MODELING STUDENTS' INTENTION
TO ADOPT E-LEARNING A CASE FROM EGYPT

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ABSTRACT

E-learning is becoming increasingly prominent in higher education, with universities increasing provision and more students signing up. This paper examines factors that predict students' intention to adopt e-learning at the Egyptian University of Mansourra. Understanding the nature of these factors may assist Egyptian universities in promoting the use of information and communication technology in teaching and learning. The main focus of the paper is on the university students, whose decision supports effective implementation of e-learning. Data was collected through a survey of 258 first year business students at the University of Mansoura in Egypt. The technology adoption model put forward by Davis is utilized in this study. Two more independent variables are added to the original model, namely, the pressure to act and resources availability. The results show that there are five factors that can be used in modeling students' intentions to adopt e-learning. These factors are attitudes toward e-learning, perceived usefulness of e-learning, perceived ease of e-learning use, pressure to use e-learning, and the availability of resources needed to use e-learning.

Keywords: E-Learning, innovation, adoption, usage, eases of use, usefulness

INTRODUCTION

In order to provide the growing population of Egypt with quality, accessible, and abundant educational opportunities, both the government and the private sector are eager to develop alternative programs and delivery methods. The delivery of e-learning programs has been recognized as one of the essential alternative delivery methods for education and training available around the world (Beckstorm et al, 2004) E-learning in the university context is influenced by a number of factors. However, the author particular interest in this paper is in the personal decision made by students to adopt e-learning at the Egyptian university of Mansoura, in Mansoura city (the capital of the Egyptian Governorate of Dakahlia).

Dakhahlia is the third largest governorate in Egypt with a population of 4,839,359; Mansoura reports a population of 1,600,000. Study at the University of Mansoura started in Faculty of Medicine in 1962, as a branch of Cairo University, then the Presidential Decree No., 49 in 1972 was issued declaring the establishment of East Delta University. In 1973, the name was modified to become Mansoura University. An e-learning Unit at Mansoura University was established in 2005 to promote and encourage the use of e-learning in teaching, and learning, and other scholarly pursuits through a variety of academic activities (Mansoura University E learning unit, 2006). Clearly, e-learning at the University of Mansoura is at its early stages, and that gives relevance to the current study which investigates the factors that affect students' intentions to adopt e-learning.

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In the following parts, the author will introduce background information about: e-learning in general, e-learning in Egypt, e-learning adoption, and an investigation of the factors that affect students' intention to adopt e-learning. That should assist E-Learning units at the Egyptian universities in their attempt to promote the use of e-learning in teaching and learning.

BACKGROUND

Learning in the academic world emphasizes: broad foundational knowledge, theory and analytical skills. Electronic learning: refers to learning that is facilitated through the use of information and communication technology. E-leaning is delivered and managed independently of the location of the instructor and the learner (Beckstorm et al 2004) E-learning is also referred to as teaching and learning that is web-enabled (Rosenberg 2001, Govindasamy 2002, Garrison & Anderson 2003),

E-learning models: E-learning models are attempts to develop frameworks to address the concerns of the learner and the challenges presented by the technology so that online learning can take place effectively. In the experimentation phase of e-learning in the 1990s, it was assumed that the delivery of traditional learning content via the internet constitutes e-learning. Then, the demand driven learning model was developed as a collaborative effort between academics and experts to emphasize the three consumer demands: high quality content, delivery, and service (MacDonald et al 2001). After that, an instructional design model was designed to emphasize the integration of *instructional practices* and *internet capabilities* to direct the learner towards a specified level of proficiency in a specified competency (Conrad, 2000). To a large degree, instructional design is the process whereby learning, not technology, is kept at the center of e-learning development. The community of inquiry e-learning model draws attention to the complexity of *communication* in a virtual learning environment. Institutions of higher education have slowly began to appreciate that the content of educational experience alone will not define quality learning but the context - how teacher designs the interactions that drive the learning transaction - will ultimately distinguish each institution. Garrison and Anderson indicate that the community of inquiry e-learning model is an attempt to give educators direction and guidance to facilitate critical discourse and higher order learning through the use of e-learning (Garrison and Anderson ,2003).

Learning Management Systems: Growing interest in e-learning, as a way to provide distance students with additional resources and support, prompted universities to investigate the adoption of Learning Management Systems to enable teaching staff to develop and manage online courses with little professional support. The term Learning Management System (LMS) refers to an integrated set of networked, computerized tools that support online learning (Virtual Learning Environment or Course Management System are other terms that are sometimes used). Learning Management System (LMS) such as WebCT, and Moodle, has many built-in features to help teachers managing their courses. A learning management system can deliver:

- Course material,
- On-line tests (multi-choice, list-matching, etc)
- Discussion groups and live chat.
- It has many tools to help teaching staff work with students' marks, conduct group work, and process the submitting and return of assignments.

Students log in with their university username and password, and have access to courses in which they are enrolled. They can access the system from a campus computer lab or over the Internet from home. The benefits of using such tools (i.e. WebCT, and Moodle) is that instructors do not require advanced web development skills to develop interactive sites as the template already contain the various interactive features, such as chat rooms and discussion lists. Course designers can add course and lecture notes in a variety of file formats, including graphics. (Parikh and Verma, 2002)

E-learning in Egypt

Beckstorm et al (2004) carried out an investigation about Egypt readiness for e-learning deployment. Their report presented a positive response to Egypt readiness. It presented a summary of two significant government initiatives that should positively further the realization of e-learning in Egypt, namely the internet and personal computer initiatives. Regarding the internet initiative the Ministry of Communications and Information Technology is maintaining a free internet access nationwide since 2002, where more than 15,000 ports serving 2 million internet users have been set up, with users paying only for local dial up phone tariffs. As for the personal computer initiatives, affordable BCs and laptops have been made available to students and professionals within a monthly installment plan that could be also financed up by a low interest loan.

E-learning is considered as a means of alleviating conventional educational problems that faces Egypt. E-learning could provide solutions to problems such as overcrowded classrooms, and transportation problems. Fayek (2004) has reported on e-learning projects undertaken by the Ministry of Higher Education and the Ministry of Education. Examples were given of the Faculty of Engineering at the University of Cairo, with e-learning related activities such as conversion of text books to interactive CD-ROMs and pilot projects in virtual classrooms, the American University in Cairo is using WebCT as learning management system (LMS) and providing a centre for helping the university members to convert their materials to web-friendly format. Kamel and Wahba (2003) presented Egypt's experience with the Global Campus project with objective to deliver programs using a hybrid model of traditional and unconventional methods based on distance learning. The global campus was a partnership between Middlesex University and a number of support centers worldwide, offering a Master of Science degree in business information technology in Egypt since 1998 and currently serving China and Singapore. Within Egypt, the global campus includes modules on CD-ROM and on the web-based in a blended learning environment, in addition to local learning support centers such as the Regional Information Technology Institute. On the web, students are provided with personal management tools such as calendar, profile for grades and assessment, a communication tool to contact local and UK-based tutor and for discussion groups and access to online libraries.

Numerous e-learning projects have been launched by a number of Egyptian government universities since 2002. The projects include Cairo University, National projects such as HEEPFE, Higher Education Enhancement Project founded by the World Bank, UNESCO endorsed open source platform for higher education, MEDA and Tempus projects supported by European Commission Directorate General for Education and Culture were initiated. Programs within these projects address issues of e-learning such as the quality of engineering education, professional training programs, developing new curricula and modifying existing curricula in areas of engineering, medicine, pharmacology, science, environment and management science and finance education.

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E-learning Adoption

Despite the wide use of information and communication technology in university teaching, research on e-learning adoption suggests that it has not reached its full potential (Zemsky et al., 2004). The UK-based Observatory on Borderless Higher Education (OBHE), carried out a survey of online learning on commonwealth universities undertaken in 2004, the results revealed that (OECD, 2005):

- Students take up of e-learning is growing in general
- Fully online whole programs account for fewer than 5% of total enrolments.
- The number of students enrolled in at least one course with a high online presence would be much higher, and sometimes from 30% to 50% of total enrolments.
- In most institutions, cross-border enrolments for e-learning are a small scale, peripheral activity.
- Whole award programs with relevant online presence were more common at postgraduate level.
- IT and business/management emerged as the most commonly cited disciplines making significant use of some form of e-learning, particularly in the mixed mode and fully online categories.

The above results support the claim that e-learning has not reached its full potential. Hence, the e-learning program providers might face difficulties in predicting the degree of acceptability of his e-learning program among potential users. That adds importance to the attempts of exploring the factors that influence users' intention to adopt e-learning. Next, a brief summary of theories in innovation adoption will be considered.

Theories in innovation adoption: Numerous studies have identified a variety of factors that affect innovation adoption in business organization. Fishbein&Ajzen developed a general model that explains and predicts behavioral intentions in many general settings (e.g., Fishbein&Ajzen, 1975). The model is referred to as TRA (Theory of Reasoned Action). The theory hypothesizes that a person's behavioral intention to perform (or not to perform) a behavior is determined by that person's attitude and subjective norms: Behavioral Intention (BI) is a measure of the strength of one's intention to perform a Specific behavior.

Attitude (A) describes an individual's positive or negative feelings about performing the target behavior. Subjective Norms (SN) refers to the person's perception that most people who are important to him think he should or should not perform the behavior in question (e.g., Fishbein and Ajzen, 1975). Davis et al. (1989) found that behavioral intention to use the system is significantly correlated with usage, and that behavioral intention (BI) is a major determinant of user behavior. Hill et al. (1987) also indicated that behavioral intentions significantly predict action. Sheppard et al. (1988), in a meta-analysis of 86 TRA studies, found an average correlation of 0.54 between intentions and actions.

Davis (1985) adapted Ajzen and Fishbein's (TRA) Theory of Reasoned Action (1980) to model intentions to accept information technology.

Davis' model is referred to as TAM (Technology Acceptance Model).It explains the causal links between beliefs (usefulness of an IS and ease of use of an IS) and users' attitudes, intentions, and actual usage of the system. Perceived usefulness (U) and perceived ease of use (EOU) are independent variables in the Model.

The dependent variable is the behavioral intention (BI). The mediating variable of TAM is the attitude toward use. Numerous studies discovered that technology acceptance theory (TAM) yields consistently high explained variance for why users choose to utilize systems (Mathieson, 1991; Pavri, 1988).

Hence, the technology adoption model put forward by Davis will be utilized in this study. Two more independent variables are added to the original model, namely, the pressure to act and resources availability. The rationale behind the use of these two factors is that, in addition to usefulness and ease of use, decision makers have to be under some pressure to adopt a particular innovation and they must have the resources necessary to adopt such an innovation.

RESEARCH QUESTIONS

> - **To what extent university students intend to adopt e-learning?**
> - **What is the best group of factors that can be used in predicting students' intentions to adopt e-learning?**

METHOD

In this section I will discuss:

1. the design of the survey instrument,
2. survey population and sample selection,
3. data analysis and the results.

Designing the Instrument

To accomplish the objectives of the study, the survey instrument was developed to gain as much information as possible regarding the factors that affect students' intentions to adopt e-learning. There are tow sections in the questionnaire:

 In *section one* a set of 24 items was used in the questionnaire, four of which refer to each of the following dimensions: *1- Attitude towards e-learning* (is represented by items 6, 12, 18, and 24). *2- Intention to adopt e-learning* (is represented by items 5, 11, 17, and 23). *3- Availability of Resources* (is represented by items 4, 10, 16, and 22). *4- Pressure to Use e-learning* (is represented by items 3, 9, 15, and 21).
5- Ease of E-learning Use (is represented by items 2, 8, 14, and 20). *6- Usefulness* (is represented by items 1, 7, 13, and 19). Respondents were asked to rate their opinion about each item using 5-point Likert scale (see appendix A)

Section two was used to collect demographic data about gender and distance between the university and the student home.

Survey Sample

The sample subjects were selected to participate in the survey through purposive sampling. Purposive sampling used to obtain desired information from specific target group. The target group came from business students who are at their first year of study at the University of Mansoura.

The author lectured a course in management to the first year business students at the University of Mansoura during the first term of the 2006/2007 academic year.

Table: 1
Sample Characteristics N=258)

Sex			
	104	Female	154
Distance of home from workplace			
Less than five kilometers	63	6-10 kilometers	29
11-15 kilometers	18	16-20 kilometers	28
21-30 kilometers	48	31-40 kilometers	11
15 41-50 kilometers		48	
		ore than 50 kilometer	

The teaching was classroom-based. However, the course outline and some lectures notes were presented online through the author's blog (Abdel-Wahab, 2007). Students were allowed to read the notes and put questions and receive answers online. The students used the site voluntarily. At the middle of the course 258 students completed the e-learning adoption questionnaire with usable data. Table: 1 provides data about gender and distance between the university and the student home.

RESULTS AND ANALYSIS

Figure: 1 shows the intention to adopt E-learning

3 (45; 17.4%)

4 (136; 52.7%)

Others (7; 2.7%)

5 (70; 27.1%)

Figure: 1
Intention to adopt E-learning

Figure: 1 shows that 79.8% of the respondents have the intention to adopt E-learning

Table: 2 shows the correlations between Behavior intention (BI) as the dependent variable and the independent variables (i.e. attitudes, resources, pressure to use, ease of use, and usefulness).

Table 2
Correlations between Behavior Intention (BI)
and the independent variables

BI behavior intention	A Attitude	R resources	PTU pressure to use	EOU ease of use	U usefulness
	0.448 0.000	0.298 0.000	0.348 0.000	0.456 0.000	0.419 0.000

Table: 3 shows stepwise regression of behavior intention versus attitude, resources, pressure to use, ease of use, and usefulness.

Table: 3
Stepwise Regression: Behavior Intention versus Attitude,
Resources, Pressure to Use, Ease of Use, and Usefulness

Step	1	2	3	4	5
Constant	2.6006	2.1110	1.4987	1.1812	0.7454
Attitude	0.429	0.282	0.210	0.198	0.164
T-Value	7.96	4.65	3.37	3.20	2.64
P-Value	0.000	0.000	0.001	0.002	0.009
Ease of Use		0.262	0.215	0.169	0.145
T-Value		4.63	3.80	2.86	2.46
P-Value		0.000	0.000	0.005	0.015
Usefulness			0.261	0.266	0.211
T-Value			3.80	3.90	3.02
P-Value			0.000	0.000	0.003
Pressure to Use				0.153	0.190
T-Value				2.41	2.98
P-Value				0.017	0.003
Resources					0.182
T-Value					2.89
P-Value					0.004
S	0.611	0.588	0.572	0.567	0.559
R-Sq	20.23	26.55	30.59	32.19	34.42
R-Sq(adj)	19.91	25.96	29.75	31.09	33.08

The table shows that the most useful subset of variables that can be used in modeling students' intentions to accept e-learning includes Attitude (A), Usefulness (U), Ease of Use (EOU), pressure to use (PTU), and Resources (R).

Accordingly, the best regression model that could be used in predicting behavior intention is:

$$\text{B Intention} = 0.745 + 0.164\,\text{A} + 0.211\,\text{U} + 0.145\,\text{EOU} + 0.182\,\text{PTU} + 0.190\,\text{R}$$

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	40.2735	8.0547	25.82	0.000
Residual Error	246	76.7434	0.3120		
Total	251	117.0169			

Source	DF	Seq SS
Attitude	1	23.6726
Usefulness	1	7.3987
Ease of use	1	4.7204
Pressure	1	1.7175

Analysis of the Dependent Variable (BI)

The above model is used to predict behavior intention's scores among the sample subjects. Figure: 2 shows the statistical description of the predicted values of (BI) among the sample subjects:
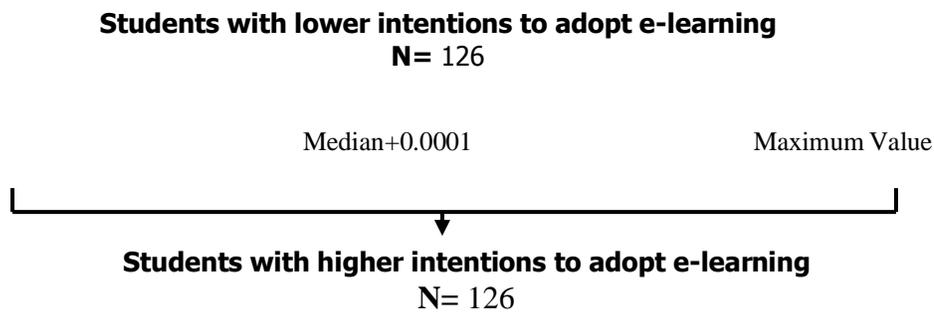
Students with lower intentions to adopt e-learning
N= 126

Median+0.0001   Maximum Value

Students with higher intentions to adopt e-learning
N= 126

Figure 2

**A statistical description of
the predicted values of behavior intention (BI) by the sample subjects**

Figure: 2 shows that among the sample subjects, there are 126 students whose (BI) scores fall in the range from 2.2713 to 3.9798 (the lower category of BI). Hence, according to the equation, they represent students who have lower intentions to adopt e-learning. Also, there are 126 students whose (BI) scores fall in the range from 3.9799 to 4.9555 (the higher category of BI). Hence, according to the equation, they represent students who have higher intentions to adopt e-learning. Table: 4 shows a test of differences between the two groups' scores in the independent variables (Attitude, Ease of use, Usefulness, Resources, Pressure to use)

Table: 4
Tests of differences between the independent variables in the two groups

	Group 1 Students with lower predicted intention to use e-learning N=126	Group 2 Students with higher predicted intention to use e-learning N=126	T	P
A	2.615	3.577	-14.50	0.000
U	3.552	4.187	-10.23	0.000
EOU	3.171	4.044	-11.24	0.000
PTU	3.694	4.242	-7.67	0.000
R	2.986	3.536	-7.92	0.000

The results in table 4 indicate that:

> ➢ **Students with higher intention to use e-learning (group1) have stronger attitude towards e-learning than student with lower intention to use e-learning (group2).**
> ➢ **Group1 students' perception of e-learning usefulness is higher than that of group2.**
> ➢ **The perception of the ease of e-learning use is higher in group1 than it is in group2.**
> ➢ **The pressure to use e-learning is higher on Group1 than it is on group2.**
> ➢ **Also the resources needed to use e-learning are more available to group1 than they are to group2.**

The first three results above are compatible with TAM model, and that validates the present study. The last tow results indicate that pressure to use e-learning and the availability of the resources needed to use e-learning are important factors in modeling students' intention to use e-learning.

DISCUSSION

This study advances knowledge about modeling students' intention to adopt e-learning as an approach to facilitate and enhance learning through both computer and communications technology. Hence, the research questions outlined in this study will now be examined.

The first question was concerned with measuring students' intention to adopt e-learning.

The second question was concerned with determining the best subset of predictors that can be used in modeling students' intention to adopt e-learning. Regarding the first question, the results show that 79.8% of the respondents have the intention to adopt E-learning, and that represent a good market for e-learning at the University of Mansoura. Regarding the second question, the results suggest that the best subset of predictors that can be used in modeling a student intention to adopt e-learning includes: attitudes toward e-learning, usefulness of e-learning, ease of e-learning use, pressure to use e-learning, and the availability of resources needed to use e-learning.

Hence, program providers could focus on these factors that are expected to affect potential users' intention to enroll with e-learning programs when offered by the university.

Thus, e-learning unit should make the following arrangements:

> ➢ **Organize induction courses for students where usefulness of e-learning for students is emphasized. Such courses must strengthen students' beliefs in the usefulness of e-learning, and in turn increase their intentions to enroll in e-learning programs**
> ➢ **Students should be introduced (through training courses) to computers, the internet and the web based learning systems. That should make students more effective in using web based learning technology and that should strengthen students' beliefs in e-learning ease of use; and that in turn should strengthen students' attitudes to adopt e-learning.**

- Computer labs should be made available to assist students who haven't got personal computers to participate in e-learning programs
- Computer advisors should be made available to answer students' questions regarding problems they may encounter when using computers and the internet.

FUTURE RESEARCH

Since the factors that are used to model e-learning explain only 33.1% of the variation of the dependent variable (behavioral intention to use e-learning), further studies should be carried out to explore more variables that can be used to get better insight into the research questions. Future research should also extend to the entire country in order to obtain better representation of the whole population

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	S.A	A	N	D	S.D
1) Reading the lecture's notes through the web clarifies some points and improves my understanding of the lecture					
2) I can not read the lectures notes through the web					
3) E-learning should be offered fully online to reach students who live in remote areas					
4) My university has got the technology needed for the delivery of e-learning					
5) I think positively about e-learning					
6) I am not in favor of full time e-learning as it lacks the face-to-face interaction between students and educators					
7) Using full time e-learning is useful as it decreases travel expenses					
8) it is easy to learn how to use the internet in reading lectures' web notes					
9) E-learning should be used to reduce travel related stress					
10) My university has a web site					
11) I plan to participate in future e-learning courses					
12) I am not in favor of e-learning as it lead to social isolation					
13) Adopting fully online e-learning allows for reduced study costs.					
14) The e-learning allows for off campus interaction between students and educators					
15) E-learning should be adopted to allow married students to balance family and study demands					
16) My university has training professionals available to carry out e-learning training programs					
17) I plan to buy a computer to be able to follow lectures notes online.					
18) I am not in favor of e-learning as it is a complex process for students with beginner-level computer skills					
19) Adopting e-learning allows for increased students' satisfaction.					
20) E-learning systems are easy to master.					
21) E-learning should be adopted to allow working students to study from home.					
22) I can't spare the time required to attend e-learning training programs that are arranged for the university students.					
23) I intend to advise my friends to use the Internet for reading lecture's notes online.					
24) I am in favor of e-learning as it will narrow the digital divide between Egypt and other developed nations.					