Effects of e-learning, lectures, and role playing on nursing students' knowledge acquisition, retention and satisfaction

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Abstract

Background: Nursing education can maintain its dynamic quality when it moves toward innovation and modern methods of teaching and learning. Therefore, teachers are required to employ up to date methods in their teaching plans. This study evaluated the effects of e-learning, lectures, and role playing on nursing students' learning, retention, and satisfaction.

Methods: Sixty nursing students were selected as an experiment and control groups during two consecutive semesters. The educational content was presented as e-learning and role playing during one semester (experiment group) and as lectures in the next semester (control group). A questionnaire containing three parts was used to assess demographics, learning and satisfaction statuses. The questionnaire also included a final open-ended question to evaluate the students' ideas about the whole course.

Results: The mean scores of posttest were 16.13 ± 1.37 using role playing, 15.50 ± 1.44 using e-learning and 16.45 ± 1.23 using lectures. The differences between the mean scores of posttest and pretest were 12.84 ± 1.43, 12.56 ± 1.57, and 13.73 ± 1.53 in the mentioned methods, respectively. Lectures resulted in significantly better learning compared to role playing and e-learning. In contrast, retention rates were significantly lower using lectures than using role playing and e-learning. Students' satisfaction from e-learning was significantly lower than lecturing and role playing.

Conclusion: Due to the lower rates of retention following lectures, the teachers are recommended to use student-centered approaches in their lectures. Since students' satisfaction with e-learning was lower than the other methods, further studies are suggested to explore the problems of e-learning in Iran.

Keywords: E-learning, lecture, role play, nursing students.

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Introduction

Increasing medical knowledge and the consequent recognition of problems along with the shift from teacher-centered instruction to learner-centered teaching in higher educations have imposed new responsibilities on both the teachers and the learners. Among the most important issues is choosing the best learning method (1). Most universities throughout the world are seeking appropriate teaching methods to enhance clinical decision making and provide continuous, self-centered learning (2).

Teaching nursing can maintain teaching dynamic quality as long as it moves toward innovation, development, and use of modern methods of teaching and learning (3). Achieving this goal requires the teachers to use up-to-date methods in their teaching plan (4). In other words, selecting the best teaching method is one of the most important steps in instructional design (5).

Effective learning is in fact the result of a good teaching (6). Giving lecture is the prevailing method of teaching in medical education. Despite the emergence of mod-

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ern teaching methods like problem-solving approach and the availability of computers and the Internet, lectures are still used to exchange information due to their numerous benefits including cost-effectiveness for large populations (7). Evidence suggests that useful content and a good lecturer will provoke positive and reasonable outcomes (6). Although attending lectures is an inevitable part of every person's learning experience, it prevents learners from thinking as an essential element of learning. Studies have shown that about 80% of the information acquired through lectures will be forgotten after eight weeks (8).

According to educational psychologists, effective, long-lasting learning entails activate engagement of the leaner. Therefore, education professionals are currently emphasizing modern, active, learner-centered methods (9). Baghaei writes in his article quoting Noules: "that adults learn efficiently only via self-directed methods" (6). Several teaching and learning approaches, including e-learning, have been derived from this theory. The e-learning enables learners to reach their educational goals based on their talents and learn how to learn, which is from educational aims (10).

E-learning is a self-learning activity which has been newly employed in many universities and education centers. It also helps achieving a main objective of formal education, i.e. preparing learners for active and independent learning (11,12). With the rapid development of information communication technologies (ICT), Internet technologies and web-based applications have created unprecedented opportunities for conducting learning, and this phenomenon has led to the exponential growth of electronic learning (e-learning) in recent years (13). This method has in fact provided a new paradigm of teaching and learning which enables everyone to learn anything anywhere and at any time throughout their lives (14). This is of particular importance and necessity in nursing profession as nurses need access to updated information on diseases, treatments, drugs,

and thus, new skills (15). Studies on the advantages of teaching with computers have shown positive and promising results compared to other methods (16). Chang et al. reported that compared to traditional teaching methods, computer-based teaching saves 25-60% of the learners' time (15). However, this method is not common in nursing education in Iran (17).

Role playing is another approach for teaching and learning. It has been especially designed to analyze individual values and behaviors, establish solutions to interpersonal (and personal) problems, and develop empathy with others. In medical education, role playing can be a practice for learners to communicate with patients, discover emotions involved in various behaviors, and practice new behaviors and attitudes in a safe situation that resembles real conditions (18,19). Role playing assists the students to enhance their understanding of their own and other people's feelings, develop new behaviors, and improve their problem solving skills. However, due to the amazing nature of role playing, it may sometimes be disregarded as a context for developing educational content. The benefits of role playing depend on the quality of its practice and more importantly on its analysis. To be precise, instead of being a goal, role playing is a means to help students show values, feelings, attitudes and solutions and finally listen to their teacher's evaluations (18).

Chan (2012), considered role playing as an effective learning strategy which facilitates independent learning and is hoped to be used by nursing teachers (20).

Despite the repeated emphasis on using modern teaching methods, the teachers still prefer traditional methods. Implementation of modern and active methods of learning will undoubtedly require an approach to research-based education. Therefore, this study evaluated the effects of e-learning, lectures, and role playing on learning, retention, and satisfaction of nursing students.

Methods

In a quasi-experimental study, 60 nursing students in their fourth semester were selected from the School of Nursing and Midwifery (Mashhad University of Medical Sciences, Iran). Using census method, individuals who were studying their fourth semester during the first and second halves of 2011-12 academic year were selected as an experiment (n=31) and control groups (n=29), respectively. The inclusion criteria were picking Medical-Surgical nursing- II course, for the first time and not having occupations related to nursing.

A three-part author-made questionnaire was used to collect data. It evaluated demographic information, theoretical knowledge (20 MCQ), and satisfaction (12 questions on a five-point Likert scale from very much to very little). The final item was an open-ended question that asked the students' opinion about the entire course. Content validity was used to validate the satisfaction questionnaire. The designed questionnaire was distributed among 32 undergraduate nursing students to identify their ideas about factors affecting educational satisfaction. Afterward, the results were presented to ten faculty members of the mentioned university and the questionnaire was revised based on their recommendations. The internal reliability of the tool was also confirmed (Cronbach's alpha = 0.82).

Data were collected at baseline and one week and one month after the end of the course. All exams were extracted from the questions bank and matched in terms of difficulty. The tests were performed on kidney and urinary tract diseases (taught during Medical-Surgical Nursing- II course). In the experiment group, the contents were divided to two parts and instructed through e-learning and role playing. The control group received all the content via lectures.

E-learning was facilitated by having unlimited password protected access to the virtual education system of Mashhad University of Medical Sciences. The students were also allowed to email or visit their instructors in case of any problems. The experiment group first attended a briefing session in which all stages of education were explained. Informed consents were then obtained from eligible students. The selected individuals filled out the pretest questionnaires and were taught how to access the Internet and use the available information. After they had asked all their questions, a unique password was provided to each subject. Although the same content was supplied by both lectures and e-learning, the latter presented the material in the form of slides, flash videos, and audio files (recorded in the teachers' voice).

During the five sessions of role playing, the scenario was developed by the instructor (the researcher) and a nursing student with experience in theater. It was then performed by four nursing students in the role of doctor, nurse, patient, and his/her companion. This scenario had been performed in three previous semesters along with applied recommendations from performers and students. One week after the completion of each teaching method, a written test was taken to examine the students' learning. A satisfaction assessment form was also distributed among the participants. After one month, a second exam was held without previous notice to determine the retention of the content.

During the next term, the same content was provided to the control group through lectures. The effects of lectures on learning, retention and satisfaction of the students were separately compared to the results obtained from role playing and e-learning. Using SPSS for Windows 11.5 (SPSS Inc., Chicago, IL, USA), the collected data were analyzed by descriptive statistics as well as t-test, paired t-test, and Kruskal-Wallis, Mann-Whitney with Bonferroni correction as Post Hoc test, Wilcoxon, and Spearman's tests.

Results

The results of this study indicated that there was no significant difference between

Table 1. Scores of nursing students immediately after the course and one month later using different teaching methods

	Immediately after	One month later	Difference	p
Role playing	16.13 ± 1.37	15.26 ± 1.50	-0.87 ± 0.62	< 0.001
e-learning	15.50 ± 1.44	14.45 ± 1.60	-1.05 ± 0.57	< 0.001
Lecture	16.45 ± 1.23	14.97 ± 1.53	-1.48 ± 0.73	< 0.001

Values are presented as mean ± SD.

Table 2. Scores of satisfaction from different methods of teaching

	Median	The First quartile	The Third quartile
Role playing	42	36	75
e-learning	26	24	32
Lecture	40	36	44

the two groups in terms of age, gender, and baseline level of knowledge. Most participants were female (65%), single (88.3%), and with little interest in their study field (61.7%) and medium knowledge of computers (65%). The mean age of the subjects was 20.91 ± 1.19 years old and their grade point average (GPA) until the time of study was 16.24 ± 1.16 (on a 20 scale).

The mean posttest scores were 16.13 ± 1.37 in the role playing group, 15.50 ± 1.44 in e-learning group, and 16.45 ± 1.23 in the lecture group. They were all significantly higher than pretest scores (12.84 ± 1.43, 12.56 ± 1.57 and 13.73 ± 1.53, respectively; p< 0.001). Moreover, lectures were more effective on learning, i.e. the difference between posttest and pretest scores using lectures was significantly greater than those using role playing (p= 0.024) and e-learning (p= 0.005). However, there was no significant difference in learning between role playing and e-learning (p=0.381).

After one month, the scores had significant reductions in all three methods (Table 1). Lectures resulted in significantly lower retention rate compared to role playing (p= 0.001) and e-learning (p= 0.013). In addition, although no significant difference in retention was observed between e-learning and role playing (p= 0.134), reductions in scores were less using the latter method.

Students' satisfaction with e-learning was less than the other two methods (Table 2). According to Mann Whitney test with Bonferroni correction results, the students' satisfaction from e-learning was significantly lower than lectures (p< 0.001). Satisfaction rates from role playing and lectures were

not significantly different. However, Mann Whitney test with Bonferroni correction results showed signficiantly higher satisfaction after role playing compared to e-learning (p < 0.001). While most participants were moderately satisfied with lectures (40%) and role playing (35%), 31.7% of the subjects had little satisfaction from e-learning.

Answers to the final open-ended question revealed major reasons for dissatisfaction with e-learning included lack of access to high-speed Internet services, the habit of having face to face relationships, reduced interaction between the students and the teacher, the habit of attending classes and studying only during exams, and teachers' methods of lecturing and giving clinical examples.

There was a significant positive correlation between the GPA during the past three semesters and satisfaction from e-learning (p< 0.001; r: 0.606). Conversely, there was no significant relation between the GPA and satisfaction from the other two methods. None of other demographic characteristics was significantly correlated with satisfaction from different teaching methods.

Discussion

We found lectures to be a significantly more effective teaching method than role playing and e-learning. In contrast, Hezaveyie et al. reported significantly higher scores of nutrition-related knowledge after role playing than after lectures (21). Similarly, Erfanian et al. showed role playing to more effectively improve learning of communicational and counsel-

ing skills of students (22).This difference might be justified by the fact that theoretical topics and multiple-choice questions deal with cognitive aspects, but role playing involves emotional, mental, and motor domains. In addition, according to the results of studies in this field, (23) careful design and development of a scenario and providing feedback can elevate the efficiency of role playing (24).

We also found lectures to result in significantly better acquisition compared to e-learning. Contrariwise, some previous studies have obtained the same levels of acquisition via e-learning and lectures (10,25-30). In a study by Woo and Kimmick, despite the absence of significant differences in acquisition scores and satisfaction between lectures and e-learning, students were significantly more motivated using e-learning. This method was nonetheless associated with more problems with software and technical support (31). Another research on nursing students who used web-based e-books reported satisfaction and self-guided learning as important factors leading to better acquisition in this method. The researchers thus concluded that high quality and effective web-based learning requires the teachers to identify the learners' characteristics from the very first steps of course design (32).

Various factors might have been responsible for differences between our findings and previous studies that suggested the benefits of e-learning. As our participants stated, reading habits and problems of e-learning such as lack of access to high-speed Internet were among the barriers to the success of this method. Likewise, Schrader and Kldiashvili indicated that possessing personal computers and having relevant skills facilitate students' function in e-learning (33). Žvanut et al. reported that voluntary use of virtual learning increases the learners' acceptance. Therefore, making this course obligatory for students reduces its effectiveness (34).

In the present study, retention of content following lectures was significantly lower than that after role playing and e-learning. Moreover, although there was not a significant difference between e-learning and role playing in this regards, the latter was associated with lower reductions in scores over time. According to previous research, role playing not only promotes knowledge retention, but also allows the students to act out real situations and reduces their anxiety (35). Maunye et al. reported role playing as a common method of teaching for nurses in Mpumalanga in the eastern part of South Africa (36). Other studies have also introduced role playing as a method to promote communication and counseling skills (22,37,38).

Our participants were significantly less satisfied with e-learning than lectures and role playing. However, there was no significant difference between role playing and lectures regarding satisfaction. In contrast, Woo and Kimmick did not find a significant difference between satisfaction from lectures and role playing (31). Our participants reasons for dissatisfaction from e-learning included not having access to high-speed Internet, being accustomed to face to face relationships, reduced interactions between students and teachers, habits of attending classes and studying only during exams, and teachers' methods of lecturing and giving clinical examples. Therefore, the students' learning methods need to be modified as they enter university or even during high school years. The students should also be motivated and their habit of studying only for exams and scores has to be changed. Multiple strategies such as using student-centered methods beside lectures and constant assessment of students throughout the semester are hence indispensable. Furthermore, problems of low-speed Internet and inadequate computer skills must be solved as the results of other studies showed that one of the major effective dimensions on using e-programs is computer and Internet skills (39).

Finally, the significant positive correlation between GPA and satisfaction from e-learning emphasizes the importance of the

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mentioned facts.

Limitations

While research has shown 80% of lecture material to be forgotten after eight weeks, we evaluated retention four weeks after the completion of the course (since summer was approaching). Nevertheless, most previous studies have also assessed retention at a similar interval.

In this study we examined three teaching method but in two groups, thus the scores of role-playing and e-learning methods might be correlated to some extent.

Conclusion

In the present study and based on learning habits of the participants, lectures accompanied with questions and answers and introducing clinical examples, could improve the learners' knowledge more effectively than role playing and e-learning. However, role playing and e-learning had more persistent outcomes compared to lecturing. Therefore, in teaching important medical and nursing contents, student-centered methods should be employed as add-ons to lectures. While e-learning was not significantly different with role playing in terms of knowledge acquisition or retention, it resulted in the lowest satisfaction rate compared to the other two methods. Consequently, modification of students' attitudes and facilitating access to high-speed Internet are necessary. Electronic presentation of some parts of each course from the first semester might also be beneficial in increasing the students' acceptance.

Acknowledgements

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