



ORIGINAL RESEARCH

An empirical study into factors that influence e-learning adoption by medical students in UAE

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Abstract

Aim: The global higher education sector has shown an inclination towards the adoption of technology-based learning for introducing innovation in teaching and learning activities. However, this e-learning environment can only be effective if students have positive perceptions of e-learning. Hence, educational personnel is required to consider how students perceive this concept. This research intends to serve this purpose by identifying factors affecting students' acceptance of e-learning as well as their intention toward the use of e-learning for their learning activities.

Methods: The Technology Acceptance Model (TAM) was used in this re-search to formulate a theoretical framework. This research will employ online questionnaires as a data collection tool while the international students enrolled at United Arab Emirates universities will serve as study participants.

Results: The research outcomes indicated the most crucial role played by the predictors of "Accessibility" "Perceived Enjoyment", "Social Influence", "Perceived Usefulness", and "Perceived Ease of Use" in shaping students' intention to resort to e-learning platforms for learning purposes.

Conclusion: The research indicated that the extended TAM model is applicable in the UAE educational context. The research outcomes also showed the possibility for policymakers in the educational sector to make effective use of e-learning platforms both as a technological solution and as an e-learning platform to support distance learning. The research also highlights the practical implications for the concerned educational developers in the educational sector to help them develop and apply a competent e-learning system.

Keywords: E-learning; higher education; international students; UAE.

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Introduction

Innovation has introduced the use and application of digital technologies in all walks of life particularly the digital learning and teaching processes. The global higher education sector has shown an inclination towards the adoption of technology-based learning for introducing innovation in teaching and learning activities. In this innovative world, student needs are also evolving and the educational sector specifically the academic institutions have to keep pace with these developments through continuous modification of their courses and mode of education delivery. Presently, the educational sector is shifting towards e-learning as a new mode of education delivery to cater to the needs of distant students. Due to the extraordinary benefits of e-learning like lower cost, ease of use, and flexibility, the global education system is showing an inclination towards the integration of e-learning as part of their teaching and learning strategy.

E-learning adoption is being observed in various higher education institutions to offer better learning experience to students in the form of easy accessibility free from temporal and spatial limitations. The UAE government's commitment to promote online learning and distance education is evident from its implementation of e-learning as part of their innovation-promoting campaign in education sector. The concept of distant learning gained popularity in March 2020 during the spread of COVID-19 when learning from home was applied by all higher education institutions and schools across the UAE. As part of this movement, training programs were conducted to equip school teachers with the essential knowledge of using distance learning programs effectively. Private schools were also encouraged to apply individual distance learning system for supporting the learning and teaching

activities during the pandemic. The smart learning platforms were also initiated by the UAE government. The teachers using distant learning programs for conducting classes were provided with guidelines by the UAE government for proper supervision of their students' behavior. The UAE government ensured easy internet accessibility to all the students across the country. In this regard, remote areas with low or no internet connectivity were provided with free-of-cost satellite broadband services. Moreover, students were also provided with free-of-cost home internet connection. The UAE is committed to implement the e-learning system in all educational institutes in the country due to the strategic significance of such systems in accomplishment of the UAEs innovation-promotion campaign. E-learning systems allow easy access to learning activities by greater number of students besides facilitating the delivery of professional education leading to higher rate of qualification and attracting students beyond the traditional area of student influx.

E-learning supports innovative teaching and learning process by revolutionizing the education sector through the modification of traditional education systems and methods as indicated in earlier studies. Eventually, educational and learning system yields better quality. Other benefits offered by e-learning system are improvement in educational curriculum and reputation of the institute, campus space utilization and optimization of resources for better learning; e-learning encourages the enrolment of greater number of students leading to higher student diversity and higher income (1). But, adoption of e-learning systems is not as easy as it seems. It involves various obstacles, such as improper infrastructure (2), inadequate ICT support (3) and public fear and reluctance towards adoption of technology (4) among others. Even the institutions fear the adoption of technology and are reluctant to switch to e-

learning and prefer to adopt a middle way method of blended learning; in this method, e-learning tools are employed to complement the traditional classes instead of fully replacing them with online learning methods (1). Positive student perception and expectations about e-learning are extremely important for the successful implementation of e-learning and development of e-learning environment. However, students' perceptions about e-learning and the factors that motivate e-learning adoption among international student community have been fully ignored. Fortunately, this study identified the factors influencing intention of students studying in higher education institutes towards using e-learning system. These factors were "Accessibility", "Perceived Enjoyment", and "Social Influence". Moreover, the effect of each of these factors on international students' perception and intention to accept the e-learning platforms were also discussed. According to the literature, there is limited empirical research on how e-learning is utilized in the UAE institutions and limited awareness of the factors that influence students' actual use. In the perspective of methodology, most technological acceptance researches assess, theoretical models, using the "structural equation modeling (PLS-SEM)" technique. As a result, there are two folds to this study. To begin, TAM (5) and external variables were combined to assess students' actual use of e-learning. Second, employing the PLS-SEM tool, verify the constructed theoretical model. This study starts with the literature review of the selected studies related to e-learning systems. In the next step, hypotheses are developed. After this, an explanation of the method is given. In the end, the study presents the results and discussion, elaborates the limitations and offers recommendations for future re-search.

Literature Review

Distance learning has become much convenient in the previous 10 years with the introduction of World Wide Web, or Web which serves as a platform for conducting online teaching and learning activities for distant students. Web is assessed by a number of users at the same time for communication and collaboration purposes; it is also accessed by many learners to obtain information. Learners also get a chance to use various learning tools available on the Internet for acquiring new knowledge or exploit the available knowledge. Various terms associated with Internet and Web-based teaching and learning activities are web-based learning, e-learning and online learning among others. E-learning is a virtual classroom where different learners and teachers located remotely use internet for developing a connection with each other and conduct teaching and learning activities. Internet acts as a mode of imparting education to students. Internet allows students to involve in repetitive learning activities and access course materials irrespective of the time and place constraints (6). Internet acts as a life-saver for students of all ages and levels who do not have physical access to educational centers or educational content to acquire advanced degrees otherwise. Besides the educational purposes, there has been an inclination towards implementing e-learning for commercial purposes (6). E-learning has helped the educational sector specifically the higher education and corporate training institutes to overcome the obstacles experienced in learning and teaching activities (6). This situation calls for more research on E-learning which is become one of the most important developments in IS industry due to the present situation where physical classes have been abandoned due to COVID-19. E-learning research is essential for allowing schools and higher education institutes and students to understand this

technology and make best use of it while conducting e-learning courses (7). Proper knowledge and implementation of E-learning in the current knowledge-based economy allows financial institutes and organizations to gain information and exploit the available information to outshine their competitors. The learning environment in Organizations is also being incorporated with e-learning technology for equipping the workers with latest information and proper training. However, it must be comprehended that student acceptance of the technology is critical factor for effective implementation of online learning in educational institutes. Students are the ones who are exposed to technology use in learning activities on daily basis, therefore their acceptance behavior towards that technology is extremely important to consider. Before taking any decision about incorporating technology in learning processes or bringing about a change in learning behavior, students' disposition and acceptance to adopt the change must be taken into account. The empirical evidence also depicted that user acceptance was imperative for effective implementation of technology (8). Re-searchers have shown keen interest in identifying factors affecting the acceptance of information technology; in this regard, they have formulated and tested many relevant models like the "theory of reasoned action (TRA)" (9) and the "technology acceptance model (TAM)" (10). Out of all these models, the most effective one is known to be TAM since it has been validated, executed and simulated extensively and is also found to be much robust and predicative than other models (11). TAM has been formulated on the basis of technology adoption literature and is a significant innovation in the domain of IS. This research mainly intends to investigate the factors that affect the acceptance of e-learning by students studying in higher education institutes. The research specifically

focuses on how "Perceived Usefulness and Perceived Ease of Use" are affected by the e-learning external factors of "Accessibility", "Perceived Enjoyment", and "Social Influence". Additionally, the impact of these factors on students' intention towards adoption of e-learning is studied. This research contributes to the domain of e-learning by allowing the formulation of effective e-learning programs and conducting e-learning courses.

The Conceptual Model and hypotheses

3.1 Accessibility (ACS)

Alshammari et al (12) defines system accessibility as the degree of ease of student access to e-learning system and the degree of student's adoption of this system for continued learning. Students find the e-learning system as easy to use if the e-learning system offers accessibility to them (13). It has been indicated by (14), that "perceived ease of use" associated with a website expresses its system accessibility. Additionally, (15,16) also conveyed the idea that perceived ease of use of e-learning system is significantly dependent on the accessibility of that system. Previous research showed same outcomes about the significant effect of perceived accessibility of an e-learning system on both its "perceived ease of use" (17) and "perceived usefulness" (18). An easily accessible e-learning system sounds more appealing to the student as the student perceives such a system to offer more usefulness and greater ease of use (15,16). Thus, it is hypothesized that:

H1a: Accessibility (ACS) has a significant influence on perceived usefulness (PU).

H1b: Accessibility (ACS) has a significant influence on perceived ease of use (PEOU).

3.2 Perceived Enjoyment (PE)

Another intrinsic variable of ‘enjoyment’ was investigated by many researchers due to its significant relevance to technology-acceptance studies. Enjoyment associated with the use of a new system has a positive influence on user perception (19). When a new system feels enjoyable, the user automatically ignores the complexities experienced during its use and perceives it to be convenient and easy-to-use (20). Thus, the factor of perceived enjoyment in using e-learning systems has a positive effect on e-learning adoption or acceptance. Similarly, previous research revealed that like any technology, for e-learning systems, perceived ease of use (21–23) and perceived usefulness (21–23) significantly depends on the user perception about the enjoyment offered by the e-learning system. An enjoyable e-learning system sounds more appealing to the student as the student perceives such a system to offer more usefulness and greater ease of use (6). As a result, we obtain two hypotheses:

H2a: Perceived Enjoyment (PE) has a significant influence on perceived usefulness (PU).

H2b: Perceived Enjoyment (PE) has a significant influence on perceived ease of use (PEOU).

3.3 Social Influence (SOL)

Social influence is defined as the perception of influential people regarding the use of a system (24). Sometimes, people’s decision to adopt or use a system is based on this social influence which means that they are willing to adopt a system to follow others and not because of their personal beliefs or emotions (25). A number of research works have investigated the impact of subjective norms on the adoption or acceptance of e-learning. (22) also revealed a significant association of

subjective norm with the “perceived usefulness” of an e-learning system (22,23,26) and “perceived ease of use” (22,23,26,27). Hence the hypothesis given below is postulated:

H3a: Social influence (SOL) has a significant influence on perceived usefulness (PU).

H3b: Social influence (SOL) has a significant influence on the perceived ease of use (PEOU).

3.4 The technology acceptance model (TAM)

The “perceived usefulness and perceived ease of use” lead to the acceptance of new technology. The users’ behavioral intention to use a technology is also significantly dependent on the “perceived ease of use and perceived usefulness”; this has been indicated in TAM as well as relevant studies. Perceived ease of use depicts the degree of willingness of a user towards the adaptation to a new technology (5). A significant association between the two aspects of “perceived ease of use (PEOU) and perceived usefulness (PU)” was revealed in previous research works (28–30). Moreover, the two aspects of the “behavioral intention to use e-learning system (IU) and perceived ease of use (PEOU)” were also found to have a positive direct and indirect link. A corresponding finding by (31) indicates that the user’s intention to employ an e-learning system and to show direct and indirect willingness to accept and adjust to such a system is affected by “perceived usefulness (PU)”. Another study revealed a significant positive association between “perceived usefulness (PU) and intention to use the e-learning system (IU)” (32,33). Hence, this research identifies that IU, PU and PEOU are positively linked. The relevant literature was reviewed leading to postulation of the hypotheses stated below:

H4. Perceived ease of use (PEOU) has a positive effect on the perceived usefulness (PU).

H5. Perceived usefulness (PU) positively affects the intention of international student to accept an e-learning platforms (BI).

H6. Perceived ease of use (PEOU) positively affects the intention of international student to accept an e-learning platforms (BI).

Figure 1 illustrates that these hypotheses are employed to propose the research model. A structural equation model is developed on the basis of the theoretical model and is subsequently tested.

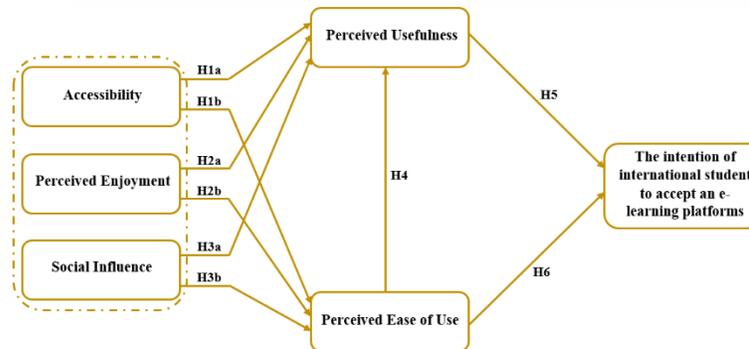


Fig. 1. Theoretical framework.

Research Methodology

Data collection

The data collection for this study was conducted throughout the month of November 2021. An online survey was used as a data collection instrument. The international students studying in public or private universities in the UAE were selected as the study participants. Besides appealing the tourists from around the world, the UAE has also been the center of attention for students worldwide to pursue their education and career. The Abu Dhabi and Dubai are the two most significant destinations that house most of the higher education institutions in the UAE. The web link of the survey was sent to the respondents through college website. This survey was then filled by the respondents. The link also contained a cover letter that elaborated the survey objectives; the cover letter also affirmed that the identities and personal data of the study participants will be kept confidential and not publicized. The cover letter also gave

indications about how long will it take to complete the research. In this research, the traditional face-to face physical classroom settings were used; however, the college used the online platforms like college website, teachers' blog and school intranet to give students the access to course materials uploaded online. The students were asked to obtain the study material available online before each class through their PCs or through the computers at the college laboratory.

Findings and Discussion Hypothesis testing using SEM-PLS

The partial least squares-structural equation modeling (PLS-SEM) was used to analyze the data for this research with the assistance of SmartPLS V.3.2.7 software. The collected data was evaluated using a two-step assessment approach that included a structural model and a measurement model. PLS-SEM was used for this research for a myriad of purposes. Primarily, PLS-SEM is thought to be the ideal option when the goal

of the study is to develop an established notion. Second, the PLS-SEM may be used to effectively manage exploratory research with complex models. Third, rather than breaking the model into bits, PLS-SEM analyses the entire model as a single entity. PLS-SEM, which delivers accurate computations sequentially, provides concurrent analysis for both measurement and structural model. The structural equation model was used in conjunction with Smart PLS and maximum

likelihood estimation to determine the interdependence of several structural model theoretical constructs. Table 1 shows the beta (β) values, t-values, and p-values for each of the hypotheses made using the PLS-SEM technique predicated on the obtained findings. All the hypotheses were strongly supported by all the researchers. The empirical data supported hypotheses H1a, H1b, H2a, H2b, H3a, H3b, H4, H5, and H6 relying on the data analysis.

Table 1. Hypotheses-testing of the research model (significant at $p^{**} \leq 0.01$, $p^* < 0.05$).

H	Relationship	Path	t-value	p-value	Direction	Decision
H1a	ACS -> PU	0.352	3.066	0.035	Positive	Supported*
H1b	ACS -> PEOU	0.617	15.485	0.000	Positive	Supported**
H2a	PE -> PU	0.359	12.572	0.000	Positive	Supported**
H2b	PE -> PEOU	0.587	17.815	0.002	Positive	Supported**
H3a	SOL -> PU	0.665	13.876	0.001	Positive	Supported**
H3b	SOL -> PEOU	0.632	9.154	0.003	Positive	Supported**
H4	PEOU -> PU	0.354	10.362	0.005	Positive	Supported**
H5	PU -> BI	0.458	3.426	0.033	Positive	Supported*
H6	PEOU -> BI	0.725	16.630	0.000	Positive	Supported**

Conclusion

This study intends to extract the factors influencing the perception of the international students about the adoption of electronic learning (e-learning) for their educational activities. The research model will be proposed and the hypothesis for testing the behavioral intention of learners to use e-learning platforms will be postulated on the basis of data analysis results. The research applies Structure equation modeling

(PLS-SEM) for evaluation of research hypotheses. It is found that the behavioral intention of students to use e-learning platforms is positively influenced by the factors of "Accessibility" "Perceived Enjoyment", "Social Influence", "Perceived Usefulness", and "Perceived Ease of Use". The study also suggested that e-learning systems hold significance and are considered as competent online learning platforms by students.

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