

Assessment of the Establishment of Blended Learning Using the ISO 10015 at Tabriz Health Centers

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Abstract

Background: There are numerous ways for blended learning and for appropriate and reasonable establishment of such methods; the use of scientific methods is essential. This study aimed at assessing the establishment of Blended Learning using the ISO 10015 in Tabriz health centers.

Methods: The statistical population of this descriptive study included all of the health staff of Tabriz health center during year 2016 and the sample size was set at 285, using the Morgan table. The data collection tool was a 63-item researcher-made questionnaire in five-point Likert scale based on the requirements of ISO 10015. It measured feasibility assessment, design, implementation, and evaluation of blended learning. The questionnaire's validity was assessed by experts and its validity was calculated by Cronbach's alpha as 0.95. Descriptive statistics and one sample t test were used to analyze the data.

Results: Assessment of the establishment of blended learning indicates that mean scores were calculated for needs assessment at 2.20 ± 0.34 , design at 2.1 ± 0.41 , implementation at 2.35 ± 0.59 , and evaluation at 2.35 ± 0.48 for the implementation of blended learning, which were less than the expected mean (3) and this difference was statistically significant ($P < 0.001$).

Conclusions: These results could be used as the basis of evaluation for providing appropriate infrastructure for the establishment of blended learning.

Keywords: Blended Learning, Assess, ISO 10015, Health Center

1. Background

In the current era, continued education as well as lifelong learning is one of the accepted principles disproving traditional views towards sectional education and training (1).

High-speed progress in science and technology and the needs for re-training has converted lifelong learning to one of the main concerns of numerous countries, with growing demands for the use of flexible educational opportunities (2). Blended Learning is a model of learning in the area of training and development of human resources, in which instructional design is performed through concentrating on the methodology of learning as well as considering a wide range of viable tools (3). Two major characteristics are taken into account in blended learning, including access to the highest quality available and use of all the potential tools for education. In this respect, the result is a combination of in-person classes with specific objectives and self-learning training via educational content; i.e. the ideal form of blended learning involves both real and e-Learning (4).

The present-day orientation towards blended learning may stand for a tendency towards education and skills

training through technology over the last 30 years (5). According to Nellman, blended learning as the second wave of e-Learning and training was introduced for the first time by March and others in 2003 (6). In general, blended learning is comprised of the following four concepts:

Combination or integration of web-based technologies to fulfill an educational objective is the incorporation of various educational methods to generate desirable learning outcomes with or without technology (integration of each form of technology), face-to-face teacher-oriented education, and integration of educational technologies with the main tasks in order to create a consistent work of learning and activities (7).

However, there are numerous ways to achieve blended learning. Assessment of the establishment of blended learning could make an important contribution in helping an organization to improve its capabilities and to meet its quality objectives. The quality management principles underlying the ISO 9000 family of standards (of which the ISO 10000 series form a part) emphasize the importance of human resource management and the need for appropriate training. They recognize that customers are likely to respect and value an organization's commitment

to its human resources and its ability to demonstrate the strategy used to improve the competence of its personnel. To make organizational education systematic, the ISO 10015 quality standard assists organizations in implementing the four stages of organizational education, including needs assessment, instructional design, implementation, and effectiveness evaluation in an organization and also in creating the required human capacities as well as affecting the nature of effectiveness. According to the findings of numerous research studies in this respect, the standardized model of education based on the ISO 10015 quality standard can be a helpful guide to educational services (8). The ISO 10015 international standards includes the following four stages:

1- Needs assessment for the requirements of blended learning and its development as well as learner needs: The designed educational system should be endowed with capabilities such as the ability of learners to have access to a variety of courses (synchronous, asynchronous, in-person, and self-learning education, and training) based on their needs in order to provide each learner with online and of-line communication and to participate in virtual educational courses.

2- Design and development of blended learning: in the design of blended learning, the following factors should be considered, instructional design, structure, and procedures, organization of educational programs, templates and standards for e-learning, educational resources and subjects, guides for instructional design and education programs based on new decisions, prediction of suitable educational technologies for any of the courses, and considering the duration of educational courses according to needs of individuals.

3- Implementation of blended learning: The best approaches to implementation of blended learning are those in which faculty members, teachers, and the staff are able to establish mutual relationships.

4- Evaluation of blended learning: The issues of progress evaluation of participants in the educational courses as well as the optimal management of learning materials must be considered at this stage (9).

However, it should be noted that the logical arrangement of face-to-face and online components leads to successful fulfillment of educational objectives in blended learning of medical disciplines (10).

Hamzehrobati et al. in a study entitled “examining the attitudes of faculty members to the implementation of e-Learning system” found a significant and direct correlation between the views of faculty members towards e-Learning and blended learning. In this respect, the attitudes of faculty members in terms of the implementation of e-Learning system were positive (11). Furthermore,

Nowroozi in an investigation on the impact of blended learning in a resuscitation environment in order to teach the related issues for nursing and operating room students made use of such education methods and proved their effectiveness (12). Furthermore, Moradi et al. conducted a study entitled “analyzing the role of preventive structures in the development of Blended Learning” examined the impact of preventive structures on the development of the blended learning system (13). Moreover, Tsugihashi, in a two-year research study on the use of blended learning and web-based education methods in clinical jobs, implemented a blended learning method for individuals with health-related jobs at 176 centers deprived of scientific-clinical competence due to their busy jobs. The results of this study revealed that 76% of individuals working at such centers reported a 40% improvement in their working hours per week and about 89% of participants attended all the programs and obtained acceptable final scores. Furthermore, the clinical competence of the participants increased despite their demanding jobs (14). In terms of using blended learning on interns working at emergency wards during a 6-month period, Spedding measured the level of learning and changes in skills through traditional methods and blended learnings. During the 5 months after the completion of the course, the interns were satisfied with the virtual environment and described blended learning as an easy, accessible, and enjoyable educational method (15). In another study, Rowe investigated blended learning in clinical issues for students of health in 57 research papers out of 71 published from 2000 to 2010 in clinical fields and found that blended learning method was better than traditional methods and it could lead to an increase in the level of learning (16).

Rahimidoost and Razavi in a research study on the feasibility of e-Learning from the perspectives of faculty members and university students at Shahid Chamran University concluded that students and faculty members of the given university had relative readiness to take part in the e-learning process (17).

Accordingly, if universities of medical sciences and health-care networks are to perform their own principal functions, i.e. education and research, as well as delivery of health-care services in line with today’s new progresses in this respect, they are required to make maximum use of the available knowledge and information. One of the implications of the present study was to evaluate the conditions and facilities of an organization in order to achieve the required readiness to move towards this learning system. To fulfill the given objectives and in order to deal with the shortcomings in this regard, the researcher was to address the question of whether all the conditions and facilities are available in order to implement the blended learn-

ing system (in terms of capability and readiness of human force, organizational structure, effective and efficient integrity of the system, as well as consistency between organizational technology and education) based on the requirements of the ISO 10015 quality standard (needs assessment, planning, implementation, and evaluation) in the health-care network.

2. Methods

In terms of the research purpose, the present study was of the applied type using a descriptive method.

The target statistical population in this study included all the staff ($N = 1100$ individuals) working in health centers of Tabriz, Iran, during year 2016. Using random cluster sampling method in this study, the given sample was estimated equal to 285 individuals based on the Krejcie and Morgan A A two-stage cluster sampling was used. Areas were divided to 5 and one health center was selected from each region. An equal number from the 5 clusters was selected based on the areas of the city.

To collect the required data in this study, the dimensions were designed by concepts, structures, and theoretical bases. This means that to measure the variables, a researcher-designed questionnaire was used under supervision of a supervisor and advisor professors that provided the possibility of the establishment of blended learning based on ISO 10015 in terms of the 4 factors of needs assessment, planning, implementation, and evaluation. In this questionnaire, 14 items were assigned to needs assessment, 16 items were associated with planning, and 18 and 15 items were related to implementation and evaluation, respectively. The highest score for the questionnaire was 5 and the lowest score was 1, measured through a comparison of the mean scores for statistical samples with arithmetic mean equal to 3. The questionnaire comprised of 63 items based on a 5-point Likert-type scale, scored from very low (score 1) to very high (score 5). The questionnaires were distributed in person after obtaining informed consent from participants and explaining the objectives of the study as well as the confidentiality of information, and then they were collected following their completion. The results of principal component analysis on the Wood worth scale showed that all 63 items had a factor loading higher than 0.3.

The face reliability of the questionnaire was confirmed by 5 specialists and faculty members at the department of educational Sciences and psychology in Azarbaijan Shahid Madani University. The content validity was also obtained following a CVR among 20 experts (the staff working at training centers).

The validity was assessed using Cronbach's alpha equal to 0.95. This value was also calculated for all the 4 components considered in the questionnaire, which was 0.78 for needs assessment, 0.87 for instructional design, 0.92 for implementation, and 0.95 for evaluation.

The inclusion criteria of the study included participants' willingness to participate in the study, and exclusion criteria included unwillingness of participants to continue the study or not completing the questionnaires. Descriptive data analysis was performed using SPSS (version 19). Data were presented by mean and standard deviation and descriptive statistics. One sample t test was used to examine the assumption of the means for the comparison of the mean scores in requirements of needs assessment, planning, implementation, and evaluation in blended learning methods with arithmetic mean assumed (3). P values less than 0.05 were considered statistically significant.

3. Results

The total number of complete questionnaires was 285. The results of descriptive data showed that 82 participants (28.7%) were male and 203 individuals (74%) were female. The mean age was 40 ± 9.2 years. Moreover, 20.5% of the participants were doctors (physician) and 25.9% of them were health experts. In addition, 47.5% of the participants were midwives; the rest of the participants were employees or paramedics. Work experience in 9.5% of participants was lower than 5 years, and over 25 years in 47.7% of the participants.

The level of significance was less than 0.005. Therefore, the null hypothesis was rejected. Also, The results revealed that the T negative, and the level of readiness at the health centers of the city of Tabriz in order to implement blended learning at all four factors was lower than the assumed mean of 3 in [Tables 2](#) and [3](#).

The results revealed that needs assessment requirements of blended learning and evaluation requirements of blended learning had obtained the highest and the lowest mean scores, respectively. In the meantime, synchronous education components had the lowest mean score and in-person education components had the highest mean score in terms of feasibility. Thus, the most significant obstacle to the establishment of blended learning was due to problems related to educational evaluation and those in synchronous education; the highest feasibility for establishment was also associated with the components of in-person education. The results demonstrated that there was no significant difference between the results of males and females and employees together ([Table 4](#)).

Table 1. Demographic Variables

Factors	Frequency	Percentage
Age, y		
Less than 30	43	15
30 to 40	111	38.9
More than 40	131	45.9
Gender		
Male	82	28.7
Female	203	71.2
Occupation		
Doctor	53	18.5
Health expert	74	25.9
Midwife	134	47.01
Administrative	24	8.4
Years of service, y		
Under 5	27	9.5
5 to 10	62	21.7
11 to 20	60	20
Over 20	136	47.7

4. Discussion

The purpose of this study was to assess the establishment of blended learning using the ISO 10015 in Tabriz health centers. The results showed that needs assessment requirements for the establishment of blended learning was lower than the mean (average). The results of this study was consistent with the findings of Momenyan, in which the impact of educational needs on the basis of the ISO 10015 quality standards on reinforcing the competency of employees working in Middle East Behsazan industries company was examined (18) and also the results obtained by Foroughi Abri et al. on the relationship between educational programs and the real needs of students in Ghadir Quranic Sciences and Islamic teachings institute of higher education (19). These findings could indicate that in terms of educational needs assessment, examining the needs of employees with different levels of knowledge, insight, and skills, determining educational needs in accordance with changes in the external environment of the organization (such as the entry of new technologies in the organization, and rival organizations), having a yearly job review in terms of the required qualifications, specifying educational needs on the basis of current and the expected needs of the organization have been less considered. Given that the component of needs assessment in synchronous education obtained a score lower than the mean for needs as-

essment in the state of theoretical mean and it also acquired the lowest mean compared to other components, it was required to pay greater attention to e-Learning, especially for the cases mentioned above.

The findings also showed that the mean score of the items on the use of various forms of instructional design (synchronous, asynchronous, in-person, and self-learning) was lower than the theoretical mean of 3. The results of the present study were in agreement with the findings of the study by Hajirahimi on the adjustment of the level and contents of educational courses with job status of the staff and different design and educational content in employees of the ministry of agriculture (20) as well as the results obtained by Abdol aziz and Ahmad in terms of appropriate planning associated with the needs of trainees (21). Moreover, the findings of this study were in line with the results of an investigation in other study, in which it was concluded that software and electronic contents were not sufficient for the implementation of e-learning (22); however, the results of this study were in contrast with the findings of Nasiri and Salehi Cheshme Ali (23) conducted at the management and planning education and research institute of higher education. The results of the study by Salehi Cheshme Ali suggested that the feasibility of planning and implementation of e-learning in terms of economic, legal, and technical dimensions was higher than average and it was lower than average considering operational and temporal aspects (24). Thus, this feasibility was largely effective, yet not desirable. The findings in terms of the factor of planning indicated that the highest mean score for responses was associated with the items of "in-person education" and the lowest mean score for responses was related to the items of "asynchronous education". It is obvious that according to the ISO 10015 quality standard, considering the duration of educational courses based on the needs of individuals, using various forms of instructional design (synchronous, asynchronous, in-person, and self-learning) in this study, applying the contents of educational courses in working environments, designing educational courses for job promotion, and matching the contents of educational courses with the needs of participants required reinforcement and optimization.

In terms of implementation, the highest mean score was related to the items of "in-person education" and the lowest mean score for responses was associated with the items of "synchronous education". In this respect, the present study was consistent with the findings of Momenyan (18), in which educational methods with educational contents and their roles in the reinforcement of the skills of employees were determined, as well as the study by Foroughi Abri et al. (19) on the use of proper educational equipment, experts, and professors and the impact

Table 2. Results of One Sample t Test Associated With the Mean Score of the ISO 10015 Quality Standard Factors Affecting Blended Learning

Factors	Mean (SD)	Degree of Freedom	t	P Value
Needs assessment requirements of Blended Learning	2.2 (0.69)	284	-19.3	0.001 >
Design requirements of Blended Learning	2.1 (0.75)	284	-20.5	0.001 >
Implementation requirements of Blended Learning	2.35 (0.59)	284	-10	0.001 >
Evaluation requirements of Blended Learning	2.35 (0.48)	284	-23.02	0.001 >
Total mean	2.2 (0.75)	284	-17.4	0.001 >

Table 3. Results of One Sample t Test Associated with the Mean Score of Components of Blended Learning

Components of Blended Learning	Needs Assessment	Assessment	Implementation	Evaluation
Synchronous education	2.2 (0.6)	2.3 (0.6)	2.4 (0.5)	2.2 (0.7)
P value	0.001 >	0.001 >	0.001 >	0.001 >
Asynchronous education	2.4 (0.8)	2.5 (0.6)	2.4 (0.5)	2.3 (0.5)
P value	0.001 >	0.001 >	0.001 >	0.001 >
In-person education	2.4 (0.7)	2.6 (0.9)	2.6 (0.6)	3.1 (0.5)
P value	0.001 >	0.001 >	0.001 >	0.01
Self-learning education	2.5 (0.8)	2.6 (0.6)	2.5 (0.7)	2.6 (0.6)
P value	0.001 >	0.001 >	0.001 >	0.001 >
Total mean	2.5 (0.7)	2.6 (0.6)	2.5 (0.5)	2.7 (0.4)
P value	0.001 >	0.001 >	0.001 >	0.001 >

^aValues are expressed as Mean (SD).

of education on the promotion of quality of in-service education of employees. The findings by Bostrom and Lassen based on the use of learning and teaching methods, learning and meta-cognitive strategies in order to explore the grounds for learning, and familiarity with the classification of different levels of learning process were also consistent with the results of the present study (25). It seems that the use of practical teaching methods in real working environments (e.g. in-service education or teacher-apprentice education), examination of the issues and problems of educational courses by authorities; utilization of resources, equipment, and educational facilities (such as computers), and consistency between new tools suitable for presenting lessons in e-Learning were considered as effective factors, which required reinforcement in order to implement blended learning methods.

Further findings indicated lower mean score for the factor of evaluation in blended learning compared to theoretical mean of 3. In one study, Momenyan (18) emphasized on continuous monitoring and improvement of stages of needs assessment, planning, implementation, and evaluation in order to reform the educational process, and Foroughi Abri et al. (19) shed light on the method of con-

tinuous and scientific evaluation, interpersonal relationships, correspondence between educational courses and learner needs, required strategies to encourage and motivate learners, and controls on the promotion of quality of in-service education of employees. It seems that the use of different methods to evaluate educational courses (written, virtual, and practical), evaluation of changes in the skills of participants in educational courses, examination of beliefs and attitudes of individuals along with the measurement of their knowledge, considering specific criteria to evaluate educational courses, level of achievement to organizational objectives and development of an effective evaluation system especially in virtual methods require greater consideration in this regard.

The major obstacle to the implementation of this study was that the existing frameworks for the establishment were more similar to instructions and a list of activities and they lacked the points required in the design of an e-Learning and teaching system. Therefore, in the blended learning method used in this study, there was an attempt to examine different parts of the process of blended learning (synchronous, asynchronous, in-person, and self-learning) within the framework of the ISO 10015

Table 4. Results of Analysis of Variance According to Demographic Variables

Factors	Mean	SD	P Value
Age, y			0.08
Less than 30	37.9	21.31	
30 to 40	77.9	12.59	
More than 40	73.9	32.83	
Gender			0.12
Male	43.7	23.97	
Female	68.27	20.64	
Occupation			0.02
Doctor	68.55	20.2	
Health experts	45.9	23.9	
Midwife	47.01	25.58	
Administrative	58.4	21.56	
Years of service, y			0.04
Under 5	38.5	17.61	
5 to 10	46.47	19.77	
11 to 20	47.51	24.52	
Over 20	70.7	17.53	

quality standard (needs assessment, planning, implementation, and evaluation). The major advantage of this framework was that researchers could be ensured that such important factors had not been overlooked or removed.

Given the results of the present study, it was concluded that the implementation of e-Learning and blended learning systems required attention to and reinforcement of the 4 factors of needs assessment, planning, implementation, and evaluation in order to establish blended learning, particularly in terms of synchronous education components. Thus, it was suggested to provide the required grounds and appropriate facilities to obtain greater access to modern technologies in order to improve the existing state and implement blended learning properly in universities of medical sciences and affiliated health-care networks. To this end, a blended learning program should be developed based on the principles of instructional design. Therefore, enrichment of teaching materials relevant to multimedia environments, emphasis on learner-centered education, flexibility in teaching methods, and arrangement of educational conditions should be taken into consideration. In this respect, factors such as development of computer literacy in teachers and staff, appropriate use of information and communication technology, as well as proper planning and effective evaluation play their own basic roles. Therefore, blended learning will lead to accept-

able outcomes provided that all the components of the design of this type of education are taken into account.

Consent was taken from all participants. At the beginning, the participants were acquainted with the purpose of the study, method of teaching, privacy, and confidentiality of the study. The author declares no conflict of interest. The researchers would like to acknowledge all the health staffs, who assisted with this study.

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