

## Improving Scientific Creative-Thinking Ability of Primary School Students through CRH Learning Model

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**Abstract.** This research is motivated by the low creative thinking ability of the fourth-grade primary school students in Cimahi City. The purpose of this research is to examine the achievement and improvement of creative thinking abilities of primary school students between those who used the Course Review Hooray (CRH) learning model assisted by monopoly game and those who used conventional learning. This research is a quasi-experimental type with a pretest-posttest control group design. The population in this study was the fourth-grade primary school students in Cimahi City, while the sample was determined using a purposive sampling technique obtained by class 4B as an experimental class with 35 students and class 4C as a control class with 35 students. The research instrument was a science creative thinking ability test. The results showed that the achievement and improvement of creative thinking abilities of primary school students with the CRH learning model assisted by monopoly game media was better than those who used ordinary learning.

**Keywords:** scientific creative thinking, course review hooray, monopoly.

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**INTRODUCTION** ~ Natural science concerns on researching nature systematically. Creative thinking needs to be developed in science learning so that students can practice finding alternatives to solve problems in science learning. Therefore, science is not only a collection of facts, concepts, or principles, but it is also findings. Science education in primary school is expected to be a vehicle for students to learn the natural environment and the prospects for further development in applying science in everyday life. Based on research by Oktaviani (2018), teachers in natural science learning usually always apply the conventional learning model or the group learning model, although the interaction between teachers and students does not occur optimally because the teacher only assigning tasks without direction or guidance for both groups and individuals. This indicates a lack of learning variation so that students become lazy to pay attention to learning. Therefore, nowadays, educational practices, especially in primary schools, are still more dominated by the knowledge transfer aspect rather than encouraging students to develop their creative power. Whereas in the Industry 4.0, the success or failure of learning depends on how the learning process experienced by students. According to Slameto (2010), there are two influential factors on students' success in learning, namely external factors (come from outside the students) and internal factors (come from students). External factors are factors originating from outside the

individual, such as family, school and community environment, while internal factors consist of three stages, namely fatigue factors (physical fatigue and spiritual fatigue), physical factors (health and disability) and psychological factors (intelligence, attention, interests, talents, motives, maturity, skills and readiness for learning). In addition, the atmosphere of learning in togetherness is more possible for an enjoyable learning process. Creativity is considered to be a fundamental part of the education process, especially in building a focused attitude towards disruptive situations that can emerge at any time. Moreover, creative thinking ability is needed by students to face problems in the learning process (Mahanal & Zubaedah, 2017). Creative thinking ability is required to support the students as an effort in exploring the understanding of a concept. Coughlan in Mahanal & Zubaedah (2017) argues that in addition to enriching and deepening learning experience, creative thinking is useful in solving problems in everyday life and making a decision.

Creativity is the outcome of creative thinking, in which the learning environment is crucial in supporting students' creativity. Some studies found that learning based on passion, creation, collaboration, and supportive atmosphere is considered as learning that supports creativity (Chan & Yuen, 2014). Students who learn in a supportive atmosphere for creativity have been shown to have higher reasoning abilities, stronger thinking abilities, increased level of trust, motivation and learning involvement, and critical thinking and problem-solving abilities (Richaricdson & Mishra, 2018)

Recognizing the importance of the ability to think creatively, students need to put in the effort to improve and enhance their creative thinking abilities, including innovating in learning using appropriate learning models, thus they can practice using their abilities in creative thinking. These problems can be solved through the learning process that can improve students' creative thinking abilities. Learning will be meaningful to students if they actively participate in various ways to construct or build their knowledge (Simone & Mostert, 2016; Atmojo, Sajidan, Winarno & Ashadi ,2019). Therefore, cooperative learning needs to be conducted as an alternative. According to Tsai and Yu (Ali, 2017),

... CL (cooperative learning) has changed classrooms from being teacher-centered, which is focused on the teacher who imparts knowledge to the students, to being student-centered, which emphasizes the active role of students participating in their learning. In cooperative classrooms, students remain responsible for their findings. and they can become truly excited about the learning process.

Therefore, the selection of learning models is significant and must be adjusted to students' thinking abilities. One of the cooperative learning models that can be used is the Course Review Hooray model.

Thus, as an effort to improve the creative thinking abilities of primary school students, this research uses one of the cooperative learning models, namely Course Review Hooray (CRH). Through this learning model, it is expected to facilitate a series of the learning process with the development of creative thinking (course) orientation, and open the possibility to interact

between different process and products of thinking through the Review stage, thus all students can express their joy when they succeed in achieving common goals in learning. To facilitate a more challenging, fun, and student collaboration encouraging the learning process, this research uses game media.

According to Shohimin (2014), the advantages of CRH learning model are as follows:

1. Learning becomes interesting and encourages students to dive into it.
2. Learning does not become monotonous because it is interspersed with a little entertainment, thus the atmosphere is not tense.
3. Students are more enthusiastic about learning because the learning atmosphere is fun.
4. Learning can practice students' cooperation.

The learning process will be more effective if the models, strategies, or methods of learning are integrated with the media. The media is an inseparable part and process of teaching and learning for the achievement of educational goals in general and learning objectives in schools. This research used monopoly as a game media.

A monopoly game is one of the game media that can make learning activities interesting and help the atmosphere of learning to be fun, lively, and relaxed (Fitriyawany, 2013). Meanwhile, according to Suciati, Septiana, & Untari (2015), monopoly game is appropriate to be used as learning media because this is one of the game media that can make teaching and learning activities interesting, lively, fun and relaxed, and can increase the involvement of students actively to solve problems in teaching and learning activities, thus students can improve their learning outcomes. In addition, monopoly games are mostly known by students so that they are able to implement and play it in classrooms (Siskawati, Pargito & Pujati, 2016).

Learning media is very useful to facilitate students in understanding the material conveyed by the teacher. Sudjana (2013) states the benefits of learning media in the learning process of students, as follows:

- a) Learning will attract more attention of students, and foster motivation to learn;
- b) Learning material will be clearer in meaning so that student will understand it easier;
- c) Learning methods will be more varied, not only verbal communication, so students do not get bored easily and teachers do not get tired easily;
- d) Students do more learning activities.

This research conducted by Lestari (2016) on fourth-grade students in Semester II in one of the primary schools in Cimahi revealed that the application of the Course Review Hooray learning model could improve the fourth-grade students' activities and learning outcomes in natural science. The research results show that the course review hooray review model is effective in optimizing student activity, learning effectiveness, and creating a fun learning

atmosphere that leads to students' learning outcomes. The results of these studies can be used as a basis for carrying out further research on the hooray review course model. The research conducted by Siutriani, Arini, & Garminah (2016) revealed that the application of the game media-based Course Review Hooray (CRH) model, especially the monopoly game, can increase the primary school students' activeness and learning outcomes in natural science. Furthermore, the research conducted by Rahaju & Hartono (2017) about game media revealed that monopoly games can improve primary school students' achievement in Mathematics. Based on the aforementioned research results, it is concluded that a monopoly game can be used to improve various aspects of knowledge both in natural science learning. However, the use of game media to improve the primary school students' scientific creative thinking ability has never been found in the previous research.

## METHODS

This research was conducted on 20 January 2019 until 28 January 2019. The research subjects were the fourth-grade primary school students in Cimahi City. The fourth-grade students were selected because the CRH models need interactive and cooperative communication among students, and the fourth-grade student Fourth-grade students are considered relatively possible to carry out this type of communication.

### Research Procedure

This research employed a quasi-experimental research design. In this research, there were two classes involved as the research sample, namely experimental class, and control class. This quasi-experimental research design used a nonequivalent control group pretest and posttest design (Ruseffendi, 2010). Both groups received a pretest and posttest, but only the experimental group received treatment. The learning in the experimental class used the monopoly game media-based Course Review Hooray (CRH) model, while the learning in the control class used conventional learning. According to Sugiyono in Kelana and Pratama (2019), the research design with the quasi-experimental method is as follows.

**Table 1.** Research Design of Nonrandomized Pretest-Posttest Control Group Design

Class	Pretest	Treatment	Posttest
Experimental	O	X1	O
Control	O	X2	O

Information:

O : Pretest or posttest of mathematical creative thinking ability

X1 : Learning using monopoly game media-based Course Review Horay (CRH) model

X2 : Conventional learning

The population of this research was the fourth-grade primary school students in Cimahi with a sample of 60 students. The sampling technique used a random cluster model because it is not possible to randomly select the students into the experimental class and the control class. The purposive sampling technique was used with the consideration that the distribution of the students of both classes is evenly reviewed in terms of their academic ability. Based on these techniques, the research sample was obtained that class 4B as an experimental class and class 4C as a control class, with the total number of students was 32 students.

The research instrument used a scientific creative thinking test using eight questions. The validity of the data in this research used content validity. To see the validity of the content of this test, the instrument was tested on classes that had received materials. The instrument was not calculated statistically but was reviewed and consulted with experts. Based on the instrument reviews from experts, there are eight questions used as the instrument. The indicators of creative thinking proposed by Munandar in Purwaningrum (2016) are as follows,

a. Fluent Thinking Skill (*Fluency*)

- 1) Come up with many ideas for answers, problem-solving, or answers.
- 2) Provide many method or suggestion for doing various things,
- 3) Always think of more than one answer.

b. Flexible Thinking Skill (*Flexibility*)

- 1) Generate varied ideas, answers, or questions.
- 2) Be able to see the problem from different perspectives.
- 3) Look for many alternatives or different directions,
- 4) Be able to change the way in approaching or thinking.

c. Original Thinking Skill (*Originality*)

- 1) Be able to generate new and unique expression,
- 2) Think of an unusual way of expressing themselves,
- 3) Be able to make unusual combinations of parts or elements.

d. Elaborative Thinking Skill (*Elaboration*)

- 1) Be able to enrich and develop an idea or product,
- 2) Add or elaborate an object, ideas, or situation in detail to be more interesting.

Data analysis is a method for the researcher to process and summarize data accurately. The first step of data processing is counting pretest and posttest, and N-Gain derived from the results of the scientific creative thinking ability test. The first statistical test is the normality test. If the two classes are normally distributed, then the data is tested for homogeneity. If the data are homogenous, the researcher conducts a t-test while the t-test is performed when the data are not homogenous. Furthermore, if the researcher finds that data are not normally distributed, the researcher must conduct the Mann-Whitney test.

## RESULT AND DISCUSSION

Before conducting the treatment, both classes were given a pretest. This aimed at finding out the initial students' abilities in scientific creative thinking, both in experimental class and control class, so these initial abilities could be outlined as equal or not. The pretest data were statistically analyzed using IBM SPSS Statistics 25 Software.

The normality test was initially conducted to find out whether the samples from the experimental class and the control class that was normally distributed or not normally distributed. In the normality test, the Kolmogorov-Smirnov test was used with a significant level of 5%. The testing criteria are as follows:

If Sig. > 0.05, the sample is normally distributed population.

If Sig.  $\leq$  0.05, the sample is not normally distributed population.

Table 2 shows the results of the normality test for the experimental and control classes at the pretest.

**Table 2.** Normality Test of Scientific Creative Thinking Ability at Pretest

	Class	Kolmogorov-Smirnov <sup>a</sup>			Information
		Statistic	df	Sig.	
Pretest Scores of Scientific Creative Thinking Ability	Monopoly Game Media-based Course Review Hooray (CRH)	.126	32	.200*	Normally Distributed
	Conventional Learning	.146	32	.079	Normally Distributed

Table 2 shows that the significance value (Sig) of the experimental class was 0.200 > 0.005 and the control class was 0.079 > 0.05. This shows that the pretest data of creative thinking ability obtained from the

experimental and control class were normally distributed. In this test, it can be concluded that both classes were normally distributed. Therefore, a variance homogeneity test was conducted. The result of the pretest data homogeneity test is as follows:

**Table 3.** Homogeneity Test of Scientific Creative Thinking Ability at Pretest

Levene Statistic	df1	df2	Sig.
.405	1	62	.527

Table 3 shows that a significance value of 0.527 was obtained. Since the significance value was greater than 0,05, the pretest data of experimental and control classes were

homogeneous or had the same variance. Based on the previous results, then the independent sample t-test was conducted using SPSS 25. To examine the similarity of initial abilities of creative thinking, both in experimental and control classes, the parametric statistical test with the independent sample t-test was used on SPSS 25 software. This test was carried out because one of the samples was originated from a normally distributed population. The hypothesis of students' initial creative thinking abilities in the experimental and control classes are formulated as follows:

$H_0$  : There is no difference in the initial ability of creative thinking between experimental and control classes.

$H_1$  : There is a difference in the initial ability of creative thinking between experimental and control classes.

The result of the independent sample t-test is presented in Table 4.

**Table 4.** Two Mean Test of Scientific Creative Thinking Ability at Pretest

		t-test for Equality of Means			
		T	Df	Sig. (2-tailed)	interpretation
Pretest Score of Scientific Creative Thinking Ability	Equal variances are assumed	.698	62	.488	H <sub>0</sub> is accepted
	Equal variances are not assumed	.698	60.824	.488	

Table 4 shows that the significance value of Asymp. Sig. (2-tailed) was  $0.488 > \frac{1}{2} \alpha$  (0.025). The result indicated that  $H_0$  was accepted because there was no difference between experimental and control classes regarding the students' initial creative thinking ability. Furthermore, to see the achievement of the scientific creative thinking ability of the experiment and control class, the posttest data was tested. The first statistical test was the normality test. The following were the results of the normality tests of experimental and control classes at posttest.

**Table 5.** Normality Test of Scientific Creative Thinking Ability at Posttest

	Class	Kolmogorov-Smirnov <sub>a</sub> Statistic	df	Sig.	Information
The Posttest Score of Science Creative Thinking Ability	Monopoly Game Media-based Course Review Hooray (CRH)	.156	32	.045	Not normally distributed
	Conventional Learning	.156	32	.047	Not normally distributed

Table 5 shows that the significance values (Sig.) of the experimental and the control classes were respectively 0.045 and 0.047. Since the significance value of the two classes was  $< \alpha$  (0.05), it shows that the pretest data of creative thinking abilities obtained from the experimental and control class were not normally distributed.

Therefore, it can be concluded that the two samples were not normally distributed populations. Since the two samples were not normally distributed, the homogeneity test was not conducted. However, the difference of the samples was directly tested using a non-parametric statistical test, Mann Whitney U, in SPSS 25 software.

To test whether the final ability of creative thinking in the experimental class and control class was similar or not, a non-parametric statistical test, Mann Whitney U, was used in SPSS 25 software. The test was conducted because both samples were originated from the non-normally distributed population. The hypothesis of the final ability of students in the experimental and control class is formulated as follows:

$H_0$  : There is no difference in the final ability to think creatively between the experimental class and control class.

$H_1$  : There is a difference in the final ability to think creatively between the experimental class and control class.

The result of the Mann Whitney U test is presented in Table 6 below.

**Table 6.** Difference Test of Two Average Posttest Data

	<b>Posttest</b>
Mann-Whitney U	299.000
Wilcoxon W	827.000
Z	-2.896
Asymp. Sig. (2-tailed)	.004

Table 6 shows that the significance value of Asymp. Sig. (2-tailed) was  $0.004 < \frac{1}{2} \alpha$  (0.025). This indicated that  $H_0$  was rejected because It shows that there was a difference in the final abilities of students' creative thinking between experimental and control classes.

Because each class in this study sample came from the same initial ability, then to find out the difference in the increasing ability of creative thinking, the N-gain test was conducted. However, before conducting the test, the normality and homogeneity of N-gain data were calculated first. The result of the normality test of N-gain data is presented in Table 7:

**Table 7.** Normality Test of N-gain Data

Class	<i>Kolmogorov-Smirnov<sub>a</sub></i>	
	Statistic	df Sig.



n-gain	Experimental	.133	32	.163
	Control	.080	32	.200*

Table 7 shows that the significance values of N-gain data of the experimental and control classes were respectively 0.163 and 0.200. The significance value of both classes  $> \alpha$  (0.05), so that the N-gain data of the creative thinking ability obtained from the experimental class and control class were normally distributed.

After finding out that the N-gain of experimental and control classes was normally distributed, the test for homogeneity of variance was conducted. The result of this test is presented in Table 8:

**Table 8.** Homogeneity Test of N-gain

		Levene Statistic	df1	df2	Sig.
n-gain	Based on Mean	.000	1	62	.987
	Based on Median	.001	1	62	.980
	Based on Median and with adjusted df	.001	1	60.426	.980
	Based on trimmed mean	.000	1	62	.989

Table 8 shows that the significance value obtained was 0.989. Since the significance value was greater than 0.05, the N-gain data of the experimental and the control classes were homogeneous or had the same variance.

Because the N-gain data shows normal and homogeneous data, the independent sample t-test on SPSS 25 was conducted. The hypothesis of increasing students' creative thinking ability of the experimental and control classes is formulated as follows:

$H_0$  : There is no difference in the increase of students' creative thinking ability between experimental and control class

$H_1$  : There is a difference in the increase of students' creative thinking ability between experimental and control class

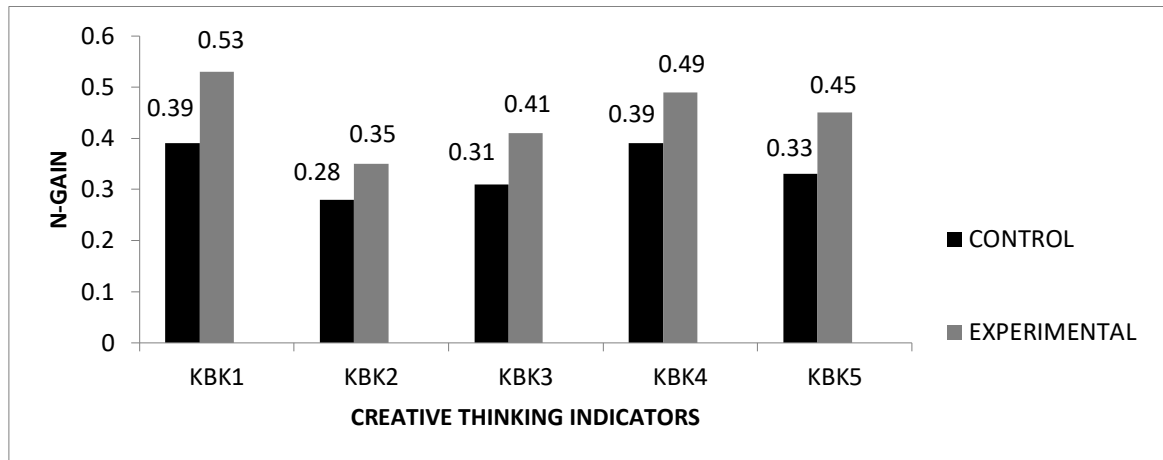
The independent t-test result is presented in Table 9:

**Table 9.** Independent sample t-test of N-gain Data

		t-test for Equality of Means				
		T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
n-gain	Equal variances are assumed	-3.831	62	.000	-.15687	.04095
	Equal variances are not assumed	-3.831	61.749	.000	-.15687	.04095

Table 9 shows that the significance values of Sig. (2-tailed) were (0.000)  $< \frac{1}{2} \alpha$  (0.025), which indicated that  $H_0$  was rejected, or there was a difference in the increase of students' creative thinking ability between the experimental and control classes.

The increase of students' creative thinking ability can be seen in detail through its indicators, namely thinking fluently, flexibly, and originally, as well as elaborating and valuing skills. Figure 1 contains the information on the indicators.



**Figure 1.** Comparison Diagram of N-gain for each Indicator of Students' Creative Thinking Ability

Information :

KBK1 = Fluent thinking skill

KBK4 = Elaboration skill

KBK2 = Flexible thinking skill

KBK5 = Valuing skill

KBK3 = Original thinking skill

Figure 1 depicts that the normalized N-gain score of each indicator of students' creative thinking abilities in the experimental class was higher than the control class. Related to the increasing students' creative thinking skills between the two classes, the lowest score of normalized N-gain of the students in the experimental class was obtained in the flexible indicator with the value of 0.35, while the highest score of normalized N-gain was obtained in the fluency indicator with the value of 0.53, categorized as a medium category. In the control class, the lowest score of normalized N-gain was obtained in the flexible indicator with the value of 0,28, categorized as the low category, while the highest score of normalized N-gain was obtained in the fluency and elaborating indicators with the value of 0,39, categorized as a medium category.

## DISCUSSION

The research results that have been presented included the creative thinking ability with the monopoly learning media-based CRH learning model. The steps of CRH learning assisted by monopoly game were adopted from Sugandi and modified from Ani, Garminah, & Suartama (2016) there were several steps in applying the CRH learning model assisted by monopoly game media in this research, namely: (1) Delivering learning objectives and preparing the students. In this step, the teacher conveyed the competencies to be achieved; and (2) Presenting information. In this step, the teacher explained the material first, then the teacher

instructed the students to play a mathematical monopoly (MONSAINS) where there were questions that measured the ability to think creatively in science as a group, afterward the teacher invited the students to discuss the problem being worked on, provided opportunities to them to ask questions and explain questions that were studied more deeply; (3) Organizing students in collaborative learning. In this step, the teacher instructed students to fill in the numbers in the answer sheet columns in groups, then the teacher read questions in a sequence, while the students wrote the answers in the column based on the number of questions; (4) Helping a group work and learning. In this step, the teacher and students discussed the questions that had been given, and the students answered the questions by filling in the sign ( $\checkmark$ ) if the answer was correct or the sign (X) if the answer was incorrect. The groups that get the correct sign vertically, horizontally, or diagonally had the right to shout the word "Hooray"; (5) Evaluating. In this step, the teacher calculated the students' scores based on the number of correct answers.; (6) Giving recognition and appreciation. In this step, the teacher gave rewards to the group that obtained the highest score. In terms of creative thinking, the results of the research showed that the experimental class was better than the control class from a whole and per indicator. These results were in accordance with the provisional conjecture stating that learning with Course Review Hooray (CRH) model will improve creative thinking abilities better, and make the students more active due to a fun learning activity. The benefits of the Course Review Horay (CRH) learning model was that learning became more attractive, and not monotonous because it was interspersed with slight entertainment so the atmosphere became more relaxing. Therefore, creative thinking would avoid students from getting bored with learning so that they became more active students (Rahma, Farida, & Suherman, 2017).

Munandar in Purwaningrum (2016) explains that the characteristics of creative thinking abilities are depicted as follows: a. Fluency is fluent thinking skills characterized by triggering many opinions, answers, solving problems, providing many ways or suggestions in doing things, and always thinking of more than one answer. b. Flexibility is the ability to produce ideas, answers, or varied questions, see a problem from different points of view, look for many different alternative solutions, and be able to change the approach. c. Originality is the ability to generate new and unique ideas, think of unusual ways to express themselves and be able to make unusual combinations. d. Elaboration (detailing skill) is the ability to enrich and develop an idea or product and add or detailing to make a more interesting situation.

Based on the observation during the research, the students in the experimental and control classes had different characteristics, including: (1) in the experimental class, the students more reacted expressively while in the control class, they tended to require time and effort from the teacher before reacting, (2) the students in the experimental class tended to be courageous so that they were able to deliver opinion quickly, while in the control class

students, tended to be passive so that they did not dare to deliver an opinion, and (3) in experimental class, the students tended to be more active without teacher's encouragement.

From the above circumstances, it can be explained that active expression of student opinion cannot be used as an indicator of the development of creative thinking abilities because the process of creative thinking includes indicators of fluency, flexibility, originality, elaboration, and re-formulation. These five indicators contain the meaning of the process of deep thinking, thus when a person engages in a creative thought process, it can be expressed in the form of expression accompanied by an argumentative explanation. To facilitate a more challenging and enjoyable learning process that can encourage collaboration between students, this research used a game media, namely monopoly. Monopoly is one of the game media which can lead to interesting activities and help the atmosphere of learning to be happy, lively, and relaxed (Fitriyawany, 2013).

Course Review Horay (CRH) learning assisted by monopoly game media does not only requires students to understand science but also requires them to be able to work on problems, which measure the ability to think creatively. In addition to cognitive abilities obtained from Course Review Horay (CRH) learning assisted by monopoly game media, other abilities are also obtained from this learning, including collaborating. This is in line with Sari and Julianto (2018) that the Course Review Horay learning model is characterized by assignment structure, goals, and cooperative rewards that produce positive dependencies among fellow students, the difference between students and others can develop a group's cooperative skills.

In general, learning deals with the formation of schemata. The formation involves the process of identifying mental objects that are already owned, making connections between these mental objects, and forming new mental objects that can be a process of creative thinking. One of the foundations that can be used to explain this process is the Zone of Proximal Development (ZPD) theory from Vygotsky (Shabani, Khatib, & Ebadi, 2010).

According to Vygotsky, learning can evoke a variety of stored mental processes that can only be operated when a person interacts with adults or collaborates with fellow friends. The development of abilities acquired through self-learning processes (without the help of others), when solving problems is called actual development. While developments that occur as a result of interactions with teachers or other students with higher abilities are called potential developments. The zone of proximal development is then defined as the distance between actual development and potential development.

According to Vygotsky in Shabani et al. (2010), the learning process occurs in two stages, namely when collaborating with others and the internalization process individually. During the

process of interaction between the teacher-student and among the students, the following abilities need to be developed: mutual respect, testing the truth of the other party's statements, negotiating, and adopting mutual opinions that developed. Based on this theory, the process of achieving actual and potential development can be carried out alternately through the process.

## CONCLUSION AND RECOMMENDATION

Based on the findings of the study, it is concluded that the achievement of the creative thinking ability of primary school students with a monopoly game media-based Course Review Hooray learning model was better than those using the conventional learning model.

Moreover, there is a number of some recommendations as follows:

- a. For further researchers, the results of this research are expected to be used as a comparison and basis for further research related to the improvement of the creative thinking of primary school students.
- b. The further researchers are expected to better understand the steps in using CRH learning, and be more creative in making learning media so that the research results are as expected.

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