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TPS improving student understanding and collaborative activity in topic blood circulation system

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Abstract. Science material is usually presented systematically and structured, Think Pair Share is one of the model that accommodates collaborative activities and directs students to work together in small groups with different abilities and social backgrounds. TPS is helpful in terms of improve student understanding, because there are activities to clarify and share ideas in pairs or groups. In addition, TPS supports collaboration activities between students and teachers. The research aims to improve understanding of concepts and describe collaborative activities related to learning using TPS in blood circulation system. This research is a classroom action research conducted during two research cycles. Data were analyzed descriptive. Based on the results of the study showed that there was an increase in student understanding in each cycle, namely in cycle I by 73.18 and cycle II by 80.56 while based on the average collaboration activity is better.
Keywords: *think pair share, student understanding, collaborative activity, blood circulation system*

1. Introduction

Teaching Biology must be systematically and structured especially in blood circulation system. Based on classroom observation, student who are taught about blood circulation system has some problem such as: (1) Teacher uses the expository method, so the classroom situation still teacher-centered learning activities. Some students do things that are not related to teaching activity such as playing mobile phone etc. Then, students are taught to memorize the material without the information process. (2) There is no confirmation activity carried out by the teacher after teaching, whereas confirmation activity as feedback what students produce through teaching experiences, adding information to strengthen mastery of competencies. So student and teacher have to engage in classroom. Student who learn Blood circulation system stated that it was difficult lesson, absences of learning resource and teacher dominant in class [1].

Based on the problem, possible solution is using teaching model which accommodate their achievement and collaborative activities. It will greatly affect the ability of students to educate themselves. Think-Pair-Share (TPS) is cooperative learning that is designed to influence student interaction patterns. Students are working to help each other in small groups (2 members). Cooperative learning is a learning system that provides opportunities for students to work together on structured tasks and in this system the teacher acts as a facilitator [2]. Think Pair Share involves sharing with partners which allows students to assess new ideas, clarify and present them to a larger group [3]. Based on the TPS learning model is very helpful to improve student understanding, because there are activities to

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clarify and share ideas in pairs or groups. In addition, TPS supports collaboration activities between students and teachers.

Previous research about of Think-Pair-Share (TPS) stated that communication skills in classroom develop well and student activities related for teaching biology are very good [4], another research prove that TPS model can convey information between student interactions. [5]. The effectiveness has been proven to improve narrative reading skills [6]. In addition, other research proves an increase score in student motivation and academic [7]. Based some evidence from previous research, TPS can improve students' understanding and collaborative activities. Successful learning also involves students in collaborative activities between students and teachers. TPS is a model that facilitates it. Collaborative activities are activities carried out with interaction between students and teachers, so students focus on working on assignments together. Collaborative activities are based on: a) students as the main focus of teaching. b) Interaction and "doing" are the most important. c) Working in groups is an important way of learning [8].

Collaborative activities based on the learning phase of the thinking phase begins when the teacher asks questions related to the lesson, and students think for themselves [9]. The pairing phase is solving problems that are proposed in pairs and the Sharing Phase where students share answers in class in groups. Cooperative learning students find information from various sources, and learning from other students can be responsible [6]. For Development students' abilities, teacher creates conditions and situations that play an active role in social processes between individuals. Based on the explanation, the research aims to improve students' understanding and describe collaborative activities by implemented TPS in topic blood circulation system.

2. Research method

This research was a Classroom Action Research (CAR) adapted Kemmis & Taggart, which each cycle consists of planning, acting and observing then, reflecting [10]. Cycle 2 is carried out based on reflecting from 1st cycle. If a classroom action research links into subject matter, the number of cycles for each subject involves more than two cycles. The steps of conducting the research are as shown below :

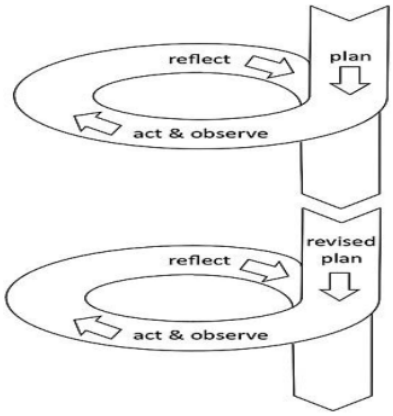

Figure 1. CAR cycle [10].

The research was on topic blood circulation system consists of 2 subtopics such as: (1) organ on blood circulation system and (2) process on blood circulation system. The subjects were all VIII grade students in SMP Banjarmasin. The study was conducted for 1 semester.

Data was analyzed by descriptive. Criteria for successful of CAR indicated by teaching outcomes in understanding topic based on the completeness of individual is achieved if the student gets value ≥ 75. The classical mastery learning is achieved when there are ≥ 85% of students get a minimum score. Based

on students' understanding for classical completeness was done with the percentage of students who scored ≥75.

Then collaborative activities were carried out descriptively through observation during the teaching process in classroom. As for the subtopics taught during the research process are seen in table 1.

Table 1. The implementation TPS on blood circulation system.

Cycle	Subtopic	Hours/ week	Model
1	Organ of Blood	4	TPS
	Circulation	4	TPS
2	Process of Blood	4	TPS
	circulation	4	TPS

While collaborative activities are activities carried out by students in pairs or groups in classroom. Collaborative activity seen on *Pair and Share* stage. The following activities include collaborative activities such: (1) Read relevant book and handouts together. (2) Use a device to look for references together. (3) Discuss with their partners about the answers. (4) Solve problems in pairs. (5) Respond to teacher questions. (6) Respond to a friend's question. (7) Express the results of pair discussion in class. (8) Share the results of discussions by their partners. (9) Maintain the ideas.(10) Respond to questions of other students and teachers. Collaborative activities carried out by observation on the student activity sheet and were analyzed based on the standard criteria set out in the table 2

Table 2. Standard criteria for collaborative activity.

No	Average Performance	Category
1.	$90\% \leq x$	Very Good
2.	$75\% \leq x < 90\%$	Good
3.	$60\% \leq x < 75\%$	Adequate
4	$40\% \leq x < 60\%$	Acceptable
5	$x < 40\ \%$	Poor

3. Results and Discussion

3.1. Improving student understanding in blood circulation system

The result of implementing TPS to improve student understanding following in table 3.

Table 3. Score in pretest and posttest.

Cycle	Meeting	Test	Completeness	Enhancement (pre-post)
1	1	Pre	2.86	68.57
		Post	71.43	
	2	Pre	0.00	77.78
		Post	77.78	
2	1	Pre	2.78	77.78
		Post	80.56	
	2	Pre	11.11	80.56
		Post	91.67	

Information: completeness reaches value of ≥75

Based on the summary data in table 3, during the 1st cycle of 1st meeting the percentage of students who completed the pretest was 2.86 percent. It means that of the 36 students present there was only one student who achieved individual completeness. This shows that the ability of students is very low, and has not yet reached classical completeness.

First meeting shows that classical completeness has not been able to be fulfilled. In the first cycle of 2nd meeting students who completed the pretest had not experienced an increase because none of the students were declared capable of achieving individual completeness. The posttest results in 2nd meeting shows classical completeness was not fulfilled because only 28 students out of 36 students who achieved completeness individual. The result is low because it is less than 85 %. On implementation TPS, there are some obstacles during the lesson such as: (1) Some student do not work in small groups, so students work individually in their groups. (2) Some students are still joking when discussing, the problems haven't resolved. (3) Students are afraid to ask the teacher in expressing their opinions, responding to statements, answering questions and presenting their work.

Reflection stage aims to determine what has been achieved, what needs to be improved in subsequent teaching. Therefore, the results of actions need to be reviewed. As for what needs to be revised for effectiveness such as: improve the content of worksheet to help student work together, teacher gives some question to increase their interaction, then add some animation to power point make student more interested to pay attention. Then to help and monitor their interaction the teacher must set the time in the worksheet for the pair and share stages.

In 2nd cycle, students have been able to achieve this determined indicator, as seen from the percentage that continues to increase in the posttest scores in each learning, so it can be categorized as successful with a percentage of 91.67. Based on table 3. The average classical completeness in 1st cycle to 2nd cycle was increased, from 73.65 to 86.16. In the second cycle posttest obtained at the 1st and 2nd meeting the average of classical completeness amounted to 86.16. At the second meeting of the second cycle the percentage of classical completeness reached 91.67. It means that in 2nd cycle the indicators of learning increased. All students have paired up to work on the worksheets, so that students can discuss between pairs of groups and use more time to do their work. TPS is effective in engaging students, students became more cooperative. Then student less than 2 weeks can be more enjoy on classroom. [11].

Recommendation of TPS to enable students to provide feedback and collaborate among groups. The stages in cooperative learning are *think-pair-share*. Teachers need to take action to ask students to work independently, pair up with other students, then share ideas with the whole class. Teacher are judging from the learning outcomes obtained for the application of type TPS cooperative learning. TPS gives a positive influence to develop abilities and is very suitable when applied to a class that is new to applying cooperative learning [12]. Previous research state TPS can increase motivation and learning outcomes [13]. Based on the data, shows that the research objectives have been achieved indicators for learning completeness because teaching completeness is considered successful if ≥ 85% of all students achieve individual completeness ≥ 75.

3.2. Collaborative Activities through Implementation TPS

Collaborative activity involves learners working together in order to complete a task. In the classroom, student get benefit from collaboration in a variety of activities, including writing tasks, discussing and sharing ideas. The result of collaborative activity following in table 4.

Table 4. Collaborative activities on TPS.

No	Activities	Cycle 1st		Enhance-ment	category	Cycle 2nd		Enhance-ment	category
		Meeting 1	Meeting 2			Meeting 1	Meeting 2		
1	Read relevant book and handouts together	88.89	100	99.45	Very good	100	100	100	Very good
2	Use a device (e.g: HP or netbook) to look for references	66.67	69.44	68.055	Adequa-te	83.34	75	79.17	Good

No	Activities	Cycle 1st		Enhance-ment	category	Cycle 2nd		Enhance-ment	category
		Meeting 1	Meeting 2			Meeting 1	Meeting 2		
3	Discuss with their partners	69.44	77.78	73.61	Adequa-te	77.78	80.66	79.22	Good
4	Solve problems in pairs.	66.67	69.44	68.055	Adequa-te	72.27	75	73.63	Adequa-te
5	Respond to teacher questions.	66.67	72.22	69.45	Adequa-te	72.22	75	73.61	Adequa-te
6	Respond to a friend's question in pairs.	44.44	33.33	38.88	poor	38.89	66.67	52.78	Accepta-ble
7	Put forward the results of pair discussion in class	66.67	75	70.835	Adequa-te	77.78	83.34	80.56	Good
8	Share the results of discussions by their partners	55.56	72.22	63.89	Adequa-te	72.22	77.78	75	Adequa-te
9	Maintain the ideas.	66.67	66.67	66.67	Adequa-te	61.11	72.22	66.65	Adequa-te
10	Respond to questions of other students from other small group	50	55.56	52.78	Accepta-ble	67.67	69.44	68.55	Adequa-te

Student will make collaborative learning. Collaborative learning is a term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together [13]. The Stages of think, students work on problems independently. So collaborative activities are not seen during learning. Based on these activities in 1st Cycle most of them categorize as adequate, but on Point Respond to a friend's question in pairs categorize poor. It means most of them working individually and they are less interaction in pair. The most activities are reading resources and relevant books together with their partner. To conclude, it appears that one way to maximize the benefits of collaboration on deep learning is to include a preparation task, which allows students to develop a readiness for learning in future discussion [11].

Based on the data, Student activity has increased at the *pair* stage when students pair up in the implementation of teaching, at these stage students help each other to be able to solve the questions proposed by the teacher. But at the meeting there were 2 students preferred to work independently. At the pair stage, the students start carried out by students raising lots of ideas related to the completion of the worksheet, students will identify the main ideas according to the learning material. On Pairing stage part of collaborative activities are: (1) Read learning resources and relevant books together. (2) Use a device (e.g: HP or netbook) to look for references together. (3) Discuss with their partners about the answers. (4) Solve problems in pairs. (5) Respond to teacher questions. (6) Respond to a friend's question in pairs.

While in the *share* stage, the students' ability in the discussion has increased. In the activities of students observed an increase in each meeting at each stage has a different percentage difference. Based on chart, the lowest activities is Responding friend's question in pairs. Most of them work independently. To increase student collaborative activities, Teacher shall do these in class such: (1) Make questions that provoke thoughts about class. (2) Give students time to think about questions and use language that is easy to understand. (3) Ask students to share their thoughts with their partners; while other students as

the answer listener. (4) in the final stage, ask students to share their thoughts with the whole group. During this discussion/ explanation, the teacher gets feedback about what students do or don't know. The teacher plays an important role to encourage student activities, so cooperative learning type TPS is proven to be able to encourage student participation by providing opportunities to discuss, ask questions and express opinions. Collaborative activity consists of peer discussion, students can receive immediate feedback, ask questions, generate explanations, challenge each other, jointly construct understanding, and elaborate on each other's ideas [14]. By using TPS as a cooperative learning approach, instructors provide students with activities that promote interaction and require accountability [15]. Collaborative and caring concept are substantial aspect to build learning community and improve the quality of student's activity [16].

4. Conclusion

Based on the observation, it can be concluded that the implementation of Think Pair Share (TPS) was an increase in student understanding in each cycle, namely in 1stCycle I by 73.18, and 2nd Cycle by 80.56. So, an increase in students understanding after implementation TPS. Collaborative activities in TPS including (1) Read relevant books together. (2) Use a device to look for references together. (3) Discuss with their partners about the answers. (4) Solve problems in pairs. (5) Respond to teacher questions. (6) Respond to a friend's question. (7) Put forward the results of pair discussion. (8) Share the results of discussions in group. (9) Maintain the ideas. (10) Respond to questions of other students and teachers. And the result of these activities seen on *Pair and Share* stages. Based on the conclusions above, the suggestion for this researcher as The transition of discussion patterns from small groups (pairs) to shares can take up learning time. Teacher must be able to plan well

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