Enhancing Biology Students Motivation Through Classroom Action Research Based STAD Learning Model

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Article History	Abstract
	This study was conducted to determine the effectiveness of Student Teams Achievement Divisions (STAD) learning models in Biology subjects in improving student learning motivation. This research is a classroom action research conducted in 2 cycles, each cycle consists of four stages consisting of action planning, action implementation, observation, and reflection. The research subjects were students of class XI IPA 2 Malang State Senior High School 6, totaling 37 people consisting of 10 male students and 27 female students. The study was carried out for 4 months, in the nervous system material (structure, function, impulse delivery principle, reflex motion, nervous system composition, nervous system in animals and the influence of drugs on the nervous system) as well as material about the hormone system (hormonal characteristics, neural and hormonal relationships, endocrine glands, vertebrate hormones, and invertebrate hormones). Learning motivation data is obtained by comparing the motivation score of cycle I and cycle II, the student learning motivation test consists of 30 questions with five answer choices, namely the scores of one, two, three, four, and five. Determination of the success of student motivation actions is determined by scoring the assessment of Benchmark Reference (PAP) of the State University of Malang (UM) using a Likert scale. The conclusion in this study is that the STAD model can improve student learning motivation, as it is proved by the increase in the percentage from 61.5% (moderate) in the first cycle to 83.9% (good) in the second cycle.

1. INTRODUCTION

Educational renewal is absolutely necessary for the development of human resources (HR) so that they can compete in the Millennium Development Goals that have been proclaimed by the government (Sakiyo et al, 2015). In the context of educational reform, there are 3 things that need to be highlighted, namely the renewal of the curriculum, the improvement of the quality of learning, and the effectiveness of learning methods. The education curriculum must be comprehensive and responsive to social dynamics, relevant not overlapping, and able to accommodate the diversity of needs and technological progress. The quality of learning must be improved to enhance the quality of

educational outcomes and micro-strategies must encourage effective strategies or approaches in the classroom that are more empowering of potential students (Nurhadi, 2004).

Based on observations that have been made by the researcher by conducting an interview of eleventh grade Biology subject teachers of Malang State 6 High School, obtained information that the main obstacle faced by teachers in learning Biology at school is the difficulty of making students active, thus it contributes to the low learning motivation of students. Students learn because they are driven by their mental strength. Mental strength is in the form of desire that activates, moves, channels, and directs the attitudes and behavior of individual learning

(Dimyati, 2002). Motivation in learning is very important because it can awaken the position at the beginning of learning, the process, and the end result is able to direct learning activities in improving learning spirit (Darmawan et al, 2017).

Cooperative learning is a learning that emphasizes group learning activities. The students actively engage in discussion, cooperation, mutual assistance and all group members have the same roles and responsibilities. In addition, cooperative learning has a positive impact on students who have low learning outcomes because students who have low learning outcomes can increase motivation for learning outcomes and retention of longer subject matter (Darmawan et al, 2018).

STAD model learning is one model of cooperative learning by emphasizing various characteristics of direct teaching, namely students working in small groups to practice and learn information. Learning STAD models can motivate students in groups so that they can encourage and help one another in mastering the material presented, and foster an awareness that learning is important, meaningful, and enjoyable (Gaith, 2003). In the STAD model learning in one group, there are 4-5 heterogeneous people both gender, race, ethnicity and ability and then help each other in mastering teaching materials through question and answer or discussion among fellow team members (Ariyanto, D. A et al, 2017). Cooperative learning in the STAD model is characterized by a cooperative task structure, goals, and rewards (Susanti et al 2014).

Based on the description above, the researcher wants to make a research on the subject of the coordination system in humans by using STAD learning models to improve the motivation to learn biology. The title taken by the researcher is "Enhancing Students Motivation Throught Classroom Action Research Based STAD Learning Model".

2. LITERATURE REVIEW

Slavin (1980) said that cooperative learning is a learning model with students learning and working in small groups collaboratively whose members consist of 4 to 6 people, with heterogeneous group structure. The success of learning from groups depends on the abilities and activities of group members, both individually and in groups. Cooperative learning can also be interpreted as a structure of shared tasks in an atmosphere of togetherness among fellow group members. Stahl (1992) said that cooperative learning model places students as part of a system of cooperation in achieving an optimal outcome in learning. This learning model derives from fundamental assumptions in people's lives, namely "getting better together" (Slavin, 1980).

STAD is one of the cooperative learning models, so the division of groups in STAD must consider student achievement (Majoka et al., 2010). Another thing that is taken into consideration is how students are able to practice and learn information in small groups (Wyk, 2012). The basic idea of STAD is to motivate students in groups so that they can encourage and help one another in mastering the material presented, and foster awareness that learning is important, meaningful, and enjoyable.

According to Slavin (1980) there are five main components in STAD, namely: (1) Submission of Material, is the learning done by the teacher in front of the class classically. Teaching in front of the class in STAD is not so different from ordinary learning that only the lessons given must focus on the concepts of the material being discussed. After the teacher has delivered the material one or two times then the students work in groups to solve the given questions.

The second component (2) is the groups, groups in the STAD, consist of 4-6 students who vary, both in their abilities and gender. The function of the formation of the STAD group is to mutually ensure that all members can work together in learning and more specifically to prepare all members for good individual testing. The group becomes very important in STAD, because in the group must be created a cooperative work between peers to achieve the expected academic ability. Determining the members of a group, the rank of report cards is first arranged and they can also be taken from the final test scores held by students. Next from the list, grouping is done. Each group consists of a student from the upper group, a student from the lower group and two students with average or moderate abilities. The teacher classifies students with the composition as described earlier. Teachers need to consider so that there is no very high conflict between members of one group, even though that does not mean that students can determine their own friends.

The third component (3) is Test or Quiz, after approximately one or two material deliveries and work and train in group, students are given individual tests. This is where each student tries and is responsible individually to do the best as a result of learning. Students also realize that their efforts and success will later make a very valuable contribution to the group's success.

The fourth component (4) is Individual Improvement Scores to give students a goal that can be achieved if they work hard and show better results than the results previously achieved. Management of student work scores is done in the following order: initial score, test score, improvement score, and group score.

The fifth component (5) is Group Scores, to get a picture of group values, it is done by collecting scores for each group member, recording and adding

up the scores so that the scores of each group are finally obtained. From this group score can be seen and at the same time which groups get the best value deserve the promised prize.

The variables measured in this study are motivation to learn. Learning motivation is the overall psychic driving force in students which leads to learning activities, ensures the continuity of learning activities, and gives direction to learning activities in order to achieve a goal. Deci, et al (2007) states that motivation is a driving force or pulling force that causes behavior towards a particular goal. Students will study seriously if they have high motivation. In this connection the teacher is required to have the ability to raise the learning motivation of students so that they can achieve learning goals. Keller (1987) compiles a set of motivational principles that can be applied in learning. In the model presented there are four motivational conditions that must be considered by the teacher. The four motivational conditions are: (1) Attention, student attention appears driven by curiosity. Therefore curiosity needs to be stimulated so that students will pay attention, and that attention is maintained throughout the learning, even longer. (2) Linkage, shows the existence of lecture material relations with the needs and conditions of students. Student motivation will be maintained if they assume that what is learned meets personal needs, or is useful, and in accordance with the values held. (3) Self-confidence, feeling competent or capable, is the potential to be able to interact positively with the environment. The concept relates to personal beliefs

that he has the ability to do a task that is a condition of success. The principle that applies in this case is that motivation will increase with increasing expectations for success. (4) Satisfaction, success in achieving a goal will result in satisfaction, and students will be motivated to continue to achieve similar goals. To improve and maintain student motivation, teachers can use the provision of reinforcement in the form of praise, giving opportunities, and so on.

Ryan (2000) distinguishes learning motivation in school for two forms, namely: (1) Intrinsic motivation, motivation that does not need to be stimulated from the outside, because in each individual there is an urge to do something in other words the motivation that comes from within students . (2) Extrinsic motivation, motivation that arises because of external encouragement or external stimulation in other words motivation that comes from outside the student.

3. METHOD
a. Research Design

This research is a classroom action research that can be taken to improve the practice of learning in the classroom, so as to get maximum results and the approach taken in this study is a quantitative-qualitative approach. This classroom action research was carried out in 2 cycles. Each cycle consists of four stages consisting of action planning, action execution, observation, and reflection. For more details, see Figure 1.
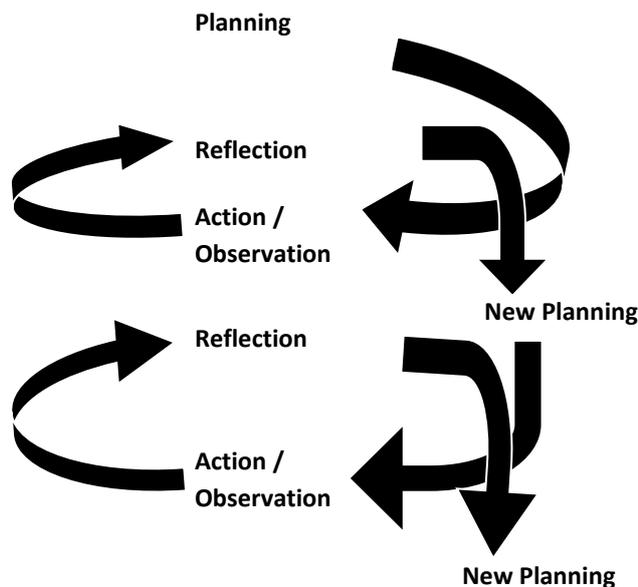
Figure 3.1 Spiral Classroom Action Research (Hopkins, 1993)

b. Research Subject

The research subjects were students of class XI IPA 2 Malang State Senior High School 6, totaling 37 people consisting of 10 male students and 27 female students. The study was conducted in March-June 2008. The implementation was carried out in April-May 2008. This study used an observation sheet instrument, field notes, and motivation tests. For more details, see Table 1.

Table 1 List of Research Instruments

No.	Variabel	Indikator	Instrumen
1.	STAD learning	● Submission of material ● Students are divided into groups, consisting of 4-5 people with heterogeneous group members ● Students work in groups to complete LKS or concept maps ● Students in groups present the results of the discussion ● The teacher conducts tests that are done individually ● The teacher rewards the best group	Observationsheets and field notes
2.	Motivation	● Attention to lessons ● Linkages ● Confidence ● Satisfaction	Motivation Test

c. Procedure

The research subjects were students of class XI IPA 2 Malang State Senior High School 6, totaling 37 people consisting of 10 male students and 27 female students. The study was conducted in March-June 2008. The implementation was carried out in April-May 2008. This study used an observation sheet instrument, field notes, and motivation tests. For more details, see Table 1.

1) Planning
a) Preparing lesson plan

Preparation of lesson plan is in accordance with STAD model cooperative learning with nervous system material (structure, function, impulse delivery principle, reflex motion, nervous system composition, nervous system in animals, and the influence of drugs on the nervous system). Material about the hormonal system (includes the characteristics of hormones, nerve and hormonal relationships, endocrine glands, vertebrate hormones, and invertebrate hormones).

Instrument preparation includes: Observation sheets was used to observe teacher and student activities during the learning process. Format of the observation sheet is shown in Table 2 and Appendix 3.

Table 2 Observation Sheet for Teacher and Student Activities

No.	Teacher Activities	Implementation of Activities	Students' Responses
1.	Submission of material a. Digging on students' initial knowledge with phenomena or questions	Executed / not	
	b. Phenomenon or question is given classically	Executed / not	
	c. Delivering material that will be taught classically	Executed / not	
2.	Study in groups a. Teachers divide groups (only at meeting 1)	Executed / not	
	b. Teachers guide students to work on LKS or create concept maps	Executed / not	
3.	Class discussion a. Teachers accompany students to	Executed / not	

	discuss and present	
	b. Teachers rectify if there is a misconception	Executed / not
	c. The teacher and students conclude the lessons learned at this meeting	Executed / not
4.	Test The teacher gives individual tests	Executed / not
5.	Award for the best group	Executed / not

Teachers prepare Student Worksheets (LKS) that will be used in the learning process using STAD model learning.

b) Implementation

The implementation of learning was in the form of the application of cooperative learning STAD model which includes the delivery of material, group learning, class discussions, tests, and group awards.

c) Observation

Observation was made during the teaching and learning activities using observation sheets, field notes, performance assessments, and motivation tests. In the observation there were two research friends namely CahyoPrasetyo, S.Pd and Arif Rahman, S.Pd as the teacher and research partner.

d) Reflection

At this stage, self-reflection whether the actions that had been taken could increase student motivation and learning outcomes in biology subjects. Strengths and weaknesses in the implementation of cycle I actions would find alternative actions to reduce deficiencies in cycle I actions.

d. Data Analysis

Data analysis was used to determine the success of the actions that had been implemented. Research is said to be successful if the data of learning motivation can be done by comparing the motivation score of cycle I and cycle II. In this study, student learning motivation tests consisted of 30 questions with five answer choices, namely with scores of one, two, three, four, and five.

Students chose answers according to the conditions during the learning process. All students' answers were written in the student motivation test sheet according to the problem number of the indicators that appear in each aspect, namely attention, relevance, self-confidence, and satisfaction.

Determining the success of student motivation actions is determined by scoring PAP UM assessment. According to the UM Education Guidelines for 2005, it uses a Likert scale with 5 criteria; values of 0-40 are very less;a score of 41-54 less; the value is 55-65 medium; value of 66-83

good; the value of 84-100 is very good.The percentage of students' motivation values is calculated by the calculation below,

Motivation Value
$$= \frac{Student's Score \ who \ Choose \ Descriptor}{Total \ Score \ of \ all \ Descriptor} \ x \ 100\%$$

4. RESULTS AND DISCUSSION

Students' motivation during the learning process can be known from the tests that have been done by students. From this test, it can be known the value of student motivation. Good student learning motivation will improve student learning outcomes. In addition, cooperative learning used by researchers during the teaching and learning process also influences the increase in student motivation. This is consistent with Slavin (1980) that cooperative learning is a learning strategy that has several advantages, including increasing intrinsic motivation of students. Prayitno (2011) also states that cooperative learning experiences can encourage students to increase high motivation to learn, especially intrinsic motivation, lead to high satisfaction, shape the attitude of accepting differences between each other, and improve interaction between students who have different ethnic backgrounds and between students who have learning difficulties with no learning difficulties. In his book entitled interaction and learning motivation Sardiman (1994) also explained that learning would be more stable and effective if driven by motivation, especially internal motivation or intrinsic motivation.

Learning STAD models used by researchers during the learning process requires students to be able to work together with members of the group. So that it has a positive impact on student learning outcomes. Group members are made heterogeneous so that they can help each other between highly capable students and those with low abilities and can achieve success together. But, at the beginning of learning not all students can follow well. This is because students are not familiar with the STAD model learning. They are used to lectures, so students are more passive and less brave in expressing their opinions. The learning process is dominated by teachers. So, by working in groups of

students are expected to be more daring in expressing their opinions, can exchange ideas and ideas in one group. Group members with various abilities are expected to form an atmosphere of discussion and good cooperation occurs because they can exchange ideas and information. The existence of collaboration between good group members is possible to increase motivation and student learning outcomes.

Student learning motivation can be seen from behavioral characteristics that concern attention,

linkages, beliefs, and satisfaction. This student's attention can be seen from how students show happiness, curiosity about lessons, attention to assignments, and time in submitting assignments. The value range of students' learning motivation in each aspect in cycle I and cycle II increases. This can be seen in Table 3, which is a table describing comparative data on the value of student motivation based on motivation tests that have been given to students.

Table 3 Range of Student Learning Motivation Values in Cycle I and Cycle II

Range of motivation values	CYCLE I								CYCLE II							
	Attention		Relevance		Convidence		Satisfaction		Attention		Relevance		Convidence		Satisfaction	
	Σ Students	Value (%)	Σ Students	Value (%)	Σ Students	Value (%)	Σ Students	Value (%)	Σ Students	Value (%)	Σ Students	Value (%)	Σ Students	Value (%)	Σ Students	Value (%)
0-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41-54	2	5,41	4	10,81	16	43,24	3	8,11	0	0	0	0	0	0	0	0
55-65	25	67,57	20	54,05	14	37,84	29	78,38	0	0	0	0	0	0	0	0
66-83	10	27,03	13	35,14	7	18,92	5	13,51	8	21,62	13	35,14	17	45,95	17	45,95
84-100	0	0	0	0	0	0	0	0	29	78,38	24	64,86	20	54,05	20	54,05

Based on the data exposure in Table 3 it is known that student motivation seen from the aspect of attention in the less category in the first cycle as many as two students (5.41%) decreased to none (0%) in cycle II. In the middle category of cycle I, 25 students (67.57%) also decreased to none (0%) in cycle II. The good category decreased from ten students (27.03%) in the first cycle to eight students (21.62%) in the second cycle. While the excellent category of none (0%) in the first cycle increased to 29 students (78.38%) in the second cycle. Attention has an important role in learning activities. Gage (1984) states that the learning process will not occur without attention.

The students' relation to what they learned also increased from cycle I to cycle II. The relationship of students was in the less category as many as four students (10.81%) became none (0%). In the medium category there were 20 students (54.05%) to be absent (0%). In the good category, 13 students (35.14%) did not have an increase or decrease in cycle II. In the excellent category there were none (0%) to 24 students (64.86%). The relationship between subject matter will increase according to the needs and conditions of students so that students' motivation becomes maintained and considers that what they learn is useful for themselves as stated by Suciati (2001).

Students' confidence to be able to interact positively with the environment has increased from cycle I to cycle II. In the less category, 16 students (43.24%) became none (0%). In the medium

category there were 14 students (37.84%) to be absent (0%). In the good category there were seven students (18.92%) to 17 students (45.59%). In the very good category there were none (0%) to 20 students (54.05%). Increasing confidence in these students to succeed in learning something will make students have good motivation to learn.

Student satisfaction also increased from cycle I to cycle II. In the less category, three students (8.11%) became none (0%). In the medium category, 29 students (78.38%) became none (0%). In the good category there were five students (13.51%) to 17 students (45.95%). In the very good category there were none (0%) to 20 students (54.05%). Student motivation will continue to increase when it has achieved a certain goal so it produces satisfaction that causes students to be motivated to achieve similar goals (Harahap, 2013).

Comparative data on learning motivation based on motivation test results given to students in detail are presented in Table 4.

Table 4.2 Average Value of Student Learning Motivation

Motivation	Cycle I average Value (%)	Cycle II average Value (%) (%)
Attention	63,4	86,7
Relevance	64,4	82,3
Convidence	57,1	83,8
Satiffaction	61,1	82,6
Average	61,5	83,9

Note   :   A   = *Attention*
             R   = *Relevance*
             C   = *Convidence*
             S   = *Satisfaction*

From the data, the students' attention during the learning process using STAD model learning was 63.4% with the medium category and in the second cycle of 86.7% with very good categories. The average increase in value was 23.3%. This shows very good attention to the lesson. Attention has an important role in learning activities (Dimyati, 2002).

The relationship of students to what is learned can be seen from the interconnectedness of the material studied with the state of the student, the ability of students to relate the lessons to their daily lives, the suitability of the subject matter they want, the suitability of the methods in learning, the usefulness of the material being taught, and the feelings that encourage learning. From the data, it can be seen that the relationship between students during the learning process using STAD model learning was 64.4% in the first cycle with the medium category and in the second cycle 82.3% with the good category. The average increase in value was 17.9%. This proves that students have a good relationship to the lesson. Suciati (2001) explained that linkages indicate the existence of a relationship between subject matter and the needs and conditions of students. Therefore by having a good relationship, students' motivation will be maintained because students consider what they have learned to be beneficial for their lives.

Students 'beliefs can be seen from their belief in success, confidence in the subject matter, confidence in understanding the subject matter, students' aspirations, ability to work hard, willingness to read books that support learning and confidence. From the data it can be seen the students' confidence during the learning process by using the STAD model was 57.1% in the first cycle with the medium category and in the second cycle with 83.8% in the very good category. The average increase in value is 26.7%. A person's beliefs (students) about their abilities greatly affect one's ability (students) itself based on the opinion of Wyk (2012).

Student satisfaction can be seen from satisfaction with learning outcomes, happy for reinforcement, willingness to help friends who have not succeeded, attendance in class, desire for achievement, enjoyment in learning, satisfaction of each lesson, and feeling satisfied with each test. From the data, it can be seen that student satisfaction during the learning process by using STAD model learning was 61.1% in the first cycle with the medium category and in the second cycle was 82.6% with good category. The average increase in value was 21.5%. This is in accordance with Darmawan (2017) stating that success in achieving goals will result in satisfaction and students will be motivated to keep trying to achieve goals.

Another factor that supports the improvement of student learning motivation is the awarding as a form of reinforcement for the success of the group in accordance with the opinion of Aberg et al (2016) that efforts that can be taken can foster motivation, among others, by using reinforcement theory as effective as possible. Appreciation for the success of the group influences student motivation. Success in achieving a goal will result in satisfaction that can maintain or increase the motivation of the subject. This was also stated by Wyk (2012), that student motivation can increase by giving praise and prizes. In addition, Sardiman (1994) states that knowing learning outcomes will encourage students to be more active in learning in order to motivate students to continue learning in the hope that the results will continue to increase. Darmawan et al (2017) also stated that students will be motivated to learn better if they are often told about how high their performance about new things is done.

5. CONCLUSION

Based on the previous discussion, it can be concluded several things as follows, the form of STAD model learning can improve learning motivation. This is proved in the first cycle 61.5% (moderate) to 83.9% (good) in cycle II. It is suggested that biology subject teachers can apply STAD model learning which is proven to increase motivation as an alternative learning model.

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