

# *Comparison of Jigsaw Cooperative Learning Models and One Stay and The Others Stray and the Beginning Ability Towards Biology Students Competency in Class XI of SMAN 3 Bukittinggi*

Fadillah Putri<sup>1\*</sup>, Syamsurizal<sup>2</sup>, Yuni Ahda<sup>3</sup>, Dwi Hilda Putri<sup>3</sup>

<sup>1</sup>Student of Master Degree Program of Biology Education, Faculty of Mathematic and Sciences, Universitas Negeri Padang, Indonesia

<sup>2</sup>Biology Department, Faculty of Mathematic and Sciences, Universitas Negeri Padang, Universitas Negeri Padang, Indonesia



**Abstract** - This research based on the problems in SMAN 3 Bukittinggi, low competencies of student caused by students being less active in the learning process. One effort that can be done in activating students is application of the *Jigsaw* cooperative learning model and the *One Stay and The Others Stray*. This research is a quasy-experimental research with a *2x2 factorial design* research for knowledge competencies and *The Static Group Comparison Design* for all competence of student. Instrument used was test of learning outcomes for the knowledge and non-tests for the attitudes and skills. Data analysis was used t-test, two-way ANOVA test, and Mann-Whitney U test. The average value of experimental class I (*Jigsaw*) is 82.60, while the experimental class II (*One Stay and The Others Stray*) is 86.98, the average value of attitude competency in the experimental class I is 85 and experiment II is 80, the average competency value of skill in experimental class I is 92 and the experimental class II is 94. So, the biology learning competencies of students using *one stay and the others stray* model can improve learning competence of students in class XI SMAN 3 Bukittinggi.

**Keyword** – Quasy Experiment; Jigsaw; One Stay and The Others Stray; Beginning Ability.

## I. INTRODUCTION

Education is important for the life of mankind. One of the ways and attempt to have faced rapid technological changes currently through education (Pratiwi, 2015). The purpose of education is to help students use knowledge in school to explain all phenomena in everyday life (Cagatay, 2013 ). Education is an effort to educate, develop and improve human resources. Human resources is the main asset in the face of developments in technology and science.

Biology is a science that presents a variety of learning experiences to understand the concepts and skills of science processes. Process of skills include observing, submitting questions, classifying and interpreting data and communicating them verbally or in writing and sorting out information and relevant tests to solve the problems that can found it everyday. The aim of bio- logics subjects according to

the Ministry of National Education (2006 ) is to form positive attitudes , foster scientific attitudes, develop experiences to ask questions, develop thinking skills and develop mastery of biological concepts.

The teacher is the spearhead in achieving an educational learning process. Teacher creativity greatly determines the learning competencies of their students. Agung (2010) said that the teacher's ability will result in the formation of student quality. If mastery of biology learning material is sufficient, but it is not supported by the teacher's ability to package learning, it will provide insufficient learning outcomes. Andriani (2013) revealed that one of the factors that led to low learning competencies is the learning model used which is still teacher-centered and lacks access for students to develop independently.

The way that teachers can package their learning so that it is not monotonous, boring and less attractive is to create a cooperative learning environment. The teacher can introduce cooperative learning as a learning method that allows students to continue and build their own knowledge and understanding by means of peer discussions and tutors (Azmin, 2016 ). Johnson (2008) in Van (2016 ) suggests that a cooperative learning environment involving students in it must have five elements in the classroom namely face-to-face interaction, individual accountability, interpersonal and social skills, positive interdependence, and group processing. Group processing can use the right learning model.

The right learning model can increase pleasure in learning, foster motivation in working on tasks that also allow students to achieve good learning competencies (Aunurrahman, 2009 ). Aunurrahman's opinion was also supported by Tarhan (2013 ) that the learning model increases understanding to understand the learning material and Zaduqisti (2014 ) which states that the learning model is able to make students active in learning, so learning becomes more valuable, meaningful and able to improve learning competencies possessed by students.

Achieving good learning competencies does not only depend on the ability of the teacher but also depends on the student's memory or input environment. If the environment and student input are good then the learning outcomes will also be good and if the environment and student input are low then the learning outcomes are not good (Huang, 2008 ).

Based on interviews of researchers with two biology teachers at SMAN 3 Bukittinggi , it is known that student learning competencies are still low, the causative factor of low biology learning competencies is learning dominated by teachers, lack of teacher interaction with students and students with students and lack of variations in learning models so students passive and less participating in the learning process. The results of the learning process prove that the learning outcomes are not as expected, as revealed that the semester 2 exam in grade XI 2017/2018 academic year is generally under the KKM, 76, the average student score as in Table 1.

Table 1. Value of Biology Semester 2 Exams of Class X I Students of SMAN 3 Bukittinggi 2017/2018 Academic Year

| Class   | Average Value | KKM | Students who meet the KKM (%) |
|---------|---------------|-----|-------------------------------|
| MIPA 1  | 65,13         | 76  | 23%                           |
| MIPA 2  | 61.26         | 76  | 17%                           |
| MIPA .3 | 66.36         | 76  | 30%                           |
| MIPA 4  | 54.65         | 76  | 6%                            |

|        |       |    |      |
|--------|-------|----|------|
| MIPA 5 | 78.37 | 76 | 80%  |
| MIPA 6 | 63.35 | 76 | 25%  |
| MIPA 7 | 80.30 | 76 | 84%  |
| MIPA 8 | 82.52 | 76 | 100% |

Source: Teacher of Biology Study in SMAN 3 Bukittinggi

Based on Table 1. the average value of students is still low. The results of observations of researchers in the realm of attitudes obtained an average value of attitudes of students that is 60.1 with the predicate C. The reason for the low level of student learning competency because students are less active in the learning process especially during discussions. At the time of discussion only a few students were actively, while other students did various kinds of activities during the discussion, such as chatting with group friends, working on other subject assignments, and disturbing friends in different groups.

The way that can be made to activate and improve student achievement in learning is using the cooperative learning model (Widodo, 2015). According to Lufri (2007), the cooperative learning model has the characteristics of a structure of tasks, goals and awards that are cooperative in nature. Kagan in Adam (2013 ) states that cooperative learning is a methodology that uses a variety of learning activities to improve students' understanding of the subject using a structured approach that involves a series of steps that require students to create, analyze and apply concepts.

Ghaith (2004 ) states that cooperative learning has instructional steps that are relatively easy to learn and implement. The application is that students achieve a goal they cooperate with, share knowledge and experience. Students work together in heterogeneous groups to complete learning material and at the end of the lesson are given appreciation in the form of appreciation. Van (2012) study that 62.5% of students like to work together and express positive attitudes towards learning and enjoy group spirit, making it easier to remember subject matter and more free in expressing opinions.

The learning model according to Roger and David in Lufri (2010) has many types including (1) *STAD* , (2) *Jigsaw* (3) *GI*, (4) *TPS*, (5) *NHT*, (6) *Two Stay Two Stray*, and (7) *Game Tournament Team* and others. Jhonsons (2005) in Trans (2014) also added a cooperative learning model namely joint learning techniques (LT) and Team Accelerated Instruction (TAI). Each cooperative learning model has its own characteristics, but its main purpose remains to increase students' creativity in solving problems and finding their own knowledge. Jhonson in Naomi (2013) suggests that students who undertake cooperative learning groups have higher

academic test scores, higher self-esteem, a greater number of positive social skills and a greater understanding of content and skills that they learned.

*Jigsaw* is a learning model that can enhance student activity in learning. Mari (2015) suggest that the model developed by Elliot aims to bring up cooperative ideas that are built by each individual and each individual will achieve his goal if other individuals achieve their goals as well. *Jigsaw* assigns students to collaborate in groups on material that has been separate into several parts. Student D. (2015) suggests that this strategy assigns students to small groups of various skill levels. Each group member has the responsibility to become an "Expert" one sub-section of the assigned material and then teach it to other members.

*Jigsaw* and *One Stay and The Others Stray* have something in common, having the same phase to move from one group to another group, both have groups that are experts in the material, and both provide responsibility to students to master a sub-material taught. The *Jigsaw* learning model with *One Stay and The Others Stray* has a difference, in *Jigsaw*, each group member has a different discussion while in *One Stay and The Others Stray* each group member has the same discussion. In the *Jigsaw* type, knowledge is extracted from a group of experts, while in *One Stay and The Others Stray*, knowledge is extracted from the group visited. In the *Jigsaw* learning model the switching phase is twice, whereas in the *One Stay and The Others* learning model the *Stray* phase moves 5 times, visiting from one group to another.

The researcher used a learning model *Jigsaw* and *One Stay and The Other Stray* cooperative learning to improve students' competence is still low, the researchers conducted the study by comparing *Jigsaw* cooperative learning model and *One Stay and The Others Stray* to know which is most effectively used, the difference with the previous study researchers used the initial ability tests to determine the students' initial ability. Students' initial abilities are abilities possessed by students before taking lessons. The teacher is very important to know the students' initial ability to determine the appropriate learning model or strategy. Therefore, the researchers conducted a study on "comparison of *Jigsaw* type cooperative learning models and *One Stay and The Others Stray* and the initial ability to learn biology competencies in Class XI SMAN 3 Bukittinggi."

## **II. REVIEW OF LITERATURE**

Learning is interaction with the environment to achieve a change, in accordance with the opinion of Slameto (2006), learning is a process of changing behavior which is the result

of interaction with the environment to meet the needs of life. Budiningsih (2005) mentions the definition of learning based on four theories, namely behavioristic theory which suggests that learning is a change in behavior, a theory of knowledge that emphasizes learning processes, humanistic theory that aims to humanize humans and cybernetics theory which states that learning is information management.

Learning is not a goal but a process to achieve a goal. Hamalik (2009) states that learning is a process that not only remembers and experiences. Learning competencies are useful for changing behavior not only for mastering the results of training. Evidence that someone has learned can be seen from changes in behavior, according to the opinion of Hamalik (2009) which suggest that behavior consists of several aspects, competence will appear in changes in every aspect. These aspects are knowledge, skills, character, and attitude.

Maonde (2015) suggest that learning is not only about intellectuals but also covers all aspects of student life, like knowledge, attitudes and good skills. If you have done learning activities you can see the changes in the aspects above. If there have been seen changes in this aspect, the individual has done the learning process. Lufri (2007) suggest, that learning is an effort to teach that refers to all efforts to make someone learn, and produce learning events in that person.

*Jigsaw* developed and tested by Aranson at the University of Texas and later adapted by Slavin at John Hopkins University (Lufri, 2010). *Jigsaw* in cooperative techniques has applications in various fields of science, language, social sciences and medical science that have led to different classroom practices based on their development (Karacop, 2017). *Jigsaw* was designed to increase students' responsibility for their own learning and the learning of others. Students are ready to teach it to other group members. This opinion is supported by Killic (2008) that *Jigsaw* can build students' communication skills in learning the assigned material. The members who have the same responsibility will gather together and discuss, this is referred to as the expert group, experts returned to the original group.

Students in *Jigsaw* cooperative learning learn in the original group consisted of 7 people were heterogeneous and is responsible for the completeness of the material part of the lessons learned then deliver material to other group members. Members of different teams with the same subtopics will meet at the expert team and discuss their material. This point facilitates the development of an independent learning process and a higher level of organization and at this stage each group

member is encouraged to develop subtopics. Students return to the original group and share the knowledge they get in the expert group. This stage aims to besides summarizing skills and presentations but also aims to collaborate in achieving the level of understanding of each member (Vargas, 2011 ).

The steps of the *Jigsaw* cooperative learning model are:

- students are divided into 5 groups, each group totaling 7 people
- each person in the team is given a different section and assignment
- each group member is responsible for studying the section
- members from other groups who have studied the same sub-section will meet in expert groups to discuss their material.
- after the expert group has a discussion, each member returns to the original group and explains to group members about the sub-chapters they have mastered
- each team presents the results of the discussion
- the teacher gives an evaluation at the end of the lesson
- closing

(Rusman, 2012 )

Modified cooperative learning model by Ristiono in 2010 from the *Two Stay Two Stray* model (Wati, 2012 ). The *Two Stay Two Stray* type cooperative learning model was developed by Spencer Kagan (1992). Cooperative model type One Stay and The Others *Stray* , students gather and discuss in groups of 7 people and members of heterogeneous groups. One person lives and the other members visit other groups. The task of one person who lives in a group is as a recipient of the guest and is obliged to provide work results to the group that visits the material discussed by the group. Visiting members are obliged to gather information from the groups visited and share the results of their discussions with the recipients and then return to their original groups and discuss the material they have obtained.

The steps taken in *One Stay and The Others Stray* by Sujosuseno (2011 ) are:

- students are divided into several (heterogeneous) groups of 7 people. Each group gets numbers 1 to 7.
- students collaborate in their groups, work together to learn the material shared with them.
- after completion, one person in the group will remain in the group as a source of information and the other members visit different groups to gather information from the group.

- visiting group members return to the original group to discuss what they have gotten from other groups.
- The teacher appoints a group that will present the results of the discussion.
- the teacher asks another group to give a response.
- the teacher gives an award in the form of a score to the group active in the discussion.
- conclusions is a closing activity and giving reading assignments at home for the preparation of learning in the next face to face.

### III. METHODOLOGY

Type of this research is an quasy-experiment. In the research students were divided into 2 classes, the experimental class 1 and the experimental class 2. The experimental class 1 used the *jigsaw* cooperative learning model and the experimental class 2 used the cooperative learning model *one stay and the others stray* . The experimental design used in this study is ( *Factorial Design* ) 2 x 2 that can be seen in Table 2.

Table 2. *Factorial Design* 2x2 for Knowledge Competencies

| Ability<br>Model Learning                              | High Initial<br>Capability<br>(B <sub>1</sub> ) | Low Initial<br>Capability<br>(B <sub>2</sub> ) |
|--------------------------------------------------------|-------------------------------------------------|------------------------------------------------|
| <i>Jigsaw</i> (A <sub>1</sub> )                        | A <sub>1</sub> B <sub>1</sub>                   | A <sub>1</sub> B <sub>2</sub>                  |
| <i>One Stay and The Others Stray</i> (A <sub>2</sub> ) | A <sub>2</sub> B <sub>1</sub>                   | A <sub>2</sub> B <sub>2</sub>                  |

Information :

A<sub>1</sub> B<sub>1</sub> = Learning competence uses the *Jigsaw* learning model for groups of students who have high initial abilities.

A<sub>1</sub> B<sub>2</sub> = Learning competence using the *Jigsaw* learning model for groups of students who have low initial abilities.

A<sub>2</sub> B<sub>1</sub> = Learning competence using the *One Stay and The Others Stray* learning model for groups of students who have high initial abilities.

A<sub>2</sub> B<sub>2</sub> = Learning competence using the *One Stay and The Others Stray* learning model for groups of students who have low initial abilities.

(Source: Lufri. 2017 )

The research design used the modified of *The Static Group Comparison Design*, because this research not use the control class. In this study students were grouped in two sample classes, the research shown in Table 3.



Table 3. Research Design *The Static Group Comparison Design*

| Class         | Treatment | Competence |
|---------------|-----------|------------|
| Experiment I  | X         | H          |
| Experiment II | Y         | H          |

Information :

X: Application of the *Jigsaw* type cooperative learning model

Y: Application of the *One Stay and The Others Stay* cooperative learning model

H: Learning competencies in experimental classes I and II

Source : Yusuf (2007 )

The population in this study is a class XI student of SMAN 3 Bukittinggi registered in 1<sup>st</sup> semester Academic Year in 2018/2019. The researcher took samples through a *purposive* technique *sampling* . The data used are primary data obtained of direct tests and observations during the students learn in class sample.

The instruments used in this study were through tests. Tests used in the form of tests and non-tests, written tests for the realm of knowledge, and non-tests for observation or observation sheets for the domain of attitudes and domains of skills and scoring rubrics. The observation sheet of the attitude and skills domain was filled by the observer.

#### IV. RESULT AND DISCUSSION

##### 4.1 Research Results

Overall, the biology learning competency data of students in the realm of knowledge after being given the treatment in the form of a *jigsaw* and *one stay* type cooperative learning model revealed information about the total score, highest score, lowest score and average for each class. The average student's biology learning competence in the experimental class 2 is higher than the experimental class 1, which is 82.60 and 86.98. The final test results given to the two sample classes showed that the highest scores were obtained by the experimental class 2 using the *one stay and the others stay* learning model compared to the experimental class 1 using the *jigsaw* learning model . These results indicate that the learning model of *one stay and the others stay* is better at improving student learning outcomes in the realm of knowledge.

The average biology learning competence of students with high initial abilities in the experimental class 2 is higher than the experimental class 1, namely 92.50 and 88.61. The final test results given to the two sample classes for high-competency real-world knowledge competencies showed that

the highest scores were obtained by the experimental class 2 using the *one stay and the others stay* learning model compared to the experimental class 1 using the *jigsaw* learning model . These results indicate that the learning model of *one stay and the others stay* in the realm of knowledge of high-ability students is better at improving student learning outcomes in the realm of knowledge.

The average biology learning competence of students with low initial abilities in the experimental class 2 is higher than the experimental class 1, which is 81.72 and 76.69. The final test results given to the two sample classes for low-competency real-world knowledge competencies showed that the highest scores were obtained by the experimental class 2 using the *one stay and the others stay* learning model compared to the experimental class 1 using the *jigsaw* learning model . These results indicate that the learning model of *one stay and the others stay* in the realm of knowledge of low-ability students is better at improving student learning outcomes in the realm of knowledge.

The value of the attitude competence of the experimental class 2 given treatment with *one stay and the others stay* model is higher, that is 90 compared to the average competency value of the attitude of the experimental class 1 students given treatment with the *jigsaw* model which is 85.

The value of the average skill competency of the experimental class 2 given treatment with *one stay and the others stay* model is higher, that is 94 compared to the average competency score of the experimental class 1 students who were treated with a *jigsaw* model. that is 92 .

##### 4.2 Testing Requirements for Analysis

The normality test on knowledge competency was carried out on the average basic competency tests of 3.6 and 3.7 competencies for students of experimental class 1 and experiment 2, while the values of attitudes and skills were carried out towards observations for eight meetings. The normality test was carried out using the *Kolmogorov-Smirnov* test with the help of *SPSS software* . The results of the normality test show that the real significance value of 0.05 is 0.980 for experimental class 1 and 0.193 for experimental class 2 which means that data is normally distributed.

The homogeneity test of the final test value of the two basic competencies of the experimental class 1 and experimental class 2 used the *Levene* test with the help of *SPSS 15 software* . The testing criteria were the testing criteria were accepted. The test criteria are accepted  $H_0$  if  $Sig > level$  ( $\alpha = 0.05$ ).  $H_{acyl}$  calculations show that the comp e tension

students' own knowledge domain padaa Sig. 0.416 so it can be concluded that the data is homogeneous.

The results of the calculation of the first hypothesis test, indicate that the realm of student competencies has Sig. at 0.02 with a real level ( $\alpha = 0.05$ ). This means that the value of Sig.  $< 0.05$  then  $H_0$  is rejected. Thus it can be concluded that student learning competencies in the realm of knowledge that follow the cooperative learning model of *one stay and the others stray* are better than students' learning competencies in the knowledge domain which follows the *jigsaw* cooperative learning model.

The results of the calculation of the second hypothesis show that the realm of competency in knowledge of early-capable students is high, indicating that the realm of student competencies has Sig. at 0.03 with a real level ( $\alpha = 0.05$ ). This means that the value of Sig.  $< 0.05$  then  $H_0$  is rejected. Thus it can be concluded that the learning competencies of high-ability students in the realm of knowledge that follow the cooperative learning model of *one stay and the others stray* are better than the learning competencies of high-ability students in the knowledge domain that follow the *jigsaw* type cooperative learning model.

The results of the calculation of the third hypothesis show that the realm of competency in the knowledge of early-capable students is low, indicating that the realm of student competencies has Sig. equal to 0.00 with a real level ( $\alpha = 0.05$ ). This means niai Sig. equal to 0.00 with a real level ( $\alpha = 0.05$ ). This means that the value of Sig.  $< 0.05$  then  $H_0$  is rejected. Thus it can be concluded that the learning competencies of low-ability students in the realm of knowledge that follow the cooperative learning model of *one stay and the others stray* are better than the learning competencies of low-ability students in the knowledge domain that follow the *jigsaw* cooperative learning model.

The results of the calculation from fourth hypothesis test indicate that Sig  $< 0.05$  which is 0.00 obtained from the results of the analysis using SPSS. This result shows that learning using *one stay and the others stray* type cooperative learning model is better than the cooperative *jigsaw* model.

The results of the calculation of the hypothesis five, test indicate that Sig  $< 0.05$  which is 0.01 obtained from the results of the analysis using SPSS. Thus it can be concluded that the domain of competency in learning skills follows a type cooperative model *one stay and the others stray* is better than the learning competencies in the attitude domain of students who take *jigsaw* learning.

Based on the results of 2-way ANOVA test calculation, the value of F count = 0.521 with 0.473 significance, because Sig.  $> 0.05$  then  $H_0$  is accepted, this means there is no interaction between learning model with initial capabilities to the achievement of learning competencies biology.

### 4.3 Discussion

The learning process is the overall development process of interaction and learning experience. The learning process is not only determined by the teacher but also is determined by the students themselves which is called by teaching students (Sanjaya, 2009: 214). Realizing the importance of involving students, research has been carried out that uses a learning model that can generate student activity by applying the *jigsaw* cooperative learning model and *one stay and the others stray*.

In experiment class 1, XI IPA<sub>1</sub> using a *jigsaw* learning model and experimental class 2 namely XI IPA<sub>2</sub> using a *one stay and the others stray* learning model. This aims to see a learning model that is better in improving student competence.

#### 4.3.1 Achievement of Knowledge Learning Competencies

The results showed that knowledge learning competencies increased by using the *one stay and the others stray* cooperative learning model in experimental class 2 compared to using the *jigsaw* cooperative learning model in the experimental class 1.

The application of a cooperative model of *one stay and the others stray*, students consisting of 7 people in 1 group with different abilities discuss subtpoik given to their group, then 1 person will stay in the group while the other members come to other groups, groups that visit know what the reception group has discussed, and the visiting group also explains what their base group has discussed to the receptionist. This is in line with the research conducted by Surjosuseno (2011) which suggest that visiting groups will look for other group signs or find out what the reception group has done, then they also explain what they have discussed in their home group.

The teacher in the *One stay and The Others Stray* study only functions as a facilitator and motivator. The teacher facilitates students with LKPD and motivates students by giving attention to students when they study, building students' confidence to achieve the highest score. Furthermore Jacob et al. (1996) confirm that using cooperative learning techniques will make students continue to use good strategies to answer questions, make questions and summarize. *One Stay and The Others Stray* is fully student-centered, not only teachers who can speak and explain in front of students, but students have

the opportunity to speak and explain in front of their friends too.

*One Stay and The Others Stray* techniques, students will have the opportunity to share answers, throw questions at each other, apply their knowledge and get feedback from group members as they socialize in groups. Study and learning like this will build students' confidence as they gain the trust of their group. In accordance with the opinion of Surjosuseno (2011) that techniques strongly recommend and are worth considering for use in experimental groups which hopefully can improve student achievement. *One Stay and The Others Stray* has other advantages, this learning model does not depend on the number of group members, at least 2 members in the group. So, when in one group only a few people can attend, the learning model can continue.

The results of the testing of the first hypothesis showed that overall, the realm of learning competency in the knowledge of experimental class 2 students who applied the *one stay and the others stray* learning model was significantly better than the experimental class 1 using the *jigsaw* learning model. The average value of the experimental class 2 is 86.98 and the experimental class 1 with the *jigsaw* model is 82.60. The high acquisition of the average learning competency value of the experimental class 2 students compared to the experimental class 1 was due to the treatment given, namely using the *one stay and the others stray* learning model. *One stay and the others stray* learning model can influence student competency knowledge. The success of cooperative learning *one stay and the others stray* is supported by a learning atmosphere that fulfills four elements as stated by Lie (2008) who say that to achieve maximum results there must be four elements in the cooperative learning model, namely; (1) positive interdependence, (2) individual responsibility, (3) face to face, (4) communication between members. In line with the opinion of Katinah (2014) which states that *one stay and the others stray* can improve the ability of the average student.

Cooperative learning *one stay and the others stray*, the teacher creates an atmosphere that encourages students to feel mutually needed and comfortable in sharing their knowledge. Nurhadi (2004) suggest that mutually needed relationships are called positive dependence. Positive dependence requires interaction that allows students to work together, interact with each other and give opportunities to ask questions or respond to each other, and motivate each other to achieve optimal results.

Lie (2008) said that interdependence can be achieved through the interdependence of achieving goals,

interdependence completing tasks, interdependence of materials or sources, interdependence of roles, and interdependence of gifts.

Curiosity of students in a problem will trigger the desire of students to learn and understand the concept to find solutions to the problem solving. Group discussion is a means for students to be active in learning and find concepts in learning.

In the experimental class 1 which uses the *jigsaw* learning model has lower knowledge domain competencies than the experimental class 2 because in the experimental class 1 student is involved in the discussion but is not as active as the experimental class 2. During discussions in expert groups, only 1 or 2 people discuss in groups while other members just copy the results of their friends' discussions. Other members chat with members of adjacent groups. As for other groups that the researchers saw in the expert group each member was busy with their respective LKPD. When returning to their original group, they only read the results they copied in the expert group, students did not explain the material they got in the expert group to the theme but read it out.

In this experimental class 1, more time is needed than in experiment class 2, they are long to discuss in the original group after their return from the expert group. This is because the original group consists of students of different abilities, when low ability students return to the compulsory school as long as they find it difficult to explain to friends in their original group about the material that has been obtained in the expert group. In line with the findings of Surjosuseno (2011) that *Jigsaw* requires more time than *One Stay and The Others Stray*.

The learning process in the two experimental classes has significant differences in the realm of knowledge. The results of testing the hypothesis that the acquisition of experimental class values using the *one stay and the others stray* learning model compared to the experimental class 1 using the *jigsaw* learning model.

Based on the analysis of students' competency knowledge on biology subjects obtained through hypothesis testing, it can be concluded that  $H_1$  is accepted, at the 0.05 significance level. This means that the learning competencies of the students' knowledge that follow the cooperative learning model of the type of *stay and the others strays* are better at improving the competency of the students' knowledge than those who follow the learning using the *jigsaw* learning model.

The initial ability of students in the learning process has an influence on the realm of student knowledge. Realizing good

learning in one class according to Harjanto (2006 ) by grouping students based on ability so that the teacher can know the initial abilities of students before learning takes place. The *jigsaw* learning model and the *one stay and the others stay* influence the initial ability of high students, *one stay and the others stay* have a higher knowledge ability compared to *jigsaw* . This is due to *one stay and the others stay* students are more active in contributing in solving problems, helping each other and collaborating between students. Communication of students is better in the learning process and is responsible individually and in groups. In the *jigsaw* class high-ability students are not very active because of the lack of collaboration between communication groups and the responsibility between groups is not good so the learning objectives are not achieved.

The learning process for students with low initial abilities shows that classes that use *one stay and the others stays* have higher learning outcomes compared to the low initial ability of students who use the *jigsaw* learning model . The *one stay and the other stay* classes are also more active than the *jigsaw* class low-ability students . This was seen when low-ability students in the *one stay and the others stay class* helped solve problems in group discussions, while those with low ability in the *jigsaw* class it is difficult to communicate what they have got in the expert group, because when they are in the group of experts they rely more on friends who have higher abilities. The competency of the knowledge domain of students with high initial abilities and low initial abilities has an influence on the learning competencies of the student's knowledge area.

#### **4.3.2 Achievement of Attitude Learning Competencies**

The results of the hypothesis testing of the realm of competency observation of student attitudes were carried out by the observer, in the experimental class 1 using the *one stay and the others stay* learning model better than the realm competency of the experimental class 1 students using the *jigsaw* learning model .

The learning process of the experimental class using cooperative learning models *one stay and the others stay* seen students honest, responsibility, discipline and careful in exploring curiosity and the cooperation of students who are disciplined and responsible in completing group tasks, students look responsible and serious -really in solving problems, and socializing with each other in discussion activities and for the success of their groups (Sagala and Djulia, 2016).

Students 'positive attitudes and attitudes during the learning process make students also motivated to learn so that

the competence of students' attitudes increases. Activities in the *jigsaw* class and the *one stay and the others stay class* began with apperception by the teacher. Students will then listen to instructions from the teacher. This stage is very important because if students do not listen instruction is good so during the discussion students will be confused because the two learning models have many steps that must be followed by students. The teacher uses LKPD learning media to assist in the presentation of material. The group learning stage, responsibility and meticulous attitude are seen when students can complete the tasks contained in the LKPD on time. The attitude of responsibility is also seen when group members share the material they have obtained and learn from other groups to their group members. Emotional environment affects learning conditions such as individual motivation, accuracy of duties and responsibilities (Har janto.2010 ).

Model *one stay and the others stay* has a level of discussion and cooperation are high and the responsibilities of both individuals and groups in the discussion. At the stage of presenting the results of the discussion, the groups that appear will be randomly selected by using lots and presenting the results of their group work in front of the class, at this stage the attitude of responsibility and curiosity can still be observed in each student. Curiosity is seen from the questions that are submitted to the group presentation or additional opinions from other groups. In line with the opinion of Efendi, et al. (2016) which states that the application of cooperative learning models not only interacts within groups but also builds interactions between groups.

*One stay and the others stay* model designed to improve thinking skills through the learning process in the form of feedback given by students. Each group will visit other groups and explore information in depth from the groups they visit. Groups that present in front of the class will be responsible for maintaining the opinions of their groups by giving also who are faithful and appropriate to other groups. Groups that do not appear with great curiosity give questions to the groups that appear. In line with the opinion of Henandez, et al. (2015), states that science is a combination of developing related knowledge, attitudes, skills and knowledge, students need to carry out investigations, problem solving, and decision-making abilities, to become lifelong learners and to maintain a sense of wonder about the world around them.

The attitude domain competencies using the *Whitney –U Man* test showed that  $H_0$  was rejected, namely students given using the *one stay and the others stay* learning model were higher than the *jigsaw* learning model .



#### 4.3.3 Achievement of Learning Skills Competency

The results of testing the skills competency hypothesis using the *one stay and the others stray* cooperative learning model are better than the experimental class using the jigsaw learning model, this is evidenced by the average score of the experimental class 2 skills, namely 94 and experimental class 1, 92 The observation of the realm of student competency is done by the observer, the realm competence of students in the experimental class 1 has very good criteria for 12 students, 22 for the good criteria, and 2 for sufficient criteria, while the experimental class 2 is very good, 20 students and 16 students with good criteria.

Experimental class 1 and experimental class 2 when practicum takes place follows the practical steps in the LKPD provided. Students are very enthusiastic in practical activities and record the results of the lab. They are very interested in practicum and there are direct tools that they can use because practicum is quite rare and often passed because of time constraints. Safitri et al. (2015) also said that the aspects used in the assessment of the skills domain were aspects of the use of tools with indicators of device coupling, tool operation, and data retrieval.

Skills assessment was also supported by the learning process used, in cooperative learning models of the type in *one stay and the others stray* increased according to those encountered in the field. This is proven through indicators filled in observers during the learning process. The high acquisition of skills domain has a positive impact on students, because students are required to be skilled in communication and play an active role in discussions so that at the end of the problem solving students can deduce the truth revealed by students and the reinforcement given by the teacher. Discussions and observations in groups make students active in speaking.

Learning models that focus on group division make students more active in discussions, students have capital in learning and high self-confidence so that when presenting discussions students play an active role and students' communication skills are better. Group discussions make students more often talk, ask, and engage directly in learning compared to teacher-centered learning (*teacher center*).

The explanation reveals that learning with the use of *one stay and the others stray* model can improve student learning competencies. The conclusion of this competency skill is that the learning competencies of students in class *one stay and the others stray* there are differences.

#### 4.3.4 Interaction of Learning Models with Early Student Knowledge

The results of the two-way ANOVA calculation for testing the interaction hypothesis between the learning model and the students' initial abilities can be concluded that there is no interaction between the learning model and the initial ability towards the realm of student knowledge. The curve of the 2-way Anova test results increase but do not cross each other so that the formed curve is known to have no interaction between the initial ability learning model, according to Sugiyono (2012) statement that if the curves intersect then there is interaction, if the curve rises but do not cross each other, there is no contraction, and if the curve is horizontal then there is no reaction and no learning model or not, does not affect the initial ability.

The main factor that can improve the competency of students' knowledge in biology is not the initial ability but the application of a cooperative learning model *one stay and the others stray*. Changes in student learning outcomes are evidence, both overall and viewed from each of the initial knowledge. When the learning process takes place, students are able to solve problems and relate them to the correct concepts. Students discuss with group friends, express opinions and correct friends' answers. There are differences in the use of time needed by students who have high initial abilities with students who have low initial abilities, students who have lower initial abilities tend to need longer time in discussion.

The ability of students in the *Jigsaw* class as well as the *One Stay class and The Others Stray* increases but there is no contraction with initial abilities. There is no interaction between the learning model and the initial ability to learn due to the following things; (1) Teachers are able to plan learning well, (2) cooperative learning model of *one stay and the other stray* involving all students with high initial abilities or low initial abilities in the learning process seen in group collaboration, expressing opinions and presenting the results of discussion, (3 ) Cooperative learning model *one stay and the others stray* can provide a meaningful learning experience and activate all the sensory tools of students in the learning process.

The cooperative learning model of the type of *one stay and the others stray* carried out is able to improve students' biology learning competencies so that it can be used as an appropriate strategy in the learning process to see students' initial abilities. Along de nga opinions Sadirman (2006 ) that the initial ability

of students is important to know the teachers in order to provide appropriate learning models.

## V. CONCLUSION

Student learning competencies in the realm of knowledge, attitudes and skills that follow the cooperative learning model *one stay and the others stray*, are significantly better than the students who follow the *jigsaw* cooperative learning model. There is no interaction between the learning model and the students' initial ability to influence learning competencies in the student's knowledge.

## REFERENCE

- [1] Adams, F. H. (2013). Using jigsaw technique as an effective way of promoting co-operative learning among primary six pupils in Fijai. *International Journal of Education and Practice*, 1(6), 64-74.
- [2] Andriani, D. G., & Kusmayadi, T. A. (2013). Eksperimentasi Model Pembelajaran Kooperatif Tipe Jigsaw II dan Think Pair Share Ditinjau dari Kecerdasan Emosional Siswa SMP Se-Kota Kediri Tahun Pelajaran 2012/2013. *Jurnal Pembelajaran Matematika*, 1(7).Vol.1, No.7,hal 651-660, Desember 2013
- [3] Agung, I. 2010. *Belajar dan Pembelajaran*. Bandung: Alfabeta.
- [4] Aunurrahman. 2009. *Belajar dan Pembelajaran*. Bandung: Alfabeta.
- [5] Azmin, N. H. (2016). Effect of the Jigsaw-Based Cooperative Learning Method on Student Performance in the General Certificate of Education Advanced-Level Psychology: An Exploratory Brunei Case Study. *International Education Studies*, 9(1), 91-106.
- [6] Budiningsih, A. 2005. *Belajar dan Pembelajaran*. Jakarta: Rineka Cipta.
- [7] Cagatay, G., & Demircioğlu, G. (2013). The Effect Of Jigsaw-I Cooperative Learning Technique On Students' Understanding About Basic Organic Chemistry Concepts. *International Journal of Educational Researchers*, 4(2), 30-37.
- [8] Depdiknas .2006. *Pedoman Penyusunan Kurikulum Tingkat Satuan Pendidikan*. Jakarta :Depdiknas.
- [9] Efendi, Augusta, Budi,dan utami Widiati. 2016. The Implementation of Cooperative Learning Model TSTS and carousel Feedback to Enhance Motivation and Learning Outcome for Social Studies. *IOSR Journal of Research & Method in Education (IOSR-JMRE)*.Vol.6
- [10] Ghaith, G., & El-Malak, M. A. 2004. Effect of Jigsaw II on literal and higher order EFL reading comprehension. *International Journal Educational Research and Evaluation*, 10(2), 105-115.
- [11] Hamalik, O. 2009. *Proses Belajar Mengajar*. Jakarta : Bumi Aksara.
- [12] Harjanto. 2006. *Perencanaan Pembelajaran*. Jakarta: Rineka Cipta.
- [13] \_\_\_\_\_. 2010. *Perencanaan Pengajaran: Komponen MKDK Materi Disesuaikan dengan Silabi Kurikulum Nasional IAIN*. Jakarta: Rineka Cipta.
- [14] Huang, Y. M., H, T. C., & Hsieh, M. Y. 2008. Using annotation services in a ubiquitous Jigsaw cooperative learning environment. *International Journal of Educational Technology & Society*, 11(2).
- [15] Jacob, G.M., Gan, S.L., & Ball, J. 1996. *Learning Cooperative Learning Via Cooperative Learning: A Sourcebook of Lesson Plans for Teacher Education On Cooperative Learning*. Singapore. SEAMEO Regional Language Centre.
- [16] Karacop, A. 2017 . The Effects of Using Jigsaw Method Based on Cooperative Learning Model in the Undergraduate Science Laboratory Practices. *Universal Journal of Educational Research*, 5(3), 420-434.
- [17] Kartinah, S. Si., M. Pd.,Maya Rini, R., Si, S., Si, M., & Prasetyowati, D. *One Stay-The Rest Stray to Improve Communication Skills Mathematics Students of Mathematical Teacher Training Institute PGRI Semarang Course in Linear Algebra 2*.
- [18] Kilic, D. 2008. The effect of the Jigsaw technique on learning the concepts of the principles and methods of teaching. *International Journal,World applied sciences journal*, 4(1), 109-114.
- [19] Lie,A. 2008. *Cooperatif Learning Mempraktekkan Cooperatif Learning di Ruang-ruang Kelas*. Jakarta : Grafindo.
- [20] Lufri. 2007. *Strategi Pembelajaran Biologi*. Padang: UNP Press.
- [21] \_\_\_\_\_. 2010. *Strategi Pembelajaran Biologi*. Padang: UNP Press.
- [22] \_\_\_\_ dan Ardi .2017. *Metodologi Penelitian*. Pafang. UNP Press.
- [23] Maonde, F., Bey, A., Salam, M., Suhar, L., Anggo, M., Rahim, U., & Tiya, K. (2015). The Discrepancy of Students' Mathematic Achievement through Cooperative Learning Model, and the ability in mastering Languages and Science. *International Journal of Education and Research*, 3(1), 141-158
- [24] Mari, J. S., & Gumel, S. A. (2015). Effects of jigsaw model of cooperative learning on self-efficacy and achievement in chemistry among concrete and formal

- reasoners in colleges of education in Nigeria. *International Journal of Information and Education Technology*, 5(3), 196.
- [25] Naomi, M. W., & Githua, B. N. (2013). Effects of jigsaw cooperative learning strategy on students' achievement in secondary school mathematics in Likipia, East District, Kenya. *Science, Asian journal of Management Science and Education*, 2(3), 177-188.
- [26] Nurhadi. 2003. *Pendekatan Kontekstual (Contextual Teaching and Learning)*. Jakarta. Depdiknas.
- [27] Pratiwi, A. N. W., Budiyo, B., & Sujadi, I. (2015). Eksperimentasi Model Pembelajaran Kooperatif Tipe Jigsaw Dengan Guide Note Taking (Gnt) Pada Materi Bangun Ruang Sisi Datar Ditinjau Dari Kemampuan Penalaran Siswa Kelas VIII SMP Negeri Di Kota Surakarta Tahun Ajaran 2013/2014. *Jurnal Pembelajaran Matematika*, 3(2).
- [28] Rusman. 2012. *Model-model Pembelajaran Mengembangkan Profesionalisme Guru*. Jakarta: Raja Grafindo Persada.
- [29] Sadirman. 2006. *Interaksi dan Motivasi Belajar Mengajar*. Bandung : Alfabeta.
- [30] Sagala, R., dan Djulia, E. 2016. "Pengaruh Model Kooperatif Tipe Think Pair Share berbantuan Video Pembelajaran terhadap Hasil Belajar dan Sikap Siswa pada Materi Sistem Reproduksi Pada Manusia di Kelas XI IPA SMA Katolik 1 Kabanjahe". *Jurnal Pelita Pendidikan*, 4(2):61-67.
- [31] Safitri, A.D, Rusilowati dan Sumarno. 2015. Pengembangan Bahan Ajar IPA Terpadu Berbasis Literasi Sains Bertema Gelaja Alam. *Unnes Physics Education Journal*. Vol. 4.
- [32] Slameto. 2006. *Belajar dan Faktor Faktor yang Mempengaruhinya*. Jakarta: Rineka Cipta.
- [33] Student, D. (2015). Effects Of Jigsaw Co-Operative Teaching/Learning Strategy And School Location On Students Achievement And Attitude Towards Biology In Secondary School In Delta State Juweto Ga B. Sc (Ed), *International Journal of Education and Research*, 3 (8), 33.
- [34] Sugiyono. 2012. *Statistik untuk Penelitian*. Bandung : Alfabeta.
- [35] Surjosuseno, T. T. (2011). *The Effects Of "One Stays The Rest Stray" And "Lockstep" Techniques On The Enhancement Of Students' reading Achievements*. *Indonesian Journal of Applied Linguistics*, 1(1), 129-146.
- [36] Tarhan, L., Ayyıldız, Y., Ogunc, A., & Sesen, B. A. (2013). A jigsaw cooperative learning application in elementary science and technology lessons: physical and chemical changes. *Research in Science & Technological Education*, 31(2), 184-203.
- [37] Van. D. (2012). The effects of jigsaw learning on students' attitudes in a Vietnamese higher education classroom. *International Journal of Higher Education*, 1(2), 9.
- [38] \_\_\_\_\_. (2016). The effects of jigsaw learning on students' knowledge retention in Vietnamese higher education. *International Journal of Higher Education*, 5(2), 236.
- [39] Vargas-Vargas, M., Mondejar-Jimenez, J., Santamaría, M. L. M., Alfaro-Navarro, J. L., & Fernandez-Aviles, G. 2011. Cooperative Learning In Virtual Environments: The Jigsaw Method In Statistical Courses. *Journal of International Education Research*, 7(5), 1.
- [40] Wati, Widia. 2012. *Studi Perbandingan Kompetensi belajar Biologi Siswa yang Menggunakan Modul Dalam Model Pembelajaran Kooperatif Tipe One Stay And The Others Stray Dengan Tipe Jigsaw Pada Kelas XI SMA N 1 Batusangkar Tahun Pelajaran 2011/2012*. Skripsi. Padang. Universitas Negeri Padang.
- [41] Widodo, W., Sujadi, I., & Riyadi, R. (2015). Eksperimentasi Model Pembelajaran Kooperatif Tipe Jigsaw Dengan Guided Discovery Learning Pada Materi Bangun Ruang Sisi Datar Ditinjau Dari Locus of Control. *Jurnal Pembelajaran Matematika*, 3(3).
- [42] Yusuf, A. Muri. 2007. *Metode Penelitian*. Padang: UNP Press.
- [43] Zaduqisti, E. (2014). Problem-Based Learning (Konsep Ideal Model Pembelajaran Untuk Peningkatan Prestasi Belajar Dan Motivasi Berprestasi). *Edukasia Islamika*, 8(2).