

Effectiveness of Jigsaw Teaching Technique on Surgical Nursing Students' Satisfaction and their Academic Achievements

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Abstract

Background: Making the teaching and learning strategies more student-friendly has helped to retain students' attention and insist in them the interest to learn and perform better. The Jigsaw Technique is one of the cooperative learning technique in which students equally participates, prepares, and leads a group thus learning for themselves as well as preparing for their group. **Aim:** The purpose of this study was to investigate the effectiveness of the Jigsaw teaching technique on surgical nursing students' satisfaction and their academic achievements, **Research design:** A quasi-experimental study design was used. **Research setting:** The study was conducted at the Faculty of Nursing at Sohag University. **Sampling:** A purposive sample of 100 nursing students who are studying in the previously mentioned setting from the first academic year". **Tools:** The data was gathered using four tools: Tool 1. self-administered questionnaire, Tool 2. The nursing student's knowledge assessment tool: consisted of two parts: Part I: Nursing student's knowledge regarding health assessment topic (pre-posttest), Part I: Nursing student's knowledge regarding Jigsaw teaching technique, Tool 3. **Tool II: Learning's Achievement questionnaire**, 4. Students' Satisfaction Assessment Sheet. **Results:** There was a significant difference between pre-and post regarding the students' achievement. Students in the jigsaw group exhibited more satisfaction concerning the teaching technique. **Conclusion:** The jigsaw teaching technique proved to be an effective educational learning tool for nursing students. The jigsaw teaching technique is effective in improving nursing students' satisfaction and their academic achievements during the course. **Recommendations:** It is advised that all nursing academic courses adopt the jigsaw teaching technique as a teaching methodology.

keywords: Academic achievements, Jigsaw teaching technique, Satisfaction, Surgical nursing students.

Introduction:

Education is a process, the chief goal of which is to bring about desirable changes in the behavior of the learner in the form of acquisition of knowledge, proficiency in skills, and development of attitudes. Students must be motivated to create objectives and be engaged in the learning process for them to be optimistic. Research has shown that learning is not effectively accomplished even with excessive training, and modern approaches to education have shifted to emphasize the use of effective teaching methodologies to move from traditional ways to interactive and cooperative approaches (Poonam & Gunjan, 2019).

The teaching strategies used by nursing faculty in their classes need to be more dynamic to guarantee full student engagement and pique students' attention. More concepts are learned by students who pay more attention, which

enhances their academic achievement (Ataman, 2021).

One integrated learning strategy called "jigsaw" encourages students to actively engage with the materials, self-prepare, take charge of their peers' learning, and lead by example. Students' natural desire to learn is stimulated by direct involvement with the teacher, who provides assistance and supervision during the technique's execution. Aronson et al. (1978) created the jigsaw approach, and Slavin (1937) modified it. This approach divides the material into sections, and students are split into teams of three to five to work on each one (Deepa et al., 2020).

Compared to other unique collaborative learning approaches, the jigsaw method has a notable advantage. This method involves experts, teams, and individuals participating in a discussion or topic they have chosen. It also offers students a unique opportunity to learn

how to take responsibility, develop critical thinking abilities, boost self-esteem, reinforce positive attitudes, develop self-leadership skills, adopt problem-solving techniques, foster intelligent and creative behavior, and teach students sophisticated social behaviors and other social skills (Ataman, 2021).

A study was done by Sumitra Melinamani, Frincy Francis, et al, on The Jigsaw effect: Impact of Jigsaw learning technique on nursing students to learn the concepts of normal labor among 40 diploma nursing students of St. Luke's Hospital's College of Nursing, Shrirampur, Maharashtra. Their pre-knowledge was assessed on the concepts of normal labor and its management and the same group was taught the Jigsaw Technique of learning and their post-knowledge was assessed. There was a significant difference in the performance of the students on the self-administered questionnaire before and after the intervention. The study proved that The Jigsaw Learning method can be used as an effective educational learning tool for nursing students (Sumitra et al., 2017).

Individual responsibility, positive autonomy, interaction promotion, teaching interpersonal and social skills, and group processing quality are the five key components of the jigsaw learning methods. Learning collaboratively in groups has been shown to benefit nursing students' intellectual, social, emotional, and psychological growth. The advantages of cooperative learning include an enhanced key desire to study and attain more favorable attitudes toward the subject; higher-level reasoning, critical thinking abilities, problem-solving, reduced levels of anxiety and tension; and advanced self-esteem (Fadilah & McKenna, 2018).

Nursing education must enhance problem-solving skills in addition to assisting students in achieving professional competence so they can study topics related to problem-solving. Applying knowledge learned in the classroom to clinical settings and society at large to achieve desired health outcomes is one of the main goals of mother health and nursing education programs. The learner's active and direct participation in the learning process results in

holistic development when using a cooperative learning strategy. The individual's role in the teaching-learning process is the main emphasis of self-regulated learning and academic motivation (Abd El Aliem, et al., 2019).

The Jigsaw strategy places great emphasis on cooperation and shared responsibility within groups. The success of each group depends on the participation of each individual in completing their task. This means the Jigsaw strategy effectively increases the involvement of each student in the activity (Jamal, 2019).

The main focus of the curriculum is the health assessment and related courses, which are completely unfamiliar to the pupils. Making the learning process more engaging is therefore crucial to helping students remember the material being learned. The Jigsaw technique sparks students' interest and encourages them to read independently and take on roles to ensure that everyone in the group understands the material with the teacher's guidance. Also, the availability of skilled health personnel with knowledge and skills in managing patients is vital in their care (Ataman, 2021). As nursing students need skilled training in screening and management of women with hypertensive disorders, the researchers are interested in investigating the effectiveness of the Jigsaw teaching technique on surgical nursing students' satisfaction and their academic achievements.

The significance of the study:

Despite significant research supporting active learning, many professors continue to use traditional lectures as their primary teaching method, particularly in introductory-level courses. The use of jigsaw is very important in improving student academic achievement, many research studies the effect of the traditional methods on nursing student achievement so the present study clarified the outcomes of the jigsaw versus lecture, This study examines how well-suited contemporary learning technologies, such as the Jigsaw method, are for giving nursing students the greatest possible educational experience. Increases in student-student and student-teacher contact are possible with the Jigsaw style of teaching. It's a useful tool for improving nursing students' interest so

they may apply the principles more readily in a variety of clinical settings. Jigsaw can be a brilliant way to extend to a variety of topics and subjects with different degrees of difficulty. It was believed that the jigsaw method's creative and collaborative approach would inspire students to acquire knowledge and good attitudes, reduce stress, and boost their sense of fulfillment and self-worth. This research was conducted to investigate the effectiveness of the Jigsaw teaching technique on surgical nursing students' satisfaction and their academic achievements.

Operational definitions

Student satisfaction

A comfortable sensation that the School of Nursing is fulfilling students' educational and welfare needs (Ashrafalsadat, 2014; Tawiye et al., 2021).

Nursing student:

A person who is registered for a four-year Bachelor of Nursing Science degree at a recognized training institution (Lundall, 2014).

Jigsaw technique:

This technique is designed for cooperative learning in small groups. Students are provided the opportunity to become 'experts' in a particular subject and share that knowledge with their peers.

Aim of the study:

The purpose of this study was to investigate the effectiveness of the Jigsaw teaching technique on surgical nursing students' satisfaction and their academic achievements.

Hypothesis:

The Jigsaw teaching method will improve surgical nursing students' academic performance and satisfaction in post-interventional courses more than pre-interventional surgical nursing students.

Subjects and Methods:

Research design:

A quasi-experimental study design was used

Setting:

The study was conducted by the faculty of Nursing at Sohag University

Samples:

A purposive sample of 100 nursing students who are studying in the previously mentioned setting from the first academic year

Sampling technique: Nonprobability purposive sampling technique

The sample size was calculated by using the z-score. A 95% confidence level and a 5% margin of error were used to calculate the sample size.

Inclusion criteria:

· Nursing students who were studying in the first academic year.

The students who are willing to participate in the study.

The students who are available at the time of study.

Exclusion criteria:

The students who are not studying surgical nursing this academic year.

Students who are sick during data collection.

Tools for data collection:

After an extensive review of the literature and discussion with experts and with personal and professional experience, the tool was prepared which consisted of four tools.

Tool 1. Self-administered questionnaire: It was used to assess the nursing students' data (age, gender, and residence).

Tool 2. Nursing student's knowledge assessment tool: consisted of two parts: It was developed by the researcher after reviewing the national and international related literature (Abdel-Mordy, et al., 2022; Nair et al., 2020; Nur Hafizah, 2019 and Abd ElAliem, et al., 2019).

Part I: Nursing student's knowledge regarding health assessment topic (pre/post): It included questions regarding the health assessment topic, it was designed to assess student's knowledge about the definition,

purposes, steps, guidelines, types, and tips on how to perform successful health assessment.

Part II: Nursing student's knowledge regarding Jigsaw teaching technique

This section evaluated nursing students' feedback about the use of the Jigsaw **teaching technique** in the learning process such as the definition of a Jigsaw teaching technique, objectives, steps, benefits of the Jigsaw teaching technique, their familiarity with the Jigsaw teaching technique as a new teaching method, how it can be applied to learning, their prior use of the Jigsaw learning strategy in learning, and their preference for using the Jigsaw teaching technique in learning.

Scoring system:

Each right response earned one point, while wrong replies got zero. The level of knowledge was categorized based on the scores obtained as follows: poor knowledge (below 60), average (60 – less than 85), and good knowledge (85 – 100).

Tool 3. Learning's Achievement Questionnaire (Tawiye et al., 2021):

It included the Jigsaw method group's various learning objectives were evaluated with 35 questions related to theoretical component lectures. It is divided into two parts.

Procedure

Scoring system:

The exam results of the students were scored by the operational scoring system used in the academic setting.

Excellent: 95 to 100 = 5.0; Excellent: 90 to \leq 95 = 4.75; Very Good: 85 to $<$ 90 = 4.5; Very Good: 80 to $<$ 85 = 4.0; Good: 75 to $<$ 80 = 3.5; Good: 70 to $<$ 75 = 3.0; B+) Excellent: 95 to 100 = 5.0; (D+) Fail = $<$ 60 = 1.0; (D) Pass = 65 to $<$ 65 = 2.5; (F) Fail = $<$ 60 = 1.0 .

Tool 4. Nursing students' satisfaction assessment Sheet:

Student satisfaction is used to assess the comfortable sensation that the Nursing students are fulfilling toward educational and welfare needs (Ashrafalsadat, 2014; Tawiye et al., 2021). Based on a five-point Likert scale

analysis, nursing students' ratings of 1 = very dissatisfied, 2 = dissatisfied, and 3 = neutral were categorized as "dissatisfied", 4 = satisfied, and 5 = very satisfied were categorized as "satisfied".

Validity of the tools:

The present study instruments' validity was confirmed by a panel of three experts from the Faculty of Nursing in the field of Medical-Surgical Nursing with more than ten years of experience in the field. Every expert evaluated the study instruments for their content validity, coverage clarity, content, length, wording, format, and overall appearance. No suggested changes were made.

Reliability of the tools:

Cronbach's alpha reliability test was used to evaluate reliability. The results showed that the tools had reasonably homogenous items, as indicated by high reliability that was ($\alpha = .889$).

A pilot study

A pilot study was done on 10% of the sample once the instrument was developed (10 nursing students). It was done to detect any ambiguity in the instrument and establish the time required for data gathering. The results of the pilot study were used to develop the final form of the instruments, which included the clarification and testing of the practicality of the research process. Students of the pilot study were included in the main study.

Ethical considerations:

Approval was obtained from the ethical committee of the Faculty of Nursing, at Sohag University to conduct this study. Before beginning the study, the researcher told the nursing students that the study was optional, that they might refuse to participate at any time, and that they were free to leave the study whenever they wanted without having to give a reason. The nursing students provided their verbal consent. Additionally, they were informed that their data would be kept private and only used for study.

Fieldwork:

The research was done between the beginning of February 2024 and the end of May 2024. At the beginning of the interview, the researchers introduced themselves, welcomed each nursing student, and discussed the purpose and nature of the study.

Phases of the study: The study was conducted through the following three phases:

Preparatory phase:

The process began with gathering all data about the Jigsaw strategy's concept, primary goal, and technique. Based on current textbooks, references, research publications, and websites, the researcher created the study materials and tools. The evaluation instruments were created at this step by the researcher.

Implementation phase: -

Approval of the nursing students was obtained orally after explaining the purpose of the study - The researcher distributed the questionnaire to assess the students' data (instrument I). - The researcher assessed the nursing students' level of knowledge regarding health assessment using Pretest (tool II). - The researcher informed the nursing students about the time of the post-test (after ten days of intervention).

Jigsaw Technique:

Step 1: First, the samples were split up into ten "Expert Groups," each of which contained ten samples.

Step 2: The group leader was chosen from among the samples in each group based on their strong academic record.

Step 3: Six distinct parts were created by dividing the concepts of health evaluation into:

- Definition of health assessment
- purposes of health assessment
- Types of health assessment
- Steps of health assessment
- Guidelines for health assessment
- Tips on how to perform a successful health assessment

Step 4: Assign each student to a topic on health assessment from among those covered by the expert group. To make the topic easy to teach and accelerate other students' learning, the groups were told to thoroughly prepare the material, read the assigned texts, and perform additional reading beyond what was written in the text. The onus of thoroughly preparing that subject fell on the allotted students.

Step 5: Students were given enough time to become acquainted with the ideas. It was advised that students prepare with comprehension rather than memorization. To set up the Jigsaw classroom, a day was designated. The first discussion on the subjects was held by the student's parent groups. Every student gave an explanation and a presentation on the topic they had prepared.

Step 6: Next, the students who were interested in the same subjects got together and talked about them. Each student presented the knowledge they had learned about their subjects. Additional points were observed by the others.

Step 7: The students then went back to their groups of experts and discussed their topics with fresh insights. Moving between groups, the teacher-investigator supported the entire procedure. Since there were too many subjects to cover, the Jigsaw class took place over three days. The instrument was used to test the kids after a week.

Plan of data collection:

After getting the permission from authorities of the setting, the general information and knowledge level were assessed by using a self-structured questionnaire. Then the students were divided into groups and the concept of health assessment was given to students for learning by jigsaw technique. They prepared the topic, discussed it together, and learned the complete topic related to health assessment.

Evaluation phase:

After one week, the post-test knowledge level was assessed by using the same pre-test tools.

Statistical analysis

The data was collected, analyzed, and tabulated after being reviewed and prepared for computer entry. Version 23 of the Statistical Package for Social Science (SPSS) was used. While means and standard deviations were used to describe continuous quantitative variables, frequencies, and percentages were employed to describe categorical variables. The row and column variables were assumed to be independent, and the Chi-square (χ^2) test was employed to compare qualitative category data without disclosing the strength or direction of the link. Comparing qualitative variables was done using the chi-square, T-test, and F-test. Statistical significance was determined when the P-value was less than 0.05 and the difference was $p < 0.001$.

Results:

Table (1): Illustrates that the studied nursing students' mean age was 20.22 ± 1.13 years and 69% of them were females. Regarding their residence, (65%) of the studied nursing students were living in urban areas.

Figure 1 demonstrates that 98% of the surgical nursing students who participated in the study reported never using the Jigsaw teaching technique in their prior learning.

Table 2 shows that the majority of nursing students' knowledge was found to be increased after using the Jigsaw teaching technique compared to before, and there was a highly statistically significant difference between their pre- and post-knowledge of health assessment ($P < 0.001$).

According to **Table 3**, there was a highly statistically significant difference between nursing students' knowledge about the **Table (1): Nursing students' data (n=100)**

Personal data	No.	%
Age/year	Mean \pm Stander deviation	20.22 \pm 1.13
Gender		
Female	69	69%
Male	31	31%
Residence		
Urban	65	65.0
Rural	35	35.0

Jigsaw teaching technique pre- and post-application ($P < 0.001$).

Figure 2 illustrates that the majority (88%) of the nursing students preferred to use the Jigsaw technique in their learning.

Table 4 shows that during the pretest no one had good knowledge thereafter in the posttest, 70% had good knowledge post-Jigsaw teaching technique application.

Table 5. The table depicts that the mean pretest score for knowledge was 10.50 with a standard deviation of 13.66 and the posttest score of knowledge was 21.77 with a standard deviation of 15.7 with a t' value of 0.05 level of significance is 3.65. Hence the hypothesis is accepted.

Table (6): illustrates that there was a high statistically significant difference between **academic achievements** pre and post-Jigsaw teaching technique application at (p -value = 0.001).

Table (7): illustrates that the total mean achievement scores were (73.4 ± 1.76 & 87.1 ± 1.04) pre and post-Jigsaw teaching technique application with a statistically significant difference at (P -value = 0.001*).

Figure (3) clarifies that on the pretest, 90% of the nursing students were dissatisfied with the **Jigsaw teaching technique application**, whereas post using the Jigsaw learning technique, this level decreased to 20%.

Table (8): indicates that there was a positive correlation between the total achievement scores among the studied nursing students, **total knowledge**, and their total **satisfaction**, with (P -value=0.000).

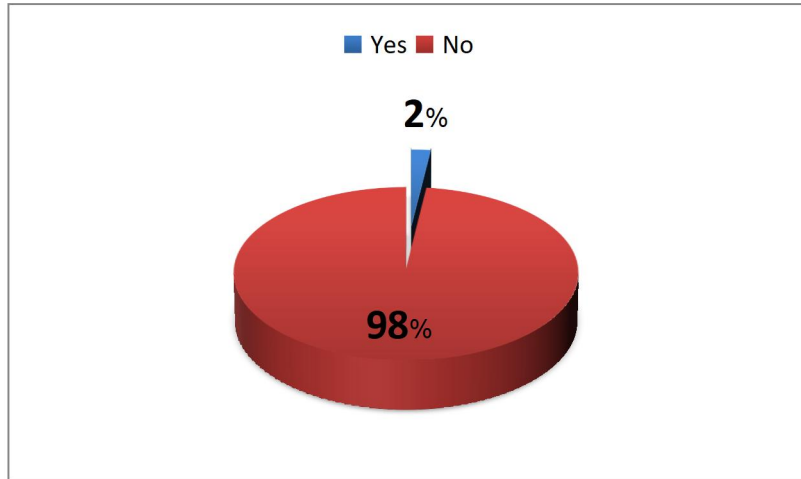


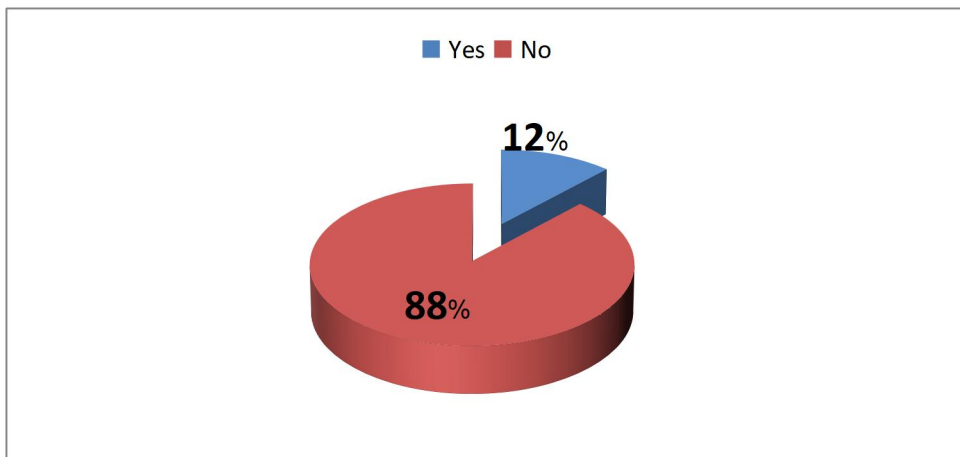
Figure 1: Previous application of the Jigsaw teaching technique among the nursing students (n=100)

Table (2): knowledge score about health assessment concept among the studied nursing students pre and post-Jigsaw teaching technique application (n = 100)

Nursing students' knowledge of health assessment	Pre-Jigsaw Teaching Technique Application		Post-Jigsaw Teaching Technique Application		X2	P-value
	No	%	No	%		
Definition of health assessment						
• Incorrect.	80	80	10	10	148.73	0.001
• Correct.	20	20	90	90		
Purposes of health assessment					172.54	0.001
• Incorrect.	70	70	9	9		
• Correct.	30	30	91	91		
Steps of health assessment					112.23	0.001
• Incorrect.	81	81	6	6		
• Correct.	19	19	94	94		
Guidelines for health assessment					143.38	0.001
• Incorrect.	79	79	10	10		
• Correct.	21	21	90	90		
Types of health assessment					143.67	0.001
• Incorrect	85	85	3	3		
• Correct	15	15	97	97		
Tips on how to perform a successful health assessment					89.78	0.001
• Incorrect.	75	75	7	7		
• Correct	25	25	93	93		

Table (3): knowledge score about the Jigsaw teaching technique among the studied nursing students pre and post-technique application (n = 100)

Nursing students'' knowledge of the Jigsaw teaching technique	Pre-Jigsaw Teaching Technique Application		Post-Jigsaw Teaching Technique Application		X2	P-value
	No	%	No	%		
Definition of Jigsaw Teaching Technique <ul style="list-style-type: none"> • Incorrect. • Correct 	100 0	100.0 0.0	10 90	10 90	118.43	0.0001
Objectives of the Jigsaw Teaching Technique <ul style="list-style-type: none"> • Incorrect. • Correct 	100 0	100.0 0.0	8 92	8 92	129.06	0.001
Steps of the Jigsaw teaching technique <ul style="list-style-type: none"> • Incorrect. • Correct 	100 0	100.0 0.0	7 93	7 93	125.03	0.001
Benefits of the Jigsaw teaching technique <ul style="list-style-type: none"> • Incorrect. • Correct 	100 0	100.0 0.0	9 91	9 91	126.02	0.001
How Jigsaw teaching technique be used <ul style="list-style-type: none"> • Incorrect. • Correct 	100 0	100.0 0.0	3 97	3 97	146.59	0.001

**Figure 2: Nursing student's preference for using the Jigsaw teaching technique in learning (n=100) Table4. Pretest and a post-test score of knowledge regarding health assessment pre and post-Jigsaw teaching technique application (n = 100).**

Knowledge level	Pre-Jigsaw Teaching Technique Application		Post-Jigsaw Teaching Technique Application	
	No	%	No	%
Poor	22	42	0	0
Average	28	58	18	30
Good	0	0	32	70

Table 5. Mean, Standard Deviation, Standard Error of Difference, Degree of Freedom, and t value of Pretest and Posttest knowledge pre and post-Jigsaw teaching technique application.

	Mean	Standard deviation	Standard error	df	Paired t Value
Pretest	10.50	13.66	2.97	48	3.65
Posttest	21.77	15.7			

Table (6): Comparison of nursing students' academic achievements pre and post-Jigsaw teaching technique application (n = 100)

Items	Pre Jigsaw teaching technique application	Post-Jigsaw Teaching Technique Application	X ² (P)
	%	%	
Achievement Levels for learning	Excellent	29.00	χ ² =15.11 P = 0.001*
	Very Good	46.00	
	Good	19.00	
	Accepted	6.00	
	Fail	5.00	

*Statistically significant difference.

Table (7): Association of the mean total achievement scores pre and post-Jigsaw teaching technique application (n = 100)

Total achievement` scores	Pre Jigsaw teaching technique application	Post-Jigsaw Teaching Technique Application	P-value
	Mean ± SD	Mean ± SD	
Total achievement` scores	73.4± 1.76	87.1± 1.04	0.001*

**High statistically significant difference P≤0.001.

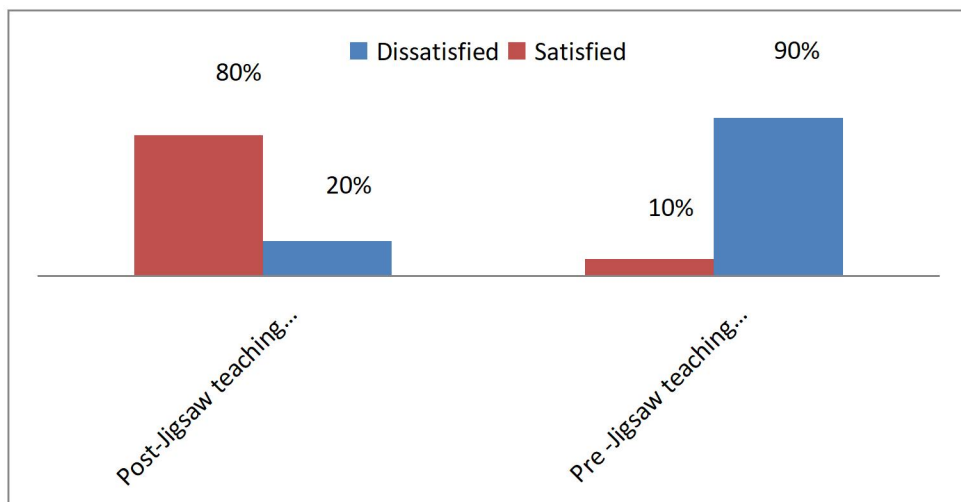


Figure (3) Nursing students' satisfaction pre and post-Jigsaw teaching technique application (n = 100)

Table (8): The correlation between total achievement scores, total knowledge, and satisfaction with jigsaw pre and post-jigsaw teaching technique application (n = 100)

Items	Time	Total knowledge scores		jigsaw satisfaction total scores	
		r	p-value	r	p-value
Total achievements scores	Pre	0.436	0.000**	0.742	0.000**
	Post	0.79	0.000**	0.75	0.000**

****A high statistically significant difference ($P \leq 0.001$).**

Discussion:

Nursing students can enhance their critical thinking, problem-solving, and decision-making abilities through the use of Jigsaw learning strategies in contemporary educational systems. These abilities can then be applied in clinical settings to deliver high-quality care (Abdullah & ABiyikli, 2017). Because it motivates students to listen, collaborate, and exchange ideas, the jigsaw technique is being used in classrooms more and more these days (Abdel-Mordy et al., 2022). Since the Jigsaw method encourages students to pay attention, collaborate, and share ideas, it is being employed in academics more and more these days. It also improves student performance and outcomes (Bagheri et al 2018).

Today, the jigsaw method is being used in classrooms more and more because it encourages students to exchange ideas, cooperate, and listen. Additionally, it enhances academic performance and results. Bagheri et al., (2018) Thus, the goal of the current study was to ascertain how well surgical nursing students' academic performance and satisfaction were affected by the Jigsaw teaching method.

The study's findings showed that almost all of the surgical nursing students who took part in it said they had never used the Jigsaw method of instruction before. According to the researchers, it supported the necessity of using the Jigsaw teaching method.

The majority of nursing students' knowledge was found to have risen following the implementation of the Jigsaw teaching technique in comparison to before the study's findings, and a highly statistically significant difference was observed between the students'

pre- and post-knowledge of health assessment. Deepa, et al. (2020) evaluated the Jigsaw learning methodology as an active teaching strategy by conducting a descriptive study with 50 first-year MBBS students at a tertiary care hospital in Mumbai, India. Students were given a questionnaire to gauge their impression of the Jigsaw technique, and a multiple-choice post-test followed the discussion. Students who attended the regular classroom lecture received the same multiple-choice question post-test.

The outcome demonstrated that students who learned the material through the Jigsaw approach had a higher mean score than those who learned it through lectures. A questionnaire was used to assess the students' perceptions of the Jigsaw teaching method. It included quantitative Likert scale questions, and the majority of students reported an increase in their interest in the subject, better student-student and teacher interactions, improved communication skills, and a preference for the Jigsaw teaching method over the traditional lecture method.

According to the results of the current study, nursing students' pre- and post-application knowledge of the Jigsaw teaching technique differed significantly (very statistically significant). According to the researchers, it supported the benefits of using the Jigsaw teaching method. This could be explained by the fact that the jigsaw learning technique encourages in-depth information processing for understanding, which improves students' ability to organize and control knowledge. The previous outcome aligned with the findings of Kritpracha et al (2018). Concerning the enhancement of master nursing students' cooperative learning practices and self-directed learning styles using jigsaw exercises They found that by pushing students to reflect

carefully on the content to comprehend it, the jigsaw learning approach improves their ability to organize and manage knowledge.

Furthermore, this study supports the findings of **Abd El Aliem et al. (2019)**, who reported that there was evidence of a beneficial relationship between using the jigsaw learning approach and improving students' cognitive abilities through nursing education. The jigsaw learning technique makes every student's participation crucial to completing the teacher-given assignments. In addition, students can assess each other's ideas and work. The results of this study are consistent with a study by **Yemi et al. (2018)** titled "Jigsaw Approach of Group Instruction's Impact on Secondary Education Pupils' Math Achievement," in which the authors found that employing the Jigsaw method of instruction was superior to traditional teaching strategies for improving academic achievement.

The majority of nursing students opted to employ the Jigsaw strategy for learning, according to the results of the current study. According to the researchers, this demonstrated how well the Jigsaw teaching technique was applied. The results of the current study were supported by a study by **Nur Hafizah (2019)** titled "Effect of the Jigsaw-Based Cooperative Learning Method on Student Performance in the General Certificate of Education," which showed that the participants enjoyed using the Jigsaw method and improved significantly after the intervention. In a different **Mahmoud (2019)** study, 53 female students participated in "The Effectiveness of Jigsaw Strategy on the Achievement and Learning Motivation of the 6th Primary Grade Students." Most of the students reported having a positive experience using the technique.

The results of this study showed that, after applying the Jigsaw teaching method, 70% of participants had good knowledge in the posttest, while none of the participants had high knowledge during the pretest. The reason behind this could be that nursing students find jigsaw learning methods novel and distinctive, particularly when they are employed in lectures, which encourages active participation. This shows that, when compared to a traditional lecture-based method, the jigsaw strategy may be a more effective way to educate nursing students and improve their academic

performance. This could be explained by the fact that, while the traditional teaching method exposes students to learning, the jigsaw strategy actively transforms nursing students from passive to active learners.

Furthermore, this was consistent with the research conducted by **Wilson et al. (2017)**, which demonstrated a statistically significant difference between the pre-and post-test interventions. Compared to pre-intervention, the majority of maternity nursing students had a satisfactory level of knowledge score after the intervention (jigsaw technique).

The study's findings demonstrated a statistically significant difference in the overall mean accomplishment scores following the use of the Jigsaw teaching technique. According to the researchers, the results demonstrated that the jigsaw method is a useful tool for learning about health assessment topics. To ascertain the "effects of jigsaw cooperative learning on the achievement and information retention of those students, as well as reporting their views regarding this type of learning," **Tran and Lewis's (2019)** Australian study included 80 final-year Vietnamese math students. Students' academic performance increased when they used jigsaw learning, it was discovered. Additionally, **Azmin (2016)** showed a substantial relationship between achievement grades and the current finding, which is somewhat corroborated.

A study conducted by **Abd ElAliem, et al., (2019)**, selected a similar group of participants to evaluate "the impact of the cooperative jigsaw learning approach on the attitudes and performance of maternity nursing students at the Faculty of Nursing, Benha University" and reported a trustworthy finding. Later on, **Abdel-Mordy et al. (2022)** conducted a study using a similar sample to assess the impact of the cooperative jigsaw learning strategy on community nursing students' attitudes and accomplishments at the Faculty of Nursing- Benha University and reported the positive findings. Furthermore, a study by **Bagheri and Mazloum (2020)** indicated that cooperative approaches may be used in a variety of subjects and at varying educational levels, which corroborated the current findings. It is advised that educators use this cooperative

method in a variety of courses to help students develop a wide range of intelligence, including critical thinking, problem-solving, theoretical and practical accomplishment, self-worth, self-confidence, and the value of learning.

About the degree to which students find the Jigsaw method of instruction satisfactory. The study's findings demonstrated that most Jigsaw group members were quite satisfied with how the Jigsaw teaching method was applied. Decision-making and critical thinking skills are enhanced by the jigsaw teaching methodology, which is considered an innovative teaching and learning approach.

The findings of **El-Said, (2019)** study, which compared Jigsaw cooperative learning to standard or typical teaching techniques, revealed that students who were trained to teach physical education lessons were more satisfied with the Jigsaw cooperative learning strategy. Additionally, **Shahri et al. (2017)** found that more participants than the majority agreed with every evaluation question that assessed their satisfaction with the Jigsaw class material. This study compared the effectiveness of the Jigsaw approach versus lectures in teaching physics to medical students, which supports the current finding.

. Additionally, this conclusion is consistent with the findings of the previously mentioned **Abd El Aliem et al. (2019)** study, which suggested that the students in the jigsaw group demonstrated higher levels of pleasure. However, a study by **Leyva-Moral and Camps (2016)**, which assessed nursing students' happiness using the jigsaw methodology within the framework of a mandatory course on nursing research methodologies, showed that student satisfaction was low. This can be the result of the majority of study participants' opinions that this course shouldn't be taken again.

This finding was in the same line with many other studies that manipulated the Jigsaw strategy for educating many fields of sciences. For example, a study conducted by **Abdel-Mordy et al. (2022)** conducted a study to assess the impact of the cooperative jigsaw learning strategy on community nursing

students' accomplishments at the Faculty of Nursing- Benha University and reported that there were statistically significant differences between jigsaw and lecture groups regarding learning achievements immediately after intervention, and the jigsaw learning strategy was successful in improving community nursing students' sense of accomplishment. These parallels in the results could be attributable to the student's attention to detail in the preparation of the lecture content, which encouraged them to reflect on the information easily and helped them think critically.

The majority of participants agreed with every evaluation question assessing their satisfaction with the Jigsaw class material versus lecture, according to **Shahri et al. (2017)**, who studied "Effectiveness of teaching: Jigsaw technique vs. lecture for medical students' Physics course." This finding corroborated the current findings.

The finding of the present study revealed that there was positive correlation between the total achievement scores among the studied nursing students, total knowledge, and their total satisfaction. This was in line with the study of **Çagatay & Demircioglu (2019)** in which there is significant relation between learner's knowledge level and their satisfaction level. Similar findings were reported by **Ibrahim et al., (2020)** about the "Effect of Jigsaw cooperative learning strategy on obstetric nurses' knowledge and information retention of emergency contraceptive methods" used a simple random sampling technique, by which 40 diploma nurses were selected and pre-knowledge about emergency contraceptive was assessed. The same group was taught using the Jigsaw technique of learning and the knowledge was reassessed. There was a significant difference in the performance of the participants before and after the intervention.

Moreover; another study conducted by **Abd ElAliem, et al., (2019)**, who evaluated "the impact of the cooperative jigsaw learning approach on the attitudes and performance of maternity nursing students at the Faculty of Nursing, Benha University" claimed that the use of the jigsaw learning method improved the performance of maternity nursing students in the maternal and newborn health nursing

course. The aforementioned study findings prove that such a strategy not only improved the understanding of the labor concept but also of all maternity course topics. Additionally, the current study supports **Abd El Aliem et al., (2019)** assertion that there is evidence linking the cooperative jigsaw learning technique to improving students' cognitive abilities through nursing education. The availability of each student as an essential component in completing the assignments assigned by the teacher is made possible by the cooperative jigsaw learning technique. Students can also assess one another's thoughts and keep track of one another's efforts.

Limitations:

The study was confined only to first-year B.Sc nursing students.

- The duration of the study was limited to one week.
- Much time is needed for the preparation and implementation.

Conclusion:

Based on the findings of the current study, it can be said that the Jigsaw teaching technique proved to be an effective educational learning tool for nursing students. The jigsaw teaching technique is effective in improving nursing students' satisfaction and their academic achievements during the course.

Recommendation:

Based on the results of the current study, the following recommendations can be suggested:

- It is advised that all nursing academic courses adopt the jigsaw teaching technique as a teaching methodology.
- The study can be replicated in large samples to generalize findings.
- A comparative study can be conducted between learning by jigsaw method and autodidacticism.
- An experimental study can be conducted with a control and experimental group.

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