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Application of the Jigsaw Model to the Human Excretory System Material as an Effort to Improve Student Learning Activities

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Abstract: The use of less varied learning models is one of the factors that can affect student activity in the learning process, which can lead to low student learning outcomes. One of the steps taken to overcome this problem is to apply the jigsaw cooperative learning model. This study aims to evaluate student learning activities taught through the application of the jigsaw cooperative learning model on the human excretory system material. The results of data analysis on student learning activities at the first meeting showed an average percentage value of 75.37%, which is included in the active criteria. At the second meeting, the average percentage value of student learning activities increased to 84.7%, which is included in the very active criteria. From these data, it can be concluded that the application of the jigsaw cooperative learning model has a positive effect on increasing student learning activities on the human excretory system material at State Junior High School 3 Indrapuri.

Keywords: Jigsaw model, student learning activities, science learning.

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INTRODUCTION

Science learning is a science that focuses on the study of natural phenomena including living things and requires students to be able to develop competition, explore and understand the natural environment scientifically (Indriani, 2015; Lepiyanto, 2017; A. H. Lubis et al., 2021). Science learning can be done by applying methods, media and learning models that can help students achieve learning goals (Dewi et al., 2020; A. H. Lubis & Dasopang, 2021; Wicaksono et al., 2020). A learning model is a plan or pattern that is applied as a guideline in planning learning in class or a plan that can be used to design face-to-face teaching patterns in the classroom and to determine learning materials or devices (Khoimatun & Wilsa, 2021). A learning model is a conceptual pattern that is systematically structured in organizing learning experiences to achieve learning goals and functions as a guide for learning designers and teachers in carrying out learning activities (Darmadi, 2016; Dasopang et al., 2023).

The jigsaw type cooperative learning model is a cooperative learning model where all activities directly involve students (Slavin, 2015). Jigsaw cooperative learning is a learning model that encourages students to be active in learning and help each other master the subject matter to achieve good learning results, think critically, collaborate and help each other in their group.

Activities are all activities carried out in the teaching and learning process that produce behavior that can influence learning outcomes (Hastuti, 2019; Nurliza et al., 2024; Silvia et al., 2023). Learning activities are a process carried out by students that results in changes in behavior or skills in accordance with educational process standards (Wolfolk, 2016). Furthermore, Santrock (2011) explained that learning activities are activities that involve physical and mental aspects. The activities observed in this study were visual activities, oral activities, writing activities, mental activities, and emotional activities on the human excretory system material through the application of the jigsaw cooperative learning model.

Based on the results of observations conducted at State Junior High School 3 Indrapuri, it is known that teachers only use the lecture method in which students only listen and take notes on the material presented by the teacher. However, students are less active, rarely ask questions, and some students cannot answer questions given by the teacher because they do not understand the material presented.

Based on the results of interviews with science teachers at State Junior High School 3 Indrapuri, information was obtained that in the learning process, teachers apply several media such as visual media and audio-visual media, but when learning takes place, many students are not interested in learning, seen from student activity, responses and questions and answers in class and not a few students who are busy with their respective activities, do not respond when the teacher asks questions, this causes low student learning outcomes.

The use of learning models is very much needed by an educator in order to create a more creative learning atmosphere and can build students' enthusiasm for learning (Dasopang et al., 2022; Siraj et al., 2023). Students will participate in carrying out tasks, responsibilities, discussions and cooperation between students so that they can more easily understand and be able to solve problems in everyday life. One application of a learning model that can help students in realizing an achievement in learning is by using the Jigsaw Cooperative Learning Model. The Jigsaw Cooperative Learning Model is a cooperative learning model designed to increase students' sense of responsibility for their own learning and also for their group members. Students learn in small groups consisting of 4 to 5 students, each group member is responsible for studying one particular material given and delivering the material to other group members. The purpose of this study was to determine the effect of applying the Jigsaw cooperative learning model to increase student learning activities on the human excretory system material.

METHODS

The design in this study uses the Pre-experimental method. Pre-experimental design is an experimental research design that has the characteristics of the class as a research sample that is not taken randomly and the group used is only one class so that this research design does not have a control class.

This research was conducted at SMP Negeri 3 Indrapuri, Indrapuri District, Aceh Besar Regency in the Even Semester of the 2024 academic year. The population in this study were all students of SMP Negeri 3 Indrapuri. The sample in this study were students of SMP Negeri 3 Indrapuri class VIII totaling 25 students. The sampling technique in this study used the total sampling method, namely the number of samples is the same as the population.

The data collection instrument used in this study was an observation sheet of student learning activities which contained a description of the aspects assessed in the

learning process related to student activities and observed by 4 observers. This observation sheet aims to see student activity in the learning process by applying the jigsaw type cooperative learning model to the human excretory system material.

The data analysis technique in this study was Student Learning Activity Analysis. To obtain student learning activity data, it can be calculated using an observation sheet that includes all student activities that have been determined in the observation sheet. The observation data analysis technique used by the author uses the following formula:

$$P = \frac{F}{N} \times 100\%$$

Information:

- P = Frequency searched
- F = Frequency of each answer
- N = Number of research samples
- 100 = Constant number

Table 1. *Student Activity Data Processing Scale*

Score	Scale	Category
4	81-100%	Very Active
3	61-80%	Active
2	41-60%	Not active
1	0-40%	Very Inactive

RESULTS

This research was conducted at State Junior High School 3 Indrapuri with the aim of evaluating student learning activities related to the material of the human excretory system. Observation of student activities was carried out through observation sheets during the learning process that implemented the Jigsaw type cooperative learning model.

Student Learning Activities with Jigsaw Learning Model

Student learning activities can be seen and assessed while the learning process is being carried out. Observation and assessment of student learning activities are carried out by observing student activities observed by 4 observers which are carried out during two meetings. Student learning activities are assessed based on student activity in listening, paying attention (visual activities), writing (writing activities), speaking (oral activities), listening (listening activities), remembering (mental activities), and emotional activities or feelings of joy or courage in the learning process.

Table 2. *Student Learning Activity Data*

Indicator	P1 (%)	Criteria	P2 (%)	Criteria
<i>Visual activities</i>	75	A	79,68	A
<i>Oral activities</i>	73,95	A	83,3	SA
<i>Listening activities</i>	81,25	SA	82,55	SA
<i>Writing activities</i>	71,87	A	84,37	SA
<i>Mental activities</i>	75	A	87,5	SA
<i>Emotional activities</i>	75	A	90,6	SA
Total	452,07		508	
Average	75,37	A	84,7	SA

Based on the data from Table 2, it shows that the data on student learning activities at State Junior High School 3 Indrapuri related to the material on the human excretion system with the application of the jigsaw cooperative learning model obtained an average value of 75.37% in the first meeting with the criteria Active and 84.7% in the second meeting with the criteria very active. The visual activities indicator for the first meeting was 75% and the second meeting was 79.68%. This increase was due to student involvement in observing and paying attention to the material presented by the teacher and friends in the discussion group. The oral activities indicator for the first meeting showed an average percentage value of student activity of 73.95% with the criteria active. At the second meeting, the average value of student activity increased to 83.3%, which indicates a very active criterion. This increase occurred because students could discuss, ask questions, and express opinions during the learning process. The listening activity indicator showed that students obtained an average percentage value of 81.25% while at the second meeting it increased to 82.55% with the criteria very active. In this indicator, during the learning process, students have listened to the material and learning objectives delivered by the teacher, as well as listened to friends' opinions and presentations of group discussion results. The indicator of writing activities in the first meeting, students obtained an average percentage of 71.87% which then increased in the second meeting to 84.37% with the criteria of very active. The indicator of mental activities shows that in the first meeting, students obtained an average percentage of 75% and in the second meeting there was an increase to 87.5%, with the criteria of very active. The indicator of emotional activities in the first meeting obtained an average percentage of 75% which increased in the second meeting to 90.6% with the criteria of very active. A comparison of the average percentage of students' learning activities in the first and second meetings can be seen in Figure 1.

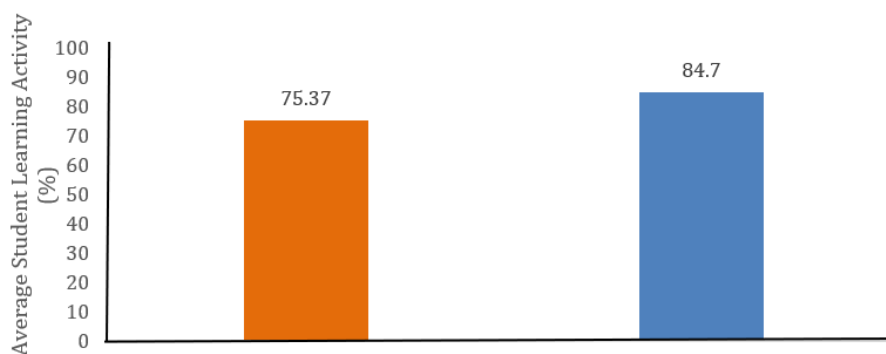


Figure 1. Student Learning Activity

Based on the graphic image above shows student learning activities through the application of the jigsaw cooperative learning model on the Human Excretory System material at State Junior High School 3 Indrapuri at the first meeting, student learning activities obtained a percentage value of 75.37% with active criteria and at the second meeting there was a significant increase with a percentage value of 84.7% which indicates very active criteria. This increase is due to high student involvement during the learning process, where they look active and follow every step of the learning process carried out.

DISCUSSION

The implementation of the jigsaw cooperative learning model is very effective. This model provides opportunities for students to participate more actively in the learning process and contributes to improving learning outcomes. At the first meeting, student learning activities obtained an average score of 75.37% which then increased at the second meeting to 80.4% indicating very active criteria. This is in accordance with research conducted by Febriani Ishak, which shows that the implementation of the jigsaw

cooperative learning model can increase student learning activities and encourage student involvement in group activities (Harefa et al., 2022). The increase in student learning activities is seen from the activeness of students in discussing, asking, and answering questions from friends. This is in accordance with research conducted by Nur Ainun Lubis and Hasrul Harahap showing that the jigsaw learning model is able to create interaction between group members. This has the potential to increase interaction between students, encourage active involvement, and strengthen a sense of responsibility for ongoing learning materials (Lubis, 2021). Visual activity indicators seen from student activities are student activities in reading and paying attention to the material presented (Susanto, 2012). The average value of visual activities in the first and second meetings is included in the active criteria with an average value of 75% and 79.68%. This is due to the attitude of students who pay attention to the presentation of material presented by other groups and read the material distributed during the learning process.

The oral activities indicator assessed by the observer is student activity in asking questions about material that is not yet understood, expressing opinions, and discussing with the group, both with the original group and with the expert group that has been distributed (Bungsu & Dafit, 2021; Lubis & Wangid, 2019). Student activity is very important to support student success in the learning process, both physically and mentally active, students can ask, answer and discuss (Yunita & Wijayanti, 2017). Listening activities are one of the students' abilities in receiving or a technique that can train students to listen, present and evaluate what is heard and students can actively strengthen cooperation and develop understanding (Mayasari et al., 2022).

The indicator of students' writing activities in writing the results of group discussions, working on assignments given by researchers at the first and second meetings obtained an average percentage value of 71.87% with active criteria and 84.37% with very active criteria. This writing or note-taking activity is carried out by students so that it can make it easier to complete discussion assignments, help students convey information to friends and answer questions given by friends. Writing skills are skills in communicating language into written form that can be understood by students to convey ideas, think and express opinions (Damayanti, 2023). The indicator of emotional activities is the emotional activities of students in the form of interest, pleasure or boredom, calm and joy. The application of the jigsaw type cooperative learning model to the human excretory system material shows the students' courageous attitude in discussing and being happy in the learning process. The indicator of students' mental activities plays an active role during the learning process. Students can complete assignments with group members who have been assigned. The average percentage value of mental activities obtained by students at the first and second meetings was 75% and 87.5%.

CONCLUSION

Based on the results of the research and data analysis, the jigsaw type cooperative learning model can improve the learning activities of class VIII students of SMP Negeri 3 Indrapuri with active criteria as evidenced by the analysis of observation data from the first meeting with an average percentage value of 75.37% active criteria and the second meeting 84.7% very active criteria. Furthermore, the jigsaw type cooperative learning model has a great influence on student learning activities. The implementation of this model in the excretory system material provides opportunities for students to express the skills they have and understand and develop their potential.

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