Original Article

Effectiveness of E-Learning in Empowering Clinical Staffs and Health Care Employees after Meaningful Use Based on the Technology Acceptance Model

Azadeh Tataei, Ali Valinejadi, Panoeh Seyedroghani, Jamileh Mahdizadeh, Mehdi Kahouei

ABSTRACT

OBJECTIVE: To research the attitudes of clinical and health care staff towards effectiveness of electronic learning based on the Technology Acceptance Model.

METHODOLOGY: This cross-sectional study was conducted from July-September 2019. Participants in this study were staffs who had used electronic learning in-service training during six months in two health care organizations associated to Semnan University of medical sciences in Iran in 2018-2019. The census process was applied and the sampling method was not applied in the present investigation. A Persian version of the TAM questionnaire was used.

RESULTS: Participants who had adopted electronic learning were 75.8%. Mean scores of staff's attitudes towards trend to use electronic learning was 3.61±0.77 and towards usage was 3.43±0.75. There were significant relationships among the mean scores of employees' attitudes toward the easiness of using electronic learning technology, the usage of electronic learning technology and the desire to use it (P<0.001).

CONCLUSION: The current research reflects the practical and applied outcomes of the factors that impact on the adoption of electronic learning based on the technology acceptance model. It has been realized due to the high level of identification and attention to the factors in the infrastructure that impact on the adoption of electronic learning among staffs in health care organizations.

KEYWORDS: Electronic learning, Technology acceptance model, Health care organization, Iran

This article may be cited as: Tataei A, Valinejadi A, Seyedroghani P, Mahdizadeh J, Kahouei M. Effectiveness of E-Learning in Empowering Clinical Staffs and Health Care Employees after Meaningful Use Based on the Technology Acceptance Model. J Liaquat Uni Med Health Sci. 2020;19(02):116-21. doi: 10.22442/jlumhs.201920673

INTRODUCTION

Nowadays, in higher education, there is no question of improving the teaching methodology, but the subject is the improvement of the learning process. Individual differences in the rate and speed of learning of materials have led teachers and authorities to select the appropriate media and tools for education so that they can provide a good educational strategy in accordance with each learner's individual characteristics and needs. It has been proven that the Internet, especially the electronic learning, has solved this problem so that each person can use this system by relying on his own intelligence and needs[1].

Electronic learning refers to a strategy that the educator and the learner can take through the physical distance from each other without face-to-face training and through the online networks[2]. Research has shown that the academic electronic learning is a successful and efficient system if the proper educational content is formulated and evaluated properly[3]. Given the low cost of electronic learning, the temporal and spatial flexibility of this training method and the possibility of independent learning for different people, the policy of using it has been suggested in Iranian university education[4]. The success of an electronic learning program, regardless of the people's point of view, is not possible, and the acceptance or the rejection of computers has a profound effect on their learning[5].

In the field of information technology (IT) and its relation with organizations and individuals, the various studies have been carried out. Some of these studies focus on the attitude of organizations and individuals about the use of information technology and some others about the effect of IT on organizations and individuals. The Technology Acceptance Model (TAM), introduced in 1989, is mostly used by the scholars when they seek to evaluate the attitudes of organizations and individuals towards information systems. In this model, the usefulness and ease of usage of technology, users' attitudes have been emphasized as the agents that can make an affirmative viewpoint about using of technology[6].

To measure electronic learning, the different dimensions of users' perceptions and thinking should be considered. If the users of electronic learning have a positive view of it, then they would be more motivated to use it[1]. The findings of the research performed by Salloum SA 2019[7] in the UAE on 251 university students showed that the information

distribution and the feature in colleges has a optimistic impact on the acceptance of electronic learning amongst the students.

In 2018, Liu Z 2018[8] performed a study aimed at investigating the factors affecting the behavior of 156 Chinese students in using virtual education based on the TAM model; they understood that "perceived ease of usage" and "perceived usefulness" had the highest total effect on "Behavioral Objectives" of the students in an electronic learning program.

Considering that in developing and implementing the new educational method the users' preparation and attitude should be examined socially, culturally, economically and educationally, and also considering that the employees are considered as the capital of an organization and their performance has an essential effect on the organization's failure and success, so the institutions have been evaluating virtual training for the employees. Due to the fact that in Semnan University of Medical Sciences, the in-service training classes are sometimes provided for learners and staff in the form of electronic learning packages, this study aimed to study the attitudes of clinical and health care staff towards effectiveness of electronic learning based on TAM model.

METHODOLOGY

This study was a cross-sectional study conducted from July-September 2019. Participants in this study were staffs who had used electronic learning in-service training during six months in two health care organizations associated to Semnan University of medical sciences in Iran in 2018-2019. The census process was applied and the sampling method was not applied in the present investigation. A whole of 638 questionnaires were disseminated; 400 were returned, which denoted a reply rate of 62.6%. A covering letter was organized for dissemination with the questionnaire, which defined the aims of the study and clarified that a reply to the questionnaire would show the trend of the study subjects to participate in the investigation. It also assured the study subjects of the privacy of their replies. In this study, we used the Persian version of the TAM questionnaire in Jahangeer G 2016 study[9]. The questionnaire was pilot tested on 33 healthcare providers who had been randomly selected from different health care organizations. The participants of the pilot study were excluded from the main study. The Cronbach's alphas for the TAM domains including usefulness, easiness, usage, and tend to use were 0.88.4, 0.89.2, 0.90.6, and 0.90.2, respectively and the Cronbach's alpha for the total scale was 0.95.1. The original attitudes scale on every entry were valued on a 5-point Likert type scale, where Very low = 1, Low = 2, Somewhat = 3, High = 4 and Very high = 5. The survey was distributed among the staffs and was returned to the researcher. A frequency distribution table was used for description of categorical variables as characteristics including demographics. Means was computed for separate items on the viewpoint scale, that valued the study subjects' attitudes about electronic learning. A cut-off 3 (low score ≤3; high score >3) was set based on the two higher scores of the 5-point Likert items (high and very high). A low number showed an undesirable attitude, while a high number showed a optimistic attitude with agreement. Curve estimation was used to analyze data. SPSS-16 software was used to describe and analyze the data in significant level of 0.05. Morals endorsement was gained from the Semnan University of Medical Ethics Committee (IR. SEMUMS. REC. 1397.130). The questionnaire was distributed among the study subjects by the researcher and were returned to the researcher. The duration of the questionnaires filling by the participants ranged from 10 to 20 minutes.

RESULTS

The results indicated that 74.9% were female, 40.6% were between 30-40 years old, 71.5% of the participants had at least a bachelor's degree, and 51.6% were clinical staffs. 37.5 % had work experiences more than 10 years, 60% had as much as necessary computer skill and 52.8% had as much as necessary internet skill. (Table I)

75.8% of the participants had adopted electronic learning. (Figure I)

Mean scores of staff's attitudes towards trend to use electronic learning was 3.61±0.77 and towards usage was 3.43±0.75. (Table II).

There was a important association among the average scores of employees' attitudes toward the easiness of using electronic learning technology and the desire to use it (Coefficient=0.617, P<0.001). (Figure II).

There was a important association among the average scores of employees' attitudes toward the usage of electronic learning technology and the desire to use it (Coefficient=0.717, P<0.001) (Figure III).

TABLE I: DEMOGRAPHIC CHARACTERISTICS

Characteristics	Group	N	%
Sex	Male	100	25.1
	Female	299	74.9
Age (Year)	>30	157	39.3
	30-40	162	40.6
	40<	80	20.1
Education level	Diploma	26	6.5
	Technician	48	12
	Bachelor degree	286	71.5
	Master degree	40	10

Job field	Administrative	70	17.5
	Allied health	124	30.9
	Clinical	207	51.6
Work experiences (Year)	<5	134	34.6
	5-10	108	27.9
	10>	145	37.5
Computer skill	Very little	5	1.3
	Little	32	8
	as much as necessary	239	60
	High	109	27.4
	Very high	13	3.3
Internet skill	Very little	6	1.4
	Little	23	5.8
	as much as necessary	211	52.8
	High	132	33
	Very high	28	7

FIGURE I: ACCEPTANCE STATUS OF ELECTRONIC LEARNING

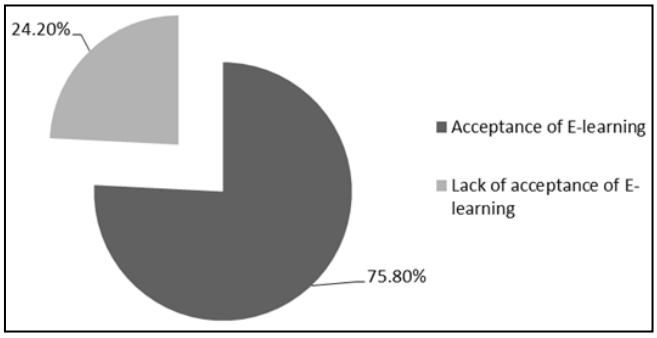


FIGURE II: THE RELATIONSHIP BETWEEN THE MEAN SCORES OF EMPLOYEES' ATTITUDES TOWARD THE EASINESS OF USING ELECTRONIC LEARNING TECHNOLOGY AND THE DESIRE TO USE IT (R^2=0.422, P<0.001)

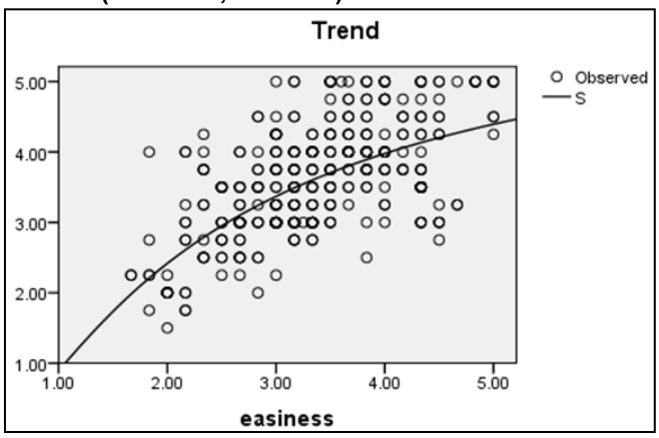


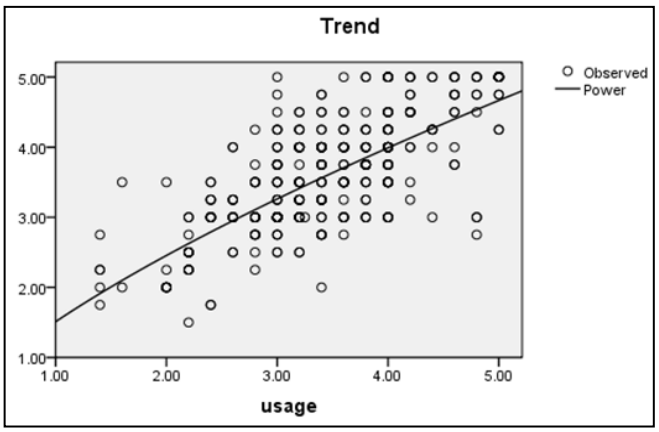
TABLE II: MEAN SCORES OF STAFF'S ATTITUDES TOWARDS THE COMPONENTS OF ELECTRONIC LEARNING ACCEPTANCE

Field	Variables	Mean	SD	Total mean (SD)
Usefulness	usefulness of the technology	3.57	0.85	3.54(0.710)
	improve the quality of work	3.61	0.86	
	increase productivity of work	3.52	0.95	
	speeding up things	3.68	0.93	
	ease of doing task	3.49	0.94	
	increase achievement goals	3.38	0.83	
Easiness	easy to use	3.43	0.86	3.37(0.71)
	easy earn skills	3.39	0.84	
	Flexibility	3.22	0.89	
	make clear communication	3.39	0.90	
	convenient use in case of need	3.40	0.95	
	easy to learn	3.45	0.86	
Usage	Usefulness	3.53	0.85	3.43(0.75)
	to be pleasant	3.40	0.89	
	to be lovely	3.33	0.85	
	Wisdom	3.47	0.91	
	be good	3.45	0.90	
Tend to use	tend to use in the future	3.63	0.95	3.61(0.77)
	tend to use if needed	3.58	0.86	
	tend to use continuously	3.56	0.87	
	tend to use to do tasks	3.67	0.83	

DISCUSSION

The findings showed that according to the technology acceptance model, most of the statistical population accepted electronic learning. Many studies show the predictability of the technology acceptance model by the users, in particular with the general approach to high-level technology[10,11]. The research of Hammouri Q 2018[12] in Jordan indicated that the realized ease of use, realized usefulness, system feature, data quality and the system self-efficacy are some important agents impacting on the gratification and acceptance

FIGURE III. THE RELATIONSHIP BETWEEN THE MEAN SCORES OF EMPLOYEES' ATTITUDES TOWARD THE USAGE OF ELECTRONIC LEARNING TECHNOLOGY AND THE DESIRE TO USE IT (R^2=0.537, P<0.001)



of electronic learning. Therefore, it can be concluded with certainty that the results of this research in the field of acceptance of electronic learning have a high predictive power and a reason for the validity of the findings.

The results of this study showed that the usefulness of electronic learning for employees was understandable (mean = 3.54). The results of the research performed by Lee YH 2014[13] in Indonesia confirm the findings of this study. The results of that investigation also showed that the students of the two state universities in that country had somewhat (average = 3.5) perceived the benefits of electronic learning. The perceived usefulness in the organization by individuals can be understood in two ways. Firstly, the proper planning by the university creates the feeling for employees that the efforts made to use electronic learning make them achieve their goals. Secondly, when electronic learning has an impact on the efficiency and effectiveness of duties of staff, they ultimately feel that this technology is beneficial[14].

The findings showed that employees have somewhat understood the ease of electronic learning (Average = 3.37). One of the important working procedures in this regard could be the proper design of electronic learning, because with the proper design and implementation of a similar model in educational processes, it is convenient for users to work with it and there is no need to learn any training process' use and strategy[15]. The findings of the investigation done by Kanwal F 2017[16] in one of Pakistan's virtual universities showed that some factors such as computer-based self-efficacy, the experience of working with the Internet, and computer system features can be the determinant factors in understanding users with regard to ease of electronic learning. The results showed that there was an optimistic and significant association (R^2 = 0.422, P <0.001) between employees' perception of electronic learning ease and their decision to use this technology. It can be argued that as much as the employees have a more positive perception of ease of electronic learning, they will evaluate this technology as a step toward their professional goals. Therefore, mentally, they are more likely to use these technologies and choose it in line with their own profession and most often use it.

The results of this study indicate that electronic learning for employees has been somewhat applicable (Average = 3.43). One of the great problems for some universities in the use of electronic learning technology is the absence of a steady strategy in using this technology. Many managers of the education system do not yet have a correct vision of using electronic learning. Therefore, teaching and inducing thinking about using information technology and creating a steady strategy in the organizations for electronic learning is an essential step for development of different dimensions in the country. In addition, its recommended that steps be taken to organize the workshops to improve the employees' attitude towards using electronic learning.

Despite the fact that the employees had a positive attitude toward electronic learning applicability, their viewpoint on the decision to use this technology for learning was good (Mean = 3.61), also the findings indicated that there was a significant optimistic relationship between the employees' attitudes toward electronic learning applicability and their decision to use this technology (R^2 = 0.537, P <0.001). The study of Faqih K 2016[17] in Jordan showed that the perceived value and realized utility had a optimistic impact on the behavioral intention, while the perceived usefulness was more effective. It seems that in the campus, the influence of reference groups (friends and colleagues) on the staff's subjective norm is high and subsequently, the subjective norm will also change the intent of people to utilize electronic learning. So, paying attention to this variable would also predict a better usage of electronic learning.

Implications

The findings of this research have several implications. Firstly, in light of the employees' insight of the helpfulness of electronic learning, it seems the educational materials provided through electronic learning to have better quality to increase the perceived usefulness of this technology. Therefore, the engineers of electronic learning systems must consider to the employee's mental perception of the usefulness of these types of technologies.

Secondly, the employees' understanding of the ease of electronic learning shows that in the field of the facilities of the technology, the hardware and software infrastructure of this technology needs to be developed and improved so that the employees feel more comfortable when using it.

Thirdly, the findings of this research can provide the basis for further research and studies and designing different interventions to improve the level of application of the web-based education among employees. The present research findings can be a guide for policymakers to anticipate the potential of organizational culture and try to institutionalize the use of web-based education, which is the most important achievement of the advancement of information and communication technology.

Limitations and future studies

Despite the increasing number of operational solutions for accepting electronic learning in the employees of health and medical institutions, the present study has had limitations, such as the lack of actual feedback from some research samples for different reasons, identification limits of the hidden layers of quality in implementing model, the impact of economic, social, cultural-social systems on the model, the different attitudes of the subject, the superficial look at the technology acceptance model, and the restriction of the term in the visible outputs of instruction. Therefore, more studies are necessary in this regard to identify other agents that play a decisive role in the attitude of individuals on the helpfulness and easiness of using electronic learning and other variables. They are: organizational factors, social factors, features of computer systems such as the type of hardware and software, education, and other people's contributions to electronic learning.

CONCLUSION

The current research reflects the practical and applied outcomes of the factors affecting the adoption of electronic learning based on the technology acceptance model. It has been realized due to the high level of identification and attention to the agents in the infrastructure that impact on the adoption of electronic learning in the staff. These include individual factors such as the variable of mental perception of the ease of using this technology, its usefulness, the use of electronic learning and the variable to decide on its use. Regarding the results of this research, it seems that the authorities should encourage teachers and instructors to apply electronic learning by encouraging targeted groups and try to create appropriate platforms for group trainings in the scientific environments.

ACKNOWLEDGEMENT

We would like to thank the Clinical Research Development Unit of Kowsar and Amiralmomenin Educational, Research and Therapeutic Centers of SemnanUniversity of Medical Sciences for providing facilities to this work.

Ethical Permission: Semnan University of Medical Sciences and Health Services permission letter No. IR.SEMUMS.REC.1397.130, Dated 21-08-2018

Conflict of Interest: The authors have declared that no competing interests exist.

Funding: Research reported in this publication was supported by a grant [number:1451] from the Semnan University of Medical Sciences, Semnan, Iran.

REFERENCES

1. Gamble C. Exploring EFL University Students' Acceptance of Electronic Learning Using TAM. J Kwansei Gakuin Univ Human Review. 2018; 22: 23-37.
2. Cidral WA, Oliveira T, Di Felice M, Aparicio M. Electronic learning success determinants: Brazilian empirical study. Comp Educ. 2018; 122: 273-90. doi:10.1016/j.compedu.2017.121.001.
3. Al-Samarraie H, Teng BK, Alzahrani AI, Alalwan N. Electronic learning continuance satisfaction in higher education: a unified perspective from instructors and students. Stud Higher Educ. 2018; 43(11): 2003-19. doi:10.1080/03075079.2017. 1298088.
4. Al-Gahtani SS. Empirical investigation of electronic learning acceptance and assimilation: A structural equation model. Applied Comp Inform. 2016; 12(1): 27-50.
5. Tarhini A, Teo T, Tarhini T. A cross-cultural validity of the Electronic Learning Acceptance Measure (ElAM) in Lebanon and England: A confirmatory factor analysis. Educ Info Tech. 2016; 21(5): 1269-82.
6. Mohammadi H. Investigating users' perspectives on electronic learning: An integration of TAM and IS success model. Comp Human Behavior. 2015; 45: 359-74.
7. Salloum SA, Al-Emran M, Shaalan K, Tarhini A. Factors affecting the Electronic learning acceptance: A case study from UAE. Education and Information Technologies. 2019; 24(1): 509-30.
8. Liu Z, Wei Z. Research on Chinese College Students' Using Behavior towards Electronic Learning Services Based on Improved TAM Model. Conference: Proceedings of the 2nd International Conference on Social Science, Public Health and Education (SSPHE 2018). 2018.
9. Jahangeer G, Dayani MH, Nowkarizi M. Acceptance of Information Systems Research (pazhoohan) and behavior of Mashhad University of Medical Sciences faculty members based on the technology acceptance model (TAM). J Librarianship. 2016; 49(4): 537-55.
10. Ibrahim R, Leng NS, Yusoff RC, Samy GN, Masrom S, Rizman ZI. E-learning acceptance based on technology acceptance model (TAM). J Fundam Appl Sci. 2017; 9(4S): 871-89.
11. Tarhini A, Elyas T, Akour MA, Al-Salti Z.

Technology, demographic characteristics and E-learning acceptance: a conceptual model based on extended technology acceptance model. Higher Educ Studies. 2016; 6(3): 72-89.
12. Hammouri Q, Abu-Shanab E. Exploring Factors Affecting Users' Satisfaction Toward E-learning Systems. Int J Info Comm Tech Educ. 2018; 14 (1): 44-57. doi:10.4018/IJICTE.2018010104.
13. Lee YH, Hsiao C, Purnomo SH. An empirical examination of individual and system characteristics on enhancing e-learning acceptance. Aust J Educ Tech. 2014; 30(5): 562-79. doi:10.14742/ajet.381.
14. Hussein Z. Leading to Intention: The role of attitude in relation to Technology Acceptance Model in e-learning. Procedia Comp Sci. 2017; 105: 159-64. doi:10.1016/j.procs.2017.01.196.
15. Decman M. Modeling the acceptance of e-learning in mandatory environments of higher education: The influence of previous education and gender. Comp Human Behav. 2015; 49: 272-81.
16. Kanwal F, Rehman M. Factors affecting e-learning adoption in developing countries–empirical evidence from Pakistan's higher education sector. IEEE Access. 2017; 99: 1-1.
17. Faqih K. Which is more important in electronic learning adoption, perceived value or perceived usefulness? Examining the moderating influence of perceived compatibility. In 4th Global Summit on Education GSE, 14-15 March 2016, Kuala Lumpur, Malaysia. World Conferences.

AUTHOR AFFILIATION:

Azadeh Tataei
Student Research Committee
School of Allied Medical Sciences,
Semnan University of Medical Sciences, Semnan, Iran.

Ali Valinejadi
Social Determinants of Health Research Center
Semnan University of Medical Sciences, Semnan, Iran.

Panoeh Seyedroghani
Department of Nursing
Nursing School, Islamic Azad University
Semnan branch, Semnan, Iran.

Jamileh Mahdizadeh
Department of English Language
School of Medicine, Semnan University of Medical Sciences
Semnan, Iran.

Mehdi Kahouei *(Corresponding Author)*
Social Determinants of Health Research Center
Semnan University of Medical Sciences, Semnan, Iran.
Email: mkahouei@yahoo.com