

Peer Teaching: A New Step to Improve Education, Learning and Student Satisfaction

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Abstract

Background: In peer teaching, students act as both teachers and learners. Peer teaching can be a useful way to learn courses in interdisciplinary fields of study.

Objectives: The purpose of this study was to investigate the viewpoint of health information technology students about learning through peer teaching.

Methods: This cross-sectional study was conducted in 2017 at Kerman University of Medical Sciences. Undergraduate students in the health information technology department using the peer teaching method participated. Data were collected using a self-administered questionnaire. The questionnaire consisting of 42 questions assesses students' attitudes toward peer teaching. It consisted of two categories: "learning improvement" and "students' satisfaction with the peer teaching." Data were analyzed using SPSS software.

Results: A total of 52 students participated in the study. Regarding learning improvement, the mean score of development of individual skills, improvement of students' learning, and improvement of peer performance were 3.43 ± 1.05 , 3.34 ± 1.08 , and 3.37 ± 1.03 , respectively. In terms of student satisfaction the mean score of interaction between learner and teacher, knowledge transferred to the student, and the class conditions were 3.52 ± 1.10 , 3.31 ± 1.09 , and 3.21 ± 1.15 , respectively. Students who attended more in peer classes were more satisfied and their learning improved ($P < 0.05$). There was no significant relationship between age, gender, and the number of passed semesters with students' satisfaction and learning ($P > 0.05$).

Conclusion: From the students' point of view, peer teaching can improve their learning. Also, the students were satisfied with the training provided by their peers. Peer teaching can be a complement to the teacher-centered method by providing a positive experience.

Keywords: Peer Teaching, Peer Learning, Evaluation, Satisfaction

Background

Training is a complex process, which when it is underestimated, can lead to the loss of human resources and waste facilities. Therefore, the development of education and making changes in its process requires knowledge of the education process and awareness regarding new educational methods (1). The conventional method of education in universities is the professor-oriented method. In this method, all the subjects are explained by only one speaker (teacher) and are received and memorized by the student. Therefore, the student does not participate in the teaching process (2). Although using this method, a large amount of data in a short time are presented, but its effect on the development of the mind, motivation, and changing attitudes is much less than new teaching methods; it also wastes human resources and facilities. Therefore, the use

of alternative teaching methods seems necessary; because using new methods, makes learning more sustainable and effective learning, and makes students motivated and interested in learning (3). One of these methods is peer teaching (4).

Peer learning is one of the models of learning and teaching and a kind of educational methods, in which people from the same social groups who are not professional teachers, help each other in learning and learn themselves (6, 5). This method has been less used in formal education, although its use in higher education and medical sciences is increasing (5). There are different methods for teaching and learning through peers (6). Peers can be identical or at higher levels regarding the educational level or experimental experiences. For example, in the peer-to-peer method, students starting university in the same year teach

each other (8,7). The benefits of this method are as follows: increasing self-confidence, increasing presentation skills (9), teamwork, responsibility, developing critical thinking skills (10), improving students' test scores (11), increasing the opportunity to ask and answer questions and solve problems. It is a useful method to prepare students for their future role as medical educators (12).

Various studies have examined peer teaching. Bucknall et al. examined the peer performance evaluation model and attitudes toward evaluation, at Bringham University in the United Kingdom and a peer-to-peer teaching model was performed in the basic sciences, and senior students taught their undergraduate students. This training was compared with the training by faculty members in an experimental study using a control group. The results showed that the peer teaching process was acceptable to many students. Compared with faculty members, peer training was valid and learning outcomes were the same (13). Brannagan et al. examined the effect of peer learning experiences on nursing students in a clinical laboratory on 179 first-year nursing students and 51 third-year nursing students. Students were divided into two groups in three semesters. A group of students was trained by third-year students and the control group was trained according to the conventional method (14). Brannagan et al. concluded that peer training enhances clinical skills and the successful experience of nurses while working and changes their attitudes (14).

In a qualitative study by Zarifnejad et al., to explain the experiences of nursing students participating in the complementary group training by peers for physiology, students who had the experience of participating in physiology with peer teaching methods were interviewed. The results showed that educational institutions and universities should pay more attention to student-centered teaching methods, such as peer teaching; because the use of these methods can complement the teacher's teaching by providing a positive experience and lasting and deep learning (15).

Kimyai et al. conducted a study to investigate the effect of peer group training on learning practical skills of dental students in the restorative preclinic and showed that the scores and practical skills of students in the intervention group (peer teaching) were the same as students who received conventional education (10).

Peer teaching is applicable in interdisciplinary fields where students need to learn different skills, of which health information technology is presented in medical universities. Graduates will be able to take charge of the management of the health information technology unit of all institutions providing health care and play a role in creating and managing health information systems using information technology. For this purpose, students must learn various sciences, such as computer, medical terminology, information management science, etc. However, the headline provided by the Ministry of Health does not meet all the training needs of these students. Also, due to the large volume of content and time limit, teachers

do not have enough time for comprehensive explanations and further practice in the classroom. For example, a health information technology expert must be competent to address the needs of technology-related hospital staff and software and hardware problems. Therefore, students in this field need to receive various types of training they need. Thus, the Department of Health Information Sciences of Kerman University of Medical Sciences to meet the educational needs of students decided to use the capabilities of graduate students in medical informatics who had various specialties, such as software engineering, hardware engineering, etc., to employ health information technology in the education of undergraduate students. To the knowledge of the researcher, no study has yet been conducted in Iran to examine students' attitudes toward education by their peers.

Objectives

The purpose of this study was to investigate students' views regarding learning through peer teaching and to measure their satisfaction with peer teaching.

Methods

This cross-sectional (descriptive-analytical) research was conducted in Kerman in 2017. The study population consisted of undergraduate students in health information technology department. The peer teaching peer teaching was carried out in October 2015 in the Department of Health Information Sciences of the Faculty of Management and Information Science. Necessary coordination was made with the professors by the head of the department. Health information technology students who had started the university in 2015 participated in the introduction meeting and an initial agreement was reached between the students and the department and the peer teaching peer teaching method was introduced to the students.

The inclusion criteria were taking the considered courses in the current semester, regular attendance at classes held by professors, and willingness to participate in research. To do peer teaching, the master's degree students in medical informatics, those who had the necessary scientific qualifications and we able to hold a training course were selected. These students were selected according to criteria, such as obtaining a score higher than 17 in the considered courses, a history of peers teaching, and willingness to cooperate. Also, the students should have good communication skills and be able to transfer their gained knowledge and manage the class. After making coordination with one of the professors of the department, the instruction and the duration of the class were provided to the selected students, and then the content that the peers had prepared for presentation in class was approved by the professor.

After preparing the content and approving it for the class, the head of the department made needed coordination with the undergraduate students, and then the class was held at the considered time and day. All undergraduate students who took courses should attend the classes held by the peers. Therefore, to participate in

classes held by peers, sampling was not done and all eligible students could participate in the provided training class. In the classes, peer students taught the intended subjects to the students and then solved the exercises and gave more examples. Due to the free time of peer students, it was possible to ask and answer questions and solve problems outside of class, through communication channels, such as email and the social media platform (Telegram group).

Medical informatics students also participated in some workshops. Information to participate in these training workshops was provided through the Telegram group. The Telegram group was created by the Department of Health Information Sciences only for informing students about the workshops and identification of other students willing to participate in the workshops.

The peer teaching process was evaluated by peers when it had been used in six semesters. A questionnaire consisting of 42 questions (two parts) was used to assess students' point of view on learning improvement and to measure their satisfaction with peer teaching. The questionnaire was a researcher-made questionnaire. The first part of the questionnaire was students' demographic information (age, gender), and the second part had two categories including learning improvement and satisfaction with peer teaching. The learning improvement category consists of three sub-categories: student learning improvement (14 questions), peer performance improvement (3 questions), and student's individual skills development (10 questions). Students' satisfaction with peer teaching was examined in three sub-categories, including classroom atmosphere and conditions (4 questions), knowledge transferred to the student (8 questions), and the interaction between learner and teacher (3 questions). At the end of the semester, students participating in classes and workshops willing to answer the questions completed the questionnaire. The questionnaire was scored on a five-point Likert scale (completely disagree = 1, disagree = 2, no idea = 3, agree = 4 and completely agree = 5). The minimum score for learning improvement was 27 and the maximum score was 135. In terms of student satisfaction with peer teaching, the minimum and maximum scores were calculated as 15 and 85, respectively. The average score of each category was between 1 and 5. In order to calculate the average of the sub-categories, first, the average score for each question was calculated. Then, for each sub-category, the average score of its questions was added and divided by the number of questions (11). To check the content validity, it was approved by two specialists experts in medical informatics. The reliability of the questionnaire was

confirmed by the marginal homogeneity test ($r = 0.89$).

In order to investigate the relationship between demographic variables and the two categories (learning improvement and student satisfaction), chi-square test was used. Data were analyzed using SPSS software version 24 (version 24, IBM Corporation, Armonk, NY).

Results

In total, 63 undergraduate students in health information technology department were trained by 5 postgraduate students. Of the students trained, 52 undergraduate students participated in the evaluation, of which 44 cases were female and 8 cases were male with a mean age of 21.00 ± 2.25 years. The average length of peer teaching was 14.5 ± 9.5 hours and the maximum length of peer teaching was 32 hours. Demographic characteristics of the participants are given in Table 1.

Table 2 shows the mean scores of learning improvement and student satisfaction categories and their sub-categories. From the students' point of view, the most important factors leading to the learning improvement of students were the appropriate speed of teaching, motivating students, engaging in the learning process, and the desire to continue education. Regarding the improving peer performance, more than half of students (69.2%) believed that peer teaching can increase the responsibility of students, which is effective for their future careers. Also, peer teaching develops individual skills and strengthens skills, such as self-confidence (69.2%), encouraging students to take responsibility in learning (63.5%), and adopting and improvement of critical evaluation skills (59.6%).

Students showed a high level of satisfaction with their relationship with peers; 44.2% of the participants agreed and 19.2% strongly agreed that peer teaching increased interactions among students.

Using peer teaching, students received answers to their educational problems in the shortest possible time, 30.8% of students agreed and 13.5% of them strongly agreed with this issue. Overall, 69.3% of the students were highly satisfied with the friendly and comfortable atmosphere of the class, in which they could ask their questions and receive the answers. The lack of taking the class seriously by some students made more than half of the students dissatisfied (57.5%). Regarding the satisfaction with peer teaching, 53.8% of students were highly satisfied with the level of difficulty and comfort of the subjects presented by their peers considered according to the level of understanding of students.

Table 1. Demographic characteristics of health information technology students participating in peer teaching

Variable	Mean \pm SD	
	Female (44 students)	Male (8 students)
Gender		
Age (18 to 29 years)	12.75 \pm 2.24	22.63 \pm 3.66
Number of semesters (1-8)	4.32 \pm 2.66	4.65 \pm 2.47
Time spent in class (1-30 hours)	14.39 \pm 10.54	13.75 \pm 12.66

Table 2. The mean scores of learning improvement and satisfaction with peer teaching

Category	Mean ± SD
Learning Improvement	
Development of individual student skills	3.43 ± 1.05
Improvement of student learning	3.34 ± 1.08
Improvement of the peer performance	3.37 ± 1.03
Learners' satisfaction with peer teaching	
Knowledge transferred to the student	3.31 ± 1.09
Interaction between learner and teacher	3.52 ± 1.10
Atmosphere and conditions of the class	3.21 ± 1.15

Students' satisfaction (42.8%) with confidence in the accuracy of the presented information was at a low level, which can negatively affect their learning.

The results of the chi-square test showed that students who attended more classes in peer classes were more satisfied and their learning was improved ($P = 0.001$); whereas there was no significant relationship between age, gender, and the number of spent semesters with students' satisfaction and learning improvement ($P = 0.08$).

Discussion

The results of the present study showed that from the students' point of view, peer teaching leads to an learning improvement. Also, the students were satisfied with the training provided by their peers. The results showed the role of peers in teaching interdisciplinary fields of study. In general, peer teaching had a positive effect on various educational-personality aspects of students and peers as teachers.

In a study carried out by Stone et al. , researchers investigated the effect of peer teaching on nursing students and selecting an effective method for learning. They showed the special role of learning from peers in nursing graduate students and peers had a great effect on increasing learning and improving knowledge (16), which was consistent with the findings of the present study. The results of the present study showed that providing explanations by the teacher at the level of students' learning ability, leads to the improvement of learning by peers. The same as our findings, Hanson et al. concluded that peer teaching could lead to a better understanding compared with the teacher due to the same intellectual level in learner and peer (17).

According to the results of the present study, one of the effective factors in promoting learning by peers is the involvement of students in the process of education and enthusiasm to continue their education. In line with the finding of our study, the results of Speyer et al.'s research showed that students gain a good insight into their performance by peer evaluation, which leads to student participation in the teaching process (18). From the perspective of students participating in the present study, peer teaching leads to increasing student responsibility, motivating students, and involving them in the education process. In this regard, the results of study by O'Keefe et al. showed that students' relationships with peers can result in cooperation and mutual trust and overcome participants'

concerns (19).

The results of the present study showed that students were highly satisfied with peer teaching, which can be due to the free time of the peer student that makes it possible to solve problems and answer students' questions in many situations outside of class. Also, students' communication with peer students is not limited to the university, and students can receive answers to their educational questions outside the university and classroom through social network platforms, such as Telegram from peer students.

Ross and Cameron concluded that using peer teaching, the student can ask their questions and receive answers and it also increases students' self-confidence (20). In the present study, participants believed that peer teaching increased their self-confidence. Communication between students and their peers was not limited to the university environment and they could establish communication through social networks. Therefore, they can increase interactions, and peers can solve problems and answer students' questions in the shortest time. Also, the use of social networks to transfer information and making coordination in holding workshops, makes it easy to transfer the information. It also makes students able to receive information about the place and time of the class and the subjects presented during the semester.

One of the factors that lead to students' dissatisfaction with peer teaching was the uncertainty about the accuracy of the subjects presented by peers. The same as our findings, O'Keefe et al. also reported concerns about the strict supervision of peer student teaching by medical professors; thus, professors were reluctant to use peer teaching (19). However, in the present study, the peers were highly experienced in the presented courses. For courses, such as data structure and programming, we used undergraduate computer engineering students who had sufficient knowledge regarding the content of the course. For courses, such as medical terms, graduate students in paramedical and health information technology were employed.

Limitations

The present study had two limitations. It was not mandatory to complete the questionnaire; thus, we lost some samples. The lack of participation of peer students in the final exam was another limitation. It is suggested that to increase students' motivation and take the class

seriously, a share of the final grade of the course should be allocated to the peer student who is doing the teaching process. Also, in order to increase the motivation of the peer student, it is better to issue a certificate of participation in teaching, which will help enrich their resumes for their future careers.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open http://sdme.kmu.ac.ir/jufile?ar_sfile=804467].

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Ethical Approvals: All students were assured that their answers remain confidential and only for research purposes. The present research was approved (IR.KMU.REC.1398.446) by the ethics committee of Kerman University of Medical Sciences.

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