

Developing a blended learning program for nursing and midwifery students in Iran: Process and preliminary outcomes

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ABSTRACT

Background: We aimed to develop and evaluate outcomes of a blended learning (BL) program for educating nursing and midwifery students of Tehran university of medical sciences (Tehran, Iran).

Materials and Methods: This was a participatory action research project. After designing BL website, providing technological infrastructures, and holding preparatory workshops, 22 blended courses were designed. BL method was implemented for one semester. Students' grade point average, participation with courses, and opinion about educational methods, and instructors' attitude and opinion about educational methods were assessed.

Results: Most students ($n = 181$; 72.1%) and 17 instructors (28.3%) consented to participate in the study. Students' grade point average and participation was significantly higher in BL rather than in face-to-face method ($P < 0.0001$). Most instructors ($n = 11$, 65%) had positive attitude toward BL method. Textual analysis of participants' opinion showed that most students preferred BL method and felt more independent in this method. However, they complained about lack of easy access to Internet and weakness in computer skills. Instructors admired the flexibility and incentives that had been provided in the program. However, some of them complained about the time-consuming nature of BL course design.

Conclusion: The program showed positive effect on students' learning outcomes and participation. The strengths and weaknesses of the program should be considered for development of next phase of the project. Lessons learned in this phase might be helpful for decision makers who tend to develop similar programs in Iran. Motivational and communicational issues and users' IT skills should be addressed in every BL program.

Key words: Action research, distance education, Iran, midwifery, nursing

INTRODUCTION

As Senge 1990 declares, "*Learning is a much more complicated phenomenon that can ever be limited to a classroom*" (p. 63).^[1] Many of the students today are attempting to adjust their family life, job, and University life toward having more flexibility in their learning programs.^[2] Current studies have suggested that a combination of face-to-face and e-learning methods would

be an adjustable way of teaching that helps the students meet these challenges.^[3,4] Continuous learning, saving time, and reducing transportation expenses are the most commonly quoted benefits of Blended Learning (BL).^[5] In addition, learners are being educated in a holistic manner, in which their individual characteristics including attitudes, beliefs, view points, knowledge, skills, and mental power are regarded.^[6] Some authors with a constructivist, student-centered, and person-centered standpoint have noted that holistic educational pedagogies have more likelihood of success than traditional ones.^[7]

Application of BL has been increased in both academic and business fields and many studies have been conducted in this area. Some of these investigations have shown that students' outcomes in BL method are better than^[8-11] or similar to those of face-to-face method.^[12,13] However, recent investigations have revealed the defeat of most web-based projects because of disregarding stakeholders' opinion, and lacking appropriate technological and executive infrastructures.^[14] Thus, conducting investigations which address these pre-requirements seems essential.

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On the other hand, there has been less attention to application of current electronic learning methods by universities and BL is relatively new to the educational systems of Iran; therefore, there would be a concern about the outcomes of applying such programs.

To the best of our knowledge, outcomes of the implication of BL program within the educational, technological, and cultural context of Iran have not been investigated. Therefore, the aim of present study was to assess the outcomes of the BL program in the Faculty of Nursing and Midwifery, Tehran University of Medical Sciences (TUMS), Iran; these outcomes included students' Grade Point Average (GPA), participation in, and attitude and opinion about the program, and faculty instructors' attitude and opinion about the program.

MATERIALS AND METHODS

This study was conducted in the form of Participatory Action Research (PAR) which encompasses five steps including Analysis, Design, Development, Implementation, and Evaluation (ADDIE) (Chang *et al.*, 2008)^[7] to develop the BL program in the Faculty of Nursing and Midwifery, evaluate its preliminary outcomes, and re-run it after potential modifications. In this paper, the results of the first cycle are presented.

Nursing and midwifery students who were studying bachelor's, master's, and doctoral degrees ($N = 467$) and instructors who were fulltime faculty members in Faculty of Nursing and Midwifery (including 50 faculty members and 10 mentors) participated in this study. Students who had no theoretical courses (those in 1st and 2nd semesters of bachelor's degree program) were excluded from the study.

The program

Analysis (January-August 2008)

This step included defining the need for such program, and evaluating the existence of the capacity for development and implementation of a BL program. As the need for such a program and the required capacity was recognized to exist (after group discussions and collecting experts' opinion inside and outside the university), decision was made to design a BL program for educating nursing and midwifery students in the Faculty of Nursing and Midwifery (TUMS).

Design (August-December 2008)

First we developed necessary technological and executive infrastructures required for implementation of BL programs. Then, the BL platform and courses were developed (see below).

Technological infrastructures

A computer lab with sufficient number of computers connected to high-speed Internet was established to facilitate students' access to computer and the Internet ($n = 104$). Moreover, fulltime access to high-speed Internet was provided for faculty members in their office. As instructors were not familiar enough with IT and BL programs, a number of workshops were held a semester before execution of the program to improve instructors' IT knowledge and skills. The importance and necessity of using BL method and how to design course matters, course scenarios, specify individuals' responsibilities were debated in these workshops. Moreover, in a single session, students were informed about the way they should work with BL system.

Executive infrastructure

In order to promote the feasibility of the program, some executive infrastructures were developed. Most importantly, a distance learning committee was organized consisting of five specialists in the field of distance learning who were responsible for making decisions, rules, macro policies, and developing new strategies. Moreover, members of either educational committee or distance learning committee of TUMS passed a number of educational regulations (e.g., each faculty instructor was permitted to hold 4/17 of his/her course credit in the form of e-learning; some incentives were designed to be offered to instructors who had used BL method in teaching students, etc.).

Designing BL platform and BL courses

BL platform was designed based on three major principles: user friendliness, stability of the system, and accessibility. Twenty-two theoretical courses (including basic, core, and specialized courses which were valued as 48 course credits) were approved by distance learning committee for designing in the form of BL courses. Preparing courses for BL program, each instructor should write and design course scenarios, designate particular activities for face-to-face and e-learning parts, specify individual activities and responsibilities, schedule for the course, develop online quizzes, and consider how he/she will give feedback to students and how teacher-learner information exchange and interaction would be.

Implementation (February-June 2009)

After they signed the agreement form, students were given a personal user account (including a user name and a password) in order to sign in to BL website at//http://dln.X.ac.ir/. Then, the students were supposed to select their courses at BL website. Initial instructions were provided for students by researcher about how to work with the BL system, get access to scientific resources, take online tests, upload tasks, download educational e-contents, and interact

with teacher and other students before starting the course. Participants were also given an instruction booklet on how to apply the BL system.

BL program was implemented at the Faculty of Nursing and Midwifery in TUMS for one semester. Instructors delivered their courses which had been designed and approved a couple of months before running the program. Checklists of students' participation were filled for each student in face-to-face method and for BL method by the in-charge instructors.

Evaluation

Data collection tools

Students' individual characteristics, GPA, participation in courses, and opinion, and instructors' demographics, attitude, and opinion toward teaching methods were assessed by the following researcher-made data collection tools:

Students' individual characteristics: were recorded via a 9-item questionnaire.

Students' participation in courses: We developed two checklists (one for BL and one for face-to-face method) to quantify each student's participation throughout the course sessions. We considered the time and duration each student logged in to the BL website and the time he/she used the BL website's chat room as indicators of participation with the BL courses. On the other hand, the time and duration the student was present in class and the time he/she involved in scientific discussions were considered as indicators of participation in face-to-face classes. Both checklists were scored based on their values and the sums of scores were classified into three distinct levels: high participation, >75%; moderate participation, 50-75%; and low participation, <50%.

Students' GPA: Students' GPA in BL method was compared to that of previous semester (face-to-face method).

Instructors' demographics: were recorded via a 10-item questionnaire.

Instructors' attitude: was measured via a 3-point, Likert-scale questionnaire (1 = agree, 2 = agree to some extent, and 3 = disagree), Including an open-ended question at the end to seek the instructors' suggestions.

Participants' opinion: Focus group discussions were conducted separately for students and instructors to explore their "opinion" about BL and face-to-face methods. These qualitative data were analyzed with textual analysis.

Validity and reliability

To develop the data collection tools, relevant literature reports

were reviewed. Initial items were created by four experts in the field of education. Those items were then evaluated for clarity and face and content validity by 10 experts in the field of education. Cronbach's alpha was applied to examine the internal consistency of the opinion and attitude questionnaires (alpha = 0.83 and 0.81, respectively).

Data analysis

SPSS software (version 12.0) was used for analysis of the data. Data were described using descriptive statistics. Paired *t*-test and Wilcoxon test were used to compare students' GPA between the two methods (BL and face-to-face) Paired *t*-test and Wilcoxon test were respectively used to compare students' GPA and participation between BL and face-to-face methods. Chi-square and Fisher exact test were used to examine the association between categorical variables.

Ethical consideration

Participants were assured that participating in the study was voluntary. Volunteers participated if they had signed the online agreement form at BL website. Research committee of TUMS financially supported the project.

RESULTS

One hundred and eighty-one nursing and midwifery students and seventeen instructors consented to take part in the study.

Students' individual characteristics: Most students were 18-25 years old ($n = 148$, 81.8%), single ($n = 162$, 89.5%), and females ($n = 163$, 90.1%). Details of students' demographics and computer skills are presented in Tables 1 and 2, respectively.

Students' participation in courses: Students' participation during course sessions was significantly higher in BL compared to face-to-face method (Wilcoxon, $P < 0.0001$) [Table 3].

Students' GPA: Averages of students' grade points were significantly higher in BL than in face-to-face method [mean (SD) of GPAs in BL method = 15.96 (1.43), in face-to-face method = 15.44 (1.49); paired *t*-test, $P < 0.0001$] [Table 3].

Instructors' demographics: Most instructors were married ($n = 14$, 82.4%) and were interested in participating in BL training workshops ($n = 15$, 88.2%). Instructors' demographics and computer skills are presented in Tables 1 and 2, respectively.

Instructors' attitude: About 34% of respondents indicated "completely positive" attitude, 66% of them indicated "positive" attitude, and none of them indicated "negative"

Table 1: Participants' individual characteristics

Students	n (%)
Age	
Mean (SD)	22.33 (4.41)
Gender	
Male	18 (9.95)
Female	163 (90.05)
Major	
Nursing	
BSc	142 (78.5)
MSc	7 (3.9)
PhD	8 (4.4)
Midwifery	
BSc	18 (9.9)
MSc	6 (3.3)
PhD	0 (0)
Residency condition	
Dormitory	91 (50.30)
Private house	1 (0.60)
With parents	89 (49.10)
Proper access to the Internet	
Yes	92 (50.80)
No	32 (17.70)
To some extent	57 (31.50)
Instructors	
Age	
mean (SD)	44.88 (5.60)
Gender	
Male	3 (17.64)
Female	14 (82.36)

attitude toward BL method; all participants appreciated the BL method as one of inevitable educational requirements in today's world. A significant positive association was revealed between instructors' attitude and their willingness to participate in workshops (Fisher's exact, $P < 0.0001$), and also their interest to BL course design (Fisher's exact, $P < 0.0001$). There was no significant difference between instructors' attitude and their individual characteristics.

Participants' opinion: Textual analysis of the focus group discussions showed that most students admired the BL program as a teaching method in nursing and midwifery education and preferred it to traditional method. One student said:

"Previously, getting the right course materials and contents was a big concern for me. Now I can easily find the right content; contents are also clearly classified into subtitles and make it easy to know which topics are included in each course."

Table 2: Participants' level of familiarity with computer skills

Skill	Students n (%)	Instructors n (%)
Word		
Not at all	3 (1.7)	0 (0)
A little	21 (11.6)	1 (5.8)
To some extent	90 (49.7)	6 (35.5)
To a moderate extent	52 (28.7)	9 (52.9)
To a great extent	15 (8.3)	1 (5.8)
Power Point		
Not at all	4 (2.2)	1 (5.8)
A little	20 (11)	2 (11.7)
To some extent	76 (42)	5 (29.4)
To a moderate extent	59 (32.6)	8 (47.3)
To a great extent	22 (12.2)	1 (5.8)
Internet		
Not at all	2 (1.1)	0 (0)
A little	10 (5.5)	0 (0)
To some extent	89 (49.2)	7 (41.1)
To a moderate extent	66 (36.5)	8 (47.2)
To a great extent	14 (7.7)	2 (11.7)
Windows		
Not at all	3 (1.7)	0 (0)
A little	26 (14.4)	2 (11.7)
To some extent	97 (53.5)	5 (29.4)
To a moderate extent	45 (24.9)	6 (35.2)
To a great extent	10 (5.5)	2 (11.7)
Others (Excel, SPSS)		
Not at all	159 (87.9)	12 (70.7)
A little	2 (1.1)	4 (23.5)
To some extent	2 (1.1)	1 (5.8)
To a moderate extent	18 (9.9)	0 (0)
To a great extent	0 (0)	0 (0)

About content development issue, one student also noted thus:

"There was a plenty of references for each course, it is good that we are offered a variety of resource addresses, in different types."

When we discussed about the feedback element, one student stated:

"I'm interested in the way I get my instructor's opinion. I prefer to have written opinions rather than just hear them, because in the former, I can save them and refer to, whenever I need."

Another student indicated thus:

"I feel I can learn better because it is possible to get my

Table 3: Students' participation and grade point average in blended learning and face-to-face methods

Variables	BL n (%)	Face-to-Face n (%)
Participation		
Low	116 (64.1)	158 (87.3)
Moderate	18 (9.9)	19 (10.5)
High	47 (26)	4 (2.2)
Total	181 (100)	181 (100)
Mean (SD)*	24.68 (16.46)	15.18 (4.56)
GPA		
17–20	46 (25.3)	31 (16)
14–17	117 (64.9)	131 (67.5)
10–14	17 (9.3)	31 (16)
<10	1 (0.5)	1 (0.5)
Mean (SD)**	15.9 (1.4)	15.4 (1.4)

*Wilcoxon, $P < 0.0001$; **paired t-test, $P < 0.0001$, BL, Blended learning; GPA, Grade point average

instructor's instant feedback about my task performance, which was not occurring in previous semesters."

Most students also admired lesson plans and assessment method used in BL method. One student stated: *"I could test myself whenever I wanted and surprisingly I could get the result of the online test in the moment!"*

Students reported that they feel more independent in learning process. One student said thus: *"I like the electronic parts of the course because I study them whenever I wish to."*

About the technological aspects, students indicated some problems. In terms of easy access to Internet, one student said thus: *"Although we have access to high speed Internet in the faculty, I have problems about uploading my tasks when I am at home."*

Another student pointed to her weakness of computer skills as a limitation and said: *"It is hard for me to work with the BL system, tasks are also too much, sometimes I get confused."* Some of them also complained about supportive aspects of the program. Including one student: *"There are lots to do within a course."*

Instructors also admired the application of the BL system in the faculty. One instructor noted thus: *"I can schedule in a more flexible manner because I do parts of my course duties in my spare time."*

Another one stated thus: *"I think we can gradually gain a reach collection of course materials and questions for quizzes by working with BL system."*

Instructors were also appreciated with incentives which had been provided to persuade them for using BL method. One of them said:

"If there were not an incentive for instructors who use this method in the faculty, the participation of instructors couldn't be guaranteed."

A couple of instructors complained about the time-consuming nature of BL course design. One of them said: *"Answering to students' questions, applying online tests and development of e-content takes a lot of time."*

Most of the faculty members believed that existence of a reward (67.90%) and a supervisory system (80.40%) for instructors who use this method is necessary.

DISCUSSION

Our results showed that students' GPA and participation in courses were higher in the BL method. Students had also a high regard for some aspects of the BL program, including "content development," "lesson plan," and "feedback;" however, they claimed about some "technological aspects" (including lack of "access to" and "skill of" using the computer and the Internet).

Our result about the improvement of students' GPA in the BL method is congruent with that of some other investigations.^[8,9,15] However, some authors have reported similar learning outcomes for e-learning and face-to-face methods.^[16-19] In this regard, a longitudinal investigation that had included teacher's routine feedback in e-learning method has shown a 19% boost in e-learning efficacy rather than in face-to-face method.^[20] Thus, it seems logical to gain better learning outcomes in BL rather than e-learning and traditional method since in this way, students can benefit from both methods.

A significant difference was revealed in students' participation between both methods. Thurmond (2003) concluded that the more frequent interactions are prepared (whether in the form of email or online chat), the more participation rates are gained, which can itself lead to better learning outcomes.^[21] However, Beard and Harper (2002) suggested that interactions more frequently happen in face-to-face method rather than e-learning and considered that as a weak point of the latter method.^[22] Indeed, this limitation is one of the causes of blending these two methods.

High proportion of faculty members had positive attitude toward applying BL method and were eager to participate in BL workshops. They also admired the flexibility of their time and supportive aspects of the program. Development

of distance learning has been a macro policy of TUMS since the year 2002;^[23] in addition, the university and faculty developed some obligation in which they offered some job promotion and financial incentives for faculty members who became volunteers to use BL method. It seems that all these situations made instructors aware of the new system and led to positive atmosphere in the university about BL; these changes themselves seem to influence on instructors' attitude in a positive manner. Maneie (2003) and Bagherian (2002) noted that efficacy and success of new educational technologies is highly related to users' psychosocial background and attitude as well as options of the technology;^[24,25] The positive correlation between faculty members' attitude and their willingness to enroll in workshops also proves this matter.

In our study, students were more satisfied with BL educational contents rather than those of face-to-face method. Students also admired supportive aspects of the program. Thurmond (2003) concluded that since students devote a considerable amount of time on task fulfillment, preparing inadequate support makes them disappointed with their attempts.^[21] Sherry *et al.* (1998) noted that teacher's instant feedback to students in e-learning method positively influences learner's motivation and provides a feeling of support.^[26] Since our website did not have an option for simultaneous learner-learner and teacher-learner interaction, designing more supportive and interactive programs is suggested; in this regard, further investigations should determine the effect of interaction option in BL program on participants' satisfaction.

Learner-related matters could not have made students completely satisfied. Since learners' success in BL program depends on their computer skills,^[27] an average technological skill and lack of constant access to computer for half of the students may affect their satisfaction of the program. Therefore, to ensure easy access and application of technologies required for working with BL system, better educational and technological infrastructures could help participants' satisfaction and appropriate involvement with the program. Sung *et al.* (2008) found that there is a positive correlation between easy application of educational methods and learners' satisfaction.^[28]

Some factors seem to have positive effect on our outcomes in this regard. Development of appropriate technological and institutional infrastructures before running the program (such as providing access to IT center and high-speed Internet, holding BL training workshops for educators, and removing some structural and organizational barriers) and motivating participants to use BL program seem to be influential elements. Philips (2002) conducted

a comprehensive analysis on the causes of defeat in web-based educational approaches; he explored three major causes: causes related to project output (e.g., weak site design, inappropriate or inadequate technical infrastructures), causes related to learners (e.g., learner's unwillingness, unpreparedness, or lack of time), and causes related to organization (e.g., lack of organizational support or reward system).^[29]

The nature of the way we assessed students' participation in BL method was different from that of face to face method, however, we tried to make them more similar by considering all aspects which can be considered as "participating in a course" and asking experts' opinion in this regard.

CONCLUSION

We presented preliminary outcomes of BL program in educating nursing and midwifery students in this paper. The program showed positive effect on students' learning outcomes and participation. The strengths and weaknesses of the program will be considered for design and implementation of subsequent steps of our PAR project. Considering lack of evidence regarding effectiveness of BL programs in the field of medical education in Iran, preliminary results gained by the present study might be helpful for decision makers who tend to develop similar programs in the country. In this regard, considering motivational and supportive aspects and providing appropriate technology basis besides proper development of knowledge and skills for users is recommended for developing successful programs.

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