The Correlation between Effective Factors of E-learning and Demographic Variables in a Post-Graduate Program of Virtual Medical Education in Tehran University of Medical Sciences

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Abstract- E-learning as an educational approach has been adopted by diverse educational and academic centers worldwide as it facilitates learning in facing the challenges of the new era in education. Considering the significance of virtual education and its growing practice, it is of vital importance to examine its components for promoting and maintaining success. This analytical cross-sectional study was an attempt to determine the relationship between four factors of content, educator, learner and system, and effective e-learning in terms of demographic variables, including age, gender, educational background, and marital status of postgraduate master's students (MSc) studying at virtual faculty of Tehran University of Medical Sciences. The sample was selected by census (n=60); a demographic data gathering tool and a researcher-made questionnaire were used to collect data. The face and content validity of both tools were confirmed and the results were analyzed by descriptive statistics (frequency, percentile, standard deviation and mean) and inferential statistics (independent t-test, Scheffe's test, one-way ANOVA and Pearson correlation test) by using SPSS (V.16). The present study revealed that There was no statistically significant relationship between age and marital status and effective e-learning (P>0.05); whereas, there was a statistically significant difference between gender and educational background with effective e-learning (P<0.05). Knowing the extent to which these factors can influence effective e-learning can help managers and designers to make the right decisions about educational components of e-learning, i.e. content, educator, system and learner and improve them to create a more productive learning environment for learners.

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Introduction

E-learning is an educational method that facilitates learning by the application of information technology and communication providing an opportunity for learners to have access to all the required educational programs any time that deems necessary (1,2). Learners are the primary users of learning management system (LMS); therefore, system managers and administrators must be accountable to their learning needs and problems and must provide a comprehensive system that resolves all the existing or probable issues.

E-learners use LMS to access content, to communicate with their classmates and teacher, to access assignments, and to take part in the evaluation process (1). To create an effective electronic learning experience, it is necessary to be knowledgeable about specific features of e-learning, individual characteristics

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of e-learners, and educational methods through which meaningful learning takes place. In this regard, rules and principles of teaching-learning process in electronic learning must be taken into consideration.

In this regard, this study is an attempt to investigate the correlation between effective key factors affecting E-learning and learners' demographics in Virtual Medical Education Post-graduate Students of Tehran University of Medical Sciences.

Materials and Methods

In this analytical cross-sectional study, there were 60 students of virtual medical education, master's degree, studying at Tehran University of Medical Sciences Virtual Faculty, who were selected by census (n=60). The participants had completed all their theoretical courses before the start of the study (February, 2013). Demographic data gathering tool and a researcher- made questionnaire were used to collect data, both of which were confirmed in terms of face and content validity and reliability.

To make the main research questionnaire, factors affecting effective e-learning were identified by a comprehensive literature review and experts' opinion. The questionnaire consisted of 19 questions ranked according to Likert scale and factors such as audio slide content presentation, quality of audio-visual slides, sequential content presentation, content presentation timing, key points presentation, number of exercises and their attractiveness, e-teacher prompt feed-back, e-teacher content mastery, e-teacher availability through the LMS, peer-availability through the LMS, reference accessibility, educational modules including films or CDs, accessibility to valid educational sites, e-learner computer literacy, e-learner virtual literacy, user-friendly LMS, face-to-face meeting with e-teacher, and simultaneous presentation of e-content and e-teacher images were included.

The face and content validity of the questionnaire were confirmed by 12 education experts and revisions were applied accordingly. In addition, reliability of the questionnaire was confirmed by test-retest. For this step, the main research questionnaire was electronically administered (through LMS system) twice (with one-week lapse) to 8 virtual postgraduate students who were not among the study sample (r=0.75).

Participant's consent to take part in the study was secured, and the data gathering tools were sent to all of them through the LMS. The response rate was 100%. To analyze the data, for descriptive statistics (frequency, percentile, standard deviation and mean) and inferential statistics the following tests were applied: Kolmogorov–Smirnov test (to assess normality), independent t-test (to compare the relationship between the impact of e-content, e-teacher, e-learner, and the LMS on effective e-learning and bimodal variables of sex and marital status of e-learners), Scheffe's test, One-way ANOVA (to compare the relationship between the impact of e-content, e-teacher, e-learner, and the LMS on effective e-learning and e-learners' educational background) and Pearson correlation coefficient (to assess the correlation between qualitative variable of e-learner's age and the influence of each factor affecting effective e-learning). A p-value of 0.05 was considered as significant for all the tests. SPSS software (V.16) was used for statistical analysis.

To assess the correlation between qualitative variable of e-learner's age and the influence of each factor affecting effective e-learning, Pearson correlation coefficient test was used. Moreover, to assess the impact of e-content, e-teacher, e-learner and the LMS according to bimodal variables of sex and marital status, independent t-test was used. Finally, to assess and compare the impact of e-content, e-teacher, e-learner and the LMS on effective e-learning according to e-learners' educational background, One-way Analysis of Variance (ANOVA) and Scheffe test were used.

Results

The results of the study showed that 85% of participants were women, most of whom (93.3%) were Bachelor degree graduates (Table1).

Table1. Frequency of participants' educational background

Educational background (degree)	Frequency (%)
Bachelor	56(93.3%)
Master's	2(3.3%)
General Practitioner	2(3.3%)
Total	60(100%)

Most of the study participants were between 35-40 years (45%) with the mean age of 40.2 years (SD 4.66) (Table 2).

Table 2. Frequency of participants' age

Age	Frequency (%)
28-34	5(8.3%)
34-40	27(45%)
40-45	21(35%)
45-54	7(11.7%)
Total	60(100%)

The results indicated that 61.7% of the participants were married, and 38.3% were single. To show the correlation between qualitative variables of age and the impact of e-content, e-teacher, e-learner and LMS according to bimodal variables of sex and marital status Pearson correlation coefficient was used. Table-3 shows that there was no significant relationship or linear correlation between the aforementioned variable and the factors(r= 0.17, *P*= 0.05). In other words, e-learners' age had no influence on their attitude in regard to the impact of four factors of e-content, e-teacher, e-learner and LMS on their effective learning (Table 3).

Table 3. Matrix of correlation between participants' age and their perspectives on the four factors affecting e-learning

Variable	Parameter	e-content	e-teacher	e-learner	LMS
Age	Pearson product moment correlation	0.166	0.08	-0.001	0.047
	p-value	0.205	0.544	0.994	0.721
	number	60	60	60	60

Independent t-test was used to assess and compare the effect of e-content, e-teacher, e-learner and the LMS on effective e-learning and e-learners' sex. The results presented in table-4 in regard to the content and the *P*-value (less than 0.05) indicate that the mean average of the impact of content in both sexes was different (*P*=0.002). In other words, from the female point of view the mean average was 3.39 that was different from that of male point of view (mean average =3.53).This finding suggests that men were more concerned about the influence of content on their effective e-learning than women.

Moreover, the influence of e-teacher on male and female e-learners show a difference (*P*-value=0.049); mean average of women's view (3.59) differs from that of men's (3.44), suggesting that women considered the influence of e-teacher on their learning more than men.

Table 4. Mean score of factors affecting effective e-learning according to the sex

Variable	Sex	e-content	e-teacher	e-learner	LMS
Sex	**Male**	3.53	3.44	2.46	2.89
	Female	3.39	3.59	2.44	2.91
p-value		0.002	0.049	0.657	0.863

To compare the relationship between the influence of e-content, e-teacher, e-learner, and the LMS on effective e-learning and e-learners' educational background, One-way Analysis of Variance (ANOVA) and Scheffe's tests were used. ANOVA assesses the significance between the mean overall average of different educational backgrounds (degrees), and it does not indicate the significant difference between the groups; therefore, to find out this value, Scheffe's non-parametric test was used (Table 5).

Table 5. Mean score of four factors affecting effective e-learning according to the educational backgrounds

Educational background (degree)	e-content	e-teacher	e-learner	LMS
Bachelor	3.42	3.56	2.45	2.91
Master's	3.5	3.83	2.42	3
General Practitioner	3.06	3.67	2.33	2.75
***P*-value**	0.024	0.443	0.851	0.78

Additionally, the results of table-5 show that there was a significant relationship between content and the learners' educational background (*P*-value=0.024). The results of Scheffe's test also indicated that the mean average score of the two groups with probability of 0.95% was unequal. The differences in educational backgrounds appeared to be between bachelor and Graduate Practitioner (GP) degrees (*P*-value=0.03). GPs (mean=3.06) compared to bachelor degree graduates believed that the content had a less significant influence on effective e-learning. Furthermore, no significant difference was found between bachelor and master's and master's and GP degrees (Table 6).

To compare the relationship between the influence of e-content, e-teacher, e-learner, and the LMS on effective e-learning and e-learners' marital status, independent t-test was used. Considering the P-value of 0.05 for all the

mentioned factors, it was found that there was no significant difference between the relationships of the influence of these factors on effective e-learning from the point of marital status.

Table 6. Mean score of four factors affecting effective e-learning according to the marital status of learners

Variable	Marital status	e-content	e-teacher	e-learner	LMS
Marital status	Married	3.39	3.55	2.47	2.97
	Single	3.45	3.61	2.39	2.8
P-value		0.295	0.482	0.274	0.08

Discussion

The findings of this study suggest that there is no significant difference between age of e-learners and the influence of four factors of e-content, e-teacher, e-learner and the LMS (*P*-value=0.05). In other words, age does not affect e-learner's point of view in regard to the above-mentioned factors, which is consistent with findings of Hong (2002), Chen and Lin (2002), Yukselturk (2007), Colorado (2010), Marti´nez-Caro (2011) (3,4,5,6,7).

Inconsistent with the results of Hong (2002), Chen and Lin (2002) the results of this study show that the influence of e-content and e-teacher on effective e-learning is different between females and males. Men believed that e-content was more influential on effective e-learning while women considered e-teachers more influential (3,4). This finding might suggest that women in this study were more teacher-oriented; while, men appeared to be more self-directed.

The learners participating in this study had no previous experience of e-learning and had merely experienced on campus classes. This might be the reason for their perception of the important role of teachers. By the same token, the participants of the study acknowledged the interaction between teachers and learners as an important issue. The other speculation about this finding could be related to personality traits of females and males. While males are more competent in working with computers and accordingly computer-based learning, females are more content with face to face interaction; however, this needs further investigation (8).

The influence of e-learner and the LMS on effective e-learning were not different between the sexes. This finding is consistent with Hong (2002), Chen and Lin (2002), and Marti´nez-Caro (2011) (3,4,7).

In contrast with the findings of Yukselturk (2007), Colorado (2010) on the relationship between e-content and e-learners' educational background and effective e-learning, the results of this study show that there is a significant difference between e-learners' educational background (Master's and GP) and their attitudes(*P*-value<0.05). In other words, GPs considered the influence of e-content on effective e-learning less than MSc graduates. However, there was no significant difference between the point of view of bachelor and master's graduates, and master's and GP graduates (*P*-value<0.05). Moreover, there was no significant relationship between other factors (e-teacher, e-learner, and the LMS) and e-learners' educational background (*P*>0.05)(5,6). Finally, the present study indicates that there is no significant relationship between e-content, e-learner, and the LMS and e-learner's marital status (*P*>0.05) that is similar to findings of Chen and Lin (2002) (3).

It seems reasonable to develop an e-learning program by taking into account gender and educational background that appeared to have a significant role in an effective e-learning program in the present study. Thus, extending knowledge in this area will help e-designers, e-curriculum planners, and e-system administrators to promote the effectiveness of e-learning on the basis of e-learners' immediate and long-term educational needs. Moreover, they can make intelligent decisions in accordance to the findings of this study that will lead to a quality e-learning program.

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