

Students' Willingness to Accept Virtual Lecturing Systems: An Empirical Study by Extending the UTAUT Model

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Abstract—The explosion of the World Wide Web and the electronic trend of university teaching have transformed the learning style to become more learner-centered, which has popularized the digital delivery of mediated lectures as an alternative or an adjunct to traditional lectures. Despite its potential and popularity, virtual lectures have not been adopted yet in Jordanian universities. This research aimed to fill this gap by studying the factors that influence students' willingness to accept virtual lectures in one Jordanian University. A quantitative approach was followed, by obtaining 216 survey responses and statistically applying the UTAUT model with some modifications. Results revealed that performance expectancy, effort expectancy, social influences, and self-efficacy could significantly influence students' attitudes towards virtual lectures. Additionally, Facilitating conditions and attitudes towards virtual lectures were found with significant influence on students' intention to take virtual lectures. Research implications and future work were specified afterwards.

Keywords—E-Learning, Student willingness, UTAUT, Virtual Lectures, Web-based learning systems.

I. INTRODUCTION

IN recent educational environments, Information systems (IS) and web-based applications are playing an increasingly significant role in delivering today's lectures. Applying IS in instruction can change education significantly [1], through the use of web-based learning systems, such as Blackboards, E-Learning classroom systems, online exams and virtual lectures. The development of virtual lectures provided by universities and educational institutions continues to grow steadily, and is expected to become a more general learning trend in developing countries.

II. LITERATURE REVIEW

A lecture is traditionally defined as "a process in which information passes from the notes of the lecturer to the notes of the student without passing through the minds of either" [2, P.640]. Lectures have been remaining the popular approach of undergraduate teaching since universities were founded. This is because lectures are effective in delivering big amounts of information by one person to a flexible numbers of students (lecturer-centered approach). In addition, lectures can be easily combined with other teaching methods [2], [3]. However, the explosion of the World Wide Web and the trend

of university teaching have transformed the learning style to become more learner-centered, which has popularized the electronic delivery of mediated lectures as an alternative or an adjunct to traditional lectures [4]. Virtual lectures (also called online lectures or digital live lectures) are playing an increasingly significant role in delivering today's lectures at many universities and educational institutes worldwide.

As part of distance learning, there are several advantages afforded by the usage of virtual lectures in comparison to traditional lectures. For instance, the student has the opportunity to take the lecture in a time and place of their own choice, resulting in more spatial and temporal learning flexibility [5], and addressing potential apprehension by students that material was missed or misunderstood during lectures. This is highly important for students who live in rural areas or in a region far from university campus, or who find some kind of trouble with transportation to attend university lectures in a daily basis. In addition, students in virtual lectures learn at the desired pace and employ their most attractive mode of learning [3]. On the other hand, one major drawback of virtual lectures is that students' may not sufficiently act and interact with such lectures. For instance, students' questions have to be deferred to either email or a scheduled question-and-answer session. This could limit the value of virtual lectures in small classes (classes of 30 or fewer students), in which lecturers are required to address individual needs and problems. In classes of 50 or more students, everyone recognizes that, up to now, the live lecture format has been basically the only practical way for every student to take advantage of an instructor's teachings, and the instructional material presented. Virtual lectures, however, provide a better alternative to teaching in large classes. It is thus likely that the extent to which virtual lectures replace live lectures in business school and allied economic and administrative courses will be a function of class size, with the guideline being that the larger the class size, the greater the value of virtual lectures.

Despite its popularity and potential, virtual lectures have not been adopted yet in Jordanian universities. The most important problem to broad acceptance and usage of virtual lectures in Jordanian universities is the obtainment of a critical mass. This tends to be an hen-egg-problem; on one hand, students will not be able to take virtual lectures unless university offer them, on the other hand universities would not provide virtual lectures unless making sure that a significant number of students will take them. Thus, and to take a one

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step forward, this study aims to examine students' willingness to accept virtual lectures, as alternatives to some traditional lectures delivered in lecture rooms and theatres, or as adjunct to traditional lectures that have many classes and divisions. A well-known theory of technology acceptance was utilized in this study, the UTAUT, as discussed below.

The Unified Theory of Acceptance and Use of Technology (UTAUT) model is one of the most widely used in the field of information and communication technology acceptance modelling [6]. UTAUT could explain 70% of technology acceptance behavior [6]. UTAUT consists of four key concepts that are, Performance Expectancy (perceived usefulness), effort expectancy (perceived ease of use), social factors and facilitating conditions that have a direct influence on intention to use it, whereas the variables of gender, age, experience and voluntariness of use moderate the key relationships in the model [6], as shown in Fig. 1. UTAUT was formulated based on conceptual and empirical similarities across eight significant technology acceptance models: Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT), Theory of Reasoned Action (TRA), Motivation Model (MM), Theory of Planned Behavior (TPB), Combined TAM and TPB, Model of PC Utilization (MPCU), and Social Cognitive Theory (SCT). These factors are clearly defined in [6] as follows:

- 1) Performance expectancy: the degree to which an individual believes that using the system will help him or her to attain gains in job performance.
- 2) Effort expectancy: the degree of ease associated with the use of the system.
- 3) Social influence: the degree to which an individual perceives that important others believe he or she should use the new system.
- 4) Facilitating conditions: the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system.
- 5) Behavioral intention is the person's subjective probability that he or she will perform the behaviour in question.

In essence, the UTAUT model uses behavioral intention as a predictor of the technology use behavior. Specifically, performance expectancy, effort expectancy and social influence have direct effects on behavioral intention, which along with facilitating conditions have direct effects on use behavior. The effects of interactions of each of performance expectancy, effort expectancy and social factors with each of age and gender; interactions of experience with each of effort expectancy and social factors; and an interaction of voluntariness of use and social factors on behavioral intention are also included. Finally, there are effects of interactions of age and facilitating conditions and experience and facilitating conditions on use behavior [6].

III. RESEARCH MODEL AND HYPOTHESES

Based on the UTAUT model, 6 constructs that have direct impact on students' intention or usage were included in the initial research model. These constructs are: performance expectancy, effort expectancy, social influence, facilitating

conditions, attitude toward using technology, and behavioral intention. In addition, two constructs were added as independent variables: anxiety and self-efficacy [7]. Anxiety is the feeling of apprehensive about taking a virtual lecture. Self-efficacy is student's ability to take a virtual lecture without the need of someone's help or assistance. The proposed research model is shown in Fig. 2.

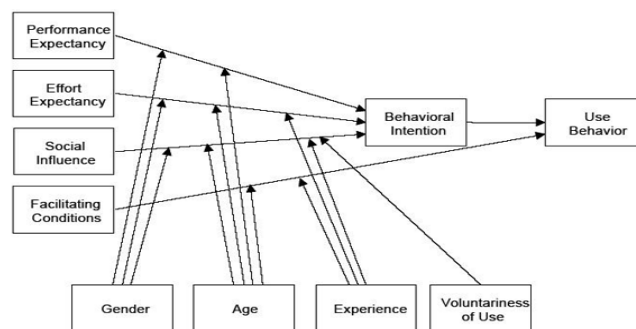


Fig. 1 The UTAUT model [6]

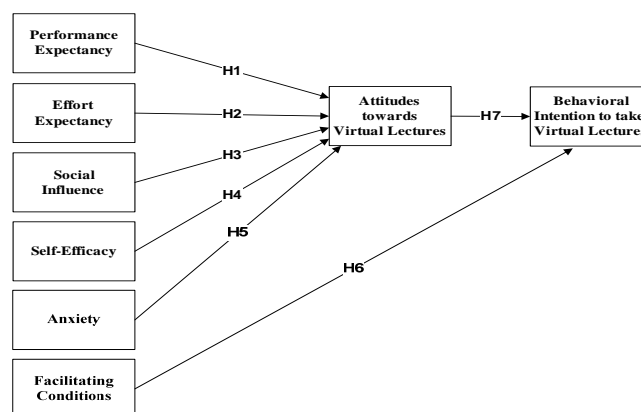


Fig. 2 Proposed research model

The research hypotheses associated with the research model are seven, presented in Table I.

TABLE I
 SET OF RESEARCH HYPOTHESES

H#	Statement
H1	Performance expectancy significantly influence students attitudes towards virtual lectures
H2	Effort expectancy significantly influence students attitudes towards virtual lectures
H3	Social influences significantly impact students attitudes towards virtual lectures
H4	Students' Self-efficacy significantly influence their attitudes towards virtual lectures
H5	Anxiety significantly influence students attitudes towards virtual lectures
H6	Facilitating conditions significantly influence students behavioral intention to take virtual lectures
H7	Student's attitudes towards virtual lectures significantly influence their behavioral intention to take virtual lectures

IV. METHODOLOGY

A quantitative approach was used in this research. The targeted population was all undergraduate students at the Faculty of Economics and Administration, at Al-Zaytoonah

University of Jordan (in Amman, Jordan). This faculty includes seven departments: business administration, accounting, marketing, finance, management information systems, tourism management and project management. Details about the data collection, instrument development, and instrument validity and reliability are presented in the subsequent subsections.

A. Data Collection

In order to empirically test the hypotheses developed in the previous section, data were collected using a convenience sampling approach via an online self-administered survey. During a three-week period, 235 respondents completed the survey. The survey was mainly promoted online and hosted by the E-learning system at the faculty. Students were invited to take the questionnaire by sending them the link of the survey webpage on their e-learning system profiles. As an incentive for participation, respondents were given the chance to enter a prize draw of mobile-device accessories through a gift voucher with a value of 25JD. Eighteen responses were discarded due to duplicate submissions or incompleteness, thus, a net sample of 216 usable questionnaires remained.

B. Instrument Development

A survey instrument with 33 questions was developed based upon the conceptualization and development work of [6]. In specific, the questionnaire contains 4 items for variables such as performance expectancy, effort expectancy, attitude toward using technology, self-efficacy, and anxiety, whereas behavior intention, and social influences had 3 items each. Remaining 7 questions are for the facilitating conditions, on which two new items about the tuition fees and the nature of the course were added. In addition, 7 items were developed to measure demographic variables, such as gender, age, academic year (on 1st, 2nd, 3rd, or 4th year), major, study program (matinee/evening), having work (part time, full time, casual), and experience in virtual lectures. A 7-point Likert scale was used to measure the constructs presented in the proposed model (scores were ranged from 1= "strongly agree" to 7= "strongly disagree", with "neutral" score= 4). This scale could effectively allow respondents to express their opinions in this research, as it offers a wider range of agreements to a statement than the 5-point.

The survey was available in two languages (Arabic and English). When translating the questionnaires, the researcher ensured that the meaning of the source language statement was preserved in the translation (called semantic equivalence) [4]. The questionnaire was originally designed in English, and was then translated into Arabic. The back translation method was used where the Arabic version was translated back into English by another bilingual person.

The survey instrument was refined during a pre-test to ensure the internal consistency of the measured instrument, with the involvement of 22 respondents. Consequently, the wording of some questions was modified. Afterwards, a pilot study was conducted by 31 students to assure the reliability and validity of the instrument. Two items which measure the

facilitating conditions and self-efficacy were removed from the questionnaire due to their low reliability scores (alpha coefficients). Consequently, the questionnaire included 38 validated items in total.

C. Instrument Validity and Reliability

It is essential to check that the questionnaire will measure what it is supposed to measure; its validity [8]. The items in the survey instruments were adapted from the items developed by [6] to estimate UTAUT. Thus, validity of the survey instrument has been already established. Reliability is the extent to which the items measure the same way each time they are used, under the same conditions, with the same sample [9]. Instrument's reliability was maximized by using clear conceptualization of the factors and ensuring accurate measurements, in addition to operationalizing each group of factors with multiple indicators [10]. Furthermore, the questionnaire was pre-tested and modified to ensure that it was easily understood. Additionally, reliability of the instrument was measured by examining the internal consistency, which can be determined statistically by the procedure developed by Cronbach in 1951 [11]. Cronbach's alpha splits all the questions in the instrument every possible way and computes correlation values for them all. Alpha coefficients for all the constructs ranged from .81 to .93, all well above the .70 standard of reliability as suggested [9], [11]. Thus, internal consistency of the instrument was demonstrated.

D. Data analysis

A total of 216 valid surveys were collected. Descriptive statistics and multiple regression analysis was performed to overview the sample participated in the survey, and to check the effects among various constructs. The regression analysis method used in this research is Structural Equation Modelling – Partial Least Squares (SEM-PLS). SEM-PLS is a second-generation comprehensive statistical data analysis approach that is more powerful than other first-generation multivariate techniques that can measure single relationships one at a time [9,11]. SPSS 18.0 and SmartPLS 2.0 were used to perform all statistical analysis. Findings are shown in the scenario below.

V. FINDINGS AND ANALYSIS

Based on the demographics and other background characteristics of the participants in the research, male respondents accounted for the majority of the sample (57.1%) and the average of respondents' ages was around 24 years. In relation to the academic year, about one third of the respondents reported their involvement in their second academic (sophomores), followed by junior students in their 3rd year, senior students in their 4th year and fresh students in their first year (who accounted 28.2%, 18.5%, and 14.8% respectively). As for major, students who do 'Accounting' were the dominant participants among other majors; accounted for 32.4% of the targeted population (given that the accounting school is the biggest in the faculty). The second biggest category was the 'Business Administration' students who accounted for 19%, followed by 'Management

Information Systems' students (around 17%), whereas the school of 'Tourism Management' and 'Project Management' had limited participation; with 6.5% and 4.6% of the population (more recent established schools in the faculty). Notably, more than two thirds of the targeted students have a job, either full time (36.1%), part time (26.8%) or casual (6.5%), whereas only around 30% of the population has no job. Importantly, around one third of the population has a previous experience with virtual lectures, whereas 67.1% of the targeted students have no prior experience with them. Further demographic details are shown in Table II.

TABLE II
DEMOGRAPHIC PROFILE OF PARTICIPANTS

Demographic variable	Categories	Response information (N=216)
Gender	Male	121 (57.1%)
	Female	95 (43.9%)
Academic year	Freshman (1 st year)	32 (14.8%)
	Sophomore (2nd year)	68 (32.5%)
	Junior (3rd year)	61 (28.2%)
	Senior (4th year)	40 (18.5%)
	Other	15 (6.9%)
Major	Business Administration	41 (19%)
	Accounting	70 (32.4%)
	Finance	23 (10.6%)
	MIS	37 (17.1%)
	Marketing	21 (9.7%)
	Tourism Management	14 (6.5%)
	Project Management	10 (4.6%)
Work	No work	66 (30.5%)
	Yes, Full time	78 (36.1%)
	Yes, Part time	58 (26.8%)
	Yes, Casual work	14 (6.5%)
General Average Grade	Excellent	20 (9.3%)
	Very Good	39 (18%)
	Good	104 (48.1%)
	Satisfactory	40 (18.5%)
Previous Experience in Virtual Lectures	Poor	13 (6%)
	Yes	71 (32.9%)
	No	145 (67.1%)

In order to measure each construct's validity and reliability, the Average Variance Estimated (AVE) was found above the threshold point of (0.5) for each construct, as recommended by [9,12], resulting in demonstrating convergent validity for each construct. In support, the composite reliability scores for each construct are above cut off point of 0.7, as suggested by [11], which also demonstrate validity for all constructs. Cronbach's Alpha score also indicate reliability for all constructs, which values were ranging from 0.81 and 0.93 (above the threshold of 0.7 by [9]), thus demonstrating reliable constructs. Table III shows all validity and reliability scores for all constructs, by presenting the values of the AVE, Cronbach's alpha, and composite reliability.

The research model is revised in Fig. 3; showing significant and insignificant paths, along with path coefficient values for each path. It is noteworthy that the strongest path in the model is the influence of effort expectancy on attitudes towards virtual lectures (0.414), which indicates the importance of students' effort expectancy to accept virtual lectures, whereas social influences scored the lowest value in affecting students' attitudes (0.127). The R² values for the predicted variables ('attitudes towards virtual lectures' and 'behavioral intention

to take virtual lectures') were all greater than the recommended level of .10 by [11] (0.732 and 0.460 respectively). Therefore, it was appropriate to examine the significance of the paths associated with these variables.

TABLE III
VALIDITY AND RELIABILITY RESULTS

Construct	AVE	Composite Reliability	Cronbach's Alpha
Performance Expectancy	0.751	0.923	0.889
Effort Expectancy	0.729	0.915	0.876
Social Influences	0.729	0.889	0.812
Self-Efficacy	0.773	0.931	0.901
Anxiety	0.756	0.732	0.879
Facilitating Conditions	0.656	0.930	0.912
Attitudes towards Virtual lectures	0.783	0.935	0.907
Behavioral Intention	0.890	0.960	0.938

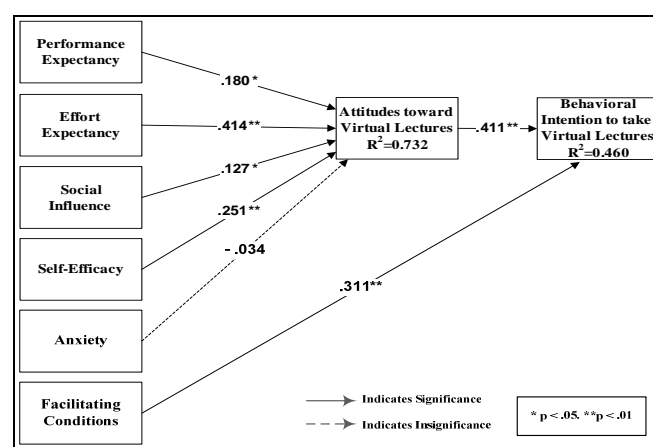


Fig. 1 Validated research model

VI. DISCUSSION AND CONCLUSION

The study of students' willingness to accept virtual lectures in Jordanian Universities requires more attention, as this learning technology has not been adopted yet in the country, despite its potential. Universities would not adopt virtual lectures unless they make clear insights about students' perceptions to accept them. This research tried to shorten this gap by studying the factors that would influence attitudes towards virtual lectures and students' intention to take them.

On the basis of UTAUT model, the items of the constructs in the research model were modified to fit the willingness perceptions. The research findings revealed that performance expectancy, effort expectancy, social influences, and self-efficacy could significantly influence students' attitudes towards virtual lectures. On the other hand, both facilitating conditions (such as technological resources, computer systems, course fees and the nature of the course) and attitudes towards virtual lectures could significantly influences students' intention to take these lectures. This could give the administrations of Al-Zaytoonah University specifically, and Jordanian universities in general. Due to time constrain, the effect of moderators on constructs were not discussed in the paper. Future research should explore the influence of gender,

academic year, students major, work availability, and previous experience in taking virtual lectures.

REFERENCES

- [1] M. D. Roblyer. *Integrating educational technology into teaching*, 4th ed. Upper Saddle River, New Jersey: Pearson Education, Inc., 2006.
- [2] R. Gilstrap, & W. Martin. *Current strategies for teachers*. Pacific Palisades, California: Goodyear Publishing Company, Inc., 1975.
- [3] J.E. Stephenson, C. Brown, & D.K. Griffin, 2008. Electronic delivery of lectures in the university environment: An empirical comparison of three delivery styles. *Computers & Education*, vol. 50, no. 3, pp.640-651.
- [4] A. Inglis, P. Ling, & V. Joosten. *Delivering digitally: Managing the transition to the knowledge media*, 2nded, London: Kogan Page, 2002.
- [5] C. Evans, N.J. Gibbons, K. Shah, & D.K. Griffin, 2004. Virtual learning in the biological sciences: Pitfalls of simply ‘putting notes on the web’. *Computers & Education*, vol. 43, no. 1, pp.49–61.
- [6] V. Venkatesh, M.G. Morris, F.D. Davis, & G.B. Davis, 2003. User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, vol. 27, pp.425-478.
- [7] D. Jong, & T.S. Wang. “Student acceptance of web-based learning system”. In *Proceedings of the 2009 International Symposium on Web Information Systems and Applications (WISA'09)*, Nanchang, P. R. China, pp. 533-536, 2009.
- [8] D.W. Straub, 1989. Validating instruments in MIS research. *MIS Quarterly*, vol. 13, no. 2, pp.147-169.
- [9] J. Hair, R. Tatham, R. Anderson, & W. Black. *Multivariate Data Analysis (5th Edition)*: Prentice Hall,1998.
- [10] W. L. Neuman. *Social research methods: Quantitative and qualitative approaches*, 6 ed., Boston, MA Allyn & Bacon, 2005.
- [11] A. P. Field. *Discovering statistics using SPSS: (and sex, drugs and rock 'n' roll)*, London: SAGE Publications, 2005.
- [12] C. Fornell, & D. Larcker, 1981. Structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, vol. 18, no. 1, pp.39-50.