Mathematical Problem Solving Ability Viewed from Extrovert Introvert Personality Types on Cooperative Learning Models Type Rally Coach

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Article Info	Abstract
	This research aims were (1) to know the quality of cooperative learning models type Rally Coach, (2) to describe students' mathematical problem solving ability based on introvert personality type, and (3) to describe students' mathematical problem solving ability based on extrovert personality. This study was a mixed method research with using sequential explanatory design. The population was 8th grade students of SMP N 1 Sumbang academic year 2017/2018. The subjects was selected based on extrovert personality type and introvert personality type. Data was collecting by questionnaire, observation, test, and interview. The result showed that (1) Cooperative learning models type Rally Coach was on good category (2) student with type personality introvert resolve the problem solving able to understand a problem well, plan problem solving well, carry out the problem will according to plan, and looking back for the against answer (3) student with type personality extrovert resolve the problem solving able to understand a problem well, plan problem solving well, in carry out a plan student cannot sit in an implement well that will not find correct answer, student cannot check their answer.

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INTRODUCTION

Education is an aspect that can fix and build the quality of being human. Quality education is expected to make a person becomes a person who is qualified. The quality of life in a nation with the advent of the science and technology rapidly as a challenge that teachers face in the era of global (Oviyanti, 2013). Therefore, required guidance solving problems in the face of problems and community (Muthohar, 2013). Persons who is qualified is expected to build a country better quality.

The Content Standards for Primary and Secondary Education Units state that mathematics subjects need to be given to all students starting from elementary school to equip students with the ability to think logically, analytically, systematically, critically, and creatively, as well as the ability to collaborate (BSNP, 2006). Cooperation and Development (OECD) held implement survey once every three years. The survey known as *Programme for Internasional Student Asessment* (PISA) that last held 2015. Indonesia are placed to 62 than 70 PISA participating country (OECD, 2016). PISA test results showed that mathematics on Indonesia is still below the average to the other participant PISA countries

The question is contained in PISA is a question problem solving, so that the result of study PISA this provides information that still a lot of students who couldn't answer the test of mathematics that as problem solving. This indicates that the ability of the Indonesian students in the process of solving the problem of the mathematics is still classified as low. Problem solving ability can be improved by giving students problems can be settled by challenging and skills they receive (Kholiq, Mariani, & Hidayah, 2017). According to Suherman, *et all* (2003) problem solving is part of math curriculum that very important because in learning and resolution, students possible to obtain experience know and skills those they have to apply to solving problems that are not common. But, most students are not usual to questions about problem solving. According to the results of international research related with the performance of students in Indonesia in resolving the questions

(problem solving) the discussion still not satisfactory (Junaedi, 2012). In general, this is because students less to practice for able to solve questions problem solving especially on about unusual, so that students less skilled in making manipulation and influential on his ability making a model mathematical (Haryati, Suyitno & Junaedi, 2016).

The ability problem solving to their students can be trained with the activities that may provide the opportunity students can uses her think, developing ideas, find a solution problem that might be developed own students, and uses his opinion to make decisions (Ismawati, Mulyono, & Hindarto, 2017). There are four measures problem solving Polya, namely 1) understand a problem; 2) devise a plan; 3) carry out a plan; 4) look back.

At the time of solving the problem there is the possibility the thought processes performed by a student. According to Pimta (2009) There are two of factors affect students in solving the problem of, namely motivation and the potential. Potential a factor owned students who connected with his personality. The distinct personality to their students can affect thought process that can affect students in solving problems. Jung said two types personality namely type personality introverted and type personality extrovert (Suryabrata, 2007). Based on research Hasanah (2013) stated that there are differences thought process on the student who are the type personality introverted and type extrovert personality. Based on the results of preliminary observations in Junior High School 1 Sumbang through interviews with math teacher the results showed that the ability of the solution of the problems students still low. This can be seen from the average test results of students who is still under 65. In addition students also experienced difficulty in resolving about on the problem solving. This is shown of several sheets of students on about problem solving math there are certain students who didn't answer the question, only rewrite the question that given, and did which are not based on actual steps for that problem.

There are few learning models that can be improve the ability of problem solving, including cooperative learning type *Rally Coach.* Cooperative

learning type *Rally Coach* is learning that effective in upgrading social, the ability to communicate, build knowledge, the capacity to think and problem solving (Kagan, 2010).

Based on it, there needs to be research on the problem solving mathematically in terms of type personality extrovert and introverted on the model learning cooperative type *Rally Coach.* Research objective is (1) know the quality of learning cooperative type *Rally Coach*, (2) described students' mathematical problem solving ability based on type introvert personality (3) described students' mathematical problem solving ability based on type extrovert personality.

METHOD

This research is a combination of qualitative and quantitative methods (mix method). This study uses sequential explanatory design. This study uses quantitative research methods as the primary method and qualitative research as a secondary method. This research begins with the study introduction, data collection quantitative, data collection qualitative, and interpretation data. This study was conducted in SMP N 1 Sumbang, Banyumas regency on April-May 2018 which the population was the whole student in grade VIII academic year 2017/2018. In those eight classes, only two classes were chosen as the sample. Two classes of sample would be examined normality, homogeneity, and the same average to make sure that both two classes had the same initial ability. One class was selected as the experiment class. The researcher applied Cooperative Learning type Rally Coach models in this class, then, one class was selected as the control class by applying Problem Based Learning (PBL).

The research subject was taken by choosing three students on every personality types. Data was collected by questionnaire, observation, test, and interview. Quantitative data was started from item analysis, prerequisite test, test of hypothesis that consist of average test, proportion test, proportion difference test, and t test. Qualitative data were analyzed by qualitative descriptive method that refers to Miles and Huberman in Sugiyono (2015), such as

data reduction, data presentation, and drawing conclusion or verification.

RESULT AND DISCUSSION

The quality of learning was obtained through the process and results of the implementation of learning. Quality of learning includes (1) planning and preparation, (2) classroom environment, and (3) professional responsibilities. The planning and preparation include the learning tools such as syllabus, lesson plans, student worksheets, and tests of mathematical problem solving ability. Validator assessment data are presented in Table 1 as follows.

Tabel 1. Validation Result

Instruments	Validation Result		Average	Category
	Val 01	Val 02		
Syllabus	4.3	4.6	4.45	Good
Lesson plans	4.6	4.9	4.75	Excellent
Student Worksheet	4.3	4.8	4.55	Excellent
Tests	4.4	4.8	4.6	Excellent

Based on the validation result by validators, the average syllabus were obtained in good category, while the lesson plan, student worksheets, and the mathematical problem solving tests were obtained in very good category. These results indicated that the device is suitable for research.

The classroom environment can be measured from the quality observation sheet and the learning environment sheet. The implementation of learning is said to be quality if the results of observations on the quality of learning. Implementation of learning if it is at least included in the good category. The results showed that the average quality and implementation of learning included in the category of minimal good, so it can be concluded that researchers prepare and manage learning well. The following data of students learning process could be seen in Table 2 below.

Table 2. Student Learning Process

Learning meeting	Score	Category
1	4.3	Excellent
2	4.1	Good
3	4.4	Excellent
4	4.1	Good
Average	4.22	Excellent

Qualitative learning assessment is carried out by giving student response questionnaires after learning is carried out. The results of the student response questionnaire indicate that the positive response of students is more than 70%, so it can be concluded that students respond positively to learning. In the quantitative assessment include prerequisite data preliminary tests that are normality and homogeneity test, average initial data similarity test, individual completeness test and classical final data, difference proportion test of problem solving ability in experimental class with control class, and t test.

The normality test of the initial data showed that the data comes from a normal distributed population, while the homogeneity test also shows that data has the same variance, and the average similarity test shows that there is no difference in the average of the two classes. The results of the individual completeness test showed $t = 5,778 > 1,69 =$

t_{table} it means the average mathematical problem solving ability of students in the class with the cooperative learning type Rally Coach achieved minimum completeness criterion. In the classical completeness test $= 1,77 \geq 1,64 = z_{table}$, it means that the proportion of students in cooperative learning type Rally Coach has exceeded 75%. In proportion difference test obtained $z \geq z_{table}$, it means that the proportion of students problem solving ability in cooperative learning type Rally Coach is more than the proportion of PBL students problem solving ability. The t test shows that $t = 2,19 > 1,6 = t_{table}$, it means that the average mathematical problem solving ability using the cooperative learning type Rally Coach is more than the average students mathematical problem solving ability in PBL learning.

These statements show that learning using cooperative learning type Rally Coach can be said to be high quality. This is also due to the syntax that is carried out during learning will lead students in habituation to solve the problem given. Cooperative learning type Rally Coach based on quality is in line with the research conducted by Akhyar (2015) that cooperative learning type Rally Coach effective in increasing students problem solving ability. The research conducted by Ningsih (2017) also produced a cognate conclusion that the cooperative learning type Rally Coach can increasing mathematical problem solving.

A description of mathematical problem solving ability students seen from four indicators of problem solving Polya based on the results of test and interview. The four indicators problem solving Polya were (1) understand the problem, (2) devise a plan, (3) carry out the plan, (4) look back. From 34 student class experiment was 14 students with type personality introvert and 20 students with type personality extrovert. The ability mathematical problem solving students with type personality introvert is as follows. The students with type personality introvert able to solve the problem until look back of the problem solving indicator Polya. The first indicator is understand the problem, student with type personality introvert capable of make the known and asked well. Hence, the student with type personality introvert could grasp an issue. The second indicator is devise a plan, the student with type personality introvert can plan solving problems good. In planning the solution of problems student able to mention the formula whatever it took to get about. The third indicator student with type personality introvert can carry out a plan problem solving based on plan which made so as to students able to solve about solving problems in good. In fourth indicator, student with type personality introvert look back against answer that have been acquired. Thus all indicators problem solving Polya could be achieved by student with type personality introvert. This is in accordance with research Hasanah (2013) that student with type personality introvert more careful in act, so that in resolving problems in greater detail.

The ability mathematical problem solving students with type personality extrovert is as follows. The students with type personality introvert able to solve the problem until look back of the problem solving indicator Polya. The first indicator student with type personality extrovert could grasp an issue well. This is because they can determine information known and asked of the problem solving well. The second indicator student with type personality extrovert plan solving problems right. Student can determine the formula that will be used to complete the problem. The third indicator student with type personality extrovert have not been able to carry out a plan problem solving. It was because the student with type personality extrovert too hasty in counting, so that students are not thorough in resolving about the problem solving. The student with type personality extrovert cannot look back against answer. From the description above, the student with type personality extrovert have the ability problem solving good, but in implementing the completion of problem solving student still not thorough. The student with type personality extrovert has reached two Polya's indicator problem solving, they are understand a problem and devise a plan.

The differences of the student with type personality introvert and type personality extrovert to solve the problem can be seen in Table 3 below.

Table 3. Mathematical Problem Solving Student

Polya's step	Student Personality Type	
	Introvert	Extrovert
Understand a problem	Student introvert could grasp an issue well	Student extrovert could grasp an issue well
Devise a plan	Introvert student can create a plan to solve the problem well	Extrovert student can create a plan to solve the problem well
Carry out the plan	Introvert student carry out the problem in accordance with the plan well	Extrovert student cannot carry out the problem in accordance with the plan well
Look back	Introvert student looking back for an answer obtained	Extrovert student cannot looking back for an answer obtained

CONCLUSION

Based on the results and discussion, the following conclusions are obtained. The assessment of the tools by the expert validator was in a good criteria. The observation of learning process was in a good criteria The average mathematical problem solving ability of students in the class with the cooperative learning type Rally Coach achieved minimum completeness criterion. The proportion of students

students in cooperative learning type Rally Coach has exceeded 75%. The proportion of students problem solving ability in cooperative learning type Rally Coach is more than the proportion of PBL students' problem solving ability. The average mathematical problem solving ability using the cooperative learning type Rally Coach is more than the average students' mathematical problem solving ability in PBL learning. Those means the quality of cooperative learning models type Rally Coach on the mathematical problem solving ability of grade VIII students in solving problems in mathematical problem solving ability qualitatively belongs to the good category. Student with type personality introvert resolve the problem solving able to understand a problem well, plan problem solving well, carry out the problem will according to plan, and looking back for the against answer. Student with type personality extrovert resolve the problem solving able to understand a problem well, plan problem solving well, in carry out a plan student cannot sit in an implement well that will not find correct answer, student cannot check their answer. The students with type extrovert personality has reached two Polya's indicator problem solving. Cooperative learning type Rally Coach can exercise students' problem solving ability. The achievement of problem solving ability in terms of type personality is different. It is necessary to uncover further reason the difference them in a way given about other similar test or add a subject of study for each type personality.

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