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Collaborative method consisting lecture, problem-based learning and weblog for clinical courses of medical students in comparison with lecture method

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Abstract:

BACKGROUND: Lecture is a common teaching method, which is not considered efficient for the development of critical and intellectual acquisition in the students of clinical courses. Although in theory combined methods are known acceptable, in practice, they are not commonly applicable. The present study aimed to compare the combination of problem-based learning (PBL), weblogs, and lectures with lecture alone to achieve an advantageous teaching method for clinical courses.

MATERIALS AND METHODS: This quasi-experimental study was conducted on 63 medical students (5th year) taking obstetrics and gynecology clinical courses at Sabzevar University of medical sciences, Iran. The participants were selected via census sampling. Based on the Student's number and using the random number table, the students were randomly assigned to two groups of interventions. The exclusion criteria were unwillingness to participate and absence for more than two sessions. Initially, the similarity of obstetrics and gynecology knowledge in both groups was confirmed based on a pretest ($P > 0.05$). A conventional lecture was performed for both groups. In the intervention group (B), the researcher asked each student (32 persons) to provide a case/problem from mentioned subjects outside the class concerning the given lecture and upload it to the lecturer's weblog to show commonality. In the next session, the presented cases were initially discussed, and another lecture was carried out. Finally, two methods were compared through identical theoretical and practical exams and scored based on a Likert scale using a questionnaire. Data analysis was performed in SPSS 19 using *t*-test and Chi-square at the significance level of $P < 0.05$.

Results: Group B achieved higher grades in the scientific exams ($P < 0.001$), especially in the domains of perception, learning and memorizing of subjects, motivation, and communication with the classmates and tutor ($P = 0.10$). Therefore, satisfaction was higher in the intervention group compared to the control group ($P = 0.001$).

Conclusion: The training of pensive, creative, and active experts for the future of medicine requires the combination of new collaborative methods with lectures, which are undoubtedly effective learning techniques. According to the results, PBL and weblogs could be invaluable for the improvement of students' knowledge, as well as the relations between tutors and students.

Keywords:

Learning, lecture, problem-based learning, teaching, weblogs

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Introduction

The modern era requires the establishment of innovative teaching methods in academic institutions and universities. Currently, lectures are considered to be the most conventional teaching method. Lecture, although is valuable, may cause the loss of the subjects for some students, leading them towards a passive stream of training. In addition, the taught contents may not stick in mind constantly since they may only be memorized by students.^[1,2] This matter can specifically influence on education and perception of materials among medical students who must be approved both theoretically and practically. Having basic knowledge, proper team working and innovative analyzing the symptoms and signs of diseases are all essential variables for diagnosis and management of the patients correctly, and they must be achieved during education.^[3-5] Evidently, teamwork has been shown to enhance the sense of responsibility in students to encounter societal problems in the future.^[6]

Since the last decade of the 20th century, problem-based learning (PBL) has been introduced as the most efficient method in medical education. In PBL, learning begins with posing a problem/question or presenting a case. Following that, students are divided into small groups to brainstorm and associate their basic medical knowledge with the clinical aspects of the problem, eventually finding a solution for effective patient management.^[3-8]

The advent of social network (e.g., weblogs) has brought about dramatic changes in the teaching techniques of almost every educational field,^[9-11] while medical education has not yet benefitted from these technologies properly.^[12,13] In this regard, educational scholars suggest that prolonged, efficient learning processes occur when students actively partake in the teaching process. Cooperative teaching not only develops the abilities of students, but also improves their communicative skills, thereby helping them to act responsibly in their profession in the future.^[6]

Although in theory combined methods are known acceptable, in practice, they are not commonly applicable. Regarding importance of clinical courses in medicine, we studied the combination of lectures, PBL, and weblogs in comparison to the conventional lectures to find novel methods for teaching medical students.

Materials and Methods

Study design and setting

This study was conducted through interventions in two groups. Following indicating the students of two groups a pretest was performed that proved no significant difference in the gynecology and obstetrics knowledge

of the two groups. The two groups were educated at the same semester, and two methods were commenced by explaining the course plan managing 2 h each session. The two groups were educated in 16 sessions.

In Group A, the tutor presented the educational content through speech (lecture) and PowerPoint presentation, introducing the course plan in the first session and lesson plan in each of the other sessions during the course. In addition, the class was held through discussions, presentation of PowerPoint slides, classifications, sorting, and summarization of the educational content. The students in Group B received training based on a new, collaborative method, which was thoroughly explained by the tutor prior to the class. After the lecture and PowerPoint presentation, the tutor introduced her weblog account to proceed with the combination method, arranging the students into small groups and asking them to pose two cases/problems concerning the presented content from outside the class and upload the content to her weblog. The students were allowed to take photos and films, share with other students, and present their related questions, problems, and comments on the weblog, so that they would all be involved in finding and discussing the solutions to the proposed problems.

In the next session, the lesson plan was started by stating, debating, and replying to the weblog cases in groups. Following that, the tutor added the required comments and performed the new lecture. The circuit helped the students to attain the knowledge of the steps required for taking the appropriate approach to patient management, such as differential diagnosis, use of diagnostic tools, proper management, treatment, and follow-up.

Study participants and sampling

All the medical students in the 5th year were selected via census sampling and enrolled in the study. The inclusion criterion was the students who had not previously passed the mentioned courses, and the exclusion criteria were unwillingness to participate in the study and absence for more than two sessions in the training intervention.

After explaining the objectives and procedures of the research, all the students in the 5th year of medicine ($n = 63$) were enrolled in the study. Based on the Student's number and using the random number table, the students were randomly (Simple Random Sampling) divided into two Groups of A and B. The students in Group A ($n = 31$) received routine lectures, and the students in Group B ($n = 32$) received combined education with lectures, PBL, and weblogs [Figure 1].

Data collection tool and technique

Before the intervention and after the implementation of the course, the students took theoretical and practical

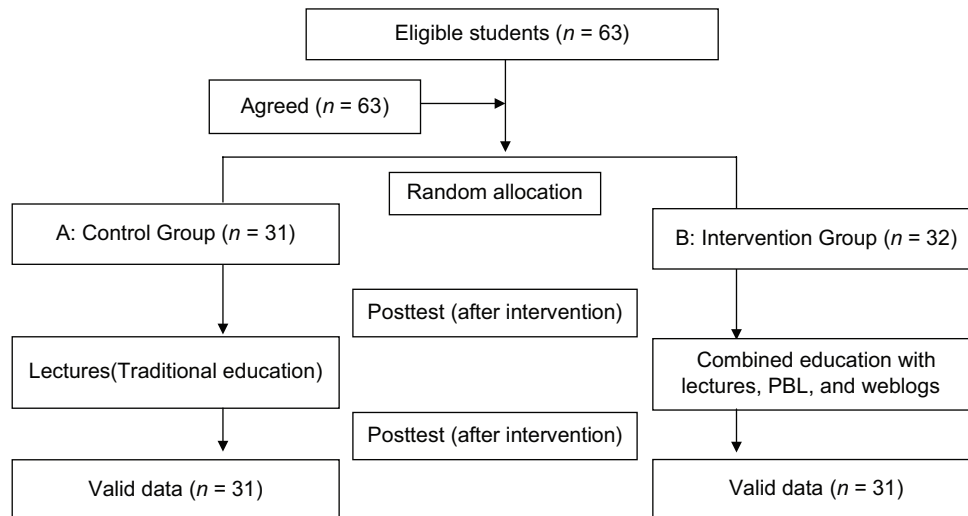


Figure 1: Consort diagram of study

exams with a total score of 20. To evaluate the satisfaction communication, and motivation of the participants with the teaching methods, we used the questionnaire had been developed by Jafari *et al.* In this questionnaire, the content validity has been confirmed by experts, and also reliability was proved by Cronbach's alpha 0.78.^[6,14-17] In our study, the reliability through internal consistency was measured and evaluated as Cronbach's alpha 0.86.

The questionnaire was composed of 11 items, covering the four domains of perception, learning, and memorization of the subjects, increasing motivation and eagerness to study, and interpersonal relations with the classmates and tutor (communication skills). The items in the questionnaire were scored based on a five-point Likert scale (Completely Disagree = 1, Completely Agree = 5). The instrument was used to assess the attitudes of the students toward the applied teaching methods. In addition, the questionnaire contained an extra space for the students to share their viewpoints in the form of open-ended questions.

The subject matter of the research was designed based on the educational curriculum and approved by two experts in the same field in terms of the arrangement and content. Furthermore, we attempted to set the same difficulty level in the two implemented practical exams.

Data analysis was performed in SPSS version 19 (I.B.M. Company, U.S.A. New York) using descriptive statistics (mean and standard deviation). In addition, the study groups were compared using independent *t*-test and Chi-square at the significance level of $P < 0.05$.

Ethical consideration

This an interventional study was conducted on the medical students at Sabzevar University of Medical

Sciences, Iran. The students were taking gynecology and obstetrics clinical courses. Informed consent was completed for all participants. The study protocol was approved by the Research Council and Ethics Committee of the university.

Results

All the students of the 10th semester of medicine participated in this experiment. The mean age of the students in the groups with lecture only and combined teaching methods was 23.76 ± 0.7 and 23.68 ± 0.6 years, respectively.

The Kolmogorov–Smirnov test showed an abnormal distribution of data. Therefore, data were analyzed using Mann–Whitney and Chi-square for quantitative and qualitative variables respectively.

Both groups were homogenous in terms of the demographic characteristics [Table 1].

Before the intervention, the mean scientific score in Groups A and B was 6.33 ± 2.05 and 7.18 ± 1.49 , respectively. Initially, the study groups had no significant difference in this regard ($P > 0.05$). On the other hand, the mean scientific score of the students in the groups receiving lecture only and combined teaching was 14.25 ± 2.06 and 16.44 ± 1.87 , respectively, which indicated a significant difference in this regard ($P = 0.004$) [Figure 2]. On the other hand, the questionnaires used in Group B demonstrated higher scores in the domains of perception, learning, and memorization of the subjects, increasing motivation, and communication with the classmates and tutor ($P = 0.010$) [Table 2].

According to the findings, the mean total satisfaction with the applied teaching method was 39.73 ± 4.2 in

the combined teaching group (total: 55), while it was estimated at 34.53 ± 6.9 in the lecture only group; therefore, a significant difference was observed between the groups in this regard ($P = 0.027$) [Figure 2]. Furthermore, 54.6% of the students welcomed the use of weblogs along with the conventional lecture, while 21.2% were against this approach.

Discussion

Along with the advancement of science and technology, the replacement of conventional teaching methods with innovative techniques seems essential. According to the results of the present study, posing a case as a problem and presenting a solution by the medical students yielded excellent educational outcomes. Base on this study the abilities of learning and memorizing increased by collaborative methods. Moreover, the students of intervention group expressed more internal motivation and enthusiasm to conduct the courses and also could establish a better relationship with their tutor classmates compared to the control group. Another positive point, they received higher scores in the final examinations.

Consistent with our findings, some studies have indicated that cooperative education in small pairs/groups based on PBL could improve the eagerness and depth of students' perception toward learning, while also moderating individual differences and minimizing stress while students regulate their activities based on group planning.^[3,5,7,17,18] Moreover, several studies have confirmed that collaborative, student-oriented teaching methods (e.g., PBL and teamwork) play a pivotal role in the excitement of classmates to adopt the teaching

process while carrying out their assignment with higher motivation and less weariness.^[17,19-22]

In line with the results of the present study, Mohammad Shahi *et al.* compared proximate and distance learning based on blogs, reporting that the education process was more efficient and resulted in deeper learning in distance learning and group discussions on blogs.^[23] In addition, Avijegan *et al.* stated that E-learning and novel educational methods, as well as their combination, could increase flexibility in the learning process, thereby resulting in the exploitation of the benefits of both E-learning and proximate methods and higher satisfaction of students and tutors. Therefore, such methods should be incorporated into the curricula of medical universities.^[24]

Consistent with the findings of the current research, Al-Qalaf *et al.* also used blogs along with language learning, reporting that the applied method empowered the students and displayed a more positive attitude towards learning English as a foreign language^[25] In another research, the use of lectures and E-learning in the courses on nurses' documentation competency was associated with no superiority of one method over the other.^[26] In the present study, the simultaneous use of distance and proximate learning could be considered a prominent reason for the acceptance of the methods by the learners. However, some studies have demonstrated

Table 1: Demographic data of participants

Demographic variables	Groups	Combination (%)	Lecture (%)	P
Age (year)	Mean±SD	23.65±0.65	23.80±0.7	0.38*
Gender	Female	17 (53.1)	21 (67.7)	0.177**
	Male	15 (46.9)	10 (32.3)	
Indigenouness statue	Native	11 (34.4)	11 (35.5)	0.56**
	Not native	21 (65.6)	20 (64.5)	

*Mann-Whitney U, ** χ^2 . SD=Standard deviation

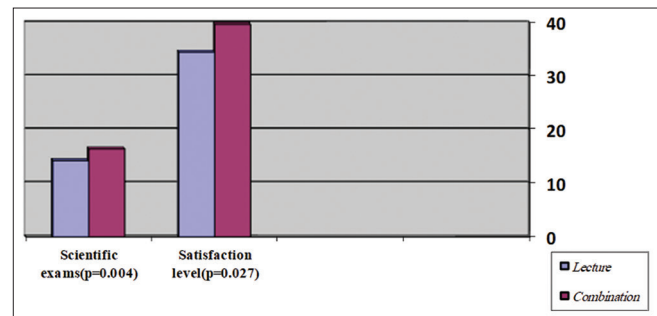


Figure 2: Comparison of exam results and satisfaction between study groups

Table 2: Efficacy of each method in different aspects of education and communication skills as expressed by students in questionnaire

Fields	Groups	Satisfaction level	SD	P*	Total effective limitation
Perception of Subjects	Combination	7.43	1.10	0.005	2-10
	Lecture	6.19	2.16		
Learning and memorizing	Combination	14.62	1.71	<0.001	4-20
	Lecture	6.00	1.63		
Internal motivation	Combination	7.81	0.93	0.001	2-10
	Lecture	6.48	1.87		
Relationship between tutor and students	Combination	7.21	0.90	0.01	2-10
	Lecture	6.19	1.99		

*Mann-Whitney U. SD=Standard deviation

that electronic education can be used for facilitating educational programs.^[23,26]

In this study, the mean of scientific score was significantly higher in the combined teaching group. The comparison of novel and conventional educational methods (e.g., lectures) reveal that the learning process becomes mutual, thereby increasing the participation rate of the learners, decreasing their boredom, causing classes to enhance educational progress, thinking abilities, and learning on higher levels, and promoting interest and motivation to partake in classes, perform the assignments, and better learning.^[23] According to the results of the present study, the students were satisfied with the applied teaching method. In the study by Sadeghi *et al.*, the problem-solving approach was reported to be well received by students, denoting their satisfaction in this regard.^[14,21] Furthermore, this method was reported to be welcomed by students and professors in the research conducted by Kermanian *et al.*^[12,14,15]

The findings of the current research showed that the applied teaching method increased the motivation and eagerness of the students to partake in the learning process. Consistently, another study indicated that forming small workgroups and assigning educational responsibilities to these groups could promote the motivation of the individuals, thereby bridging the gap between theoretical and practical courses.^[13] In addition, learning through participation in blog network could enhance the independence of individuals.^[21,23,27] Inconsistent with this finding, Mohammad Shahi quotes from other studies that despite the higher independence in methods such as E-learning, lectures could influence learning and motivation more remarkably.^[23]

The results of the present study indicated that the combined teaching method based on PBL and blogs could improve the interpersonal relations of the students with each other and the tutor. Another research also demonstrated that using participate learning based on using blogs could enhance social interactions.^[20,23,26] Accordingly, participate learning reinforces communication skills, preparing students for their profession and management of social issues in the future.^[6]

One of the differences between this study and other studies is the simultaneous use of both traditional methods and participatory methods and distance learning. Using weblog space compared to websites is simple, attractive, and environment friendly. In addition, the blog, compared to other distance learning methods such as software CDs, allows people to ask and answer questions and comment freely.

Some studies explained when lecture and virtual learning are used separately, their efficacy have no significant difference.^[10,28] Whereas using a combination of traditional and modern methods (including PBL and/or virtual learning) is more effective than each method lonely.^[5,7,14,29-31]

In the end, the limitations concerning the methods should be mentioned, lack of constant availability of internet in some dormitories has affected on the findings we received in the last section of the questionnaire. Some of the limitations of the present study were the small sample population and using of only one subject in the teaching process. It is notable that no reports were available on the examination of the mentioned methods together in the literature. In addition, we were faced with issues such as lack of access to high-speed internet. Technological facilities in universities, hospitals, and dormitories are absolutely essential to modern processes, and the insufficiencies in this regard adversely affect the outcomes of every method. Moreover, the time management expertise of the tutors for gaining optimal profit in combined methods is another prerequisite to be incorporated into re-education workshops.

Limitations of the study and recommendation

It is recommended that extensive investigations be conducted to demonstrate the strengths and weaknesses of the novel methods in this regard. Although in theory combined methods are known acceptable, in practice, they are not commonly applicable. Our research showed efficacy of various methods of education, specifically in clinical courses, can be considerable.

Conclusion

According to the results, the administration of novel educational strategies in combination with conventional teaching methods could induce dynamic motion and motivation in students and tutors. Some of the key advantages in this regard include the improvement of basic knowledge, enhanced ability in practical medicine, proper use of social networks, computers, and smartphones, access to updated medical knowledge, enhancing communication skills and professionalism, and increasing enthusiasm and satisfaction in students.

Acknowledgment and ethical moral code

The study protocol was approved by the Research Council and Ethics Committee of the university (code: medsab.rec. 93.124).

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Nil.

Conflicts of interest

There are no conflicts of interest.

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