



The Influence of Project Based *Creative Problem Solving* Toward Creative Thinking Ability on Circulation System

Desy Probowati^{1✉}, Retno Sri Iswari¹, Sri Sukaesih¹

¹Biology Department, Faculty of Mathematics and Sciences, Universitas Negeri Semarang, Indonesia

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Abstract

This study purposes to describe the influence the Project-Based Creative Problem Solving model in learning circulation system material toward students' creative thinking. The study used One-Shot Case Study Design. Research subject is students of XI MIA 1 and XI MIA 3 classes as treatment groups. The independent variable of this research is Project-Based Creative Problem Solving learning model in circulation system material. The dependent variable is students' creative thinking, activities and project result. The analysis result shows that the Creative Problem Solving Model Project-Base Circulation System Material has positive effect toward the students' creative thinking by the percentage 86.1% for XI MIA1 and 91.66% for XI MIA3 with category very high. Analysis of reached indicator of creative thinking are fluent thinking/fluency 79.85% (high), flexible thinking/flexibility 91.15% (very high), original thinking/originality 77.35% (high), elaborate thinking/elaboration 89.2% (very high). The result of observations on students' activity is more than 75% students gained good criteria. On the analysis of products result, mean of XI MIA 1 is 89.4% criteria good and 90.8% very good criteria for XI MIA 3. Base on the research result can be concluded that Creative Problem Solving Model Project Base Circulation System Material has very high positive influence toward students' creative thinking in the circulation system material; students' activity and projects' result are very good also.

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✉Correspondence Address:

D6 Building 1st Floor, Jl Raya Sekaran Gunungpati Semarang 50229

E-mail: desyprobowati@gmail.com

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INTRODUCTION

Education is an important factor in the improvement of individual skills. One of them is the ability to think. Thinking based on rote knowledge, understanding, application, and analytical thinking can be viewed as convergent thinking that is one level lower than divergent thinking. In divergent thinking solutions or answers cannot be ascertained. In contrast to thinking synthesis that is one of the terminals to make people more creative. Creativity can develop when it is given stimuli that can stimulate creative thinking. Creative thinking is an important component to a person's success in living activities. Creative thinking becomes the determinant of a nation's superiority (Suparman & Husen, 2015).

Indonesia's creative industries are the lowest in comparison to other countries in the world. Global Creativity Index (GCI) 2015 puts Indonesia at 115 out of 139 countries. The "Martin Prosperity Institute" Survey Institute assesses a country's creativity index based on three indicators, namely technology, talent, and tolerance (Florida *et al.*, 2015). Creativity can be developed in the world of education through Biology learning. In Biology learning there are real problems that surround students who can be associated with the subjects studied in the discipline, for example the circulatory system. Appropriate Biology learning strategies are needed to engage students as optimally as possible both intellectually and emotionally (Oktaviani, 2014).

One of the learning models that can develop creative thinking ability is *Creative problem solving* (CPS) model. The advantage of the CPS learning model is to give students an understanding of concepts by solving a problem, make students active in learning, develop students' thinking skills and enable students to apply the knowledge they already possess. Project-based learning is a learning that involves a project. Projects can be done either individual or group projects and are implemented within a certain time period collaboratively, producing a product, whose results will be showed and presented (Jagantara *et al.*, 2014). Implementation of learning needs to be considered for the purpose of learning can be achieved. Activities that can support the CPS process that is a creative thinking link can develop creative thinking skills as well as cooperate in groups, be active in finding sources to obtain information about the problems gained, selecting data relating to the issues studied and being serious in carrying out project tasks.

Based on school observations, some students in class XI use the method of memorizing the phenomena of life in a biological perspective. Based on student questionnaire, it is found that students feel less motivated and interested in biology learning. Twenty out of thirty-six students who answered that the material of the circulatory system is hard to understand maximally because the reason the circulation system cannot be described or visualized in real, so it needs good creativity in describing a process that is not visible to the eye. Biology subjects have a complex level of ability, incorporating a level of understanding of reasoning and implementation. The material of the circulatory system understands the structure, function and mechanism of circulation in the human body, so that there is an alternative learning model, which in this study used project-based CPS learning model, in addition, the class XI has never applied *Creative Problem Solving* model in Biology learning. Based on this background, the problem formulation studied in the research is the influence of Creative Problem Solving Model Project Base Circulation System Material on the ability of creative thinking of students in SMA. This study aims to determine the effect of project-based CPS model on the material circulation system on students' thinking ability in high school.

RESEARCH METHOD

The research used One Shot-Case Study design with two treatment groups. This research was conducted in SMA N 15 Semarang. The samples of research are determined by Purposive Sampling Technique, that are class XI MIA 1 and XI MIA 3. The independent variable in this research is the implementation of learning model of *Creative Problem Solving* based on project. The dependent variable in this research is creative thinking ability, activity and project result. The instrument used is 8 description of the circulation system that has been adapted to the aspects of creative thinking to measure the ability of creative thinking, student activation observation sheet and project assessment sheet. Data were analyzed by

descriptive percentage. The following stages of implementation of project-based CPS model on the material circulation system.

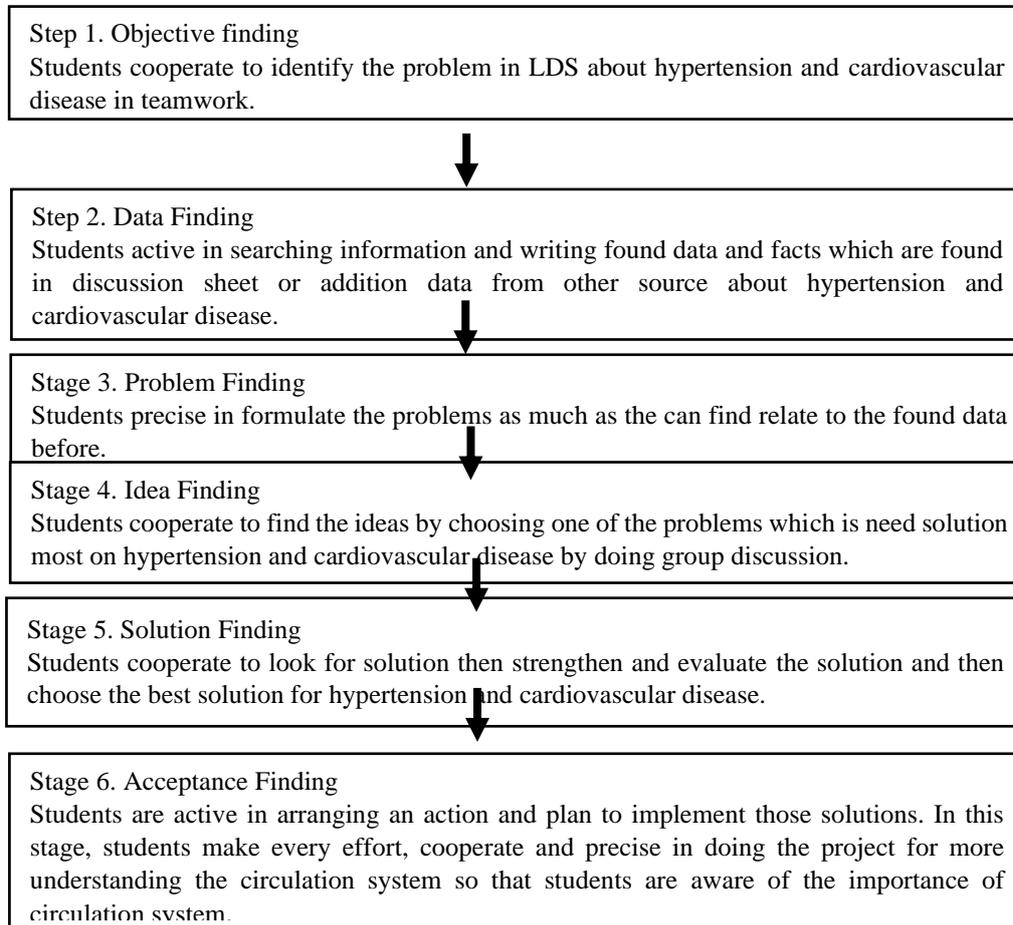


Figure 1. Creative Problem Solving Model Project Base Circulation System Material

RESULT AND DISCUSSION

This study used 8 essay questions post-test that have been corresponded to the basic competencies on circulation system material. The questions represent four criteria from creative thinking. They are fluency, flexibility, originality, and elaboration. The samples, XI MIA 1 and XI MIA 3, are given treatment with CPS learning model during three days and the fourth days is used for testing the students' creative thinking. Result from students' creative thinking can be seen as follows:

Creative Thinking Ability

Table 1. Recapitulation Result of Students' Creative Thinking

Score	Criteria	Number of Student		Percentage
		XI MIA 1	XI MIA 3	
85-100	Very High	19	22	56,16%
75-84	High	13	11	32,87%
56-74	Medium	5	3	10,96%
40-55	Enough	0	0	0%
0-39	Less	0	0	0%

Total	37	36	100%
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Based on the result of students' creative thinking ability, there are 56.16% students who got very high category and 32.87% students got high category in creative thinking ability. The results show that project-based CPS model has a positive effect on students' creative thinking ability. The results are due to the treatment of learning activities that have been designed using a project-based CPS model. During the learning process, students are directed to solve a problem in an article that is guided using LDS (Student Discussion Sheet) which allows students to solve problems. The problems presented in the form of problems regarding the condition of hypertension and cardiovascular disease in Indonesia.

The learning achievements of circulation system which are students can describe, relate, and associate between the organ structure compiler, bioprocess and disruption of function in the circulation system through the stages of the project-based CPS model which will stimulate students' creative thinking ability and can influence the students' creative thinking ability. There is not much difference between the class XI MIA 1 and XI MIA 3. The difference is due to uneven group division factors, as well as different classroom environment or conditions. At the 7th hour at XI MIA 1 and XI MIA 3 is different because the classroom atmosphere in XI MIA 1 is shade that can improve student concentration well. While the atmosphere in class XI MIA 3 tends to be hot that can decrease the spirit and concentration of students so that there is a difference on results.

Table 2. Percentage of Indicator Achievement of Creative Thinking

No	Creative Thinking Aspects	XI MIA 1	XI MIA 3	Average	Criteria
1	<i>Fluency</i> / fluent thinking	73,8%	86,1%	79,85%	High
2	<i>Flexibility</i> / flexible thinking	86,1%	96,2%	91,15%	Very High
3	<i>Originality</i> / original thinking	80,7%	74,0%	77,35%	High
4	<i>Elaboration</i>	90,9%	87,5%	89,2%	Very High
				84,38%	High

Based on Table 2, the percentage of achievement of the indicator of creative thinking is high and very high. On the aspect of thinking smoothly the percentage of creative thinking smoothly reached 79.85% with high category, the aspects of thinking flexible 91.15% with very high category, authenticity aspects 77.35% with high category and the aspects of thinking detail reached 89.2% with very high category. From the four aspects, the flexible thinking has the highest percentage. The flexibility aspect has a high creativity compared with the other three aspects. This is because the flexible thinking aspect emphasizes the disclosure of different ideas or ideas. In addition, the student's perspective in seeing a problem also affects the ability to think flexibly. Most students can develop the ability to think flexibly by providing interpretation on the table and can provide a different perspective in concluding a fact that exists about the article of cardiovascular diseases. Another factor in the flexibility aspect is based on students' responses that students' interest in learning on the material of the circulatory system increases with the project-based CPS model.

Aspects of flexibility can also be seen in the stages of data finding where students search for sources by looking for sources related to the material. Students actively ask questions and look for material from other sources that make students more open their insights in understanding a problem from a different point of view. Besides the Data Finding stage, the Objective Finding and Problem Finding stages can also stimulate students' flexibility by training in formulating a problem and expressing ideas. In making project products, flexibility aspects can be seen when students reveal ideas generated on the project. In the process of project creation many ideas for the manufacture of products such as charts, props, songs, models and others.

Analysis of fluency thinking ability was categorized as moderate in both experimental class with 79,85% average for class XI MIA 1 as much as 73,8% and XI MIA 3 higher by 86,1%. Fluency (thinking fluently) in the creative aspects of this research is, the ability of students to express ideas or ideas more than one answer. Based on the test, most students are lacking in the ability to convey ideas in formulating an issue that is in the article, but to provide an idea related to cardiovascular disease, students are quite good and many express ideas. Students' Fluency appear when faced with an issue and students asked to provide the solution used on the problem. In the XI class MIA 3 looks enthusiastic when faced with a problem on the LDS sheet and asked to formulate the problem of providing as many solutions as possible. In addition, the smoothness of students in working on the project is very visible in the class XI MIA 1 which has a higher creativity in this aspect is able to complete the project within the specified time.

The fourth aspect is the elaboration or thinking detailing aspect. The result of data analysis that 89.2% student have high level of creativity in thinking aspect, the ability to think detailing in this research referred with the ability of student in revealing an idea in detail and depth. Thinking detailing is indispensable as creativity grows and arises when ideas can be reviewed in depth and detail. In the test of creative thinking ability, students are given problems by displaying blood pressure checking images and given the question how to use sphygmomanometer. The result is that students can respond with an almost correct average as described during the lesson, even students can write in detail along with the reading of the sphygmomanometer. In addition students are able to think in detail on the project activities, where students are asked to explain the details of the project presented in front of the class in depth and details in detailing the process of making and using the product results. Activities at the stage of idea finding and solution finding are done through literature study and keep using LDS guides. This activity trains students to find knowledge from existing ideas, and then students can add ideas to enrich existing ideas. It can develop elaboration aspects. Students can expose steps in detail by developing their own ideas after finding relevant literature reviews.

The aspect of authenticity (*originality*) is an important aspect in the creative thinking ability, where one can be said to be creative when generating an idea that is original. Based on the analysis of 77.35% students are said to have high creativity in the aspect of authenticity. In these results, there is a gap that exists in the aspect of authenticity in this study. The creativity of each human being is different, there are groups of students who have high original creativity based on the test results students have different answers but in accordance with existing theories.

Tests the creative thinking ability of the authenticity indicator by exposing the student to a theory, then asked to describe the circulatory system. The result is students can describe in accordance with the theory in question, although different for each student. The student's original ability can be seen also when the project's learning stage, where the students are more likely to come up with ideas and produce creative products. In stages the project-based CPS model can stimulate students to think original by producing project products in the form of reports and props such as charts, props, posters, and chants in the disruption circulatory system project.

Students' Activities

The project base CPS model has positive effect in students' activities in the learning process based on the observation of students' activities using the observation sheet based on project base CPS model steps. The result can be seen on Table 3.

Table 3. The Result of Students' Activities Analysis in the learning process using Project-base CPS in Circulation System Material

No	Stage of Project-base CPS	Students' Activities (%) XI MIA 1 Class			Students' Activities (%) XI MIA 3 Class		
		Meeting I	Meeting II	Mean	Meeting I	Meeting II	Mean
		1	Objective Finding	80.6	77.8	79,2	81.3
2	Data Finding	77.8	83.3	80,55	81.3	78.1	79,7
3	Problem Finding	86.1	80.6	83,35	78.1	81.3	79,7
4	Idea Finding	83.3	75.0	79,15	78.1	87.5	82,8
5	Solution Finding	83.3	83.3	83,3	81.3	78.1	79,6
6	Acceptance Finding	80.6	80.6	80,6	84.4	81.3	82,85

Implementation of project-based CPS model in this research with six stages that are, objective finding, data finding, problem finding, idea finding, solution finding, and acceptance finding. The first stage of project-base CPS is objective finding by grouping students heterogeneously. The group is consisting of 4-5 students. The group will be a permanent group during the learning of the circulatory system materials and project activities. Objective finding stage is to train students to identify problems to be solved.

Problem solving activities are conducted in groups to facilitate students exchange opinions and students are more enthusiastic when groups, students are more active and can work together because the project-based CPS model is done in groups. The division of groups is done at the beginning of the meeting. The division of groups can encourage the establishment of mutually supportive relationships among group members. Students experiencing difficulties in expressing ideas or ideas can ask a group of friends to improve students' problem solving skills and maximized learning outcomes. In line with Sunaryo (2014) that the problem-based learning model requires students to be active in the learning process and have the opportunity and apply their own ideas in solving problems.

Implementation of project-based CPS model in this research has six stages: objective finding, data finding, problem finding, idea finding, solution finding, and acceptance finding. The first step of project-based CPS is objective finding by grouping students heterogeneously by teachers consisting of 4-5 students. The group became a permanent group during the learning of circulation system materials and project activities. Objective finding trains students to identify problems to be solved.

Based on Table 3, students' activity in implementing objective finding stage got good category. The students of class XI MIA 1 were more active in the objective finding process, where each group discussed finding the problem object in the article of hypertension and cardiovascular diseases in LDS. Activity in this stage can be seen that the students work together in doing the LDS, meticulously in finding the core of sought and serious problem in completing student discussion sheet. Objective activities allow teachers to guide students to formulate questions about the causes of various hypertensive and cardiovascular diseases. The teacher's duty in this stage is only as a facilitator for the continuity of learning, the students do more activities independently and actively. Implementation of objective finding stage has increased in the second meeting. It can stimulate creative thinking to facilitate students in thinking smoothly where students are increasingly encouraged to identify by formulating the problem as much as possible.

At this stage there are aspects of creative thinking that develop the smooth and flexible thinking. Formulating the problems from an article can develop smooth thinking, students trying to find an idea or idea of the problem of hypertension and cardiovascular articles based on the data presented in the article. Flexible thinking is required by students in this stage, where the formulation of the problem is viewed from various angles such as, the cause of the occurrence of hypertension and cardiovascular problems and the effects of hypertension and cardiovascular. Students can conclude the problem by looking at various data of affected people and even activities that can cause hypertension and cardiovascular.

The next stage is data finding, students and groups collect data (exploration) by observing and looking at the information presented in the discussion sheet on hypertension and cardiovascular diseases, ranging from causes, impacts, and also patient data from previous years. Students then select relevant

information and ignore irrelevant information so that students can find keywords from the problem. During fact and information retrieval, students gain knowledge to solve problems using various learning resources such as textbooks and the internet. The task of teachers in the *data finding* stage is to guide students to sort through relevant information and to help infer the data to be selected. At this stage students begin to think openly and widely to find a problem from a different point of view according to the information/facts collected. In addition, at the data finding stage students become more sensitive and sensitive to a problem in accordance with one of the flexible thinking indicators in which students can propose ideas from different perspectives.

Stage of data finding trains students to develop student activities. Student activity in the data finding stage is good. Students are active in searching for supporting data to support in the conclusion of the formulation of the problem. Students can collaborate in the division of tasks to find data from books and internet. At this stage students are also seen enthusiastically asking teachers related to the sorting of data relevant to hypertension and cardiovascular information. The application of a project-based CPS model at the data finding stage can develop creative thinking in the aspects of flexibility and thinking of detailing. Aspects of flexible thinking can be developed through the activities of students looking at the data table presented through LDS sheets, students can arrange problems not only from reading but also based on the facts contained in the table number of patients with hypertension and comparison of patients in Indonesia. Those thinking can train students to find an idea from a different perspective in accordance with an indicator of the aspects of flexible thinking. The thinking aspects of detailing can also be generated through the stages of thinking detailing, where students are able to process data and facts that exist and link it with additional information obtained from literacy others. These activities can foster the ability aspects of detailing the students who are required to not pass any data so that the ideas obtained more reliable and relevant.

Furthermore, at the problem finding stage, students and their groups prepare problem statements which are then selected to be solved through group discussion. In addition, the teacher guides the students to determine other interesting issues to look for solutions related to hypertension and cardiovascular diseases. This stage trains students to find a problem solved with the group. In addition, this stage can also train students to think flexibly, where students use their creativity to find possible problems that will occur.

Student activity of problem finding stage can be seen when students discuss with other group members in determining the main problem. Students are active in determining problems by discussing, students are also careful in choosing an important problem, and serious in doing LDS. This is seen with the observation of students who achieve 80.6% in the class XI MIA 1 and 79.7% class XI MIA 3. The difference in activity in both classes seen in how students are enthusiastic in asking about hypertension and cardiovascular, class XI MIA 1 is more actively inquires than the class XI MIA 3. The students of class XI MIA 1 understand the given instruction by the teacher, unlike the XI MIA 3 which less understood by determining the main issues. The stages of problem finding can develop students' creative thinking in the aspect of thinking smoothly (fluency) and thinking of detail (elaboration). Aspects of thinking smoothly allows students to find various problems based on the formulation of problems and data supporting hypertension and cardiovascular. Thinking of detailing in this stage is needed in digging deeper information and listing which issues are deemed most important to discuss the right solution in solving the problem.

At the idea finding stage, students generate various problem solving ideas/solutions about cardiovascular diseases through group discussions, teachers play a role in guiding students to discuss the association between cardiovascular structure and cardiovascular function to establish a positive attitude. After discussion, the group can modify the idea of a strategy that is done in solving the problem. At the stage of disclosure of ideas, students become proficient in representing problems. Students are given the opportunity to discover and disclose various solving strategies by considering all information from the objective finding stage to problem finding. The fundamental thing that students need to do well is to build a picture of logical and creative thinking.

A prominent student activity at the idea finding stage is how the students argue with each other in determining the solution. Students are active in expressing personal opinions to other members. Students are brave in defending their arguments against other group members. After the student activity result that 79.15% class XI MIA 1 have good activity and 82.8% class XI MIA 3 has very good activity. Differences between the two classes can be seen from different student discussions, in class XI MIA 1 students more discussion about the solution obtained, but only one child decides which solution is used what is not, in contrast to class XI MIA 3 is active in discussions, mutual arguments and no children are dominant in the group. The idea of thinking authenticity, thinking smoothly and thinking detail plays an important role in the implementation of idea finding stages. Thinking of authenticity plays a role in finding solutions used in avoiding and overcoming hypertension and cardiovascular, the originality here means that the solution given is new to students, not necessarily new and unprecedented. Thinking well in this stage is also necessary in bringing forward the ideas or solutions of hypertensive and cardiovascular diseases, the more food solutions the more the ability to think smoothly. Thinking in detail at this stage that students can explain the solution about hypertension and cardiovascular disease with detail and detail how and why selected the solution.

At solution finding stage, students are encouraged to be skilled in selecting and developing the most effective method of completion in solving problems with logical reasons. With the guidance and direction of the teacher, students evaluate and select ideas about solving strategies so that they ultimately come up with an appropriate strategy to solve the problem. Student activity in this stage reached 83.3% class XI MIA 1 with very good criteria and 79.6% class XI MIA 3 with good criterion. Student activities in this stage include liveliness and cooperation of students in discussing determining the best solution. At this stage students use their creativity to find solutions. Students not only find solutions but students also choose which solutions are best in solving a problem. The solution in question is a solution how to avoid hypertension and cardiovascular disease. The four indicators of creative thinking are maximized in this stage, especially the original thinking indicators, not necessarily creating new ideas but also modifying previous ideas to see the originality of ideas.

At the acceptance finding stage, students determine which strategies can be taken to solve the problem, then apply it to find solutions to the problems and interpret the correct answers. In addition, students are also asked to contribute as a younger generation for the impact of hypertension and cardiovascular disease can be reduced in the community. This stage is the final stage in the application of project-based CPS model on the material of the circulation system. Students' activities at this stage are to create a work in the form of reports and products in the project after receiving long stages of the CPS model based on the material circulation system project. Project activities are based on KD 4.6 which is students display products based on analysis from various sources regarding circulatory system disorders through various forms of media which are then presented in front of the class. Outputs and outcomes from the application of project-based CPS models are at the acceptance finding stage. The result is that the students have high creativity, where the product results are displayed diverse and good.

Activity at this stage reached 80.6% in the class XI MIA 1 and 82.85% in XI MIA 3 with very good category. This is based on cooperation, accuracy among group members in completing projects Project use at this stage trains creative students in producing products. In accordance with research by Karlin *et al.* (2016) that the project activities done by students are directed to be active in learning to improve the performance of students and teachers act as facilitators and evaluators of the process and product of projects produced by groups of students. Students can find their own construct of the concept of circulating material with the use of the project. In accordance with research Masjudin & Hasanah (2014) that learning CPS can improve students' motivation and creative thinking.

Students' Project Result

The project is done by students in the acceptance finding stage in two weeks. Students are given project work to create products such as chart, diagram, poster, songs or props about circulation system disruption and disease. The project is assessed base on four criteria which are product planning, designing, implementing and presenting in front of class. From the process above obtained students' score as follows.

Table 4. Students' Project Result

Class	Score	Criteria
XI MIA 1	89,4	Very good
XI MIA 3	90,8	Very good
Average	90,1	Very good

Based on the analysis of the project results in Table 4, the average value of the project for both treatment classes was 90.1 with very good criteria. The effect of the CPS model on the project is shown in Table 4 that class XI MIA 1 and XI MIA 3 have excellent project outcomes. The results are based on the assessment of project results from planning, design, implementation to presentation of project outcomes. A series of project activities can be accomplished after the implementation of a project-based CPS model, in which stages of a project-based CPS model can stimulate students to think creatively and get into project work. In planning assessments, students can plan materials and tools and product ideas which are produced very well. In the planning activities students can develop the ability of original thinking in determining the resulting product, thinking smoothly and fluidly in considering the tools and materials used, and thinking details in planning as detailed as possible the resulting product.

After project planning then students are asked to design the project by drawing the design along with the product description and how to use the product. At this stage students are asked to develop the ability to think detail and authenticity, where students can describe the product in detail in line with the theory. The assessed product is the finished product and then presented in front of the class. The four aspects of students' creative thinking skills can also be seen in the percentage of project results based on the series of project work being undertaken. The results of the project can improve student learning outcomes in agreement with research conducted by Susilowati *et al.*, (2013) that the project-based learning effect on student's learning outcomes.

The impact of Project-Base CPS model application toward students' creative thinking, activities, and project result can be supported by students' response. Students' response is done by distribute checklist questionnaire for all students in class XI MIA 1 and XI MIA 3. There are 17 points filled by students after Project-Base CPS model learning. The score of students' response is analyzed in descriptive percentage with very good, good, enough and less criteria. The students' response sheet contains response of Project-Base CPS model in the circulation system material. The result can be seen in the Table 4 as follows.

Table 5. Results of Student Responses to the Project-Based CPS Model on Circulating System Materials

No	Indicator	XI MIA 1 (%)	XI MIA 3 (%)	Average (%)	Criteria
1.	Students interested and love the project-based CPS learning applied to the material of the circulatory system	85.5	84.1	84.8	Very good
2.	The project-based CPS learning model encourages students to be active and cooperate during the learning process.	83.0	83.9	83.45	Very good
3.	Students are easy to understand the concept of circulation system materials with project-based CPS learning.	83.2	84.4	83.8	Very good
4.	The project-based CPS model motivates students to learn the circulatory system.	84.3	84.4	84.35	Very good
5.	Model-based CPS project to encourage students to dare in express opinions/ideas to the class.	84.3	84.2	84.25	Very good
6.	The project-based CPS model encourages students in developing creative thinking skills by designing and creating projects of circulatory system abnormalities	84.3	86.4	85.35	Very good

7.	Learning of the project-based CPS model encourages students' interest in learning the material of the circulatory system.	82.9	82.8	82.85	Very good
8.	The project-based CPS model makes students' curiosity on the matter of improved circulatory systems.	84.9	83.9	84.4	Very good
Average				84.2	Very good

The response of Project-Base CPS Model appropriateness which is developed for the circulation system material learning get score 84.2% from students' response with very good category. The success of teaching and learning process in the class is influenced by several factors such as teacher, students, and model learning (Triyanti, 2015). Students more interest to the Project-Base CPS model so it can pushes students to be active and cooperate in teamwork during learning activity. Beside that, students can understand the circulation system material concept easily because the application of Project-Base CPS model. According to Table 5, Project-Base CPS model is able to motivate and inspiring students to learn the circulation system material well. Moreover students become more curious and able to express the ideas bravely. Project-Base CPS model can develop the students' creative thinking in the circulation system material well. In line with study by Fitriyah *et al* (2015) that Project-Base CPS model has positive effect toward creative thinking.

The limitedness in this study is the allocation of time given to apply project-based CPS learning on the material circulation system only 8JP. While, on the syllabus in the curriculum of 2013, the circulatory system material has 12JP. At the limitation, there are some obstacles in developing the creative thinking of students, where students are still not ready to develop ideas because of time limitations in the discussion. Discussion stages are quite time consuming where students have to find problems first, find information relating to the problem and find solutions to solve problems. The series of activities in the two meetings is not enough, so it needs more time so that students can develop creative thinking maximally.

CONCLUSION

The conclusion if this study is the use of Project-Base Creative Problem Solving Model process has positive effect toward students' creative thinking, activities and project result in the learning circulation system material in SMA. The summaries of the study specifically are: (1) The implementation of Project-Base Creative Problem Solving (CPS) Model to improve the students' creative thinking in the circulation system material get positive impact on class XI MIA 1 and XI MIA 3 with high and very high category, (2) The implementation of Project-Base Creative Problem Solving (CPS) Model improves the students' activities during learning activity more than 75%, (3) The implementation of Project-Base Creative Problem Solving Model can increase the project result well. According to those result, the writer suggests that the CPS model can be applied as alternative learning model in the circulation system material. In the next research, teacher is expected can manage the time better.

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