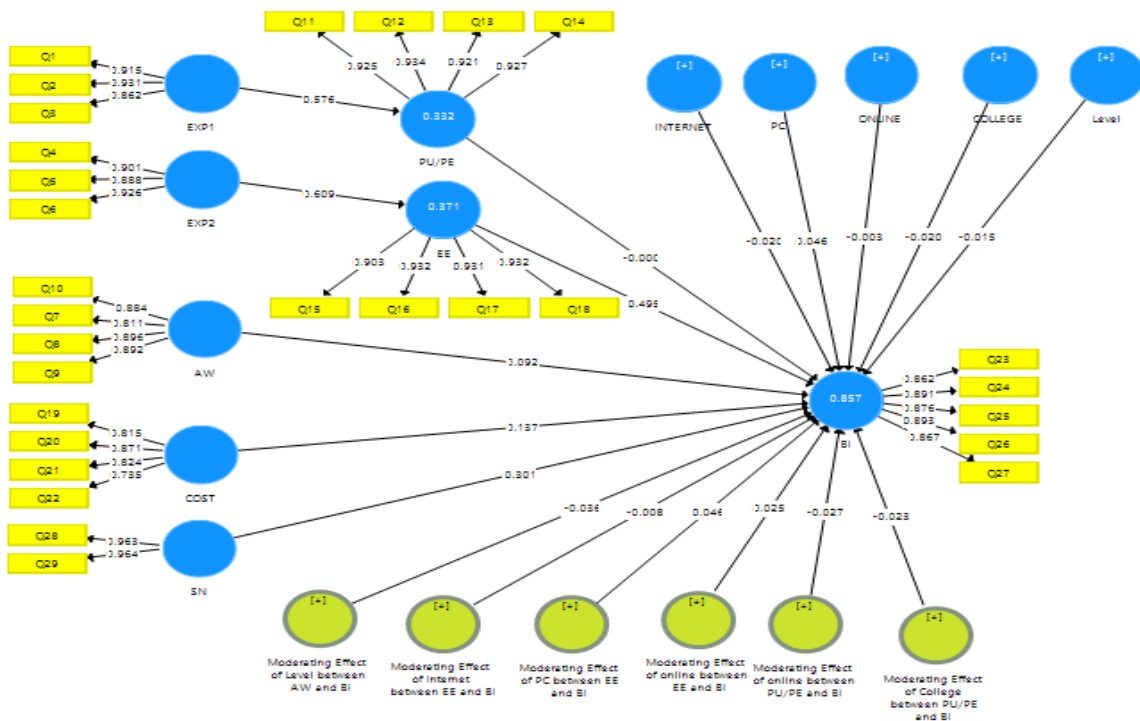


Fig. 2. Measurement Model.

The reliability was analyzed, and the results are shown in Table VI. Cronbach's Alpha values for all variables were acceptable since the values were (> 0.70) and ranged from 0.832 to 0.945. Composite Reliability (CR) was acceptable since the values were (>0.70) and ranged from 0.886 to 0.963. Average Variance Extracted (AVE) was acceptable since the values were (>0.50) and ranged from 0.661 to 0.928). The results of SmartPLS are shown in Fig. 3 and Table VII.

The descriptive statistics are shown in Table IV. The mean values range from 3.56 to 4.00, and the standard deviations range from 0.91 to 1.14. Thus, students generally are aware of online courses, their benefits, and of online learning environment. The internal reliability of the factors is acceptable, since Cronbach's alpha values range from 0.83 to 0.95.

TABLE IV. FACTOR DESCRIPTIVE STATISTICS

Factor	N	Mean	Std. Deviation	Cronbach's Alpha
EXP CL	385	3.8043	0.96365	0.887
EXP2	385	3.9957	0.90889	0.89
PU	385	3.7273	1.06753	0.945
EE	385	3.8896	0.98102	0.943
AW	385	3.7552	0.94182	0.894
COST	385	3.5623	0.96404	0.832
SN	385	3.6584	1.14204	0.922
BI	385	3.8618	0.95907	0.926
Valid N (listwise)	385			

H1: EXP CL influences PU: The results show that EXP CL influences PU with T-Statistics were 13.414 and p = 0.001. Hence, the computer literacy affects the decision of perceive usefulness of online courses. If students have general knowledge of using computers, they will understand the benefits of using online courses.

H2: EXP2 influences EE: The results show that EXP2 influences EE with T-Statistics were 13.112 and p = 0.001. Therefore, having knowledge of managing files on computers and solving some technical problems will affect the reduction of effort needed to use online courses.

H3: SN influences BI: The results show that SN influences BI with T-Statistics were 5.918 and p = 0.001. In other words, a social advice from a friend or an advisor will encourage students to use online courses.

H4: COST influences BI: The results show that COST influences BI with T-Statistics were 3.871 and p = 0.001. The students are aware of the direct and indirect cost of online courses.

H5: The influence of PU on BI is moderated by COLLEGE: This hypothesis was not supported since the reported values of T-Statistics were 0.822 and p = 0.411. Therefore, student's major does not affect his/her behavioral intention to use the online courses. Neither the direct relation between PU and BI nor the moderated relations were supported.

H6: The influence of PU on BI is moderated by Enrolled Online: This hypothesis was not supported since the reported values of T-Statistics were 0.468 and p = 0.64. Neither the moderated relation nor the direct relation between PU and BI were supported.

H7: The influence of EE on BI is moderated by Enrolled Online: This hypothesis was not supported since the reported values of T-Statistics were 0.465 and $p = 0.642$. Although the moderated relation was not supported, the direct relation between effort expectancy and behavioral intention to use online courses was supported. The reported values of T-Statistics were 8.164 and $p = 0.001$. The friendlier the online course is, the higher the behavioral intention to use it is.

H8: The influence of EE on BI is moderated by PC: This hypothesis was not supported since the reported values of T-Statistics were 1.646 and $p = 0.1$. However, the direct relation was supported. Owning a personal computer did not affect student's decision to use an online course.

H9: The influence of EE on BI is moderated by INTERNET_CONNECTION: This hypothesis was not supported since the reported values of T-Statistics were 0.294 and $p=0.769$. However, the direct relation was supported. Having an internet access did not affect student's decision to use an online course.

H10: The influence of AW on BI is moderated by STUDENT_LEVEL: This hypothesis was not supported since the reported values of T-Statistics were 1.557 and $p = 0.12$. However, the direct relation was supported since the reported values of T-Statistics were 2.432 and $p = 0.015$. Student's awareness of online courses affects the behavioral intention to use it.

TABLE V. ITEM FACTOR LOADINGS

Item	AW	BI	COST	EE	EXP CL	EXP2	PU/PE	SN
Q1					0.915			
Q2					0.931			
Q3					0.862			
Q4						0.901		
Q5						0.888		
Q6						0.926		
Q7	0.811							
Q8	0.896							
Q9	0.892							
Q10	0.884							
Q11							0.925	
Q12							0.934	
Q13							0.921	
Q14							0.927	
Q15				0.903				
Q16				0.932				
Q17				0.931				
Q18				0.932				
Q19			0.815					
Q20			0.871					
Q21			0.824					
Q22			0.735					
Q23		0.863						
Q24		0.89						
Q25		0.875						
Q26		0.893						
Q27		0.868						
Q28								0.963
Q29								0.964

TABLE VI. CONSTRUCT RELIABILITY AND VALIDITY

	Cronbach's Alpha	rho_A	Composite Reliability (CR)	Average Variance Extracted (AVE)
AW	0.894	0.904	0.926	0.759
BI	0.926	0.926	0.944	0.771
COST	0.832	0.842	0.886	0.661
EE	0.943	0.945	0.959	0.855
EXP CL	0.887	0.894	0.93	0.816
EXP2	0.89	0.893	0.932	0.819
PU/PE	0.945	0.946	0.961	0.859
SN	0.922	0.923	0.963	0.928

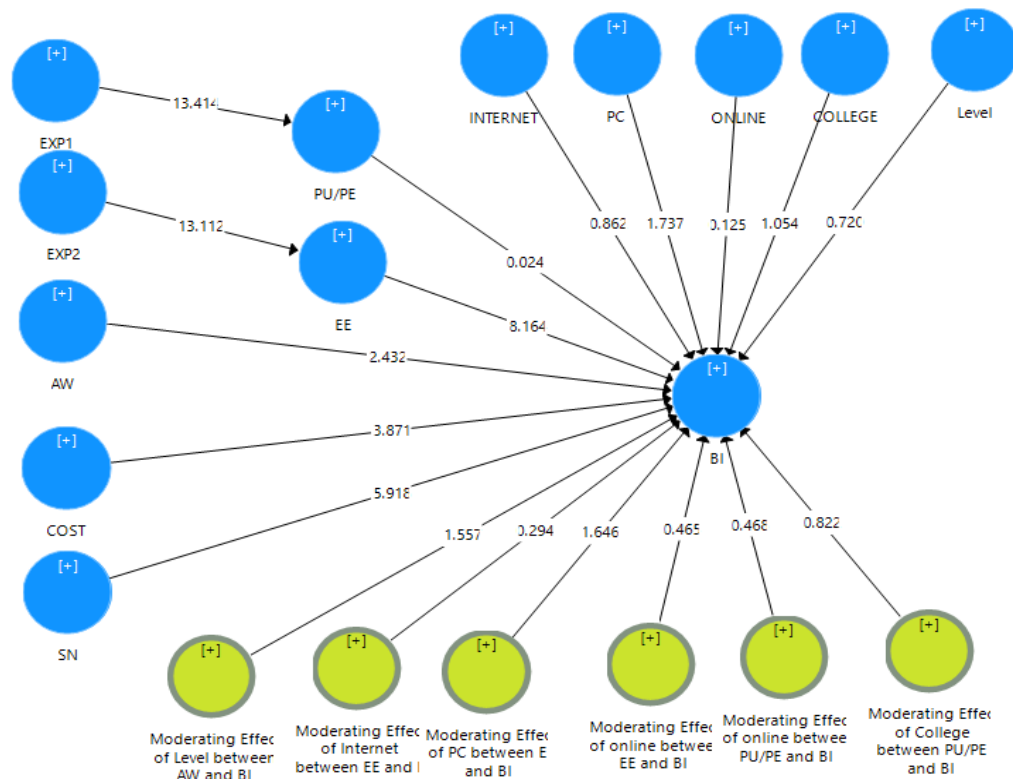


Fig. 3. Hypotheses Structural Model.

TABLE VII. BOOTSTRAPPING

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV) **	P Values *	Decision
AW -> BI	0.091	0.094	0.037	2.432	0.015	Supported
COST -> BI	0.137	0.139	0.035	3.871	0	Supported
EE -> BI	0.494	0.491	0.061	8.164	0	Supported
EXP CL -> PU	0.576	0.576	0.043	13.414	0	Supported
EXP2 -> EE	0.609	0.609	0.046	13.112	0	Supported
Moderating Effect of College between PU and BI -> BI	-0.023	-0.022	0.028	0.822	0.411	Not Supported
Moderating Effect of Internet-connection between EE and BI -> BI	-0.008	-0.001	0.028	0.294	0.769	Not Supported
Moderating Effect of Level between AW and BI -> BI	-0.036	-0.033	0.023	1.557	0.12	Not Supported
Moderating Effect of PC between EE and BI -> BI	0.046	0.043	0.028	1.646	0.1	Not Supported
Moderating Effect of online between EE and BI -> BI	0.024	0.012	0.051	0.465	0.642	Not Supported
Moderating Effect of online between PU and BI -> BI	-0.026	-0.014	0.055	0.468	0.64	Not Supported
PU -> BI	0.001	0.005	0.056	0.024	0.981	Not Supported
SN -> BI	0.302	0.295	0.051	5.918	0	Supported

*Significant p <= 0.05

** Significant T Statistics >= 1.96

IV. CONCLUSIONS

This study proposed a model extending Unified Theory of Acceptance and Use of Technology (UTAUT) to investigate the factors that influence students to use online courses. The factors which were included in the models were: experience, perceive usefulness, awareness, effort expectancy, cost,

subjective (social) norms and behavioral intention to use online courses. In addition to the effects of these moderators: college, college level, personal computer ownership, internet access, and online course enrolment were investigated. The study was conduct at Al-Ahliyya Amman University to investigate the factors which affect students' adoption of online courses.

By testing the hypotheses using the structural equation modeling (SEM) approach and SmartPLS, it was found that effort expectancy, subjective (social) norms, cost, and awareness of online course availability affect the behavioral intention to use online courses. Unlike the findings of effect, which were not significant in the social norms on behavioral intention to use in South Eastern University of Sri Lanka (SEUSL) [10], it was found that the subjective (social) norms were significant in Al-Ahliyya Amman University. In a similar study of [10] [8], effort expectancy was significant on behavioral intention to use online courses. Whereas in Vululleh [8] study, the relation between perceive usefulness and behavioral intention to use online courses could not be approved. The effects of awareness of the online courses and their costs were significant on the behavioral intention to use the online courses.

By testing the effects of the moderators, none of them was significant. In other words, student's major, college level, owning a personal computer or having an internet access would affect student's decision to enroll in an online course. Al-Ahliyya Amman University provides a free wireless Internet access in campus; as well, the computer labs are free to be used by students after 2 PM. As result, having a personal computer or an internet access do not affect the adoption of online courses.

In conclusion, the technical knowledge (EXP2) of using the computer for online access, awareness of online courses availability, subjective (social) norms, cost, and effort expectancy were found significant on behavioral intention to use online courses; therefore, the university should adopt a strategy to focus on those factors. An academic advice should inform the students about the availability and advantages of online courses. This would increase student's awareness and subjective norms. New student orientation should include some workshops about online courses to increase their technical experience and effort expectancy. Finally, the elective courses that are online should have reduced fees to encourage students to enroll in online courses.

There are some limitations in this study. The questionnaire was distributed in an electronic format using the Learning Management System (LMS). Another limitation is that the sample was randomly selected from only one private university. Also, the study did not distinguish between compulsory and optional online courses. Therefore, those issues should be taken in consideration in future work. The study should be extended to include sample from more than one university. Also, Subjective norms and social factors should include more elements to study the effects of the social and environment on the behavioral intention.

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