



The Jigsaw Method: Empowering Students to Achieve Learning Outcomes in Architecture Education

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ABSTRACT

Participatory learning with the jigsaw technique is a pedagogical strategy for increasing student engagement and collaboration. This method divides students into small groups, with each group accountable for a specific piece of the curriculum, and encourages active involvement and peer-to-peer education. The main objective is to set up an environment where students feel motivated to acquire knowledge, be empowered to take responsibility for their education and develop their capacity to think critically. Instead of serving as the single source of information, the participatory learning strategy encourages Lecturers to act as facilitators or guides and actively encourage students to join the learning process. The results indicated that using the jigsaw approach in participatory learning dramatically enhances student learning outcomes and participation in the learning process. Furthermore, students provided excellent feedback on the jigsaw approach of participatory learning. Most students were pleased and at ease with this strategy, and they found it easier to absorb the topic and collaborate with their classmates. In conclusion, using the jigsaw approach in participatory learning can be an excellent way to improve learning outcomes and student engagement in the learning process. When implementing the jigsaw method, it is essential to determine the best way to achieve the best results. Lecturers should use this strategy while considering the learning context, student characteristics, and subject matter material to improve the learning outcomes, abstract either.

Keywords: Collaborative Learning, Participatory Learning, Student Engagement, High Order Thinking Skills, Critical Thinking, Problem-Solving Abilities.

1. INTRODUCTION

The learning process occurs through interaction between students, Lecturers, and learning materials in a classroom environment. It is critical to properly plan classroom activities to ensure that students thoroughly comprehend and digest the subject content. However, barriers or hurdles frequently develop during learning activities, making it difficult for students to obtain optimal learning results.

The student's environment has a significant impact on their learning process. A student's knowledge will be improved if they feel comfortable in their learning environment. Consequently, it is critical to establish a welcoming and conducive learning atmosphere that promotes the best possible learning. Students can better

comprehend and assimilate the subject matter in a supportive environment. However, if all of these steps have been taken and pupils still need help learning, the problem is with the students themselves.

Students need more interest in the learning process in the architectural engineering education program during theory-based lessons. The timing of these lessons—based on the class schedule, given in the afternoon—increases the risk of learning fatigue and a drop in students' attentiveness and enthusiasm. These elements make it difficult for Lecturers to properly engage students and provide a supportive learning environment.

Lecturer require a method capable of increasing student learning motivation in the form of student active

involvement in class using participatory instructional techniques such as jigsaw and icebreakers.

Ice breaking method is used in classroom learning to overcome student saturation and improve the effectiveness of student learning. It helps to increase students' concentration, attention to the material, activity, cooperation, discipline, and responsibility [1].

Icebreakers and re-energizers are instructional strategies that can be used to build rapport, create a safe learning environment, and enhance student participation and communication [2].

According to the previous research, learning concentration in the afternoon has been explored in various contexts. The "Afternoon Theme" concept in medical education, which involves problem-based learning and an integrated approach to teaching [3]. Furthermore, an experiment was conducted with visual texture discrimination and found that learning performance improved after an afternoon nap [4].

On the other hand, the effects of afternoon sugary snacks on cognitive processes essential for learning. They discovered that they generally enhanced spatial memory but had mixed effects on attentional performance [5]. During this time, education and preparation for the second half of life, or the "afternoon of life". While individuals were more prone to dishonesty in the afternoon due to fatigue and self-control depletion [6].

The learning process becomes a challenge for the lecturers. The quality of the learning environment, including factors such as classroom organization, social interactions, and air quality, can impact the effectiveness of student learning. The learning process is significantly influenced by student engagement and enthusiasm, as well as the environment and settings in the classroom. Since they significantly impact student learning in school, teachers must select the best teaching strategies. Consequently, a successful and cutting-edge learning model is needed for both teachers and students to improve the learning process [7].

A student-centred strategy overcomes these learning obstacles and difficulties. Lecturers, who can improve classroom dynamics, foster a positive environment, and make learning fun, are essential to conquering learning barriers.

The Jigsaw Cooperative Learning Model has the potential to improve learning activities. The cooperative learning model jigsaw type is today's creative learning method. Cooperative learning is defined as learning that focuses on the activities of students in groups, such as relationships with peers, participation in answering discussion questions, participation in solving group problems, and accountability for the group's success. In accordance

with that, Jigsaw type cooperative learning with a student learning model responsible for their different tasks and teach to other group members to comprehend the subject matter in groups [8]. This strategy focuses on the active participation of students within a group, including interactions with peers, participation in discussions, cooperative problem-solving, and shared responsibility for the group's successes [9].

In particular, the jigsaw cooperative learning paradigm gives students individual tasks [10]. It encourages them to impart knowledge to other group members, facilitating a thorough mastery of the subject matter in a group setting. Additionally, this approach strongly emphasises the value of small group work, creating in students a sense of responsibility for themselves and their classmates while encouraging interdependence among peer groups.

Students in the architectural engineering education program need to be engaged in the learning process during theory-based lessons. Based on the class schedule, these sessions are offered in the afternoon, increasing the possibility of learning fatigue and reducing students' attentiveness and interest. These factors make it difficult for lecturers to engage students and provide a conducive learning environment.

This study aims to put cooperative learning approaches into practice and examine the efficiency of the jigsaw technique in improving students' learning experiences and comprehension of course material, including student participation in afternoon learning. Learning in the afternoon presents its own set of obstacles, with students becoming fatigued and their concentration decreasing as a result of the lecture activities that have been scheduled. This study discusses the benefits and an overview of using cooperative and participatory learning approaches in the classroom to increase learning outcomes and student understanding.

2. REVIEW OF LITERATURE

2.1. Cooperative Learning Model

Cooperative learning is another kind of constructivist learning. Constructivism learning is a learning technique in which students actively construct their knowledge using what they already know [11].

Four types of Classroom Cooperative Learning Techniques which are as follows: (1) Teams-Games-Tournament (TGT); (2) Student Teams-Achievement Divisions (STAD); (3) Jigsaw; and (4) Small-Group Teaching.

Jigsaw is a unique case of low reward interdependence; there is no formal group goal, but task interdependence is so high that reward interdependence is formed indirectly. Students can only perform well on

their quizzes if their teammates teach them properly, as each group member has unique information. High task interdependence is a circumstance in which students must rely on one another to complete group work. Students with low task dependency may work alone without interfering with group activity. Among cooperative learning strategies, "high" and "low" task interdependence are relative expressions; even a methodology with a very low task interdependence would be high compared to a typical individual task structure [11]. Additionally, this research combines jigsaw application in the learning process with ice-breaking methods at the first steps.

2.2. Ice Breaking Method

Icebreakers are quick activities intended to get people to know one another and lower barriers before an event begins. Many teachers discover that they can better understand their pupils and foster a sense of community among their students by using icebreakers [2].

Every action that Lecturers do in the classroom to pique students' interest in learning is known as an "ice breaker". Three separate icebreakers. Openers come first on the list. The idea is to challenge and inspire the pupils to get them warmed up. This style of conversation starter can be utilized to open a meeting or discussion or to introduce a new subject. The following kind was an energizer. This icebreaker is used when students are under pressure or need more motivation to study. Feedback and transparency are the final two. This serves as an example of a communication variable. It might be administered after the class. In terms of the activities, icebreakers come in various shapes and sizes to ensure that the students have understood the subject [12].

2.3. The Jigsaw Method

The Jigsaw Classroom approach, was designed to increase cooperation among children in newly integrated classrooms marked by animosity and competition. This strategy involves employing two sets of small groups to facilitate learning [13].

The Jigsaw technique stated in five steps: (1) Students are organized into small groups called "jigsaw groups" or "learning group"; (2) Each group member is provided with specific materials relevant to one of the topics, ensuring that all necessary content is covered inside the group. Students are given plenty of time to review their assigned sections thoroughly; (3) Students join "expert groups" or "preparation groups," in which they cooperate with members of other jigsaw groups who have been assigned the same piece of the material; (4) Students return to their jigsaw groups with two tasks: a) to teach their content to their

group with adequate time for clarification questions and discussion, and b) to learn the materials taught by other members; (5) Reflection and discussion.

The jigsaw method is a cooperative learning technique involving all participants, who are divided into certain groups to work on certain problems, with the ultimate goal of collaborating on the results of the discussion. This learning method shifts the main focus of the learning process from the instructor to the participants, thereby creating a more active learning atmosphere that is brought to life by the participants. Utilizing this method can improve conceptual understanding, problem-solving skills, analytical skills, logical thinking, and the skills of expressing opinions among learning participants [14] [15].

The jigsaw method is a cooperative learning technique in which students work together in groups to solve problems and collaborate on the final results [14]. The Jigsaw Method is a collaborative learning approach that respects student individuality and reduces conflict among students with a variety of learning styles [15]. The jigsaw method is a cooperative learning technique that involves small groups of students working together to increase their own responsibility for learning and that of their peers.

The Jigsaw method is a cooperative learning strategy that has been shown to be more successful than the standard biochemistry instruction for medical students [16].

Theoretically, cooperative learning is viewed to be able to develop academic achievement and non-academic achievement as well, such as social relation, inter-personal, intra-personal and group cooperation. The pattern of learning process where the lecturer is active (teacher centered) and the students are passive has low effectiveness, and cannot develop active participation process in learning [17].

Firstly, Jigsaw was developed and tested by Elliot Aronson and his friends at Texas University, then adapted by Slavin and his friends at John Hopkins University [18]. Students not only have to learn the material given, but also have to be prepared in teaching that material to the members of the group. Therefore, the students are depending on each other and have to work cooperatively to learn the material and task given. In this technique, the lecturer pays attention to schema or students experiences backgrounds and helps them in activating this schema so that the material learning become more meaningful. Jigsaw is designed for improving the sense of student's responsibility on their own learning process and others learning process too. Jigsaw is a model of cooperative learning where students work in small groups consist of 4-6 members in heterogeneously and work together with positive dependence and responsibility on thoroughness part of

learning material that has to be learnt and deliver that material to the rest group members [17].

The conduction steps of Jigsaw learning strategy, areas follows: first, the lecturer conveys the course competency that has to be acquired in one term; second, the lecturer forms groups and determines the group representatives in averages; third, the lecturer delivers the subjects or teaching material used according to the determination of group representatives; fourth, each group representative join in expert group; fifth, the students discuss and work through the expert group; sixth, the report to original group to explain the result of discussion in expert group; seventh, the lecturer encourages the group members to ask questions to the presenter and discuss the group worksheet; eighth, stabilizing and making conclusion over the material by the guidance of the lecturer; and ninth, individual evaluation and group rewards [17].

In carrying out or applying the jigsaw technique, the Lecturer must understand several procedures. The procedure for implementing the jigsaw technique is as follows:

- 1) In forming groups, each group member has differences such as ability, gender, and ethnicity (A, B, C, D, E, and F).
- 2) Dividing tasks into sub-materials, each group member becomes a field expert or sub-material expert. A1, A2, A3, A4, A5, A6, etc.; B1, B2, B3, B4, B5, B6, etc.
- 3) To understand the sub-material, each group is given time to mutually understand the sub-material given to group members who have become sub-material experts.
- 4) Each sub-material expert from each group gathered to form expert groups, including A1, B1, C1, D1, E1, F1, A2, B2, C2, D2, E2, F2, etc.
- 5) Sub-material expert members return to their respective groups to convey and share the results of their discussions.
- 6) The quiz is carried out as a control for the entire series of learning materials.
- 7) Reward and appreciation for the efforts that have been made.

This research use qualitative approach. The type qualitative research applied is classroom action research. Classroom action research is systematic observation, which is conducted by researching teacher, the headmaster, school counselor, or others who have authority to make policy on teaching learning environment to gain information about the school conduction, how they teach, and how good are the students have learnt [17].

The subjects of this study were students of the Architectural Engineering Education Study Program, Universitas Pendidikan Indonesia, who were taking the Learning Evaluation course. Students who take this

course are students of the class in semester 5 (five), period 2022/2023, with the number of students are 56 people.

This research is conducted through several steps, which are introduction study and arranging action plan. The activity of introduction study is conducted to gain sufficient data in order to formulate the needs. The next step is arranging action plan to be carried out in action cycle. The next is conducting the action, observation, and reflection of action result. If the case related to the objective of learning is not achieved, then the revision will be conducted on next cycle. The conduction of action on one cycle covers four steps, which are planning, conducting the action, observation, and reflection.

2.4. Bibliometric Study of Parcticipatory Learning, Student Centered Learning and Jigsaw Methods

This bibliometric made use of mapping analysis via the VOS viewer program. The Publish or Perish tool aided the data collection process, which served as a reference manager. The information was gathered using a keyword filter focused on "jigsaw and participatory learning." The study relied on bibliographic data that included topic areas, titles, keywords, and abstracts. A review of the search results found 1000 relevant publications published between 2013 and 2023. The study also identified four clusters with variable quantities of elements in each cluster, demonstrating the popularity of research on jigsaw learning among scholars. Topics typically covered in these articles include student, learning, effect, group, and control group.

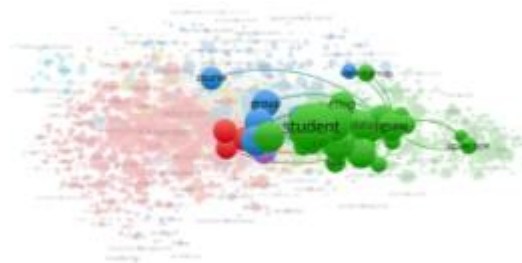


Figure 1. Bibliometric analysis of jigsaw.

Cooperative learning development research uses the Jigsaw technique among first-year medical students to learn biochemical concepts, a cooperative method that makes students interdependent and helps each other acquire knowledge [14].

The jigsaw learning method allows users to better understand content based on sound files and the purpose of learning to listen, speak, read, and write through interaction with other users.

3. METHODS

The implementation of this research was applied to the PTA learning evaluation course in the class, with the number of participants modifying the Jigsaw technique by adding the preparing aspect in the form of dissolving the class atmosphere and the visual aspect in the form of symbols or group identity. The ice-breaking method is used in classroom learning and helps overcome student boredom and increase learning effectiveness. This helps improve student concentration, attention to material and activities, cooperation, discipline, and responsibility [2] [1].



Figure 2. Post-test Activity.

The application of the participatory learning method is divided into five stages, including: Preparatory Stage: This preparatory stage aims to prepare class conditions so as to create a conducive classroom atmosphere so that students can follow each stage of class learning. This preparation stage begins with ice-breaking activities. All students are asked to stand supporting each other, protruding backwards while singing and playing a game called the "long dragon snake" game. The student who is caught in the first round will become the group leader, and then the student who is caught in the second round will become a member of the group.

The use of the ice-breaking technique at the beginning is very effective in breaking the ice and creating togetherness with one another. The icebreaker that is used is singing while spinning. During the ice-breaking process, group members were randomly selected based on the rhythm of the songs sung by the students. After getting the leader and group members, students are asked to choose a symbol from their group and a group symbol for their expertise.



Figure 3. (left) Ice Breaking Process; (right) Choose a symbol.

The selected symbol must be used on the head so that it is easily recognized, which will later be used as the identity of the group of expertise. This preparatory stage ends with the division of tasks for each member of the expertise group by the group leader. The icebreaker was closed by selecting group members and choosing a group symbol. Symbols or signs have an important influence on forming the identity of a group [19].

Symbols have been found to play an important role in forming group identity. Research has shown that simply having a symbol can make a collection of individuals appear more like a real, unified group [19]. Moreover, symbols not only increase the perceived cohesiveness of a group but also make the group appear more threatening and effective to others [20].

The use of symbols influences individual, relational, and collective processes. Groups are created and maintained through the use of symbols [21]. Overall, symbols have the power to shape group identity, influence perceptions of group competence, and influence intergroup relations.

The next stage is round 1, in which each member of the expertise group spreads out to look for the same expertise from other groups and discuss with each other the problems that have been determined.

Round 2, each group of expertise that has spread and been discussed with members of the same expertise from other groups then returns to their respective groups to present the results of their discussion with their original group.



Figure 4. Group setting.

Group members collaborate intensively to identify creative ideas and solutions to solve the problem. After

brainstorming, the group can identify the main topics that need to be discussed to reach an effective solution.

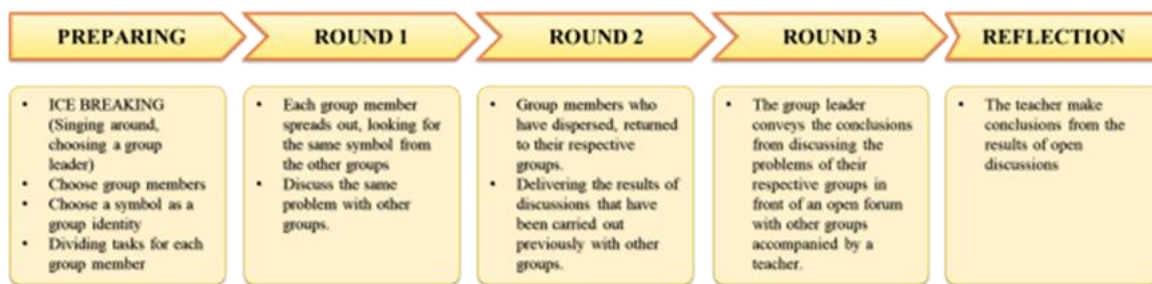


Figure 5. Step by step Application of Method

Selecting representatives from each expert group is also crucial in maintaining balanced representation and optimal quality of discussion. By selecting representative members who represent a variety of perspectives and knowledge from each group, it is hoped that in-depth and inclusive discussions will occur, thus providing an opportunity for all experts to contribute equally and reach more comprehensive and balanced decisions.



Figure 6. Group Discussion Expertise.

In Round 3, each group leader conveys the conclusions from discussing the problems in the group to all class members to equalize perceptions guided by the Lecturer.



Figure 7 The Jigsaw Group Discussion.

After the expert group has held discussions in the same peer group, they return to the leading group to take turns presenting the discussion results to other members. This process allows other students to gain additional knowledge from their group members. Next, they discussed and shared information they had learned from their respective peer groups. Through this active interaction, they built a complete picture of all the topics discussed, brought together various perspectives, and achieved a deeper understanding. In this way, collaboration and knowledge exchange between group members are the keys to success in dealing with problems holistically and gaining richer insights from various points of view.

The final stage is reflection, in which the teacher provides conclusions from the results of the discussion with all group leaders and provides quizzes and appreciation for students who managed to get the highest score.



Figure 8. Final Presentation.

After all expert groups have finished discussing problems in each group, it is time for the group leader to present to all students. This presentation aims to provide a more comprehensive explanation of the results of the discussions among each group of experts. In the presentation, the group leaders will summarize each idea, strategy, and solution generated by each group. This comprehensive explanation allows all group members to get an overall picture of their problems and how each group reached a solution. In addition, presentations from group leaders can also provide new insights and additional perspectives for other students who may have yet to be exposed to the details of their group discussions. In this way, the presentation by the group leader plays an essential role in ensuring collaboration and the sharing of information between group members, thereby creating a more in-depth understanding of the problems encountered and the proposed solutions.



Figure 9. Evaluation Test.

After the presentation by the group leader, the lecturer will continue by giving a post-test to all

students. This post-test is a control tool to measure learning achievement after discussing problems in groups. This test will test students' understanding of the material taught and their ability to apply the concepts and solutions discussed in groups. The post-test results will give the lecturer an overview of each student's understanding and mastery of the material. In addition, the results of the post-test will also be a benchmark for evaluating the effectiveness of the group-based learning method that has been implemented. By knowing the achievement of this learning, lecturers can make adjustments or improvements, if necessary, to improve student learning outcomes in the future.

4. RESULTS AND DISCUSSION

During lectures, the condition of students who experience boredom and feel they have not understood the material presented in the pre-test can indicate difficulties in understanding the material. Before applying the jigsaw learning concept, the pre-test aims to measure students' initial understanding of the material to be taught. If the pre-test scores show low results and students find it challenging to answer questions, the material may still be difficult for some students to understand.

After applying the jigsaw learning concept, where students work in small groups to learn certain parts of the material and then share information with other group members, it is hoped that students' understanding will increase. Through this process, students will support each other and help each other understand the material in greater depth. After the jigsaw lesson, reflect on understanding to see how far students have progressed in understanding the material. The results of this reflection can be in the form of self-evaluations or group discussions about their level of understanding after applying the jigsaw learning concept. With this reflection, lecturers can discover how far students have increased their understanding and overcome boredom and initial difficulties in understanding the material.

Modifying the jigsaw learning concept by adding visual aspects in the form of symbols or identities and carrying out the ice-breaking process significantly improves learning outcomes. By adding visual aspects, such as symbols or identities that can represent each group, students will be more involved and feel closer to their group. This can increase mutual trust and enthusiasm for collaboration. In addition, the symbol or identity also helps in identifying and distinguishing one group from another.

The ice-breaking process before starting jigsaw learning will help create a more relaxed and enjoyable atmosphere in class. Ice-breaking activities can help students get closer and get to know each other, making them more comfortable interacting and working in

groups. Thus, students become more open to sharing ideas and discussing learning materials.

The impact of this modification is increased interaction between students and a collaborative spirit in learning. Students will also feel more motivated to find group solutions and contribute actively to the learning process. Additionally, student learning outcomes will improve overall due to a supportive atmosphere, more effective interactions, and enthusiasm for understanding and mastering learning material.

The learning environment substantially impacts students' attention spans and academic performance. Students' interest, excitement, and productivity are increased when the classroom environment is supportive and enjoyable, as seen by the presence of a calm, cosy, and pleasant ambience [7]. The efficacy of students' learning is significantly influenced by external elements, including the environment's quality, classroom design, social interactions, supervision, air quality, noise levels, and environmental pollutants [22]. Students' learning and academic success can be influenced positively or negatively by factors including school open spaces, noise levels, lighting, and suitable colours.

An introduction to the Jigsaw Method for first-year education students can help them acquire effective techniques for learning integrated subjects and reduce conflict between students with a variety of learning styles [15]. Furthermore, it provides an increase in student scores, a better understanding of concepts, and active learning [14]. Symbols play an important role in children's understanding of group identity and can influence their perception of ingroup and outgroup symbols [23].

The ice-breaking process is the main key to melting the class atmosphere. Going around while singing and choosing groups at random makes students more enthusiastic and creates a special moment for them. Symbols play an important role in forming group identity and influencing the suggestions of group members, making them look more fanatical and feeling more united, so that when solving a problem, they will increase concern for the fate of the group.

The descriptive data analysis technique, quantitative by percentage, was utilized in this study. The data from the observation sheet is in the form of a rating scale, which is then analysed quantitatively in portions to determine the rate of learning outcomes scores in the PTA learning evaluation course. Based on the findings, it determines the extent to which the rise in learning outcomes in PTA learning evaluation lectures. This review focuses on cooperative learning outcomes is academic achievement by using Pre-test dan Post-test score. The following is questionnaire accusation based on pre-test and post-test scores that were correctly answered by students.

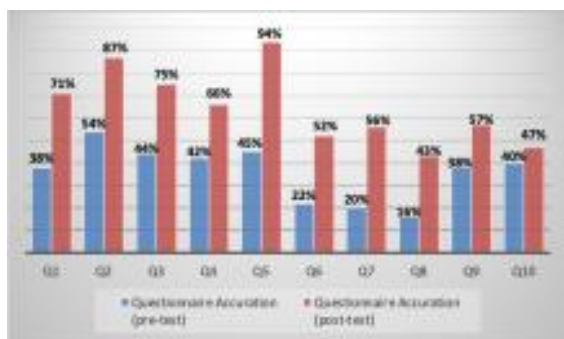


Figure 10. Different of Questionnaire Accuracy Pre-test and Post-test.

According to the Fig. 10, there is significant growth in each question. While the last question (question no. 10) has slightly increased as visualizes as the following chart is the deviation of the average percentage of improved learning outcomes in courses, pre-test and post-test scores that were correctly answered per question.

According to the Fig. 11, the average increase occurred in all questions significantly, except for the last few numbers, when there was a decline in the increase in the average accuracy of answers. The following graphical representation is obtained compared to the average data of all pretest and posttest results.

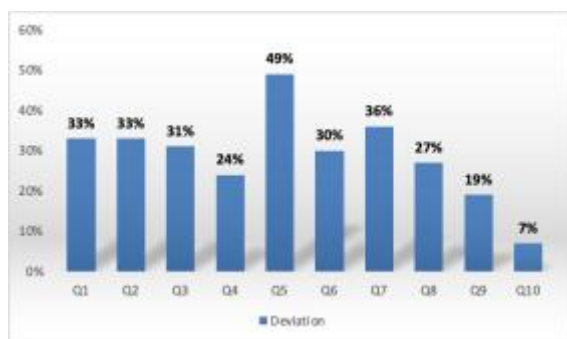


Figure 11. Average increase occurred in all questions.

Based on the Fig.12, the average value obtained pre-test 36.07 and post-test 66.01, an increase in value of 84.65% from the initial value or it can be said to have a difference of 29.94.

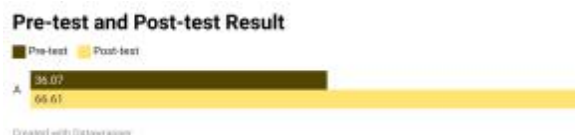


Figure 12. Pre-test and post-test result.

N-Gain Formula,

$$N\ Gain = \frac{Score\ Post\ test - Score\ Pre\ test}{Score\ Ideal - Score\ Pre\ test}$$

Calculation of N-gain, obtained 0.46 included in the medium category. A statistical test is calculated to determine the significance of the difference in scores between the pre-test and post-test, with the following results:

t-Test: Paired Two Sample for Means

	Variable 1	Variable 2
Mean	36.0714286	66.6071429
Variance	333.376623	382.824675
Observations	56	56
Pearson Correlation	0.29791385	
Hypothesized Mean Difference	0	
df	55	
t Stat	-10.1852	
P(T<=t) one-tail	1.4401E-14	
t Critical one-tail	1.67303397	
P(T<=t) two-tail	2.8802E-14	
t Critical two-tail	2.00404478	

Figure 13. Result of statistical test.

Based on statistical analysis, produce N-Gain Value is 0.46, which indicates a moderate increase, N-Gain (normalized gain) is used to measure the increase in cognitive learning outcomes between before and after learning. Formerly, from the t-Test: Paired Two Sample for Means test analysis, the obtained P-value (T<=t) two-tail <0,05 indicates a significant difference between the pre-test and post-test. Furthermore, the average of test results increased to a high degree, 84.65%, meaning that, despite the gain being in the moderate category, the jigsaw significantly increased the average of the cognitive test.

5. CONCLUSION

Jigsaw is a technique that promotes student respect and responsibility in the classroom through student contact and participation. Specific apply in undergraduate education, which rarely engages in activities that generate classroom debate, can be linked to the broader concept of a democratic class. Particular application in undergraduate education, which rarely participates in activities that stimulate classroom debate, might be connected to the more general idea of a democratic class. Jigsaw emphasizes that students providing insight and analysis deepens their experience and elevates their status as High-Order Thinking Skills (HOTS). The Jigsaw technique has proven to be a beneficial tool for improving the learning process and allowing pupils to participate in learning activities actively.

Furthermore, according to the results of the opinion scale exclusively applied to the jigsaw group at the end of the study, it was discovered that the jigsaw technique

generated a more effective learning environment in laboratory practices.

AUTHORS' CONTRIBUTIONS

(1) Nitih Indra Komala Dewi, Design research and research methodology, Collect data and conduct experiments, Analyse the data and interpret the results. (2) Johar Maknun: Contributed to research design and methodology, Writing certain parts of the paper manuscript. (3) Tuti Iriani: Contributed to research design and methodology, Writing certain parts of the paper manuscript. (4) Wahyu Buana Putra: Write the initial draft of the paper manuscript, Analyze the data and interpret the results, Compile paper manuscripts and make revisions. (5) Kunthi Herma Dwidayanti: Compile paper manuscripts and make revisions.

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