ENHANCING OF STUDENTS' MATHEMATICAL REFLECTIVE THINKING ABILITY THROUGH KNOWLEDGE SHARING LEARNING STRATEGY IN SENIOR HIGH SCHOOL

By
Ishaq Nuriadin[1)], Yaya S. Kusumah[2)], Jozua Sabandar[2)], Jarnawi A. Dahlan[2)]
[1)]Mathematics Education, FKIP-UHAMKA
[2)]Department of Mathematics Education, School of Post Graduate Studies,
Universitas Pendidikan Indonesia
Email: ishaq_nuriadin@yahoo.co.id

ABSTRACT

This study aims to find out enhancement of students' mathematical reflective thinking ability through knowledge sharing learning strategy in Senior High School. The method of study used quasi experiment by non-equivalent control group design. The population of this study are eighth grader students of Senior High School in Tangerang City, Banten Province. Sampling technique used cluster random sampling with the numbers of students are 140 students. The instruments used in the form prior mathematical knowledge test and mathematical reflective thinking ability test. Data analysis are done by requisite test, namely data normality test (Kolmogorov-Smirnov *Z* Test) and homogeneity test (Levene Test). The statistic analysis of the data was conducted with one-way ANOVA, two-way ANOVA, and Scheffe Test. The results of study are as follows: (1) there is enhancement difference of mathematical reflective thinking ability of the students learning with knowledge sharing strategy and conventional learning; (2) there is enhancement difference of mathematical reflective thinking ability between students learning with knowledge sharing strategy (KSS) and conventional learning based on school level and prior mathematical knowledge (MPK) of students (higher, middle, lower); (3) The interaction between learning strategy (KSS) and prior mathematical knowledge (higher, middle, lower) influenced student's enhancement of mathematical reflective thinking ability.

Keywords: Reflective Thinking Ability, Knowledge Sharing Strategy (KSS)

I. INTRODUCTION

Teacher should be careful in thinking about learning experience which rise higher mathematical thinking process for students' in mathematics learning. Schoenfeld (1985) described that activity which related with that higher mathematical ability comprise: search and explore pattern, understand structure and mathematical relation, use data, formulate and solve the problem, analogical reasoning, estimate, arrange rational reason, generalize, communicate mathematical ideas, and check the answer correctness. Students are demanded to be active in each learning activity in order that mathematical ability to be developed optimally.

The problems occured in school when teacher only give information and cannot provide much opportunity to students when deliver their idea in learning. This is result in students who considered that mathematics is very difficult and scarring, so they don't like even hate mathematics lesson. Mathematics learning is felt difficult, because loaded by formulations and learning strategy which is incorrect that make student feel uncomfortable during mathematics learning activity. Most of

students less understand mathematics concept given by teacher. Given that condition, finally students cannot concern with benefit of mathematics which is part of daily life.

Students should be able to see and experience themselves the usefulness of mathematics in real life, and give benefit of learning mathematics for other subjects. That habit can provide opportunity to students in order to speak, write the idea, give perception or reason in class. Perception or reason contains logical idea related with mathematics concept. According to Dewey (Che, 2008:6) that the goal of education is give contribution in personal and social development through experience and problem solving that take place reflectively (reflective thinking). Reflective thinking is a process which involves skill mentally in solving problem, identifying about everything have been known, doing understanding modification, and applying the result which is obtained in other situation. Sabandar (2009) reveal that critical thinking ability and creative thinking is coverage of reflective thinking ability.

Critical thinking ability became demand in KTSP or Curriculum 2013 which is now being applied in some schools. The result of study which was conducted by Harel & Sowder (2000), and Jacob & Sam (2008) showed that process of student's critical thinking is still categorized low and based on observation result toward teachers in teaching, often focus on the ways of understanding but cannot help students to build effective ways to think from the ways of understanding. The next result of study which was conducted by Noer (2010) to see student's reflective thinking ability, has an average is 31.43 with minimal value of 16 and maximal value of 52. This result showed that student's reflective mathematical thinking generally is still under 70% from ideal score. Then, mathematical reflective thinking ability which is still low reflected in introductory study which was conducted by Nindiasari (2010) in one of Senior High School in Tangerang Regency, Banten Province. Her observation result are: teacher in teaching not get used to develop student's thinking ability, teacher in giving ready to used formulations in explaining a mathematical concept, almost 60% student has not been able to achieve mathematical reflective thinking.

Mathematics learning in each school level has similarity in learning, that is still mechanistic, student less involved in learning process, less present various situation and problem, exercise items which is given by teacher often resemble example and routine. This situation have the impact on student's mindset which is underdeveloped in revealing idea or opinion, limitation of creativity not in accord with potency possessed. To omit negative impression, teacher should be clever to choose learning that introduce mathematics concept which effectively presented with daily life problem, that is with knowledge sharing learning strategy.

Knowledge sharing strategy is learning strategy which can strengthen, broaden, and apply knowledge, so capable to answer mathematics problem. Activity of knowledge sharing learning cannot be separated from prior mathematical knowledge (PMK) for students when sharing knowledge process occured. Students' prior knowledge will give contribution to knowledge quality which will be shared. Knowledge sharing strategy which is supported by prior mathematical knowledge in mathematical learning give opportunity to students to give reason in each step taken, by look back to what have been done, search strategy/solution to problem. It is hoped that students who follow knowledge sharing strategy can be developed well in evaluating what has been done when solving the problem faced.

II. THEORITICAL INQUIRY

1. Mathematical Reflective Thinking Ability

Reflective thinking in mathematics learning can create meaningful learning for students. John Dewey (1933) define reflective thinking are something which is done actively, persevering, and with full of consideration toward a belief which is supported by clear reason and can make conclusion/decide a solution to problem given. Students who has reflective thinking ability do learning activity independently based on logical reasons and proof in accord with what become demand of assumption in making conclusion. Through reflective thinking, students can always evaluate or think back what has been done. Evaluation process aim to search and decide solution taken in answering a problem in hand in order to obtain best solution.

Reflective thinking is self-regulation to generate interpretation until conclusion. Someone who used reflective thinking ability will has ability to identify the problem, choose alternative of solution or solution strategy to generate an interpretation to problem, analyze problem and evaluate solution, conclude and decide best solution to problems given.

Weast (1996) arrange list of mathematical reflective thinking ability as follow: (1) identify conclusion; (2) identify reason and proof; (3) identify confused and vague language; (4) identify valuable assumption and conflict; (5) identify descriptive assumptions; (6) evaluate statistic reasoning; (7) evaluate sampling and measurement; (8) evaluate logical reasoning; (9) identify information which is omitted; (10) articulate or define a value in thinking, the way of thinking which is full of consideration.

Student's reflective thinking ability can be developed through learning which involve students in finding a mathematics concept, so students have opportunity to explore the ability possessed through scaffolding which is done by teacher. In this study, mathematical reflective thinking ability is student's ability in understanding logical thinking process by looking back at what have been done then searching solution or answering a problem situation to achieve thinking level when solve the problems. Indicators of mathematical reflective thinking ability which are measured are: (1) Use various solution strategies, or give various examples statement related with certain mathematical concept; (2) Use relation/connection among mathematics topic; (3) Identify mathematic concept or formulation which is involved in mathematics problem which is not simple; (4) Evaluate/examine the correctness of argument/reason based on concept/nature of mathematics used; (5) Determine general rule/conclude from data presented and determine the correctness of conclusion and its reason.

2. Knowledge Sharing Strategy

Knowledge sharing strategy is often described as learning activity in the form of discussion of problems related to daily life. Each student becomes subject of investigation and reliable information resource based on reference. Diversity of learning sources and intellectual which is possessed by students become challenge for teacher in selecting information which is difficult to understand. Nutchey (2011) explicitly stated that knowledge sharing is capable to describe learning community and special understanding of each student. Teacher as facilitator should have sensitivity in observing smart student and help students' difficulties in knowledge sharing.

According to Nonaka and Takeuchi (1995) things which can done in knowledge sharing are: socialization, externalization, combination and internalization. Principles in knowledge sharing strategy according to Burch (2007:26) are as follow: (a) the more knowledge shared, the more new knowledge grow; (b) knowledge cannot be transferred, but only can be shared; (c) each person in group posses valuable knowledge; (d) diversity of experience and opinion should be respected in order that sharing process can be implemented well; (e) each student posses knowledge about topic which is discussed, the contribution of each person is equally valuable and respected; (f) in discussion group which is connected with certain topic, there is none feel better (all members are expert); (g) acknowledge the others contribution which can change and increase knowledge, both individually or collective; (h) acknowledge that time is valuable, so it is important to value the time which is given to talk about another participation and impede process interaction.

Learning activity which uses knowledge sharing strategy will trigger teacher in preparing learning set with context problem or situation correctly. Context or situation problems which is presented to students in learning by knowledge sharing strategy is made to become sharing experience when building new knowledge. Process of new knowledge sharing shapes student's sense of responsibility and self development in order to help peers in solving the problems. Students actively learn in small and big group, accompanied by discussion with appropriate information source, discussion result is presented with self-confidence.

Teacher guidance is given directly or indirectly in accord with student's need. Direct guidance is given at the time of discussion process, teacher direct discussion if students swerve from theme or topic which is discussed, ask learning source and give justification toward student's argument or idea which is not correct. Indirect guidance through scaffolding, that is by giving questions which is directing or by asking student either in one group or in another group. Following is example of case in mathematics learning by using knowledge sharing strategy with some questions which challenge students.

Example of case 1. A sport store is offering promotion to sport equipment purchase. The store give some direct bonuses. Direct bonuses which are given among others is one slop of shuttlecock badminton for each purchase by multiple Rp.200.000. Slop shuttlecock as bonus always arranged stretch along a length and both edges are tied by red ribbon, such as in some example as follow:

Figure 1.
Slop of Badminton Shuttlecock

(1) **(2)** **(3)** **(4)**

From situation which is given in Example of Case 1, some possible questions which can be asked, for example: (a) what can you know from situation above?; (b) do you see regularity from the ribbon tied?; (c) can you determine the length of ribbon in picture 1, 2, 3 and 4 above?; (d) what

reason that make you give that answer?; (e) can you determine the length of ribbon which is needed to tie 10 slop shuttlecock?; (f) how do you explain that answer?; (g) how if *n* is slop shuttlecock?; (h) how to determine the general form of length of that ribbon?; (i) if customer make a purchase at the price of Rp.1.540.000, how long of the ribbon which is needed to tie the amount of slop shuttlecock badminton bonus which is obtained by that customer?; (j) is there any who has another answer?

Subsequently, there are some questions which are directed by teacher as scaffolding when student gives answer reason to question from another students, namely: (a) explain completely the answer reason of problem which is given? (b) inform learning source which is used as reinforcement; (c) explain strategy which is used; (d) predict the possibility which can be happened; (e) identify inappropriate question; (f) develop question to create relevant problem. Steps in using learning by knowledge sharing strategy in this study are as follow:

a. Socialization stage. Students is given opportunity by teacher to know how to recognize, identify and search information source which is needed as much as possible about situation which become key topic in learning process in class. A student can restructure knowledge by giving and taking information from each other in the form question, statement, and give various logical example, connected to certain mathematics concept.

b. Combination stage. Student elaborates and combines analysis, identification result information, and process information by teacher direction. Students are encouraged to hold discussion, dialog, present information they collect. When discussion takes place, students share and compare each other their finding and perspective which is believed to make similarity and difference which is supported by learning source (book, module, article, journal, etc).

c. Externalization stage. Students try to redefine and acknowledge with expression toward concept which is known so far but they are wrong to understand it, so set knowledge with new understanding which is true. This expression can be shown to students as well as group as confirmation process of self evaluation result in transforming original understanding into new understanding whose the truth is convinced.

d. Internalization stage. Students transform old knowledge to shape and build mindset in obseving reality meaningfully from new knowledge obtained. In this stage, a student has been able to use and apply new knowledge to explain ideas, predict phenomena, and construct argument to create new knowledge possessed with various problem solution from situation presented by teacher.

Formulation of Study Problem

Based on the explanation above, the problem of this study is formulated as follow: (1) Is there enhancement difference of mathematical reflective thinking ability between students who follow knowledge sharing learning strategy (KSS) and students who follow conventional learning (CL)?; (2) Is there enhancement difference of mathematical reflective thinking ability between students who follow knowledge sharing learning strategy (KSS) and students who follow conventional learning (CL) based on school level and student's prior mathematical knowledge (higher, midlle, lower)?; (3) Is there influence of interaction between learning (knowledge sharing strategy, conventional learning) and student's prior mathematical knowledge (higher, midlle, lower) in

enhancement of student's mathematical reflective thinking ability?; (4) How the description of mathematical reflective thinking ability of students who follow knowledge sharing learning strategy?

III. METHOD OF STUDY

This method of this study is quasi experiment by non-equivalent control group design, pretest-posttest control group. The population of this study are eighth grades students of Senior High School in Tangerang City, Banten Province in 2013/2014 academic year. Sampling of school level (midlle, lower) by stratified random sampling technique, based on grade average of National Examination, whereas group of study is determined by cluster random sampling technique. The experiment group got learning by knowledge sharing strategy and control group by conventional learning. Schools which are selected as sample of study are SMAN 12 Tangerang and SMAN 13 Tangerang. In a whole, sample used in this study consists of 140 students. Instruments used are prior mathematical knowledge test and mathematical reflective thinking ability test.

Data analysis which is used are one-way ANOVA, two-way ANOVA and General Linear Model (GLM) in the form of Scheffe Test. Requirement tests which are done are data normality test (Kolmogorov-Smirnov *Z* Test) and homogeneity test (Levene Test). Analysis of enhancement use average normalized gain by Metlzer (2002). Statistic test is done by IBM SPSS Statistic 19 software aid.

IV. RESULT AND DISCUSSION OF STUDY

1. Result of Study

Based on pretest, posttest data, many samples (*N*), and Standard Deviation (*SD*) of mathematical reflective thinking ability test, N-Gain value is analyzed based on learning strategy, school level and prior mathematical knowledge (PMK). Descriptively, the result of study about mathematical reflective thinking ability (MRTA) is described in Table 1 as follow.

Table 1. Data of Student's Mathematical Reflective Thinking (MRTA) Ability N-Gain based on Learning Strategy, School Level, and Prior Mathematical Knowledge (PMK)

School Level	MIK	Statistic	Learning					
			KSS			CL		
			Pretest	Posttest	N-Gain	Pretest	Posttest	N-Gain
Middle	Higher	*N*	8	8	8	9	9	9
		Mean	10.875	19.375	.935	6.000	16.444	.743
		SD	.834	.518	.054	1.871	2.505	.174
	Middle	*N*	18	18	18	16	16	16
		Mean	6.722	15.556	.670	6.812	13.625	.497
		SD	1.841	2.229	.155	2.428	2.125	.185
	Lower	*N*	9	9	9	10	10	10
		Mean	4.778	14.778	.661	5.700	9.700	.262
		SD	1.986	2.539	.144	2.057	1.767	.189
Lower	Higher	*N*	9	9	9	9	9	9
		Mean	7.444	18.000	.845	10.444	16.889	.669
		SD	1.944	1.414	.109	.726	.782	.102
	Middle	*N*	19	19	19	18	18	18
		Mean	7.053	13.842	.505	7.611	13.222	.469
		SD	2.738	1.608	.167	3.310	1.592	.135
	Lower	*N*	7	7	7	8	8	8
		Mean	6.714	12.286	.415	4.500	8.625	.263
		SD	2.138	1.890	.141	1.414	.744	.049

*The ideal score of MRTA is 20.

Based on data description in Table 1, it is obtained data analysis result of student's mathematical reflective thinking ability enhancement is as follow:

1) In a whole, students learning with KSS obtain MRTA average of 15.414 (there is enhancement of .652) and students learning with conventional obtain MRTA average of 13.171 (there is enhancement of .405).

2) Students in medium-level school, students learning with KSS obtain MRTA average of 16.229 (there is enhancement of .728) and students learning with conventional obtain MRTA average of 13.229 (there is enhancement of .493).

3) Students in low-level school, students learning with KSS obtain MRTA average of 14.600 (there is enhancement of .575) and students learning with conventional obtain MRTA average of 13.114 (there is enhancement of .473).

4) In high category PMK, students learning with KSS obtain MRTA average of 18.647 with standard deviation of 1.272 (there is enhancement of 0.888) and students learning with conventional obtain MRTA average of 16.667 with standard deviation of 1.815 (there is enhancement of .706).

5) In PMK with medium category, students learning with KSS obtain MRTA average of 14.676 with standard deviation of 2.096 (there is enhancement of .586) and students learning with conventional obtain MRTA average of 13.412 with standard deviation of 1.844 (there is enhancement of .482).

6) In PMK with low category, students learning with KSS obtain MRTA average of 13.688 with standard deviation of 2.549 (there is enhancement of 0.553) and students learning with conventional obtain MRTA average of 9.222 with standard deviation of 1.478 (there is enhancement of .263).

Result of difference testing toward mathematical reflective thinking ability after getting those learning (knowledge sharing strategy, conventional) can be seen in Table 2 as follow.

Table 2. Analysis Result of One-Way ANOVA
Test Mathematical Reflective Thinking Ability (MRTA) N-Gain
based on Learning Strategy

	Sum of Squares	***df***	***Mean Square***	***F***	***Sig.***
Between Groups	.994	1	.994	21.489	.000
Within Groups	6.383	138	.046		
Total	7.377	139			

Result of difference testing toward enhancement of mathematical reflective thinking ability based on learning strategy (sharing knowledge strategy, conventional) and school level (middle, lower) can be seen in Table 3 as follow:

Table 3. Analysis Result of Two-Way ANOVA Test Mathematical Reflective Thinking Ability (MRTA) N-Gain based on Learning Strategy and School Level

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.257[a]	2	.628	14.069	.000
Intercept	45.072	1	45.072	1008.995	.000
Learning	.994	1	.994	22.250	.000
School Level	.263	1	.263	5.888	.017
Error	6.120	137	.045		
Total	52.449	140			
Corrected Total	7.377	139			

a. R Squared = .170 (Adjusted R Squared = .158)

The result of difference testing toward enhancement of mathematical reflective thinking ability is based on learning strategy (knowledge sharing strategy, conventional) and that prior mathematical knowledge (PMK) can be seen in Table 4. as follow.

Table 4. Analysis Result of Two-Way ANOVA Test Mathematical Reflective Thinking Ability (MRTA) N-Gain Based on Learning Strategy and Prior Mathematical Knowledge (PMK)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.819[a]	3	1.273	48.664	.000
Intercept	41.691	1	41.691	1593.744	.000
Learning	.993	1	.993	37.975	.000
PMK	2.825	2	1.413	53.999	.000
Error	3.558	136	.026		
Total	52.449	140			
Corrected Total	7.377	139			

a. R Squared = .518 (Adjusted R Squared = .507)

Result of interaction testing between learning strategy (knowledge sharing strategy, conventional) and school level (middle, lower) toward enhancement of mathematical reflective thinking ability used General Linear Model (GLM) by Two-Way ANOVA which is presented in Table 5. as follow.

Table 5. Analysis Result of Interaction between Learning Strategy and School Level

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.414[a]	3	.471	10.752	.000
Intercept	45.072	1	45.072	1028.046	.000
Learning	.994	1	.994	22.670	.000
School Level	.263	1	.263	5.999	.016
Learning*School Level	.157	1	.157	3.587	.060
Error	5.963	136	.044		
Total	52.449	140			
Corrected Total	7.377	139			

a. R Squared = .192 (Adjusted R Squared = .174)

Result of interaction testing between learning strategy (knowledge sharing strategy, conventional) and prior mathematical knowledge (higher, middler, lower) toward enhancement of mathematical reflective thinking ability used General Linear Model (GLM) by Two-Way ANOVA which is presented in Table 6. as follow.

Table 6. Analysis Result of Interaction between Learning Strategy and Prior Mathematical Knowledge (PMK)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4.021[a]	5	.804	32.110	.000
Intercept	41.860	1	410.860	1671.456	.000
Learning	1.149	1	1.149	45.881	.000
PMK	2.777	2	1.389	55.444	.000
Learning *PMK	.202	2	.101	4.028	.020
Error	3.356	134	.025		
Total	52.449	140			
Corrected Total	7.377	139			

a. R Squared = .545 (Adjusted R Squared = .528)

Result of testing which has higher influence toward enhancement of mathematical reflective thinking ability from each pair of prior mathematical knowledege level (higher, middle, low) is presented in Table 7. as follow.

Table 7. Scheffe Test of Student's MRTA Enhancement Among Prior Mathematical Knowledge (PMK) Level

(I) PMK	(J) PMK	Beda Rata-rata (I – J)	*Sig.*
Higher	Middle	.2582	.000
Higher	Lower	.3944	.000
Middle	Lower	.1363	.000

Based on difference testing of mathematical reflective thinking ability enhancement in Table 2, Table 3, Table 4, Table 5, Table 6 and Table 7, the result is obtained as follow.

1) There is significant difference of mathematical reflective thinking ability enhancement between students learning with knowledge sharing strategy and students learning with conventional.

2) There is significant difference of mathematical reflective thinking ability enhancement between students learning with knowledge sharing strategy and students learning with conventional in each school level.

3) There is significant influence of mathematical reflective thinking ability enhancement between students learning with knowledge sharing strategy and conventional learning in each PMK level.

4) There is no significant influence of interaction between learning strategy and school level toward enhancement of mathematical reflective thinking ability.

5) There is significant influence of interaction between learning strategy and prior mathematical knowledge toward enhancement of student's mathematical reflective thinking ability.

6) There is significant difference in enhancement of mathematical reflective thinking ability between students with high PMK category and medium PMK, students with high PMK category and low PMK, students with medium PMK category and low PMK.

2. Discussion of Study Result

The finding show that mathematical reflective thinking ability enhancement of students who got learning by knowledge sharing strategy (there is enhancement of .625), higher than students who get conventional learning (.405). From mathematical reflective thinking ability of two learning groups, it can be concluded that mathematical reflective thinking ability enhancement of students who got learning by knowledge sharing strategy is better than students who got conventional learning.

The finding in medium school level shows that learning enhancement by knowledge sharing strategy is .728 which is higher than the students who got conventional learning which only enhanced as much as .493. The same finding result in low school level shows that mathematical reflective thinking ability enhancement of students who got learning by knowledge sharing strategy is .575 which is higher than students who got conventional learning which is enhanced as much as .473.

The finding in each category of mathematical initial knowledge (MIK), students who got learning by knowledge sharing strategy have mathematical reflective thinking ability enhancement which is better than students who got conventional learning. Another finding result show that there is no significant influence of interaction between learning strategy and school level toward mathematical reflective thinking ability enhancement. For interaction between learning strategy and mathematical initial knowledge toward enhancement of student's mathematical reflective thinking ability, it is found that there is significant influence of interaction between learning strategy and mathematical initial knowledge toward enhancement of student's mathematical reflective thinking ability.

The finding which is connected to indicators of mathematical reflective thinking ability measured show that N-Gain score average is enhanced as much as .652 with medium category. This result of

finding confirms Osborne and Wittrock opinion (1985) that students should be brave to reveal ideas clearly in their mind, knowing that in topic which is being learned there is difference conflict with the others which will force students trying to do a change.

Mathematics learning by knowledge sharing strategy is started by preparing and searching learning resource which is relevant to strengthen student's initial understanding. After teacher giving learning guide in worksheet, student is asked to list questions connected to situation or daily problems.

Students' asked to write sources which becomes reference in answering questions. This is intended to omit feeling of doubt or as reinforcement to new knowledge which is just obtained. When the process of discussion group go on, the teacher monitor students learning and give direction to group who experience confusion and difficulty by giving scaffolding as necessary. According to Dahlan (2011), when learning process take places, teacher can encourage student learning by: (1) allowing students to know that they can learn by new strategy and include their ideas independently; (2) setting the goal as learning strategy than giving assignments; (3) demonstrating strategy and self-talk about how and why something is done; (4) planning feedback of work process which is part of learning process; (5) asking student to monitor learning strategy and noting its influence. After students catch what has been directed by teacher, students are given opportunity with their own ideas to build knowledge.

New knowledge formed is communicated together with group peer in order to find mathematical concept, procedure or principles which is agree in situation and problems given. According to Turmudi (2008:55), when a student is challenged and asked to give argument to communicate his/her thinking result to other people either in verbal or in writing, he or she learn to explain and convince other people, listen ideas or explanation of others people, and give opportunity to students to develop their experience. The process of student's learning discussion can be seen in Figure 4 as follow:

Figure 2.
Learning By Knowledge Sharing Strategy (KSS)

Figure 2 shows learning process by knowledge sharing strategy. Students appear very enthusiastic in following mathematics learning. Each student give contribution for each other either in their group or in another group. In this discussion activity, there is interaction enhancement among students, indirectly students can build a new knowledge effectively.

Discussion among group giving a change to students connecting or bridging mindset either externally or internally in learning process. In knowledge sharing process, student work hard to get new knowledge supported by appropriate information and learning source. Students become more self confidence and learning become more meaningful when student can understand and use knowledge which is stored in their mind in relatively long term. This is in accord with Glaser opinion (Ferla, 2008) that meaningful learning involves new information connection and integrate it into knowledge which is obtained before.

After getting adequate knowledge, students begin to solve the problem with their own way, students give logical reason and explanation for answer. Students exchange the answer for each other and share the knowledge and give critical perception which is appropriate to get various ways, solutions and answers from one situation or case which is given by teacher in student's worksheet. When problem solving process take places, students should be able to control and evaluate their thinking process, as said by Yeo (2008) that to be success in solving various kind of mathematical problem, a student should has four kinds of readiness, namely: specific mathematical concepts understanding, skill, process and metacognition attitude to solve the problem.

After group has the answer of problem which is given by activity can continued by delivering group idea in the front of class, teacher giving reinforcement directly if there is concept misunderstanding and giving emphasis firmly which becomes a goal in learning in the form of reflection.

6. Whether $x\sqrt{3} + y = 10$ is one of the equations of the tangent of the circle $x^2 + y^2 = 25$ drawn from point (0,10)? give your reasons!

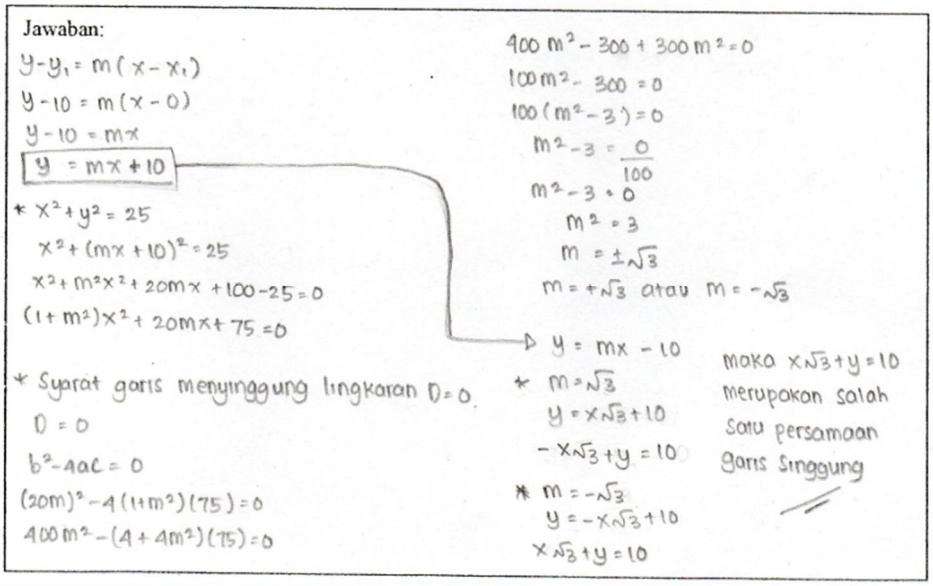

Figure 3. Example of Student's Performance in Evaluating Based on Mathematical Concept

In Figure 3, students' performance got maximal score of 4. This is because students have been able to evaluate action and what is believed by comparing reaction to general principle or theory, and

completely give reason and correct answer. Student's mathematical reflective thinking ability was started by writing line equation through one point, that is $y - y_1 = m(x - x_1)$ then substitute information which is known until find line equation $y = mx + 10$. Then students written the requisite of line to contact circle $D = 0$, for value D is substituted into $b^2 - 4ac = 0$. In the end of solution, students make conclusion as confirmation that what have been evaluated has the truth. Students performance have been able to evaluate or examine a statement/reason/argument based on mathematical concept/property which is used as aspect in mathematical reflective thinking ability.

V. CONCLUSION AND RECOMMENDATION

1. Conclusion

Based on explanation of result and discussion of study, conclusions about student's mathematical reflection thinking ability and knowledge sharing learning strategy are obtained as follow:

1) There is enhancement difference of mathematical reflective thinking ability between students who follow knowledge sharing learning strategy and students who get conventional learning.

2) There is enhancement difference of mathematical reflective thinking ability between students who follow knowledge sharing learning strategy and students who get conventional learning based on school level and student's mathematical prior knowledge (higher, middle, lower).

3) There is significant influence of interaction between learning strategy and school level toward enhancement of mathematical reflective thinking ability.

4) There is significant influence of interaction between learning strategy and mathematical prior knowledge toward enhancement of student's mathematical reflective thinking ability.

2. Recommendation

Based on explanation of study result and conclusion, recommendations which are suggested by author are as follow:

a) Mathematical reflective thinking ability need to be trained and developed by students in order to know quickly the mistake which has done in solving mathematical problem to be corrected immediately.

b) Learning by knowledge sharing strategy can be used in learning implementation in class as an effort to enhance student's mathematical reflective thinking ability. Students who follow knowledge sharing learning strategy have opportunity to deliver idea in which they believe its truth to be delivered to another student accompanied by reason and logical explanation in searching mathematical problem solution in daily life.

c) In this study, the enhancement of mathematical reflective thinking ability indicators only achieve middle category. Therefore, next research is needed in order that contribution in enhancing the quality of mathematical reflective thinking ability to be more optimal.

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