

The Effect of Jigsaw Cooperative Learning Method on Students Performance in the Class Assessment Test (CAT): A Quasi Experimental Study

Aftab Ghouri, Abdul Rehman Khan, Muhammad Zaman, Sheeraz Anum,
Imran Ashraf, Zuhra Shahjhan

ABSTRACT

OBJECTIVE: To evaluate the difference between jigsaw cooperative learning and the traditional method on the students' performance in the CAT.

METHODOLOGY: This quasi-experimental study was completed at Indus College of Nursing & Midwifery Karachi. The data was collected from April to September 2021. The total sample size was 60. Male and female of 3rd year nursing students were included. The participants were approached by using the non-probability consecutive sampling method. SPSS version 22.0 was used for data entry and interpretation.

RESULTS: Out of 60 participants, 52% were male. A large number of 49 (82%) respondents were between 18-22. Thirty-one subjects (52%) education level was matriculation. A significant difference was found between pre and post-test (7.03 ± 2.44 & 14.48 ± 2.45) of both traditional (lecture) and jigsaw groups with substantial (0.00) p-value. Gender knowledge found dissimilarity that females of study slightly remained at higher side than men in pre-test and post-test of knowledge and both conditions p-value was insignificant.

CONCLUSION: It was concluded that the participants' knowledge was measured with a paired t-test, which result is similar in both groups, but no difference was found in the lecture and jigsaw method among participants.

KEYWORDS: Jigsaw Method, Traditional Teaching Method, Student's Performance

This article may be cited as: Ghouri A, Khan AR, Zaman M, Anum S, Ashraf I, Shahjhan Z. The Effect of Jigsaw Cooperative Learning Method on Students Performance in the Class Assessment Test (CAT): A Quasi Experimental Study. J Liaquat Uni Med Health Sci. 2022;21(01):75-8. doi: 10.22442/jlumhs.2022.00913.

INTRODUCTION

The high awareness level among learners raised the need for understanding for better performance in their social life. Hence, institutes are moving toward interactive teaching methods¹. Previously the most popular teaching approach for student learning was the lecture method, where the teacher plays an active and student's passive role; this sometimes leads to a lack of understanding²⁻⁴. Currently, the institutes are adapting different styles of interactive teaching methodologies to activate their students in academic performance³ and have the best result⁵.

Cooperative learning (CL) is the task-oriented method of effective learning to enhance the knowledge and capability as per students' performance⁶. Jigsaw is one of the methods of the CL, which provides an opportunity for learners to work in groups actively and achieve their task⁷.

The jigsaw learning method consists of four stages. In the first stage, the participants are divided into a group of (3-7 members), also known as the "home group". Second stage: each participant is assigned specific reading material and comes together as "expert

group" and explores this study material content within the allotted time as task specialized student. In the third stage: reporting and reshaping, the students rejoin their home group and share their learning experiences. Its activity is time bounded where the facilitator monitors the groups and known as the evaluation stage; the learned knowledge is assessed^{13, 20}.

In Jigsaw, students are distributed into groups called the home group and further divided into expert groups; firstly task is given to the home group for reading and discussion for 15-20 minutes; afterward, further groups are created by selecting one student from each group having a different topic to discuss with all students of particular group^{8,9}.

A study among nursing students showed that the cooperative teaching method is more effective and develops a better learning attitude towards the studies¹⁰. Another study of collaborative learning style group found more effective results for English pronunciation than traditional¹¹. The objective of this study was to evaluate the difference between jigsaw cooperative learning and the traditional method on the students' performance in the CAT.

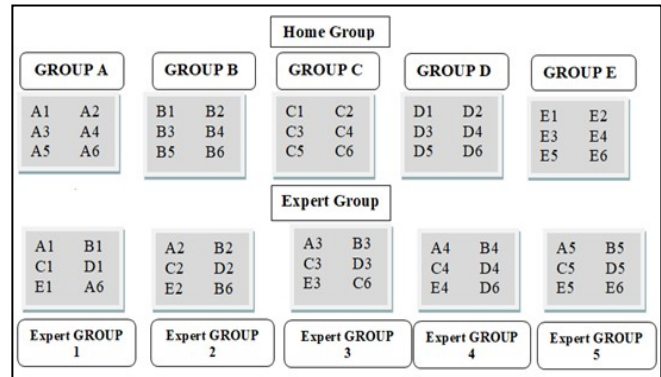
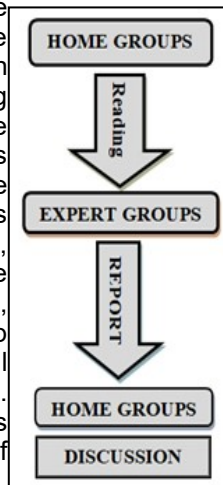
METHODOLOGY

The Quasi-experimental (Pre & Post) study was carried out at Indus College of Nursing and Midwifery Karachi from April to September 2021. The general nursing students were approached with a probability consecutive sampling technique in their final year. The sample was calculated based on the previous article data interventional group was (23.75 ± 3.46) and the control group (19.65 ± 4.7) ¹². The total sample size was 16 in each group, but because of readily available participants, 30 included in each group, ethical approval was obtained from Interactive Research & Department (IRD) with IRD_IRB_2019_07_007.

The questionnaire was developed, and one subject-related expert and two supervisors verified face validity. The questionnaire comprises 24 questions and contains two sections; 1) bio data includes four questions, and the knowledge section includes 20 questions. This questionnaire was about Diabetes Mellitus, its types, causes, how can we diagnose and differentiate in types, health education to manage the disease symptoms such as exercise, body mass index (BMI), self-care, what it will cause in the future (complication) if remain uncontrolled, and other diseases which affect on DM.

The intervention was based on four days; on the first-day researcher introduced the objectives and benefits of this study to all participants. Written informed consent was taken; random group selection was made for traditional and cooperative teaching methods before the questionnaire application, as 30 minutes were given to fill the pre-test form. On the second day, traditional teaching was given 45 minutes to the conventional group, and handouts were shared for home reading. The other two days jigsaw group was dealt with. On the first day, students were divided into five groups, six students in each group, and the objectives of each group were distributed among all participants to read at home. Second-day jigsaw activity was performed under the supervision of the facilitator.

- Step 1: Participants are divided into five groups "Home group"
- Step 2: 20 minutes to study their objectives in a home group
- Step 3: Home groups are distributed into "expert groups"
- Step 4: Each student has a different objective to explain
- Step 5: Participants return to the home group
- Step 6: Discussion



The post-test was taken on the fourth day of the intervention. The data was entered and analyzed on SPSS version 22.0. Categorical data were presented in frequency and percentage, whereas; mean and standard deviation was calculated for continuous data. The Independent t-test and pair t-test was applied for pre & post-test, respectively, with a 0.05 level of significance.

RESULTS

Among sixty participants of this study, 52% were male and 48% female. 82% of participants were between 18-22 of the age, 16% were 23-27, and 2% were above 27+. The maximum number of samples was metric (52%), 43% FSc, whereas only 5% were graduate **Table I**.

TABLE I: DEMOGRAPHIC INFORMATION OF THE PARTICIPANTS

Demographic Factors	N	%
Gender		
Male	31	52
Female	29	48
Age (in Year)		
18-22	49	82
23-27	10	16
Above	1	2
Educational Qualification		
Metric	31	52
FSc	26	43
Specify Others	3	5
Marital Status		
Married	4	6.6
Unmarried	56	93.3

Table II shows the pre & post-test mean knowledge of participants for the Human immunodeficiency virus. The pre-test score mean was 7.0333 ± 2.44233 ; however, the post-test knowledge was

14.4833±2.45979 with statistical significance (p-value 0.000).

TABLE II: PAIRED t-TEST

		N	Mean	Standard deviation	P value
Pre-test	Lecture	30	6.7667	2.7503	
	Jigsaw	30	7.3000	2.1033	
	Inclusive	60	7.0333	2.44233	0.000
Post-test	Lecture	30	13.9667	2.6061	
	Jigsaw	30	15.0000	2.2283	
	Inclusive	60	14.4833	2.45979	0.000

Table III revealed gender-wise knowledge dissimilarity elaborate that female pre-knowledge is slightly higher (7.1379±2.04807) than male (6.9355±2.79208), with insignificant (p-value= 0.318). Still, the post knowledge of the female also remained on the higher side (15.6207±2.09444), and male post knowledge was (13.4194±2.32055) with again insignificant (p-value = 3.848), hence it is concluded that there is not much mean difference of knowledge between male and female.

TABLE III: PRE-TEST AND POST-TEST

Knowledge	Gender	Mean	SD	p-value
Pre-test	Male	6.9355	2.79208	0.318
	Female	7.1379	2.04807	
Post-test	Male	13.4194	2.32055	3.848
	Female	15.6207	2.09444	

DISCUSSION

According to another study the majority of their pharmacology course students appreciated group work in the jigsaw classroom¹³. The majority of the students in this study believed that using the jigsaw strategy helped them learn the basics of DM. It gave students the chance to see and adapt to diverse learning approaches utilized by their peers. These findings suggest that the techniques within the paradigm of cooperative learning enhance deep learning in difficult and complex courses in higher education¹⁴. The present study's findings indicate that there is no statistical difference between traditional and jigsaw-based cooperative learning. Still, the existing literature suggests that collaborative learning can enhance students' ability to acquire knowledge and apply that knowledge. The findings back with Peek LE 1995¹⁵ conclusion that cooperative learning is not appropriate for content or subject matter. Among 60 students, the male was 52%, and (82%) most of them were between the ages of 18-22 years; similar findings were found in the study of Indonesia, in which male participants were 65%¹⁶. Another study performed among equal male and female participants found positive interest of students in jigsaw group

rather than lecture method, and more satisfaction was observed among female subjects¹⁰. The present study's pre-test mean was 7.03 and post-test 14.48 with a significant p-value of 0.000. Whereas similar research from the USA reported the same data of pre-test score of 9.96 and post-test 18.03, but with an insignificant p-value of 1.70, the current study had a significant p-value of 0.00 among pre and post-test¹⁷. Another similar study revealed the same within pre & post (M 52.50, SD14.90) and (M 80.00, and SD16.90), respectively, with a significant p value of 0.000. The study proved that jigsaw-based cooperative learning is more efficient than other techniques¹⁸. Indian research reveals that jigsaw action is effective as the pretest was 9.96 and post-test 18.03, but the p-value was (13.21) more significant than the table value (1.70) at a 0.05 level of significance¹⁹. Hence, most studies identified that the jigsaw technique is more effective and exciting among all the students than the lecture method. Still, in this study, both the traditional and Jigsaw technique scores are equal; it might be due to the habitual nature of the participants with the lecture method.

CONCLUSION

The present study found that traditional (lecture) and jigsaw-based cooperative learning are found to have no difference during pre and post-test; it might be due to the continuous habits of students for the traditional method. Therefore, the knowledge of both groups was increased. Furthermore, the jigsaw students enjoyed a lot to this cooperative learning technique.

Ethical permission: IRD (Innovative Research Development) - IRB for Department of Nursing Ziauddin University, Karachi letter No. IRD_IRB_2019_07_007, Dated: 18 March 2020.

Conflict of Interest: There is no conflict of interest among the authors.

Financial Disclosure / Grant Approval: There was no funding agency.

Data Sharing Statement: The data supporting this study's findings are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions

AUTHOR CONTRIBUTIONS

Ghouri A: Conceived idea, manuscript writing

Khan AR: Data collection, statistical analysis

Zaman M: Proofreading, manuscript writing contribution

Anam S: Data collection, critical review

Masih I: Literature search, analysis, and interpretation

Shahjhan Z: Critical revision of the article, assemble data

REFERENCES

1. Mirzajani H, Haji Alizadeh K, Gorji OH, Mohammadi SEO, Sohaei R, Bayekolaie MD. The need for recognition and implementation of educational technologies by teachers in the educational and learning process. *Int J Learn Develop.* 2015; 5(3): 14-24.
2. Dat TV. The Effects of Jigsaw Learning on Students' Knowledge Retention in Vietnamese Higher Education. *Int J Higher Educ.* 2016; 5(2): 236-53.
3. Melinamani S, Francis F, George R, Pushpa LM, Vergheese S. The Jigsaw effect: Impact of Jigsaw learning technique on nursing students to learn the concepts of normal labor. *Asian J Nurs Educ Res.* 2017; 7(2): 1-4.
4. Khan A, Farooq RA, UL Haq Z. Effect of Cooperative Learning Approach on Ninth Grade Students' Achievement in Chemistry. *Res J Soc Sci Econ Review.* 2020; 1(3):247-54.
5. Namdol N, Chauhan M, Kanojia D, Kandari H, Rana J, Singh J et al. Students learning outcomes in response to lecture method and jigsaw teaching methods. *IOSR J Nurs Health Sci.* 2015;4(3):78-83.
6. Mahmoud HG. The effect of cooperative learning strategy on undergraduate nursing students enrolled in nursing administration course. *Int J Learn Develop.* 2017; 7(1): 23-40.
7. Azmin NH. Effect of the Jigsaw-Based Cooperative Learning Method on Student Performance in the General Certificate of Education Advanced-Level Psychology: An Exploratory Brunei Case Study. *Int Educ Stud.* 2016; 9(1): 91-106.
8. Phillips J, Fusco J. Using the jigsaw technique to teach clinical controversy in a clinical skills course. *Am J Pharm Educ.* 2015; 79(6): 90. doi: 10.5688/ajpe79690.
9. Chiriac EH. Group work as an incentive for learning—students' experiences of group work. *Front Psychol.* 2014; 5: 558. doi: 10.3389/fpsyg.2014.00558.
10. Mohammadjani F, Tonkaboni F. A Comparison between the Effect of Cooperative Learning Teaching Method and Lecture Teaching Method on Students' Learning and Satisfaction Level. *Int Educ Stud.* 2015; 8(9): 107-12.
11. Moghadam ZS, Moghadam FS, Zarein-Dolab S, Zarifi V, Roozbehi A. The Effectiveness of Cooperative Learning in Teaching English for Specific Purposes to the Students of Nursing Regarding Pronunciation. *Educ Res Med Sci J.* 2016; 5(1): e79178.
12. Megahed MM, Mohammad FA. Effect of cooperative learning on undergraduate nursing students' self-esteem: A quasi-experimental study. *J Nurs Educ Pract.* 2014; 4(11): 1-7.
13. Uzma A, Bano N, Malick N, Ansari SA. A mixed method evaluation of cooperative learning using jigsaw classroom model in clinical pharmacology course. *Res Square.* (Preprint) 2021; 1-18.
14. Azizan MT, Mellon N, Ramli RM, Yusup S. Improving teamwork skills and enhancing deep learning via development of board game using cooperative learning method in Reaction Engineering course. *Educ Chem Engineer.* 2018; 22: 1-3.
15. Peek LE, Winking C, Peek GS. Cooperative learning activities: Managerial accounting. *Issues in Accounting Education.* 1995; 10(1): 111.
16. Sulisworo D, Ishafit I, Firdausy K. The Development of Mobile Learning Application using Jigsaw Technique. *Int J Interact Mob Technol.* 2016; 10(3): 11-6.
17. Murphy L, Eduljee NB, Parkman S, Croteau K. Gender differences in teaching and classroom participation methods: A pilot study. *J Psychosoc Res.* 2018; 13(2): 307-19.
18. Azmin NH. Effect of the Jigsaw-Based Cooperative Learning Method on Student Performance in the General Certificate of Education Advanced-Level Psychology: An Exploratory Brunei Case Study. *Int Educ Stud.* 2016; 9(1): 91-106.
19. Dhage JR, Patil MS, Pawar AB. Implementation and feedback analysis of Jigsaw active learning method. *J Engineer Educ Transform.* 2017; 30(3): 192-9.
20. Williamson MJ, Garbin J. The Impact of Student Choice to Engage in Cooperative Learning on the Final Exam While Controlling for Early Exam Performance and ACT in Introduction to Psychology. *Teach Psychol.* 2021; 00986283211 021033.

AUTHOR AFFILIATION:

Aftab Ghouri (*Corresponding Author*)
Lecturer, Benazir College of Nursing
Shaheed Mohtarma Benazir Bhutto
Medical University
Larkana, Sindh-Pakistan.

Abdul-Rehman Khan
Senior Lecturer
Faculty of Nursing and Midwifery

Ziauddin University
Karachi, Sindh-Pakistan.

Mohammad Zaman
Senior Instructor
Tabba Heart Institute
Karachi, Sindh-Pakistan.

Sheeraz Anum
Registered Nurse

Sindh Government Hospital
Gadap Town Karachi, Sindh-Pakistan.

Imran Masih
Registered Nurse
KRL Hospital, Islamabad-Pakistan.

Zuhra Shahjhan
Nursing Instructor
Tabba Heart Institute
Karachi, Sindh-Pakistan.