Comparing the effect of lecture and Jigsaw teaching strategies on the nursing students' self-regulated learning and academic motivation: A quasi-experimental study

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ABSTRACT

Background: In cooperative learning approach, the active and direct involvement of the learner in the learning process leads to a comprehensive development. Self-regulated learning and academic motivation focus on the role of the individual in the teaching-learning process.
Objectives: The aim of this study was to investigate the comparing of lecture and Jigsaw teaching strategies on the nursing students' self-regulated learning and academic motivation.
Methods: This was a quasi-experimental conducted from January to November 2018 on 94 nursing students in the fourth education semester in two classrooms. A classroom was randomly assigned to the lecture group and the other as a Jigsaw group. The data collection tools were demographic data questionnaire, self-regulated learning questionnaire, and academic motivation scale. The interventions were lecture and Jigsaw teaching strategy for seven sessions lasting for 2 h in the lecture and Jigsaw groups respectively. Data was collected before and after the interventions. Finally, data was analyzed using Kolmogorov-Smirnoff test, paired *t*-test, independent *t*-test via the PASW-22 software.
Results: There was no statistically significant differences between the groups in terms of self-regulated learning and academic motivation before the interventions (P = 0.59, P = 0.38), but after the interventions, the mean scores of self-regulated learning and academic motivation were significantly different in Jigsaw group from that of the lecture group (P = 0.000).
Conclusions: The Jigsaw teaching strategy can be used for nursing student's theoretical education to improve the self-regulated learning and academic motivation.

1. Introduction

Nowadays, most university education centers are seeking new educational methods for developing the capacities of clinical decision-making as well as continuous and student-centered learning in nursing students (Fesharaki et al., 2010). Undermining education as a complex process can lead to the loss of resources. Therefore, the development of education requires the knowledge of the learning process and new methods for implementation in practice (Schoening et al., 2015). Nursing education is also a reciprocal process in which learning takes place, and through which knowledge and behavior are affected (Wilson et al., 2016). Nursing education plays an important role in the improvement of nursing professionalism. The use of new educational methods in nursing profession is of great importance. Educational strategies can help improve the quality of educational programs offered to nursing

students (Rees et al., 2015). The application of new learning methods in nursing education is important, because the main mission of nursing education is to educate competent nurses who have required knowledge, attitudes, and skills to maintain and improve community health (Li et al., 2014).

Traditional lecture teaching strategy (LTS) has historically been the primary teaching modality in medical education. LTS is a teacher-centered approach that relies on the passive transfer of knowledge and promotes superficial learning. It often uses assessment models that reward a learner's ability to reproduce facts without truly understanding the topic (Zhao and Potter, 2016). The results of a research revealed that traditional teaching methods, such as lecture are not welcomed by students, because they do not provide the ground for students' development, motivation and learning (Karimi Moonaghi et al., 2014; Muenks et al., 2017). On the other hand, during the last decade, in the

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process of teaching of nursing students, emphasis has been placed on the humanistic paradigm, which has led to the emergence and widespread growth of active teaching and learning methods including cooperative learning approach (Abrami et al., 2015).

In collaborative learning, the learner is directly involved in the learning process, and active participation have multidimensional effects on his/her growth (Johnson and Johnson, 2014). Cooperative teaching methods is one of the most comprehensive approaches that are implemented in a variety of ways. Regardless of the type of cooperative learning approach, generally learners in small groups work together to achieve a common goal, which is beneficial for each learner (Leyva-Moral and Camps, 2016). In cooperative learning approach, students play the most important role in understanding concepts. The teacher creates the context and an appropriate environment for maximum learning, and through encouraging learners, provides learning possibilities. Also, it provides feedbacks throughout the learning process (Ahmad et al., 2014). Cooperative learning approach provides the potential for the active participation of learners in cognitive, metacognitive and motivational learning areas and help them set learning goals. Thus, they achieve self-efficacy and a higher level of success (Tran, 2014).

One of the new methods of teaching based on cooperative learning approach is the Jigsaw teaching strategy (JTS). This approach was developed in response to educational problems raised by Aronson in 1970 (Thurston et al., 2010). In this method, learners are divided into small groups consisting of three to five non-homogenous individuals. In each group, each person is assigned a topic for study, so that the contents of a classroom session are distributed among all individuals in each group. The teacher determines the time for the learners to study and individuals with a common study theme are combined to form a secondary group. The members of the secondary group will share their knowledge of the subject at a specified time. Eventually, each person returns to their original group and presents what he/she has learnt to other members of the group. Therefore, each topic is then repeated and reviewed for each person several times (Buhr et al., 2014).

One of the important consequences of learning is self-regulation. Self-regulation helps achieve goals through activating thoughts, feelings, and actions (Çelik et al., 2013). Self-regulated learners use realistic learning goals and also use effective learning strategies to achieve their goals. They effectively manage their time and learning resources (Cho and Heron, 2015). Self-regulated learners face higher self-esteem with learning activities and tasks (Fida et al., 2016). The results of studies have shown that the use of this cooperative learning approach have increased 15–25% deep learning (Hedeen, 2003; Van Tran, 2012). Also, the results of studies indicated that the use of cooperative learning approach helped with the development of self-regulation skills (Bol et al., 2016; Özdemir and Arslan, 2016; Wibrowski et al., 2017).

Another variable is academic motivation (AM). Learners should be motivated and interested in the topic to participate in the learning process (Lynch et al., 2013). In Ghiasvand et al.'s (2017) study, there was a relationship between the anxiety of nursing students and AM and time management so that with an increase in students' AM, their anxiety levels were reduced and time management were improved. Also, cooperative learning approach compared with traditional methods had a significant effect on the development of cognitive indices and enhancement of learner's motivation.

As in the Komarraju and Nadler's (2013) study, teaching using the individual methods had a little effect on motivation. Motivation depends to a large extent on the teaching style of the teacher. A learner-centered and flexible teacher can enable learner for learning. The motive structure means that all psychological (conscious and unconscious) factors help with realizing actions, attitudes, and goals. In other words, there is a significant relationship between the motivation of learners and the achievement of educational goals (Wibrowski et al., 2017).

The use of participatory teaching strategies can help with improving AM and learner's success skills program (Lemberger et al., 2015). The

JTS has been shown to have a greater impact on improving AM and learning outcomes than the lecture method (Muhammad, 2018; Namdol et al., 2015). Other studies also showed that the use of the participatory learning approach, such as the Jigsaw, promoted AM, improved learning and enhanced learner collaboration (Hashemi et al., 2015; Jurkowski and Hänze, 2015).

2. Literature

Some studies have been conducted to examine the impact of cooperative learning approach on students' self-regulated learning (SRL) and AM, for example, the effect of JTS on SRL and AM of elementary students (Hashemi et al., 2015), the impact of cooperative learning approach on student' SRL (Gaitero et al., 2015), the impact of JTS on motivation and learning outcomes of nursing students (Muhammad, 2018), the impact of the cooperative learning intervention on student motivation (Fernandez-Rio et al., 2017), the effects of cooperative learning on the motivational beliefs and SRL strategies in nursing and midwifery students (Karimi Moonaghi et al., 2014), the effect of cooperative learning approach on improving the AM of master degree students (Komarraju and Nadler, 2013), the impact of cooperative learning approach on increasing students' AM. Given the lack of empirical evidence in this area, this study aimed to compare the effect of LTS and JTS on nursing students' SRL and AM.

3. Method

This was a quasi-experimental design conducted on nursing students in … (university name) in … (city), Iran, from January to November 2018. The independent variables were learning strategies, including TBL and JBCL and the dependent variables measured as outcomes of the study were nursing students' SRL and AM.

3.1. Participants and setting

Participants were recruited from two classrooms of nursing students in the fourth academic semester who were attending the Maternal and Child Health Nursing course. The reason for choosing this course was easy accessibility to the participants. The routine planning for the course was that a group of nursing students was considered group A and the other was considered group B. One of the two groups was attending the first half of the week to pass theoretical education at the School of Nursing and Midwifery and the second half of the week for clinical education at the hospital. At the same time, the other group was present at the hospital in the first half of the week and the School of Nursing and Midwifery at the second half. Therefore, the contamination of the nursing students in the groups was as low as possible. The instructor, the classroom environment in the School of Nursing and Midwifery, and the clinical learning environment in the hospital were the same for both groups. All students in each group had chosen one of the two Maternal and Child Health Nursing course held in the first or second half of the week at the beginning of the semester. The number of students was almost similar in the two groups.

Flipping of a coin was used to assign each classroom to the Jigsaw and lecture groups. In the lecture and Jigsaw groups, 50 and 52 students were enrolled, respectively. All students were initially studied and completed the questionnaires before and after the interventions, but there was some samples' attrition in the groups. A total of 94 nursing students participated in the lecture and Jigsaw groups (Fig. 1).

3.2. Instruments

Data was collected using the demographic data questionnaire including questions about age and gender; the Self-Regulated Learning Questionnaire and Harter Academic Motivation Scale. Self-Regulated Learning Questionnaire was consisted of 14 items in three domains of
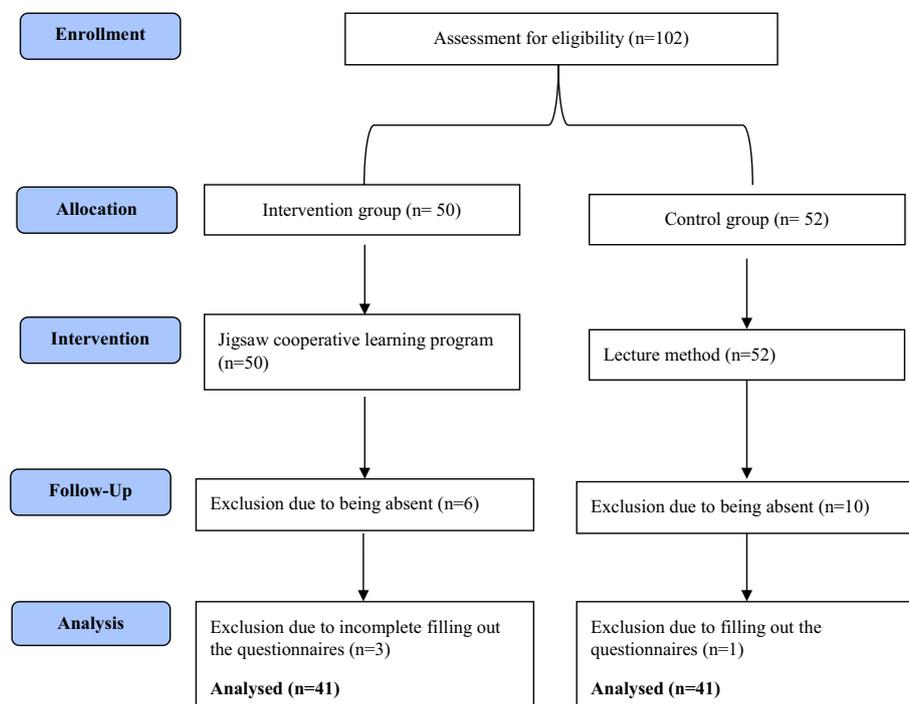
Fig. 1. The process of the study.

cognitive strategies, motivation strategies and metacognitive strategies, with a five-point Likert scale from completely disagree (score 1) to completely agree (score 5). Item 14 had a reverse scoring method. The minimum and maximum scores of the questionnaire were reported as 14 and 70, respectively. This questionnaire was considered a standard tool in many Iranian studies in terms of reliability. Its Cronbach's alpha coefficient was reported as 0.84 (Harter, 1981) and 0.76 (Hashemi et al., 2015). Cronbach's alpha coefficient of Self-regulation questionnaire in this study was 0.85.

The Academic Motivation Scale had 33 items with two including the Intrinsic Motivation Subscale and the Extrinsic Motivation Subscale. The Intrinsic Motivation Subscale had three dimensions as challenge (9 items), curiosity (3 items), and independent mastery (5 items). The Extrinsic Motivation Subscale had three dimensions including easy work (6 items), pleasing teacher (4 items), and dependence on teacher (6 items). It had a five-point Likert scale from completely disagree (score 1) to completely agree (score 5). Some items such as items 3, 5, 8, and 15 were scored in a reverse order. The minimum and maximum scores of this scale were 33 and 165, respectively. The Cronbach's alpha coefficient of this scale in a study was reported as 0.88 (Harter, 1981) and also in a study in Iran was reported as 0.82 (Hashemi et al., 2015). Cronbach's alpha coefficient of Academic Motivation Scale in this study was 0.80.

3.3. Interventions

The interventions were the LTS and JTS implemented by a researcher who was the same instructor of Maternal and Child Health Nursing course for the both groups at the School of Nursing and Midwifery classroom. Seven two-hour sessions of the whole education semester (17 two-hour sessions) were devoted JTS to the Jigsaw group and LTS to the lecture group. The LTS for lecture group implemented as traditional lecture. In order to implement JTS in the Jigsaw group, the instructor, while expressing the objectives and the syntax of the intervention, randomly divided the students into eight groups with six members at the first session. Next, a reference textbook was introduced and in each session, the content of the next session was divided to six sections and was assigned to each member of the group. At the next

meeting, under the supervision of the lecturer, each member of the group who was required to study a specific section of the content, was placed alongside others and formed a secondary group. The members of the secondary group had the opportunity to review and discuss the course content for 20 min, with the guidance of the lecturer. After the time has elapsed, the members of the secondary group rejoined their initial groups and discussed and what they have learnt to the rest of the group for 10 min. Therefore, all the content of one session in each of the six primary groups was discussed, which lasted for about 60 min. The instructor also continually was present at the primary and secondary groups and explained the vague and questionable points and directs the meeting. At the end of each session, the lecturer reviewed all topics using the question-answer method for 20 min and answered the students' questions. The intervention process lasted for seven consecutive weeks. Generally, the students participated actively in the presentation of educational content of each session along with the teacher and the classroom was the main place where motivation to learn and self-learning influenced.

3.4. Data collection and analysis

Data was collected in two stages before and after the interventions in the last session of the learning program in the groups. To appreciate the students' participation in the groups, each student received a gift. Data analysis was performed using descriptive statistics such as mean and standard deviation, and inferential statistics such as the independent *t*-test, paired t-test and Fisher exact via the PASW v.22 software. Before the study, the normal distribution of the data was assessed using the Kolmogorov-Smirnov test. The significance level was set as $P < 0.05$.

3.5. Ethical considerations

Before the intervention, the purpose of the research and the method of intervention was completely explained to the groups. If they were willing, they were included in the study. They were assured that their names would not be disclosed and they could withdraw from the study at any time. Written informed consent was obtained from all

Table 1

Comparison of the lecture and Jigsaw groups before and after interventions regarding SRL.

Domain	Group	Before intervention	After intervention	P-value[**]
		M ± SD	M ± SD	
Cognitive strategies	Lecture	13.04 ± 2.97	13.65 ± 2.73	0.000
	Jigsaw	12.74 ± 3.21	19.34 ± 2.43	0.000
	P-value[*]	0.64	0.000	
Motivation strategies	Lecture	8.65 ± 1.3	8.84 ± 1.29	0.019
	Jigsaw	8.62 ± 1.54	12.52 ± 1.74	0.000
	P-value[*]	0.90	0.000	
Metacognitive strategies	Lecture	17.76 ± 2.87	18 ± 2.79	0.003
	Jigsaw	7.12 ± 3.38	25.66 ± 2.98	0.000
	P-value[*]	0.37	0.000	
Total	Lecture	39.77 ± 5.52	40.95 ± 5.37	0.000
	Jigsaw	39.9 ± 6.87	57.47 ± 5.64	0.000
	P-value[*]	0.59	0.000	

$P \leq 0.05$.

[*] Independent *t*-test.

[**] Paired *t*-test.

participants.

4. Findings

The mean and standard deviation of the students' age in the lecture and Jigsaw groups was reported as 20 ± 1.9 and 20 ± 1.6, respectively. They had not significantly difference (P = 0.801). In the lecture group 20 boys and 21 girls and in the Jigsaw group, 22 boys and 19 girls participated. There was no statistically significant difference between the two groups in terms of gender (P = 0.729).

According to Table 1, the independent *t*-test showed that the two groups had no statistically significant difference in the mean total score of SRL and its domains including cognitive, motivation, and metacognitive strategies before the LTS and JTS (P = 0.59, P = 0.64, P = 0.90, and P = 0.37 respectively). However, after the interventions, the mean total score of SRL and its domains in the Jigsaw group significantly increased more than the lecture group (P = 0.000).

The paired t-test showed that the total mean score of SRL after LTS and JTS was significantly different in both groups (P = 0.00 to P = 0.019 in total and subscales scores), but the total mean score of this variable in the lecture group increased from 39.77 ± 5.52 to 40.95 ± 5.39, but in the Jigsaw group it increased from 39.9 ± 6.87 to 57.46 ± 5.64, which was significantly different from that of the lecture group. Considering the above results, JTS has influenced nursing students' SRL more than LTS.

As shown in Table 2, independent t-test showed that before the LTS and JTS, the two groups had no statistically significant difference in the mean total score of AM and its domains, but after the LTS and JTS, these scores in the Jigsaw group showed a statistically significant increase compared to the lecture group (P = 0.000).

The paired t-test in the in-group examination showed that LTS only changed the mean score of challenge (intrinsic motivation), pleasing teacher (extrinsic motivation) and total score of AM (P = 0.00, P = 0.001, P = 0.006 respectively), although the JTS except for the pleasing teacher made a statistically significant difference in the mean total score and other dimensions of AM (P = 0.000). In the lecture group, the total mean score of AM increased from 91.6 ± 7.39 to 93.2 ± 6.2, but in the Jigsaw group, this increase was more significant and ranged from 89.83 ± 7.66 to 119.4 ± 8.54. According to the above results, it can be said that JTS has been able to significantly influence nursing students' AM in compared to LTS.

5. Discussion

The aim of this study was to compare the effect of the LTS and JTS on nursing students' SRL and AM. This was a unique study, because not a similar study was found in the international literature. Given the special importance of education method in nursing science (Rees et al., 2015), attention to new teaching methods, including the cooperative learning approach such as Jigsaw is important. The findings of this study showed that the JTS significantly increased SRL and AM in the comparison LTS in the nursing students. SRL and AM are factors influencing academic achievement and are the main criteria of the efficiency of each educational system. Therefore, promoting these two variables is very important in educational settings.

The results of this study showed that the mean score of SRL increased significantly after the JTS compared to the LTS. A similar study indicated that learning through the JTS influenced students' SRL (Gaitero et al., 2015). In another study in Iran, the JTS could enhance SRL of elementary students (Hashemi et al., 2015). Another study indicated that student-centered education influenced motivational beliefs including motivational orientation, self-efficacy, and self-regulation (Cheang, 2009). Karimi Moonaghi et al. (2014) showed that the cooperative learning approach had a significant effect on promoting SRL strategies in nursing and midwifery students. It seems that, in traditional instructional methods, like LTS, learners make little attempt for fulfilling their educational needs (Dehghanzadeh and Jafaraghaee, 2018).

Another finding was that the mean scores of AM after the JTS in the significantly increased compared to the LTS. Hashemi et al.'s (2015) study also showed that the use of the Jigsaw method had a significant effect on improving the AM of elementary students in mathematics. The use of JTS improved the SRL and AM of undergraduate students studying the theory of psychology compared with individual education method or LTS (Komarraju and Nadler, 2013). In a study on nursing students, the use of JTS improved AM and learning outcomes including knowledge and attitude toward the subject (Muhammad, 2018). In the study by Fernandez-Rio et al. (2017), the use of cooperative learning approach in students led to an increase in their AM compared to LTS. According to the results of another study, the use of JTS in comparison with passive methods such as LTS had a greater impact on the promotion of students' AM (Jurkowski and Hänze, 2015). The study of Goodyear et al. (2014) found that the cooperative learning approach promoted AM in students. In the study by Karimi Moonaghi et al. (2014) that compared the effect of the LTS and cooperating learning approach on motivational beliefs in nursing and midwifery students, the use of cooperating learning approach had a more significant effect on promoting AM and SRL compared to LTS.

The use of cooperative learning approach as a modern teaching method can lead to active participation in the learning process and active engagement of learners (Darnis and Lafont, 2015; Smith and Parr, 2007). The active engagement of learners can promote their AM, collaboration and satisfaction (Jurkowski and Hänze, 2015; Leyva-Moral and Camps, 2016). The JTS enables students to participate in the learning process and engage them to other learners and educators. It provides suitable and dynamic learning conditions through a cooperative learning approach that enhances the student's AM (Levpušček and Peklaj, 2007). The JTS provided an opportunity for students to actively apply their learning abilities and capabilities. Also, the students could find more enthusiasm and motivation for learning through sharing their learning experiences with classmates and receiving feedbacks from the instructor. This also led to an improvement in their motivation for learning. The students also acquired skills such as lecturing in the classroom, time management, setting goals for learning, using examples and teamwork, which increased the SRL of nursing students.

Table 2
Comparison of the lecture and Jigsaw groups before and after interventions regarding AM.

Sub-scale	Domain	Group	Before intervention	After intervention	P-value**
			M ± SD	M ± SD	
Intrinsic motivation	Challenge	Lecture	22.47 ± 3.01	25.02 ± 2.85	0.000
		Jigsaw	21.91 ± 3.57	30.83 ± 2.89	0.000
		P-value*	0.37	0.000	
	Curiosity	Lecture	8.55 ± 0.86	8.48 ± 1.23	0.75
		Jigsaw	8.59 ± 1.24	10.96 ± 1.16	0.000
		P-value*	0.83	0.000	
	Independent mastery	Lecture	14.20 ± 1.09	14.28 ± 1.160	0.74
		Jigsaw	14.04 ± 1.16	18.72 ± 1.69	0.000
		P-value*	0.46	0.000	
Extrinsic motivation	Easy work	Lecture	16.9 ± 2.46	17.24 ± 1.42	0.32
		Jigsaw	16.77 ± 2.48	21.83 ± 2.28	0.000
		P-value*	0.79	0.000	
	Pleasing teacher	Lecture	11.75 ± 1.18	11.20 ± 1.04	0.001
		Jigsaw	13.04 ± 1.48	14.81 ± 1.51	0.41
		P-value*	0.33	0.000	
	Dependence on teacher	Lecture	16.84 ± 1.63	16.88 ± 1.59	0.88
		Jigsaw	16.84 ± 1.58	21.94 ± 1.58	0.000
		P-value*	0.68	0.000	
Total		Lecture	91.6 ± 7.39	93.2 ± 6.2	0.006
		Jigsaw	89.83 ± 7.66	119.4 ± 8.54	0.000
		P-value*	0.38	0.000	

$P \leq 0.05$.
* Independent *t*-test.
** Paired *t*-test.

6. Conclusions

The results of this study showed that using the JTS promoted the students' SRL and AM compared to the LTS. Considering the importance of engaging students in learning and creating a suitable platform for active learning, it is suggested that JTS is used for other theoretical nursing courses as well as education of clinical skills. Also, the authors suggest that the impact of JTS on other variables affecting learning such as satisfaction, practical skills and self-directed learning in theoretical and practical environments is assessed. One of the most important limitations of this study was the availability of a relatively small number of participants for matching and a lack of physical structure proportional to the number of students for more accurate implementation of the program.

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