



## THE IMPLEMENTATION OF COOPERATIVE LEARNING MODEL TYPE JIGSAW TO IMPROVE THE UNDERSTANDING OF BIOLOGICAL CONCEPT OF STUDENTS IN CLASS XI IPA 3 SMA NEGERI 5 KENDARI

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### Abstract

This study aims to improve the understanding of biology concepts of students of class XI IPA 3 in SMA Negeri 5 Kendari by applying jigsaw type cooperative learning models. This research was conducted in the second semester of the academic year 2013/2014. This type of research was a classroom action research (PTK) Kemmis and Taggart with three learning cycles. Each cycle goes through four stages: (1) planning; (2) implementing actions; (3) observation and (4) reflection. The data source of this research was the measurement of students' worksheets as a test of understanding concepts in cycle I, cycle II and cycle III. The data obtained were analyzed using descriptive analysis. From the results of the study, it was found that students' understanding of biology concepts in the first cycle with a mean of 77.68%; the second cycle was 87.20% and the third cycle was 91.37%. It can be concluded that the implementation of the jigsaw cooperative learning model can improve the understanding of the biology concepts of students of class XI IPA 3 at SMA Negeri 5 Kendari.

**Keywords:** Jigsaw, Conceptual Understanding

### A. Introduction

The learning process is a process that contains a series of actions of teachers and students based on reciprocal relationships that take place in educational situations to achieve certain goals. Interaction or reciprocal relationship between teacher and students is the main requirement for the ongoing learning process. Interaction in the learning process has a broader meaning, not just the relationship between teachers and students, but in the form of educational interactions (Usman, 2003: 4).

The role and competence of teachers in the learning process one of them is as a learning planner. As a learning planner, a professional teacher is required to plan the learning process in order to create a comfortable atmosphere so that the students can develop their creativity in the

classroom by presenting the right learning model based on the characteristics of the learning material.

Based on preliminary observations at SMA Negeri 5 Kendari on 23 and 24 January 2014 by interviewing XI IPA 3 teachers, information was obtained that most students were still noisy, difficult to direct in discussions, and students lacked knowledge sharing with classmates. Besides, it was still found the implementation of learning models were not based on the learning material, as well as the lack of understanding of students' concepts of biology learning materials. This resulted in the low activity and understanding of students' biological concepts.

The solution to this problem is the implementation of learning strategies. Effective learning strategies can provide opportunities for students to empower their thinking skills (Safilu, 2010). One of the learning strategies that can increase the activity and understanding of students' biology concepts in biological science learning is the Jigsaw type cooperative learning model. According to Nurhaeni (2011: 1-10), Jigsaw type cooperative learning is intended so that students in the class have many opportunities to express opinions, process the information obtained, improve communication skills, take responsibility for the success of the group, convey to their group members about the material being learned so that can help students understand the concept of the lesson.

Jigsaw type learning models are designed to increase students' sense of responsibility towards the subject matter. Students not only learn the material given, but also teach the material to group members. Thus, students must work together cooperatively to learn the material assigned (Lie, 2002: 73).

Research conducted by Hunaningsih et al (2017) states that learning by applying the JIGSAW model can improve students' understanding of concepts because in this model students are required to be responsible for completing tasks that have been obtained and help each other group members to understand the results of the discussion. In this case, the Jigsaw type cooperative learning model is very important to be applied in biology science learning so that the understanding of biology concepts of Class XI IPA 3 students at SMA Negeri 5 Kendari can be improved.

## **B. Literature Review**

### *1. Conceptual Understanding*

Understanding the concept is the behavior of translating, interpreting, inferring or extrapolating concepts by using words or other symbols of their own choosing. Understanding the concept includes behavior that shows students in understanding certain concepts (Suparman, 2005: 80).

According to Anderson and Krathwohl (2001: 99-115), the dimensions of cognitive processes consist of several levels, namely: remembering, understanding, applying, analyzing, evaluating, and creating. Cognitive processes that are based on transfer skills and are emphasized in schools and colleges are understanding. Understanding is constructing the meaning of the learning material, including what is said, written, and drawn by the teacher. Students are said to understand if they can construct the meaning of learning messages, whether oral, written or graphical delivered through learning, books and computer screens.

Cognitive processes in the understanding category include the ability to interpret, model, classify, summarize, infer, and explain. Interpret occurs when students can change information from one form to another. Modeling occurs when students give examples of general concepts or principles. Classifying occurs when students know something, for example an example belongs to a certain category such as a concept. Summarizing occurs when students present a sentence that represents information received or abstracts a theme. Summing up includes the process of finding patterns in a number of examples. Comparing involves the process of detecting similarities and differences between two or more objects, events, ideas, problems and situations. Explaining takes place when students can create and use causal models in a system (Anderson and Krathwohl, 2001).

### *2. Cooperative Learning Model Type Jigsaw*

Jigsaw is a cooperative learning model designed to increase students' sense of responsibility for the material being studied. Students not only learn the material given, but they should also be prepared to teach the material to the group. In the jigsaw learning model, students are divided into small groups consisting of 3-5 people consisting of original groups and expert groups (Hamdani, 2017).

A certain number of members from different teams meet to discuss certain topics and help each other in carrying out the discussion of assigned learning topics, then the students return to their own team / group to explain about the material that has been studied and discussed together when meeting with a team of experts (Lie, 2002: 73).

Origin group is the main group of students consisting of students with diverse academic abilities, ethnic origin, and family backgrounds. The origin group is a combination of several experts. Expert groups are groups of students consisting of members of different origin groups who are assigned to study and explore a particular topic and complete tasks related to the topic to then be explained to members of the home/origin group (Rusman, 2008: 203).

According to Ibrahim (2000: 67), there are 5 steps in applying the Jigsaw cooperative learning model, namely:

#### *a. Preparation*

At this stage, the teacher prepares a learning plan by analyzing the material, creating a unit of learning program, a learning plan that is compatible with the Jigsaw type cooperative learning model. This application starts from the formation of groups based on sub topic/problem that must be solved. Besides heterogeneity criteria such as the level of intelligence, gender, and race are also considered.

#### *b. Group Activity*

In presenting the material the teacher explains various topics/problems to be discussed then students are assigned in groups to read various topics/problems that have been prepared by the teacher. Furthermore, members from different origin groups meet with expert groups to discuss the topics/problems given to each group member.

#### *c. Reporting*

After the discussion is finished, the members of the expert group return to the original group (origin) and try to explain to their group friends the results obtained through a meeting with the expert group.

#### *d. Provision of Concept Understanding Tests*

Students are given a concept understanding test in the form of a written test that is an essay test to measure students' understanding of the concept of the topic/problem they have learned

#### *e. Giving Gifts /Awards*

In this phase the teacher can give gifts/awards in the form of praise. This is important so that the group of students who have the highest score can maintain and groups of students who are still low scores have a high motivation to improve the score.

### **C. Methodology**

#### *1. Research Design*

This research was conducted in the second semester of the academic year 2013/2014 on the subject of human and animal excretion systems at SMA Negeri 5 Kendari. The subjects of this study were all students in class XI IPA 3 at SMA Negeri 5 Kendari with 42 students, consisting of 11 male students and 31 female students.

This type of research is classroom action research (CAR). Characteristics of CAR are cyclic actions to improve the learning process in the classroom. In this study carried out in three cycles, each cycle consisting of two meetings with the subject of human and animal excretion systems.

#### *2. Instruments*

The instruments used in this study were 7 number essay test instruments compiled based on the indicators of concept understanding, namely interpreting, modeling, classifying, summarizing, concluding, comparing, and explaining what was given at the end of each cycle to measure the understanding of biology concepts of class XI IPA3 students at SMA Negeri 5 Kendari.

#### *3. Technique of Data Analysis*

The data in this study were analyzed using descriptive statistical analysis to provide an overview of increased activity and students' understanding of biology concepts in the subject of human and animal excretion systems by applying the Jigsaw type cooperative learning model. The steps in analyzing learning activity data and students' understanding of biology concepts were as follows:

1. Data tabulation was made in the form of students' understanding of biology concepts through LKS 01, LKS 02, LKS 03, LKS 04, LKS 05 and LKS 06.
2. Tabulation of data regarding students' understanding of biology concepts tests on the subject of human and animal excretion systems conducted at the end of cycle III to measure the level of success in applying jigsaw type cooperative learning models.
3. The tabulated data were analyzed and then graphs were made to measure the success of students' understanding of biology concepts.
4. Students' understanding of biology concepts was measured using the following formula:  

$$\% \text{Conceptual understanding score} = \frac{\text{Total score}}{\text{Maximum score}} \times 100\%$$
 (Usman dan Setiawati, 2001:138).
5. The average of students' understanding of biology concepts were measured by the following formula:  

$$\bar{x} = \frac{\sum x}{n}$$
 Information:  
 $\bar{X}$  = The average value obtained by students  
 n = Total number of students  
 x = The value obtained by each student (Sudjana, 2008:49).
6. The distribution of students' understanding of concept values was adjusted based on the range of values in table 1.

**Table 1.** Range and Criteria of student grades

Range	Criteria
85-100	Very good
75-84	Good
60-74	Medium
45-59	Less
<45	Very less

Source : Hunaningsih, et al (2017)

## D. Findings and Discussion

### 1. Findings

The students' understanding of biology concept tests was carried out during the learning process using LKS 01 and LKS 02 questions in the form of a description. The results of the LKS analysis of students' understanding of biology concepts in the first cycle can be seen in Table 2.

**Table 2.** The results of LKS Assessment in Cycle I.

Origin group	Value
I	82.14
II	73.21
III	83.92
IV	76.78
V	66.07
VI	83.92
Total	466.07
Average (%)	77.68

Based on the LKS analysis, the average understanding of students' biology concepts in cycle I was 77.68%.

In this section discussions with observers I, II and III were conducted to sort out and see the shortcomings and successes of students so that they can be improved in cycle II. The learning process in the first cycle there were still shortcomings that need to be improved, including (1) the time allocation used was not based on the indicators and learning objectives to be achieved in the learning process, (2) students were not accustomed to group discussions with heterogeneous members, (3) students were still noisy and difficult to be directed when moving from the original group to the expert group and vice versa, (4) student learning

activities were lacking because there were some students busy with their own activities and interfere with group members.

Cycle II learning was carried out by paying attention to the reflection of cycle I namely (1) The teacher should design and implement learning activities in class between time allocation and indicators and also learning objectives to be more perfect and proportional, (2) The teacher should be more clever in organizing and coordinating students and provide students with understanding that the importance of collaboration to complete group assignments, (3) Teachers should be more skilled at guiding students in group work to complete their group assignments in an orderly manner, (4) Teachers should further enhance students learning activities so that they can understand the learning material delivered by teacher in order to improve students' understanding of biology concepts.

Students' understanding of biology concept tests was carried out when the learning process takes place using LKS 03 and LKS 04 arranged in the form of a description based on indicators of conceptual understanding. The results of the LKS analysis of students' understanding of concepts in the second cycle can be seen in Table 3.

**Table 3.** The results of LKS Assessment in Cycle II.

Origin group	Value
I	98.21
II	100
III	75
IV	69.64
V	96.42
VI	83.92
Total	523.21
Average (%)	87.20

Based on LKS analysis, it can be obtained that the average of students' understanding of biology concepts in the second cycle was 87.20%.

In this section discussions with observers I, II and III were conducted to sort out and see the shortcomings and successes of students so that they can be improved in cycle III. The learning process in the second cycle there were still shortcomings that need to be improved, including: (1) students were still preoccupied with unimportant stories in the expert group rather than answering questions already in the worksheet, (2) most students wait to record the answers without knowing the origin and accuracy of the answers from the expert group members so that the answers expressed in class discussions after returning to their original group tend to be the same, (3) the activeness of students in the expert group and the homegroup was still dominated by only a few students.

Cycle III learning was carried out by paying attention to the results of reflections from cycle II actions, namely: (1) The teacher should firmly reprimand and warn students to focus on the learning process in order to understand the learning material being discussed in the expert group, (2) The teacher should direct students to each other cooperate in working on the questions and formulating the answer LKS in their original groups. (3) The teacher should guide students to actively listen to conversations/group discussions, interruptions if there were still answers raised in the original group, solve problems and make decisions within the expert group and in the homegroup.

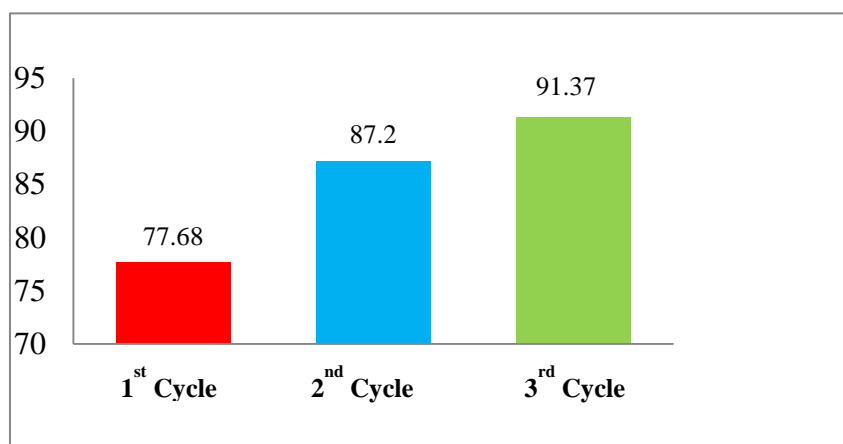
Students' understanding of biology concept tests was carried out when the learning process takes place using LKS 05 and LKS 06 which were arranged in the form of a description based on indicators of understanding biological concepts. The results of the LKS analysis of students' understanding of biology concepts in cycle III can be seen in Table 4.

**Table 4.** The results of LKS Assessment in Cycle III.

Origin Group	Value
I	94.64
II	94.64
III	92.85
IV	94.64
V	89.28
VI	82.14
Total	548.21
Average (%)	91.37

Based on LKS analysis, it can be obtained the average students' understanding of biology concepts in the third cycle of 91.37%.

A description of the mean students' understanding of biology concepts in cycles I, II and III can be seen in Figure 1.

**Figure 1.** Graphic Understanding of Biology Concepts for Students Cycle I, II and III

Based on Figure 1., students' understanding of biology concepts on the subject of human and animal excretion systems shows an increase from cycle I to cycle II of 9.52% while cycle II to cycle III has increased by 4.17%. This shows that the implementation of learning by applying the Jigsaw cooperative learning model can correct and cover up the deficiencies in the learning process in the classroom. This is evident with the increasing of students' understanding of biology concepts in cycle I, cycle II to cycle III.

## 2. Discussion

Based on the data analysis of students' understanding of biology concepts in LKS 01 and LKS 02, the first cycle obtained an average of 77.68%. This shows that students have understood the concept of biology on the subject of the human excretion system and animal learning material of the human excretion system which discusses the structure of the kidneys, processes in the kidney and things that affect human urine production. However, there were still shortcomings that must be corrected in cycle II.

This can be seen in one of the six origin groups where the score for students' understanding of biology concepts from the V group only scored 66.07. In the second position from the bottom, there was a group of origin II with a value of 73.21. Furthermore, the IV originating group occupies the third position with a value of 76.78. Followed by the origin group I with a value of 82.14. In the highest position occupied by two groups of origin namely origin groups III and VI with a value of 83.92 each. Thus the teacher should guide and coordinate students to cooperate in group discussions so that they were not dominated by certain groups. The teacher as a class manager should guide and direct students in solving LKS questions. This was following the teacher's assignment stated by Usman (2003: 10) that students continue to be guided and directed by teachers in learning activities but still provide opportunities for students to gradually reduce their dependence on teachers so that they can guide their activities to become accustomed to being independent.

The mean score on LKS 01 and LKS 02 indicators classify getting the lowest score which only reaches 2.23 with a percentage of 58.33%. This was because students have not been able to detect the characteristics or patterns by the examples and concepts of kidney structure, processes in the kidney and things that affect human urine production. This was according to Anderson and Krathwohl (2001: 109) where classifying occurs when students know something, for example, an example is included in certain categories such as concepts. So the teacher should provide more guidance to students in working on classifying LKS indicators so that the improvements can be made and improved in the second cycle.

Based on the mean of LKS 03 and LKS 04, it seems to have increased with a value of 87.20%. In the second cycle, each indicator of understanding the concept has increased quite significantly because students have begun to work well together even though they must continue to be guided and coordinated so that they remain focused on receiving lessons in class. Darsono (2000: 24) explains that the Jigsaw cooperative learning model is learning where students learn in groups and are responsible for mastering the learning material assigned to them and then teaching the material to other group members. So that the maximum value of each student affects the value of the original group.

The results of LKS analysis students' understanding of the concept of biology in cycle III increased very well with the mean of LKS 05 and LKS 06 of 91.37%. This is by the opinion of Isjoni (2007: 54) that the cooperative learning type Jigsaw is one type of cooperative learning that encourages students to be active and help each other in mastering subject matter to achieve maximum value.

Implementation of learning by applying the Jigsaw type of cooperative learning model could improve and cover up the deficiencies in the learning process in the classroom. This was empirically tested with research conducted by Indriwati (2010) where Jigsaw type cooperative learning could increase student learning activities. Besides, research conducted by Indriana (2014) concluded that Jigsaw cooperative learning could improve cognitive learning outcomes of students in the cognitive domain.

## E. Conclusion

The learning outcomes of biology students in class XI IPA3 at SMA Negeri 5 Kendari are taught by using a Jigsaw cooperative learning model with an average understanding of biology concepts for cycle I students of 77.68% and increased in cycle II to 87.20%, and cycle III continued to increase to 91.37%. Based on the results of the study, it can be suggested that the implementation of the Jigsaw type cooperative learning model has the potential to improve students' understanding of biology concepts on the subject of human and animal excretion systems.

## F. References

- Anderson, L.W & Krathwohl D.R.. (2001). *ATaxonomyForLearning,TeachingandAssessing (A Revision of Bloom's Taxonomy of Educational Objectives)*. New York: Addison Wesley Longman. Inc.
- Darsono, M. (2000). *Belajar dan Pembelajaran*. Semarang: IKIP Semarang Press.
- Hamdani. (2017). *Strategi Belajar Mengajar*, Bandung: Pustaka Setia.
- Hunaningsih, T.Y., Amirudin, & Juarti. (2018). Upaya Penerapan Model Pembelajaran JIGSAW Untuk Meningkatkan Pemahaman Konsep Geografi Pada Materi Dinamika Hidrosfer Kelas X.3 SMA Negeri 1 Kademangan Kabupaten Blitar. *Jurnal Pendidikan Geografi: Kajian, Teori, dan Praktik dalam Bidang Pendidikan dan Ilmu Geografi*. Tahun 23, Nomor 1, Hal 62-67.
- Ibrahim, M. (2000). *Pembelajaran Kooperatif*. Surabaya: Universitas Negeri Surabaya.
- Isjoni. (2007). *Cooperative Learning*. Bandung: Alfabeta.
- Lie, A. (2002). *Cooperative Learning (Mempraktikkan Cooperative Learning di Ruang-ruang Kelas)*. Jakarta: Grasindo.
- Nurhaeni. (2011). Penerapan Model Pembelajaran Kooperatif Tipe Jigsaw untuk Meningkatkan Pemahaman Siswa pada Konsep Listrik Siswa Kelas IX SMP Negeri 43 Bandung. Bandung: *Jurnal Penelitian Pendidikan*. Volume 12. Hlm 1-10, Universitas Pendidikan Indonesia.
- Rusman. (2008). *Model-Model Pembelajaran Mengembangkan Profesionalisme Guru*. Jakarta: Raja Grafindo Persada.
- Safilu. (2010). *Hakekat dan Strategi Pembelajaran Biologi untuk Memberdayakan Keterampilan Berpikir Siswa*. Abstr. Malang: Universitas Negeri Malang.

- Sudjana, N. (2008). *Penilaian Hasil Proses Belajar Mengajar*. Bandung: Tarsito.
- Suparman, M. A. (2005). *Desain Instruksional*. Jakarta: Depdiknas.
- Usman dan Setiawati. (2001). *Evaluasi Pembelajaran*. Jakarta: Rineka Cipta.
- Usman, U.M.(2003). *Menjadi Guru Profesional*. Bandung: Remaja Rosdakarya.