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TEST OF ATTITUDES TOWARDE-LEARNING(TOATEL): (CONSTRUCTION, VALIDATION AND IMPLEMENTATION OF THE INSTRUMENT)

Jaleh Hassaskhah, Firoozeh Firoozi*

Abstract

The issue of quality in the E- Learning programs has not yet come to rest. In this regard, there are still many higher education institutions, such as the University of Guilan, which need ongoing assessment of their programs to keep up with the global standards of virtual education across the globe. Therefore, this study was designed to construct, validate and implement an instrument (TOATEL) in order to test the attitudes of one major group of stakeholders (N= 103 students) towards the role of nine major components of success inmost E-Learning systems: technology, content, goals and objectives, text structure and content, graphic designs, length of the course and its efficacy, educational sources, teaching method, and cooperation and interaction. The results of the factor analyses, and the non-parametric Mann-Whitney U Test pinpointed the areas in the E-Learning programs that need to improve in order for the University to be able to keep up with the standards of the E-Learning systems .

Keywords: E-learning, Attitude, success determinants of E-Learning

Introduction

With the quality of eliminating the barriers of time and distance, E-Learning has prompted universities and others higher education institutions to adopt the technology. In fact, today nearly 75% of the 129 top US universities are usingthe system (Wang & Wang, 2009) and as a result their teaching and learning processes have already been changed (Punie et al., 2006).

* **University of Guilan**

Considering that due to many constraints some individuals in some countries, such as in Iran, do not have access to conventional face-to-face classrooms, E-Learning is able toprovide them with a chance of higher education (Hassanzadeh et al., 2012).

Iranian universities are still in their infancy in the field of E-Learning. Indeed, it was only in 2001 that the first virtual education site was launched in the University of Tehran with 9 course, and although more recently,the number reached 26 (Hassanzadeh et al., 2012),in retrospect, not all have been successful. Indeed, there are a number of challenges that theyshould either cope with or overcome as they seek to implement the E-Learningsystems. Therefore,to meet the demand for E-Learning and hence to elevate the general acceptance of virtual communities, Iranian universities need to evaluate the E-Learning programs, standardize their system for E-Learning, and calibrate them to their local demands.Accordingly, the goal of this research is to construct, validate and implement a scale which can be helpful in addressing the issues in the E-Learning system of the University of Guilan.

Methodology

Participants& Procedures

The population for the study consisted of all of the students doing different types of degree programs at the E- Learning system of the University of Guilan in the academic year 2016–2017. A research instrument, called Test of Attitudes Toward E-Learning (TOATEL) was constructed for this research purpose. After validating the TOATEL and assessing its reliability the researcher administered the test to the target population in two formats: both in print and online format to test their attitudes toward the E-Learning program at their university. From among the received questionnaires only 103 were suitable for the analyses (The others were incomplete). The main purpose of the questionnaire was to evaluate the E-Learning program at the University of Guilan with reference to the success determinants in the E-Learning system. In compliance with ‘Ethics in Research’, all participants were informed about the research objectives, and those who participated in the study did so with the full consent.

Scale Construction

Initially, based on the information obtained through previous literature (e.g. Laskaris, 2015), researcher's own experience and consultation with teachers and students involved in the E-Learning, the defining factors in the E-Learning system were identified. Next, the factors (N=86) were incorporated in a closed questionnaire and then were reviewed by two experts in the field of E-learning. Each item in the questionnaire was a statement followed by options that ranged from strongly agree to no comment to strongly disagree . In addition, in order to have a clearer picture of the study, the items in the questionnaire were further categorized into nine main categories, each of which represented one dimension of the success determinants in the E-Learning systems. Later, the statistical technique of factor analysis was used as a data reduction tool to reduce and summarize the data.

Scale Validation

In order to verify whether or not the data was suitable for the factor analysis, the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) value was checked. The computed KMO value came to (KMO= .847) that was higher than the minimum amount required (KMO ≥ .6). Moreover, the Bartlett's Test of Sphericity value was significant (.00 ≤ .05) therefore factor analysis was appropriate. In order to determine the number of factors to retain, the Scree plot was used (Figure 1). There was quite a clear break between the first and second components in the scree plot. Furthermore, there was also slight break after the second component and the third one. Minute breaks were also observed between component three and four, four and five, five and six, six and seven, seven and eight, and eight and nine. However, component 1 explained much more of the variance than the remaining components.

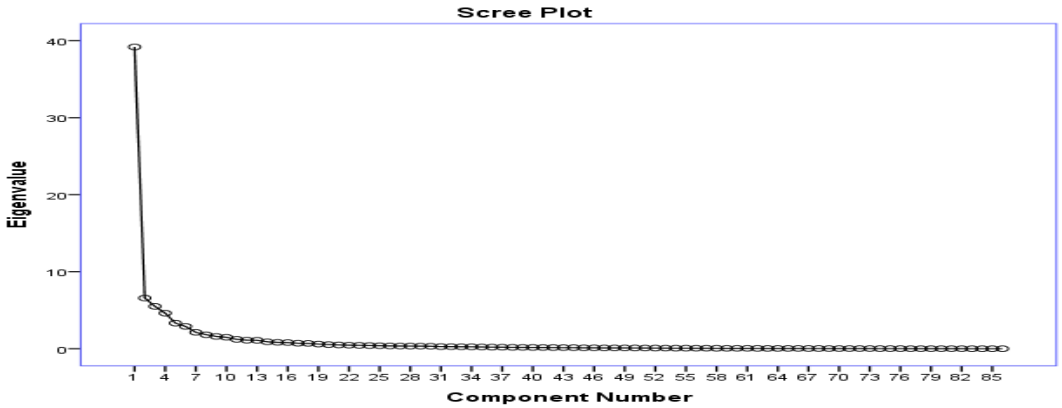

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Figure 1 scree plot for the component extraction

Principal components analysis revealed the presence of nine components with Eigen values exceeding 1, explaining 45.56%, 7.65%, 6.39%, 5.36%, 3.86%, 3.36%, 2.47%, 2.11% and 1.85% of the variances, respectively. An inspection of the scree plot revealed a clear break after the first component. The nine components explained (78.64%) of the variance, with Component 1 with the highest percentage of contribution to explain the variances of the items (45.56%).

The extraction of nine factors in the factor analysis indicated that the evaluated questionnaire was reliable and construct valid. The items measured the same underlying construct. However, the results of the rotated component matrix showed that items 5, 7, 8, 9, 17, 37, 50, and 80 did not load on any nine components specified and consequently were excluded. Therefore, the original 86 item questionnaire was reduced to a questionnaire including 78 items which were used as the final instrument for data collection. In order to determine how closely related the items were as a group, the reliability of the TOATEL was estimated through Cronbach's Alpha's measure of internal consistency.The value of Cronbach's Alpha for the questionnaire used by this study was (.977, rounded up to .98), indicating that the questionnaire could be considered as a reliable tool for the main survey study. (Barker, Pistrang& Elliott, 1994)

Scale Implementation

The main purpose of theTOATEL was to assess the attitude of the students towardsthe E-Learningprograms at the University of Guilan. In order to address this, descriptive statistics was run to summarize the data for the nine components of the questionnaire. The results appearbelow.

Results

1. Descriptive Statistics for the Students' Attitudes towards E-LearningTechnology

The first category of the questionnaire inspected the participants' viewpoint with respect to "E-learning technology." Descriptive statistics including mean ranks and standard deviations were computed for the (n= 7) items of the first section of the questionnaire. The results are presented in Table 1.

Table 1: Item Statistics for the E-LearningTechnology

	Mean	SD
1. Virtual learning infrastructures including high speed internet, computer with ability to connect to internet, and … are appropriate.	3.17	1.269
2. Appropriate systems and electronic devices for educational management are provided.	3.01	1.159
3. Information is easily accessible for students.	3.11	1.171
4. Navigation in web based portals and E-Learninginterface is easy.	3.26	1.057
5. Instructions on the software and hardware requirement are clear.	**3.45**	1.082
6. Using multimedia technology is easy for all students.	2.99	1.034
7. Students are surveyed on the type of technology used.	**2.47**	1.110

The students in the University of Guilan reflected their highest positive attitude towards item five. This item scrutinized their perceptions of "the comprehensiveness of instructions on the software and hardware requirement" (M= 3.45). In contrast, they made their lowest rating for the seventh item that asked them "if the students were surveyed on the type of technology used" (M= 2.47). The respondents were relatively varied in their ratings for the first item (SD= 1.26). However, they were somewhat consistent in their ratings for item six (SD= 1.03).

The results indicated that technology introduced and implemented into their educational systems was satisfactory. Moreover, most of them seemed to believe in the appropriateness and usefulness of technology resources in improving their E- learning program.

2. Descriptive Statistics for the Content of the E- Learning Program

The second category of the questionnaire assessed the participants' viewpoint with respect to "E-learning content." Descriptive statistics including mean ranks and standard deviations were

calculated for the (n= 5) items of the second section of the questionnaire. The results are presented in Table 2.

Table 2: Item Statistics for Content of the E- learning Program

		Mean	SD
8.	Course syllabus contents are up-to-date.	3.12	1.140
9.	Course syllabus offered is relevant to the subject of the course.	**3.77**	.888
10.	The academic level of offered courses is in line with student's level.	3.27	1.131
11.	Examples and samples are beneficial, relevant, and enlightening.	3.11	1.137
12.	Course content as the only source is sufficient for comprehending the lessons.	**2.55**	1.091

The students in the University of Guilan expressed their highest positive attitude towards item nine. This item inspected their perceptions of "the relevance of the course syllabus offered to the subject of the course" (M= 3.77). In contrast, they made their lowest rating for the twelfth item that enquired them "about the sufficiency of the course content as the only source for comprehending the lessons" (M= 2.55). The ratings were relatively heterogonous for the eighth item (SD= 1.14). However, the respondents were uniform in their ratings for item nine (SD=.88).

3. Descriptive Statistics fortheGoals and Objectives of E- Learning Program

The third category of the questionnaire assessed the participants' viewpoint with respect to "goals and objectives." Descriptive statistics including mean ranks and standard deviations were calculated for the (n= 5) items of the third section of the questionnaire. The results are presented in Table 3.

Table 3: Item Statistics for Goals and Objectives of E- Learning Program

		Mean	SD
13.	Course content is in line with the goals of E-learning.	**3.16**	1.064
14.	The goals of E-Learningare clearly laid out in beginning of the instructional period.	2.98	1.120
15.	The actual benefits of the E-Learningare reflected in the goals of E-learning.	2.84	1.127

16.	The goals of the learning period are set according to the student ability.	2.89	1.154
17.	Students are surveyed on the additional goals that could be important for E-learning.	**2.41**	1.167

The students in the University of Guilan reflected their highest positive attitude towards item thirteen. This item evaluated their perceptions of "the linearity between the course content and the goals of E- leaning" (M= 3.16). In contrast, they made their lowest rating for the seventeenth item that asked them "if the students were surveyed on the additional goals that could be important for e-learning" (M= 2.41). The respondents provided relatively dispersed ratings for the seventeenth item (SD= 1.16). However, they were consistent in their ratings for item thirteen (SD= 1.06).

4. Descriptive Statistics for the Text Structure and Content

The fourth category of the questionnaire inspected the participants' viewpoint with respect to "text structure and content." Descriptive statistics including mean ranks and standard deviations were calculated for the (n= 12) items of the fourth section of the questionnaire. The results are presented in Table 4.

Table 4: Item Statistics for the Text Structure and Content of the E- learning Program

		Mean	SD
18.	The courses are offered in a rational and understandable sequence.	3.03	1.115
19.	Major and minor course subjects are sorted in a rational manner.	3.17	1.158
20.	All the constituents are relevant and in line with course subjects.	3.16	1.073
21.	Table and charts are used to organize the course contents.	2.97	1.133
22.	Course keywords are bolded.	3.06	1.170
23.	Course layout is arranged based on predictable models such as subject-content-assignments-quizzes…	3.02	1.188
24.	The language used is appropriate for the audience.	3.32	1.148
25.	There are no spelling error or grammar mistakes in the course content.	**3.39**	1.113
26.	Course contents are properly categorized and paragraphed.	3.32	1.078
27.	The symbols and numbers used to emphasize the important points	3.20	1.013

match throughout the contents.

28.	Course contents are created with planning and care.	2.98	1.221
29.	Students are surveyed on the course content structure.	**2.43**	1.035

The respondents displayed their highest positive attitude towards item twenty-five. This item evaluated their perceptions of "the correctness of the course content in terms of spelling or grammar" (M= 3.39). In contrast, they made their lowest rating for the twenty- ninth item that asked them "if the students were surveyed on the on the course content structure" (M=2.43). Although the participants made relatively diverse ratings for the twenty- eighth item (SD= 1.221). However, they were relatively homogenous in their ratings for item twenty-nine (SD=1.031).

5. Descriptive Statistics forGraphic Designs

The fifth category of the questionnaire inspected the participants' viewpoint with respect to "graphical designs."Descriptive statistics including mean ranks and standard deviations were calculated for the (n= 4) items of the fifth section of the questionnaire. The results are presented in Table 5.

Table 5: Item Statistics for the Graphic Design of the E- Learning Program

		Mean	SD
30.	Font type and size used in the design of the virtual interface influences the learning.	**3.63**	1.066
31.	The virtual interface is designed in such manner that helps easing the process of learning.	2.91	1.121
32.	The design of virtual interface affects the effectiveness of the courses.	3.36	1.065
33.	Students are surveyed on the design of the interface fonts size and color, background).	**2.21**	1.081

The participants displayed their highest positive attitude towards item thirty. This item inspected their views to find out "about the efficiency of the font type and size used in the design of the virtual interface" (M= 3.63). In contrast, they made their lowest rating for the item thirty-three that asked them "if the students were surveyed on the on the design of the interface fonts size,

color, or background" (M= 2.21). Although the respondents were relatively varied in their ratings for the item thirty-one (SD= 1.121), they were relatively homogenous in their ratings for items thirty (SD= 1.066) and thirty-two (SD= 1.065).

6. Descriptive Statistics for the Length of the Course and its Efficacy

The sixth category of the questionnaire inspected the participants' viewpoint with respect to "length of the course and its efficacy." Descriptive statistics including mean ranks and standard deviations were computed for the (n= 13) items of the sixth section of the questionnaire.

Table 6: Item Statistics for the Length of the Course and its Efficacy

		Mean	SD
34.	The duration of the learning period is suitable.	**3.28**	1.175
35.	The duration of the learning is adequate to prepare students professionally.	3.04	1.212
36.	Students can access the course contents anytime and from anywhere.	3.14	1.237
37.	Additional sessions such as problem solving sessions are offered to help the student and to make up for missed classes.	2.99	1.241
38.	Quality, content and timing considered for all activities are proper	2.93	1.199
39.	Proper alternative schedule are available for senior and working students.	3.24	1.216
40.	Student confidence is improved in the learning period.	3.06	1.259
41.	Students are able to opine on what they learn during the learning period.	2.86	1.164
42.	All the subjects that student expect from the learning period are available.	**2.45**	1.118
43.	Satisfaction after completion of the period is observed.	2.70	1.162
44.	Information can be shared quickly during the learning period.	3.09	1.139
E-Learningimproves the quality of education and teaching.		2.91	1.189
46.	E-Learningstudents are encouraged to read more.	3.05	1.248
47.	Academic standing and knowledge are the prerequisite for teacher recruitment.	3.17	1.124

The students of the University of Guilan displayed their highest positive attitude towards item thirty-four. This item evaluated their perceptions towards "the appropriateness of the duration of the learning period" (M= 3.28). In contrast, they made their lowest rating for the item thirty-three that asked them about "accessibility of the subjects that the students expect from the learning period." (M= 2.45). Although the respondents were relatively varied in their ratings for the item forty (SD= 1.25), they were relatively homogenous in their ratings for item forty-two (SD= 1.18).

7. Descriptive Statistics for the Educational Sources of the E- Learning Program

The seventh category of the questionnaire inspected the participants' viewpoint with respect to "educational sources." Descriptive statistics including mean ranks and standard deviations were computed for the (n= 6) items of the seventh section of the questionnaire. The results are presented in Table 7.

Table 7: Item Statistics for the Educational Sources of the E- Learning Program

		Mean	SD
48.	Students are trained on how to access the resources.	3.17	1.197
49.	The sources suggested by the professors provide adequate and additional information needed to the students.	3.46	1.178
50.	Orientation to course sources is valuable for the students.	**3.86**	1.121
51.	Students are surveyed on the course sources.	2.63	1.268
52.	Virtual learning is more attractive due to the use of dynamic and diverse resources.	3.06	1.305
53.	Students can suggest additional resources for their course.	**2.46**	1.186

The students of the University of Guilan displayed their highest positive attitude towards item fifty. This item asked the participants "if the orientation to course sources was valuable for them" (M= 3.86). In contrast, they made their lowest rating for the item fifty-three that asked them "if the students could suggest additional resources for their course" (M= 2.46). Althoughthe respondents were relatively varied in their ratings for the item fifty-two (SD= 1.30), they were relatively homogenous in their ratings for item fifty (SD= 1.12).

8. Descriptive Statistics for theTeachingMethodinE- Learning Program

The eighth category of the questionnaire inspected the participants' viewpoint with respect to "teaching method."Descriptive statistics including the mean ranks and standard deviations were computed for the (n= 19) items of the eighth section of the questionnaire.

Table 8: Item Statistics for the Teaching Method in E- Learning Program

		Mean	SD
54.	Parts of the courses are used for online discussion.	2.78	1.17
55.	Courses are accompanied with audio.	3.61	.95
56.	Courses are accompanied with video and audio.	3.25	1.13
57.	Courses are accompanied as texts.	3.36	1.08
58.	Teaching methods are based on memorization.	3.51	1.04
59.	Interaction between student and instructor exists.	3.07	1.17
60.	Teaching method emphasizes critical thinking.	2.82	1.10
61.	Use of modern educational technology is inevitable in virtual education.	**3.71**	1.09
62.	Answering student questions will help them in the future stages of learning.	3.55	1.10
63.	Short quizzes are given during the instructional period.	2.73	1.17
64.	Online exams are given during the instructional period.	2.83	1.18
65.	The quality and relevance of the exam questions are assessed against the course content.	3.10	1.15
66.	Exam questions are given with variety of formats.	3.01	1.11
67.	Feedback received by students is clear and constructive.	2.98	1.06
68.	Students are given enough time to interact.	2.80	1.16
69.	Instructors are assessed on their ability to teach online.	2.97	1.15
70.	Students' feedback and feelings are assessed during the period.	2.63	1.23
71.	Assignments and activities are proper and wisely chosen.	2.91	1.13
72.	Students are surveyed on potential methods of improving learning.	**2.50**	1.14

The students of the University of Guilan displayed their highest positive attitude towards item sixty-one. This item asked the participants about "the inevitability of the use of modern educational technology in virtual education" (M= 3.71). In contrast, they made their lowest rating for the item seventy-two that asked them "if they were surveyed on potential methods of improving learning" (M= 2.50). Although the respondents were relatively varied in their ratings for the item seventy (SD= 1.23), they were relatively homogenous in their ratings for item fifty-five (SD=.952).

9. Descriptive Statistics for the Cooperation and Interaction

The ninth category of the questionnaire inspected the participants' viewpoint with respect to "cooperation and interaction." Descriptive statistics including the mean ranks and standard deviations were computed for the (n= 6) items of the ninth section of the questionnaire. The results are presented in Table 9.

Table 9: Item Statistics for the Cooperation and Interaction

	Mean	SD
73. The possibility of directly contacting the professors is provided.	3.12	1.273
74. If contacted directly, professors are responsive.	3.07	1.152
75. Collaboration and coordination between professors in all majors exist.	2.86	1.038
76. None of the students feel isolated during the learning period.	**2.65**	1.143
77. It is important for the students to interact with other students.	3.96	1.119
78. Student interaction improves their learning experience.	**4.05**	1.118
Cooperationandinteraction	3.28	.844

The students of the University of Guilan displayed their highest positive attitude towards item seventy-eight. This item asked the participants about "the effects of students' interaction in in improving their learning experiences" (M= 4.05). In contrast, they made their lowest rating for the item seventy-six that asked them "if they felt isolated during the learning period" (M= 2.65). Although the respondents were relatively varied in their ratings for the item seventy-three (SD= 1.27), they were relatively homogenous in their ratings for item seventy-eight (SD=.844).

Conclusion

This study firstly aimed at developing a scale which is able to investigate students' attitude towards the status quo of the E-Learning systems, initially for use at the University Guilan. Also, it sought to explore the areas in the E-Learning programs that need to improve in order for the University of Guilan to be able to keep up with the standards of virtual higher education systems. The findings can be summarized as follows: like previous research on the factors that drive a successful E-Learning program (Arbaugh, 2002; Hannafin and Cole 1983; Piccoli et al., 2001; Thompson, Meriac, and Cope, 2002; Dillon and Gunawardena, 1995; Taylor, 1996; Webster and Hackley, 1997; Thurmond, Wambach, & Connors, 2002) the current research confirmed strong positive impact of the factors that had proven to be important in managing a successful E-Learning system. In addition, referring to the research question which explored the factors that can lead to a better E-Learning system, the findings of the research pinpointed the areas which need to be addressedby the University of Guilan towards improving the quality of the E-Learning system at the University of Guilan.

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