The effectiveness of investigation group learning model based on Marzano's instructional framework in improving students' higher order thinking skill

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Abstract: This study aims to analyze the effectiveness of investigation group learning model based on Marzano's instructional framework in improving students' higher order thinking skills. The method used in this study was a quasi-experimental method with the matching only control group pretest-posttest design. Here, the data were collected through observations, questionnaires, and tests. The tests consisting of limited and extensive tests aim to analyze the effectiveness of the investigation group learning model based on Marzano's instructional framework in improving students' higher order thinking skills. The results showed that the majority of students (>75%) have an increased level of higher order thinking skills (critical and creative thinking skills). It was proved by the results of statistical analysis where the sig. value < 0.05 and $t_{table} > t_{count.}$ Thus, H_0 is rejected meaning that there is a significant difference on students' higher order thinking skills before and after applying the investigation group learning model based on Marzano's instructional framework in the teaching and learning process. Then, if it is classified, the improvement of students' critical and creative thinking skills is included into the medium category. Hence, it can be concluded that the investigation group learning model based on Marzano's instructional framework is effective in improving students' higher order thinking skills in social studies learning.

Keywords: *investigation group; Marzano's learning dimensions; higher order thinking skills; critical thinking skills; creative thinking skills.*

INTRODUCTION

Law No. 20 of 2003 concerning the National Education System defines education as a conscious and planned effort to realize a learning atmosphere where students can actively develop their potential to have religious knowledge, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state.

Education plays a very important role in improving the quality of human resources. Education is expected to be able to develop students' abilities and competencies. Therefore, in practice, education must be able to develop students' potential. This concept of education becomes increasingly important when students must live in a society where they are required to be able to face various problems in their daily lives. Unfortunately, in the learning process, students are less encouraged to develop their critical thinking skills. So far, the learning activities in the classroom are more directed at memorizing information. Conversely, students' thinking skills should be directed at understanding and connecting information with everyday life to deal with current problems.

Higher order thinking skill as one of the transferable skills is very important to be developed in the teaching and learning process at school. This skill is one of the skills that must be possessed by students to be able to compete in the 21st century. Transferable skills are defined as skills developed in one situation that can be transferred to another situation, in the sense of a classroom learning situation to situations in real life (Denicolo & Revees, 2012; Balcar, J. *et al.*, 2011). Furthermore, critical thinking skills have been defined in various ways. Beyer (1995) in Filsaime (2008, p. 56) defines critical thinking as "making reasonable judgments." According to Beyer (1995), critical thinking is a way of thinking used by someone to evaluate the validity of something (statements, ideas, arguments, research, etc.). On the other hand, Screven and Paul (1996) and Angelo (1995) in Filsaime (2008, p. 56) define critical thinking as "an intelligent discipline process of conceptualization, application, analysis, synthesis, and active evaluation as well as skills collected from or developed by observations, experiences, reflections, reasoning, or communications." From several definitions and indicators of critical thinking skills, the indicators used to measure critical thinking skills are the ability to identify problems, to analyze, to interpret, to give solutions, to reflect, and to think of practical actions.

Improving students' higher order thinking skills can be facilitated by using investigation group learning model. The use of investigation group learning model can help teachers in organizing teaching materials and in determining learning strategies to facilitate the teaching and learning process in order to achieve optimal results. Investigation group learning model is a cooperative learning strategy which involves task specialization (Slavin in Montgomery, Holder & Stuard, 2008). In the same vein, The Network Scientific Inquiry Resources and Connections as cited in Aunurrahman (2010, p. 151) define investigation group as an organizational medium to encourage and lead students' involvement in learning activities. Here, the students are encouraged to be actively involved in various activities in the classroom. They can communicate freely and work together in planning and investigating the topics they choose. By doing so, they can achieve more than those who do it individually. In other words, the results of the group work reflect the contribution of each member, but are intellectually richer than the results of work done individually by the same student.

Theoretically, investigation group learning model is one of the teaching methods in social studies (Joyce, Calhoun, & Hopkins, 2002) in (Abordo & Gaikwad, 2005). The investigation group learning model aims to develop skills to participate in democratic goals and to promote academic skills development and personal understanding (Joyce, Weil & Calhoun, 2000) in (Abordo & Gaikwad, 2005). Sharan *et al.* in Trianto (2010, p. 80) divide the stages of

investigation group learning model into 6 (six), namely topic selection, cooperative planning, implementation, analysis and synthesis, presentation of final results, and evaluation.

Learning dimension was firstly introduced by Robert J. Marzano in 1992 in his book *A Different Kind of Classroom*. There are five dimensions of learning proposed by Marzano (1992), namely; a) Attitude and perceptions - Attitudes and perceptions affect the students' ability to learn. If students view the classroom as an uncomfortable and irregular place, they will not be motivated to learn; b) Acquiring and integrating knowledge - One of important aspects in learning is helping students to gain new knowledge and integrate it into knowledge stored in their memory; c) Extending and refining knowledge – Students' learning do not stop by only acquiring and integrating knowledge, but they must be able to develop their understanding through a process of extending and refining knowledge; d) Using knowledge meaningfully - One indicator of a meaningful learning is the students' ability to use their knowledge to solve problems; and e) Productive habits of mind - The learning process can be said to be effective if students are able to develop their thinking habits that lead them to think critically and creatively as well as to control their own behavior.

This study tried to analyze the effectiveness of investigation group learning model based on Marzano's instructional framework in improving students' higher order thinking skills. The principles of investigation group learning model based on Marzano's instructional framework are as follows: 1) Creating a conducive learning environment; 2) Providing issues associated with daily lives; 3) Providing opportunities for students to complete tasks cooperatively; 4) Providing performance objectives containing operational verbs to direct students' performance in analyzing the materials so that the students will be able to develop their higher order thinking skills; and 5) Using prior knowledge in the long term memory to reconstruct material concepts which result in assimilation of knowledge. These five principles are arranged based on the principles of Marzano's learning dimensions and curriculum organizations using Investigation Group learning model.

Referring to the above description, the problem raised in this study is formulated into the following question: How is the effectiveness of investigation group learning model based on Marzano's instructional framework in improving students' higher order thinking skills?

METHOD

The research method used to analyze the effectiveness of investigation group learning model based on Marzano's instructional framework in improving students' higher order thinking skills was a quasi-experimental method with the matching only control group pretest-posttest design. In this quasi-experimental study, one control class and one experimental class were used. The teaching and learning process in the control class was done by applying the conventional method of teaching. Meanwhile, the teaching and learning process in the experimental class was done by applying the investigation group learning model based on Marzano's instructional framework. The matching only control group pretest-posttest design is shown in Table 1.

Table 1. *Design of the extenxive tests*

Class	Pre-Test	Treatment	Posttest

Experiment	O_1, O_2	investigation group learning model based on Marzano's instructional framework	O_3, O_4
Control	O_1, O_2	conventional method of teaching	O_3, O_4

Tests of the effectiveness of investigation group learning model based on Marzano's instructional framework in improving students' higher order thinking skills consists of two types, namely limited and extensive tests. The limited tests or initial field tests were carried out at SMPN 1 Kuningan and SMP Yos Sudarso. Meanwhile, the extensive tests were carried out at SMPN 4 Kuningan, SMPN 6 Kuningan, SMP IT Al-Multazam, and SMP Itus. In this study, the effectiveness of the model is based on learning processes and outcomes. The instruments used to measure the effectiveness of the learning model are presented in Table 2.

Table 2. *The instruments used to measure the effectiveness of the learning model*

Purposes	Data Collection Techniques	Data Sources
Evaluating the effectiveness of the process	Observation guidelines	Learning activities
Learning outcomes	1. Tasks (portofolio) 2. Students' worksheet Questionnaires: 1. Teachers' responses 2. Students' responses	Students: 1. Pre-Test result 2. Post-Test result

RESULTS AND DISCUSSION

Limited test

A general description of the limited tests

The limited tests were conducted in two schools, namely SMPN 1 Kuningan which involved 31 students and SMP Yos Sudarso which involved 25 students. The limited test conducted at SMPN 1 Kuningan took place on August 6-8, 2018. This trial activity was carried out by involving one model teacher, observer teacher, and headmaster. In general, at the 1st until the 3rd meeting, the learning process has run quite well where the model teacher has begun to fully master the phases of the investigation group learning model based on Marzano's instructional framework. An interesting thing occurs when students were discussing in groups concerning the plurality of Indonesian society. The students were active and enthusiastic in; 1) identifying the diversity of cultures existing in Indonesia both on a local, national and global scale, 2) analyzing the impact, causes and solutions, 3) reflecting on it, and 4) designing concrete actions to overcome the problems of plurality which often result in conflict and division. The students were active and confident to express their opinions and ideas.

After conducting the trial activity at SMPN 1 Kuningan, the model teacher, the observer teacher, and the headmaster made an evaluation conducted in the teacher's office. The evaluation results showed that the limited test has run well where the teacher has mastered the teaching material, has conducted the teaching and learning process by applying the investigation group learning model based on Marzano's instructional framework, and has understood the assessment techniques. Yet, there are several points to be improved, namely: a) the teacher must facilitate students' activity while discussing in groups, b) the teacher must be

able to draw conclusions after the question and answer session, and c) the teacher must facilitate students to be more confident in conveying ideas and opinions on the issue of plurality in Indonesia.

Furthermore, the second limited test conducted at SMP Yos Sudarso took place on August 22-24, 2018. This second limited test involved one model teacher, observer teacher, and headmaster. Overall, the teaching and learning process with the investigation group learning model based on Marzano's instructional framework at the 1st until the 3rd meeting has not run optimally due to several reasons, including: the model teacher has not fully mastered the classroom management and the phases of the learning model, and the learning media provided have not been used properly. Besides, the students tended to be passive since they were not familiar with the presence of model teacher and observer in the classroom. This unfavorable situation has an impact when students are divided into discussion groups. This happened because they did not really understand the teacher's direction regarding the group discussion sheet so that the teacher needed to re-explain it.

However, the students began to be active and confident in expressing their opinions and ideas while discussing in groups, starting from identifying a simple problem of plurality to a complex problem of plurality, analyzing the impact, causes and solutions, reflecting on it, and designing concrete actions to overcome the plurality issues which often result in conflict and division. At the third meeting, each group was asked to prepare several teaching aids in the form of posters, pictures, morals, etc. to campaign on preventing the plurality issues in Indonesia as a multicultural society. Here, the students became more active, critical and creative. They try to express and explore their reasoning and creativity.

After conducting a limited test at SMP Yos Sudarso, an evaluation involving the model teacher and observer teacher was carried out. The evaluation highlighted several important points as follow: 1) The teacher needs to prepare themselves more thoroughly in terms of mastery of the teaching material, the syntax of the learning model, and the assessment techniques to measure students' critical and creative thinking skills; 2) The teacher must be able to stimulate students to be actively involved, both in discussing and presenting the discussion results; and 3) The teacher needs to facilitate students while presenting in order to increase their self-confidence so that they can express their opinions and ideas critically and creatively.

The effectiveness of investigation group learning model based on Marzano's instructional framework

To assess the effectiveness of the investigation group learning model based on Marzano's instructional framework, observations towards teacher's and students' activities were carried out. The observation results towards the teacher's activities in SMPN 1 Kuningan are presented in Table 3.

Table 3. *The observation results towards the teacher's activities in SMPN 1 Kuningan*

Rated Aspects	**SCORE**					
	1st meeting		**2nd meeting**		**3rd meeting**	
	P1	**P2**	**P1**	**P2**	**P1**	**P2**

Preliminary Activities	3,57	3,71	3,43	3,86	3,86	3,86
Core Activities						
1. Teaching strategies	3,71	3,86	3,57	3,43	3,86	4,00
2. Mastery of teaching materials	3,40	3,60	3,80	3,80	3,80	3,80
3. Use of learning sources/media	3,75	4	3,50	3,50	3,75	4,00
4. Students' involvement in learning	3,50	3,60	3,70	3,80	3,90	3,90
5. Assessment of processes and outcomes	3	3	4	3	4,00	4,00
6. Use of language	3,33	3,67	3	4	3,67	4,00
Closing	3,50	3,75	4	3,75	4,00	4,00
Average score	3,47	3,65	3,63	3,64	3,86	3,95
Average score in each meeting	**3,56**		**3,63**		**3,90**	

Table 1 shows the observation results towards the teacher's activities at SMPN 1 Kuningan. In general, the preliminary activities were carried out well by the teacher. Yet, the teacher did not provide a complete explanation regarding the learning activities that would be done during the application of the investigation group learning model based on Marzano's instructional framework. At the core activity, there was an improvement in teacher's activities from the first until the third meeting. The lowest score at the first meeting was in the aspect of asking students to identify social problems occurred in their environment. Here, the teacher did not provide opportunities for students to think and explore, but she directly gave examples to be discussed. Besides, at the next stage, the teacher did not ask students to write any important things that need to be further discussed. Yet, at the second and third meetings, there was an improvement on teacher's activities so that the teacher got higher scores.

Furthermore, the observation results towards the teacher's activities in SMP Yos Sudarso are presented in Table 4.

Table 4. *The observation results towards the teacher's activities in SMP Yos Sudarso*

Rated Aspects	**SCORE**					
	1st meeting		**2nd meeting**		**3rd meeting**	
	P1	**P2**	**P1**	**P2**	**P1**	**P2**
Preliminary Activities	3,57	3,57	3,43	3,86	3,86	3,86
Core Activities						
1. Teaching strategies	3,43	3,71	3,57	3,71	3,86	3,86
2. Mastery of teaching materials	3,40	3,60	3,50	3,70	3,80	4,00
3. Use of learning sources/media	3,50	3,75	3,50	3,50	3,75	4,00
4. Students' involvement in learning	3,60	3	3,60	3,60	3,80	4,00
5. Assessment of processes and outcomes	4	3,5	3,5	3	4,00	4,00
6. Use of language	3	3,67	3,67	4	3,67	3,67
Closing	3,75	3,50	3,50	3,75	3,75	4,00
Average score	3,53	3,54	3,53	3,64	3,81	3,92
Average score in each meeting	**3,53**		**3,59**		**3,87**	

The data in Table 4 shows that the teacher's activities were run quite well. The teacher has been able to implement the investigation group learning model based on Marzano's instructional framework and each step of learning activities in the lesson plan has been carried out properly. The preliminary activities in the three meetings have run quite well with the

shortcomings of giving explanation regarding the learning activities that would be done during the application of the learning model. At the 1st meeting, some aspects that were less emphasized by the teacher were asking students to write the answers of each member in the group. At the 2nd and 3rd meetings, these activities can be done properly by the teacher. The comparison of observation results between the two teachers at SMPN 1 Kuningan and SMP Yos Sudarso is presented in the Diagram 1.

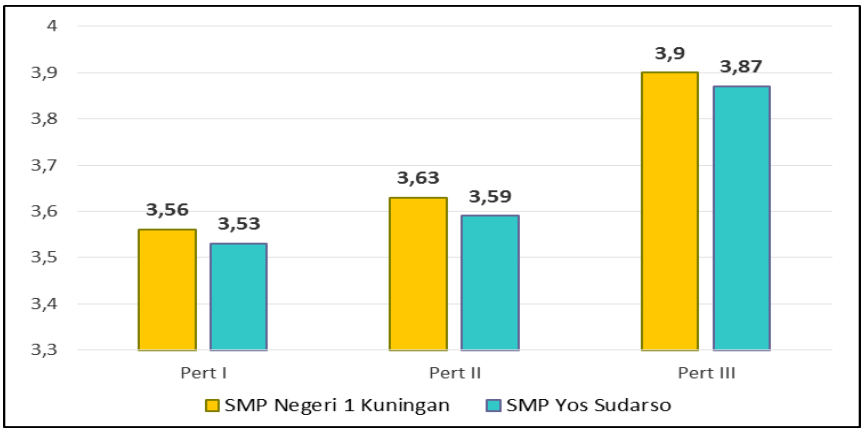

Diagram 1. *The comparison of observation results between the two teachers*

As it can be seen in the diagram, there is an increase in the average score of teacher's activities from the 1st to the 3rd meeting. This condition shows that the two teachers have increasingly understood the application of the learning model so that each syntax of the learning model can be applied properly.

Furthermore, observations on students' activities were also carried out in both SMPN 1 Kuningan and SMP Yos Sudarso. The observation results towards the students' activities showed that the average learning activities was 85.3% at SMPN 1 Kuningan and 84.6% at SMP Yos Sudarso. It means that the students are very active in group collaboration, actively involved in observing, active in discussions and presentations, and active in expressing practical ideas. This improvement was caused by the application of the investigation group learning model based on Marzano's instructional framework which facilitates students to be actively involved in the learning activities.

The improvement of students' critical and creative thinking skills

The effectiveness of the investigation group learning model based on Marzano's instructional framework was measured qualitatively and quantitatively. Qualitatively, the effectiveness measurement of the learning model was carried out by using observation sheet of critical and creative thinking skills during the learning activities. These observation sheets were filled by observers while observing students' critical and creative thinking skills. Students' critical thinking skills were assessed in terms of expressing opinions, analyzing problems, providing solutions, and designing concrete actions. Meanwhile, students' creative thinking skills were assessed in terms of asking as many questions as possible, expressing causes of various events, describing possibilities that may occur, and creating a new and unique product design.

Quantitatively, the effectiveness measurement of the learning model was based on the results of critical and creative thinking skills tests given at the beginning and at the end of learning.

1) **The effectiveness of the learning model qualitatively**

Detailed observations towards students' activities were carried out during the teaching and learning process. This observation aims to measure the effectiveness of the learning model in achieving its purpose to improve students' higher order thinking skills. The observation results towards the students' activities at SMPN 1 Kuningan showed that there was an increase score in the four rated aspects. It means that, qualitatively, the investigation group learning model based on Marzano's instructional framework can improve students' critical and creative thinking skills. In the same vein, the observation results towards students' activities at SMP Yos Sudarso showed that there was an increase in students' thinking skills in each meeting. Similar to the students at SMPN 1 Kuningan, the students at SMP Yos Sudarso have shown enthusiasm in providing solutions and ideas to solve problems regarding the plurality of Indonesian society.

Reflecting on the above description, it can be concluded that the investigation group learning model based on Marzano's instructional framework can improve students' higher order thinking skills. This is characterized by the active participation of the students during the learning activities. Students' active participation is needed to create a learner-centered learning atmosphere so that students' thinking skills, especially critical and creative thinking skills, can be optimally developed.

2) **The effectiveness of the learning model quantitatively**

Quantitatively, the effectiveness measurement of the learning model was based on the results of critical and creative thinking skills tests given at the beginning and at the end of learning. The results of the tests were then analyzed quantitatively by using inferential statistics.

The pretest and posttest results at SMPN 1 Kuningan showed that there was an increase in students' average score. The increase in students' critical and creative thinking skills were 0.57 and 0.62 which belonged to the "medium" category. The following is the result of one sample pretest-posttest statistical analysis which was preceded by a prerequisite test.

The hypotheses tested are:

H_0 : Samples come from a normally distributed population

H_1 : Samples do not come from a normally distributed population

The criterion used was if the probability (sig.) > 0.05, H_0 is accepted meaning that the samples come from a normally distributed population. The normality test results of students' critical and creative thinking skills at SMPN 1 Kuningan using SPSS 21 are presented in Table 5 and Table 6.

Table 5. *The normality test results of students' critical thinking skills at SMPN 1 Kuningan*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
pretest	,295	31	,000	,827	31	,000
postest	,192	31	,005	,939	31	,039

a. Lilliefors Significance Correction

Table 6. *The normality test results of students' creative thinking skills at SMPN 1 Kuningan*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
pretest	,171	31	,021	,942	31	,042
postest	,137	31	,043	,944	31	,010

a. Lilliefors Significance Correction

The results of the normality test showed that the sig value of both data are smaller than 0.05. Thus, H_0 is rejected meaning that both data come from populations that are not normally distributed. Since both data are not normally distributed, hypothesis testing was done by using Wilcoxon Test for nonparametric statistics. The hypotheses tested are:

H_0 : There is no significant difference on students' higher order thinking skills before and after learning with the investigation group learning model based on Marzano's instructional framework.

H_1 : There is significant difference on students' higher order thinking skills before and after learning with the investigation group learning model based on Marzano's instructional framework.

The results of hypotheses testing are presented in Table 7 and Table 8.

Table 7. *The results of hypotheses testing of pretest-posttest data on students' critical thinking skills at SMPN 1 Kuningan*

Test Statistics[a]

	postest - pretest
Z	-4,794[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Table 8. *The results of hypotheses testing of pretest-posttest data on students' creative thinking skills at SMPN 1 Kuningan*

Test Statistics[a]

	postest - pretest
Z	-4,804[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

The results of statistical analysis showed that the sig. value < 0.05. Thus, H_0 is rejected meaning that there is significant difference on students' higher order thinking skills before and after learning with the investigation group learning model based on Marzano's instructional framework.

The pretest and posttest results at SMP Yos Sudarso showed that there was an increase in students' average score. The increase in students' critical and creative thinking skills were

0.53 and 0.61 which belonged to the "medium" category. The following is the result of one sample pretest-posttest statistical analysis which was preceded by a prerequisite test.

The normality test results of students' critical and creative thinking skills at SMP Yos Sudarso using SPSS 21 are presented in Table 9 and Table 10.

Table 9. *The normality test results of students' critical thinking skills at SMP Yos Sudarso*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
pretest	,192	25	,018	,888	25	,010
postest	,184	25	,029	,909	25	,029

a. Lilliefors Significance Correction

Table 10. *The normality test results of students' creative thinking skills at SMP Yos Sudarso*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
pretest	,203	25	,009	,866	25	,004
postest	,224	25	,002	,887	25	,009

a. Lilliefors Significance Correction

The results of the normality test showed that the sig value of both data are smaller than 0.05. Thus, H_0 is rejected meaning that both data come from populations that are not normally distributed. Since both data are not normally distributed, hypothesis testing was done by using Wilcoxon Test for nonparametric statistics. The results of hypotheses testing are presented in Table 11 and Table 12.

Table 11. *The results of hypotheses testing of pretest-posttest data on students' critical thinking skills at SMP Yos Sudarso*

Test Statistics[a]

	postest - pretest
Z	-3,881[b]
Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Table 12. *The results of hypotheses testing of pretest-posttest data on students' creative thinking skills at SMP Yos Sudarso*

Test Statistics[a]

	postest - pretest
Z	-4,153[b]

Asymp. Sig. (2-tailed)	,000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

The results of statistical analysis showed that the sig value < 0.05. Thus, H_0 is rejected meaning that there is significant difference on students' higher order thinking skills before and after learning with the investigation group learning model based on Marzano's instructional framework.

Extensive tests

A general description of the extemsive tests

The revised version of learning instruments were then tested in four schools, namely SMPN 4 Kuningan which involved 32 students, SMPN 6 Kuningan which involved 26 students, SMP IT Al-Mutazam which involved 25 students, and SMP ITUS which involved 20 students. Moreover, there are eight teachers involved in this study in which two teachers from each school become a model teacher and an observer teacher who accompanies the researchers in conducting observation.

The effectiveness of investigation group learning model based on Marzano's instructional framework

To assess the effectiveness of the investigation group learning model based on Marzano's instructional framework, observations towards teachers' and students' activities were carried out. The effectiveness measurement in these extensive tests was carried out in the same procedures as limited tests. The results of the effectiveness measurement of the investigation group learning model based on Marzano's instructional framework are presented in Table 13.

Table 13. *The observation results towards the teachers' activities in extensive tests*

No	Extensive Tests	SCORE					
		1st meeting		2nd meeting		3rd meeting	
		P1	P2	P1	P2	P1	P2
1	SMP Negeri 4 Kuningan	3	3,5	3,2	3,5	3,8	3,9
	Average score	**3,25**		**3,35**		**3,87**	
2	SMP Negeri 6 Kuningan	3,2	3,6	3,8	3,8	3,8	3,9
	Average score	**3,4**		**3,8**		**3,9**	
3	SMP Al-Multazam	3,5	3,7	3,7	3,7	3,8	3,8
	Average score	**3,6**		**3,7**		**3,8**	
4	SMP ITUS	3,7	3,7	3,7	3,8	3,8	3,9
	Average score	**3,7**		**3,8**		**3,9**	

The observation results of teachers' activities in the extensive tests conducted in four schools showed that the quality of teaching and learning process has improved in each meeting. It can be seen in the third meeting where the learning activities using the investigation group learning model based on Marzano's instructional framework has been well realized. The teacher has been able to implement the investigation group learning model

based on Marzano's instructional framework and each step of learning activities in the lesson plan has been carried out properly. The preliminary activities in the three meetings have run quite well with the shortcomings of giving explanation regarding the learning activities that would be done during the application of the learning model. At the 1st meeting, some aspects that were less emphasized by the teacher were asking students to write the answers of each member in the group. At the 2nd and 3rd meetings, these activities can be done properly by the teacher. The comparison of observation results between the four teachers from the four schools is presented in Diagram 2.

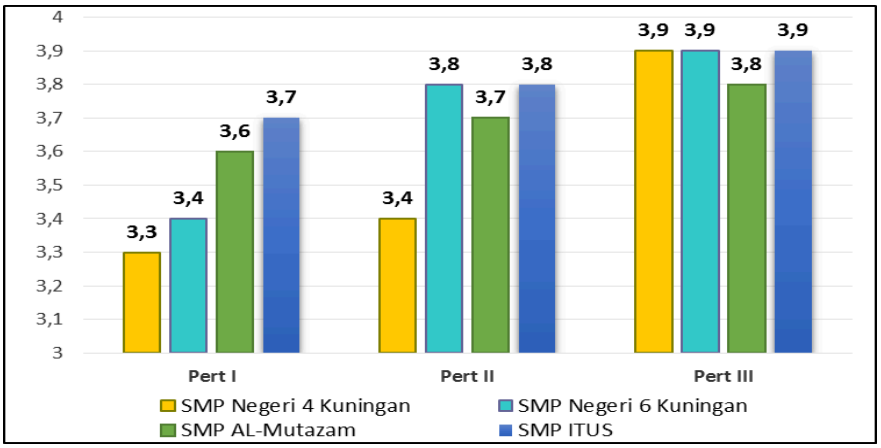

Diagram 2. *The comparison of observation results between the four teachers*

As it can be seen in the diagram, there is an increase in the average score of teacher's activities from the 1st to the 3rd meeting. This condition shows that the four teachers have increasingly understood the application of the learning model so that each syntax of the learning model can be applied optimally.

Moreover, the observation results towards the students' activities in the four schools showed that the average learning activities was >80%. It means that the students are very active in group collaboration, actively involved in observing, active in discussions and presentations, and active in expressing practical ideas. This improvement was caused by the application of the investigation group learning model based on Marzano's instructional framework which facilitates students to be actively involved in the learning activities. The students' active involvement will then lead to the development of students' higher order thinking skills.

Furthermore, from the recapitulation results of teachers' responses on the questionnaires, it can be concluded that the teachers gave positive responses to the application of the investigation group learning model based on Marzano's instructional framework. This can be seen from the score that is >3.50 as well as from the interview sessions conducted to the four teachers. From the interview, it was revealed that the teachers agreed that the investigation group learning model based on Marzano's instructional framework is valid and relevant to be applied in social studies learning in junior high school level. In addition, the recapitulation results of students' responses on the questionnaires also showed that students enjoyed social studies learning which relates the materials with social issues occurred in their environment (contextual and constructivist). Social studies learning is no longer a monotonous learning since it emphasizes collaboration and the development of higher order thinking skills, namely

critical and creative thinking skills. These skills are needed to face various problems regarding the plurality of Indonesian society.

The improvement of students' critical and creative thinking skills

The effectiveness of the investigation group learning model based on Marzano's instructional framework was measured qualitatively and quantitatively. Qualitatively, the effectiveness measurement of the learning model was carried out by using observation sheet of critical and creative thinking skills during the learning activities. These observation sheets were filled by observers while observing students' critical and creative thinking skills. Students' critical thinking skills were assessed in terms of expressing opinions, analyzing problems, providing solutions, and designing concrete actions. Meanwhile, students' creative thinking skills were assessed in terms of asking as many questions as possible, expressing causes of various events, describing possibilities that may occur, and creating a new and unique product design. Quantitatively, the effectiveness measurement of the learning model was based on the results of critical and creative thinking skills tests given at the beginning and at the end of learning.

1) **The effectiveness of the learning model qualitatively**

Detailed observations towards students' activities were carried out during the teaching and learning process. This observation aims to measure the effectiveness of the learning model in achieving its purpose to improve students' higher order thinking skills. The observation results towards the students' critical and creative thinking skills at the four schools showed that there was an improvement of students' thinking skills in each meeting at the four schools, both in SMPN 4 Kuningan, SMPN 6 Kuningan, SMP IT Al-Mutazam and SMP ITUS. All of the students in the four schools have shown their enthusiasm in learning. They are even able to give solutions and express ideas to solve problems and issues regarding the plurality of Indonesian society during the presentation sessions. It shows that the investigation group learning model based on Marzano's instructional framework is effective in improving students' critical and creative thinking skills.

2) The effectiveness of the learning model quantitatively

Quantitatively, the effectiveness measurement of the learning model was based on the results of critical and creative thinking skills tests given at the beginning and at the end of learning. The results of the tests were then analyzed quantitatively by using inferential statistics. The pretest and posttest results of students' critical and crative thinking skills at the four schools showed that there was an increase in students' average score. The increase is classified into the "medium" category. The following is the result of one sample pretest-posttest statistical analysis which was preceded by a prerequisite test.

The hypotheses tested are:

H_0 : Samples come from a normally distributed population

H_1 : Samples do not come from a normally distributed population

The criterion used was if the probability (sig.) > 0.05, H_0 is accepted meaning that the samples come from a normally distributed population. The normality test results of students' critical and creative thinking skills in extensive tests using SPSS 21 are presented in Table 14.

Table 14. *The normality test results of students' higher order thinking skills*

Extensive Tests	Higher order thinking skills					
	Critical thinking		Notes	Creative thinking		Notes
	Pretest	Posttest		Pretest	Posttest	
SMP N 4 Kuningan	0,106	0,066	*Normal*	0,080	0,062	*Normal*
SMP N 6 Kuningan	0,087	0,061	*Normal*	0,075	0,135	*Normal*
SMP Al-Multazam	0,801	0,067	*Normal*	0,071	0,098	*Normal*
SMP Itus Jalaksana	0,074	0,068	*Normal*	0,081	0,060	*Normal*

The results of the normality test showed that the sig value are higher than 0.05. Thus, H_0 is accepted meaning that the data come from populations that are normally distributed. Since the data are normally distributed and homogen, hypothesis testing was done by using parametric statistics through independent samples t-test. The results of hypotheses testing are presented in Table 15 and Table 16.

Table 15. *The results of hypotheses testing of pretest-posttest data on students' critical thinking skills at SMPN 4 Kuningan, SMPN 6 Kuningan, SMP IT Al-Multazam & SMP ITUS*

Variables	*Std.Deviation*	*t*	*Sig.* (*ρ*)
SMP N 4 Kuningan	23,38	9,384	*,000*
SMP N 6 Kuningan	20,45	8,600	*,000*
SMP Al-Multazam	24,50	9,956	*,000*
SMP Itus	23,33	8,650	*,000*

Table 16. *The results of hypotheses testing of pretest-posttest data on students' creative thinking skills at SMPN 4 Kuningan, SMPN 6 Kuningan, SMP IT Al-Multazam & SMP ITUS*

Variables	*Std.Deviation*	*t*	*Sig.* (*ρ*)
SMP N 4 Kuningan	20,56	8,250	*,000*
SMP N 6 Kuningan	31,56	6,800	*,000*
SMP Al-Multazam	23,56	5,750	*,000*
SMP Itus	24,30	7,800	*,000*

Based on the results of statistical analysis above, it can be clearly seen that the four schools have sig. value < 0.05 and $t_{table} > t_{count}$. Thus, H_0 is rejected meaning that there is a significant difference on students' higher order thinking skills before and after applying the investigation group learning model based on Marzano's instructional framework in the teaching and learning process. Then, the improvement of students' critical and creative thinking skills is classified into the "medium" category. Moreover, the n-gain results are presented in Table 17 and Diagram 3.

Table 17. *The comparison of n-gain results in extensive tests*

Schools	N-gain		
	Critical thinking	Creative thinking	Criteria
SMP N 4 Kuningan	***0,59***	***0,63***	Medium
SMP N 6 Kuningan	***0,62***	***0,61***	Medium
SMP IT Al-Multazam	***0,60***	***0,65***	Medium

SMP Itus Jalaksana	*0,61*	*0,64*	Medium

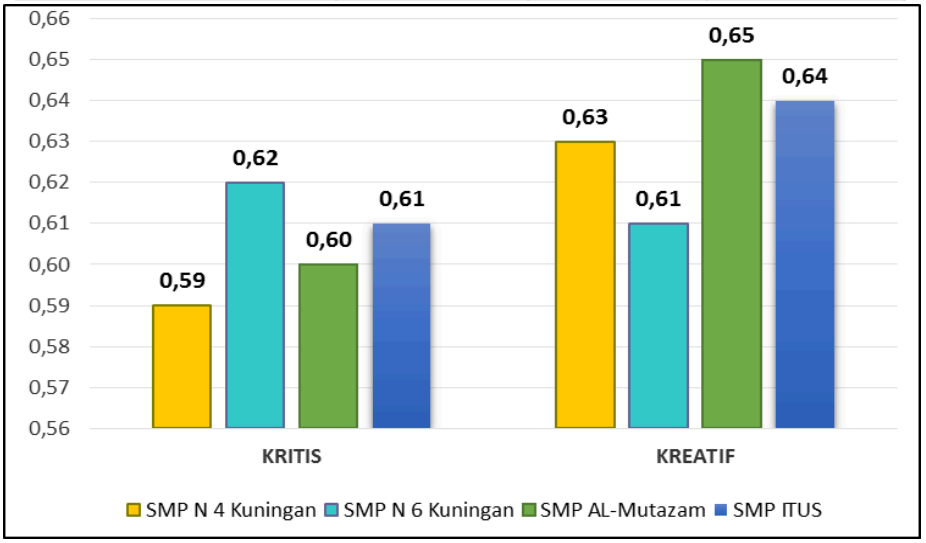

Diagram 3. *The comparison of n-gain results in extensive tests*

CONCLUSION

From the results of the limited and extensive tests, several conclusions can be drawn. First, in terms of effectiveness, the investigation group learning model based on Marzano's instructional framework can be applied effectively in which there is an increase in students' learning outcomes, the teachers and students give positive responses to the application of this learning model, and observation results show that the learning model works well. Here, the majority of students (>75%) have an increased level of higher order thinking skills (critical and creative thinking skills). The imrpovement was proved by the results of statistical analysis where the sig. value < 0.05 and $t_{table} > t_{count.}$ Thus, H_0 is rejected meaning that there is a significant difference on students' higher order thinking skills before and after applying the investigation group learning model based on Marzano's instructional framework in the teaching and learning process. Then, if it is classified, the improvement of students' critical and creative thinking skills is included into the medium category. Second, in terms of efficiency, this model has empowered various supporting sources to achieve the goals of developing and improving higher order thinking skills. This learning model is practical so that it saves time, costs, energy, and facilities as well as infrastructure. Third, in terms of attraction, the learning model has formed fun and exciting learning activities for students. In the limited and extensive tests, the learning model has been able to make students enthusiastic and motivated to be actively involved in the teaching and learning process. They are more confident in asking questions, discussing, and expressing opinions and ideas.

REFERENCES

Abordo & Gaikwad. (2005). Group investigation: How does it work? *International Forum, 8,* 79-98.

Annurahman. (2010). *Belajar dan pembelajaran*. Jakarta: Alfabeta.

Costa, A. L., & Kallick, B. (2008). *Learning and leading with habits of mind 1*6 *essential characteristics for student*. Washington DC: Association for Supervision and Curriculum Development.

Ennis, R, H. (1996). *Critical thinking*. New Jersey: Prentice-Hall Inc.

Filsaime, D. K. (2008). *Menguak rahasia berpikir kritis dan kreatif*. Jakarta: Prestasi Pustakaraya.

Iskandar. (2009). *Psikologi pendidikan sebuah organisasi baru*. Jakarta: Gaung Persada Press.

Johnson, E. B. (2014). *Contextual teaching and learning: Menjadikan kegiatan belajar – mengajar mengasyikan dan bermakna*. Bandung: Kaifa Learning.

Marzano, P. J. (1992). *A different kind of classroom, teaching, with dimension of learning.* Alexandria: Association for Supervision and Curriculum Development.

Ramdhy, S., & Permadi, D. (2012). *Bagaimana mengembangkan kecerdasan (Metode baru untuk mengoptimalkan fungsi otak manusia)*. Bandung: PT. Sarana Panca Karya Nusa.

Rusman. (2012). *Model-model pembelajaran mengembangkan propesionalisme guru*. Jakarta: Raja Grapindo Persada.

Sanjaya, W. (2008). *Perencanaan dan desain sistem pembelajaran*. Jakarta: Kencana.

Slavin, R. E. (2009). *Cooperative learning: Teori, riset, dan praktik (terjemahan)*. Bandung: Nusa Media.

Sumaatmadja. (2007). *Konsep dasar IPS*. Jakarta: Universitas Terbuka.

Trianto. (2010). *Pembelajaran inovatif berorientasi konstruktivistik*. Surabaya: Prestasi Pustaka Publiser.