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The Analysis Of Student's Problem Solving Difficulty Viewed From Adversity Quotient On Means-Ends Analysis Learning

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Abstract

The purpose of this study is (1) to describe the quality of Means-Ends Analysis (MEA) learning in contextual nuances and (2) to analyze students' difficulties in Zalina's problems solving in terms of adversity quotient. The type of research used is mixed concurrent embedded model methods. The population of this study were students of class X MIPA SMA N 1 Gubug, Grobogan. The research subject was determined based on the adversity quotient category, namely quitter, camper, and climber. Data collection techniques in the form of questionnaires, observation, tests, and interviews. The results showed that (1) contextual MEA learning is qualitatively and quantitatively qualified (2) students' problem solving abilities quittered to the point of understanding the problem and achieving the first problem solving indicator, the student camper could solve the problem until the stage of expressing the answer and achieving all solving indicators problem, climber students can solve the problem until the stage states the answer and reaches all the problem solving indicators.

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INTRODUCTION

Mathematics has a very important role in aspects of human life. Many problems in everyday life that solve using mathematics (Permatasari, Setiawan, & Kristiana, 2015). One of the uses of mathematics is to measure and calculate (Ilyyana, Rochmad, & Mastur, 2018). A person can solve or solve an existing problem properly if it is supported by a good problem solving ability (Rosita & Rochmad, 2016). This is supported by the basic abilities in mathematics that must be mastered by students, namely problem solving abilities (Mardika & Insani, 2016). Pungut & Shahrill (2014) stated that basic mathematics is important to be used to solve mathematical problems. By mastering problem solving abilities students are taught to think realistically and systematically in solving a problem.

Mathematical problem solving is the process of interpreting the situation mathematically, which usually involves several repetitive cycles to express, test, revise mathematical interpretations, sort, integrate, modify, and improve mathematical concepts from various topics inside and outside mathematics (Kuzle, 2013). One of the problem solving steps is from Zalina (2005) who applies 3 stages of problem solving, namely (1) understanding the problem, (2) solving the problem, and (3) stating the answer (Tambychik & Meerah, 2010).

Based on the results of research from Novriani (2017) obtained the average percentage of students in solving problem solving problems reached 54.48% and classified as not enough. Every student will find problems in learning mathematics, but the most important thing is how to find the right way to get out of the problem. This relates to students' resilience in finding solutions to the problems given. The resilience of students in finding solutions to the problems given relates to intelligence over the difficulties called adversity quotient (AQ).

Based on the observations of researchers in class X MIPA Senior High School 1 Gubug found students who were desperate and difficult in working on math problems. This is shown from several student answer sheets on the problem solving aspects of mathematics there are 65% students who do not answer questions, only rewrite the questions given and work on an innappropriate strategy when do mathematics test in the 2017/2018 school year.

In learning needs to be supported by an effective learning model and routine practice questions so that students' problem solving abilities develop well (Alfurofika, Waluya, & Supartono, 2013). Students' problem solving abilities can be improved by providing problems faced in real life, providing challenging problems and can be solved by the mathematical skills they acquire (Kholiq, Mariani, & Hidayah, 2017). Means-Ends Analysis learning model (MEA) is a variation of learning with problem solving because the heuristic approach used in MEA helps students in the process of solving mathematical problems (Novotna, et al., 2017). MEA learning models with contextual nuances can be used to help students in solving mathematical problems.

Based on the previous description, the problems in this study are (1) how the quality of MEA learning has contextual nuances on problem solving abilities of tenth grade students of Senior High School 1 Gubug, and (2) how difficult the students of class X MIPA Senior High School 1 Gubug type quitters, campers, and climbers in the Zalina problem solving phase in learning MEA with contextual nuances. What is to be achieved in this study are (1) to analyze the learning quality of MEA in contextual nuances, and (2) to describe the difficulties of quitters, campers, and climbers type students in the Zalina problem solving phase of MEA learning in contextual nuances.

METHODS

The type of research used in this research is concurrent mixed methods model embedded with quantitative research as the primary

method. The population in this study were students of class X MIPA SMA 1 Gubug, Grobogan Regency even semester 2017/2018 school year. Sampling in this study uses simple random sampling technique, which is randomly selected by two classes of population. With this technique obtained two sample classes, namely class X MIPA 9 as an experimental class which was taught with MEA learning model with contextual nuances and class X MIPA 8 as a control class taught by Problem Based Learning (PBL).

The data collection instrument used in this study was a test of problem solving ability used to obtain data about students 'mathematical problem solving abilities, adversity quotient questionnaire to get students' adversity quotient level data, learning achievement observation sheets to obtain learning quality data, and interview guidance sheets to obtain deeper and more accurate data on how students' mathematical problem solving skills use Zalina's steps.

Before use, learning tools and research instruments are validated in advance by expert validators. Learning devices and research instruments are said to be valid and can be used if each device and instrument is in a good minimum criteria. Learning tools and research instruments validated in this study include syllabi, lesson plans, student worksheets, teaching materials, initial problem solving ability tests, and adversity quotient questionnaires.

The final TKPM question was tested to class X MIPA 6 SMA N 1 Gubug. After the trial was carried out, the item was analyzed. Analysis of the test items used in this study is the test of validity, reliability, distinguishing power and difficulty level. Based on the results of the trial analysis of 7 questions, 5 final TKPM questions were met which met the criteria, namely items 1, 2, 3, 5 and 6.

Quantitative data analysis consists of initial data analysis and final data analysis. Based on the results of the initial data analysis it was found that the initial data of the experimental class and the control class were normally distributed, had homogeneous variance and there was no initial ability difference between the two sample classes. While the final data analysis is done after MEA learning contextual nuances using normality test, homogeneity test, average test, proportion test, average difference test and proportion difference test. Qualitative data analysis in this study refers to the opinion of Miles and Huberman in Sugiyono (2015), namely data reduction, data presentation, and drawing conclusions or verification.

RESULT AND DISCUSSION

The learning quality of MEA with contextual nuances was measured based on three stages in learning, namely (1) the learning planning stage, (2) the learning process implementation phase, and (3) the learning outcome assessment stage. Learning quality is reviewed qualitatively and quantitatively. In the learning planning stage researchers make learning tools and research instruments. Learning devices and research instruments are said to be used if each device is in a good minimum criteria. Recapitulation of validation data is presented in Table 1.

Table 1. Recapitulation of Validation Results Data

No.	Data Type	Average Validator Score		Average	Criteria
		V1	V2		
1.	Learning Media				
	a. Syllabus	3,8	4,1	4,0	Good
	b. RPP	3,7	4,1	3,9	Good
	c. Teaching materials	3,6	4,2	3,9	Good
	d. LKS	3,7	4,2	4,0	Good
2.	Problem Solving Ability Pretest	4,0	3,6	3,8	Good

Based on the validation of the learning device which includes syllabus, lesson plans, teaching materials and worksheets are included in the criteria. The results of the validation of the research instrument are the initial TKPM included in good criteria, and the adversity quotient questionnaire included in the criteria. From these results it can be concluded that the tools and research instruments are valid and can be used for research.

At the implementation stage of the learning process, it can be seen from the observation sheet on the implementation of learning. The results of observations of the implementation of the learning process indicate that at the 1st meeting up to the 5th meeting included in the criteria very well. Based on these results obtained the average percentage of learning achievement reached 86.4% included in the criteria very well. The following results of the learning outcomes are presented in Figure 1.

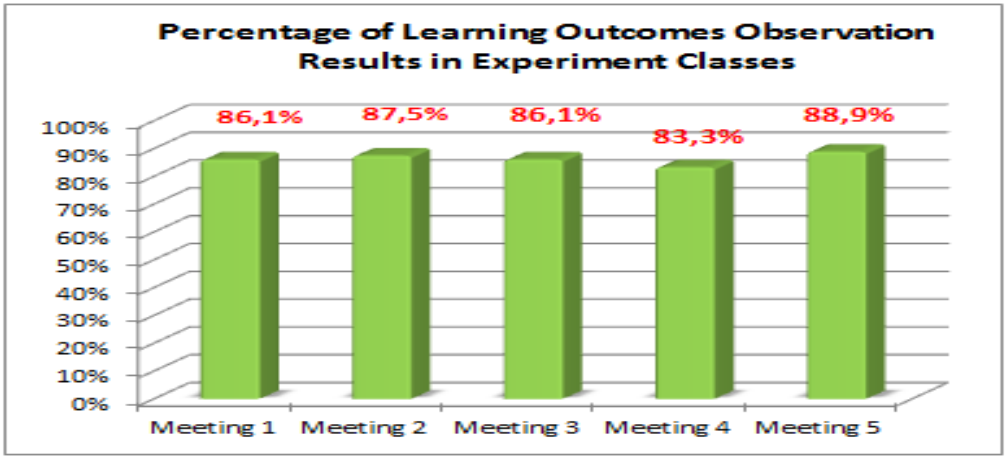

Figure 1. Percentage of Learning Model Implementation

Learning assessment phase is seen from the results of the final learning test. The results of the final test analysis found that the final data of the experimental class and the control class were normally distributed and had homogeneous variance. Test the first hypothesis by using the average test obtained by the price t_value = 4.497 while t table = 1.692. Because t_value> t table, it can be concluded that the average mathematical problem solving ability of students in the class taught by MEA learning model with contextual nuances is more than 70. The result of the proportion test is z_value = 1.857, while z = table = 1.64. Because z_value> z table can be concluded that the proportion of students completeness in the class taught by the MEA learning model has a contextual nuance of more than 75%.

Based on the second hypothesis test using the average difference test obtained the price t_value = 2.571 while t table = 1.67. Because t value> t table, it can be concluded that students 'mathematical problem solving ability in the class taught with MEA learning model with contextual nuances is better than students' mathematical problem solving skills in the class taught by PBL model.

Based on the third hypothesis test using proportional difference test obtained the price of z_ value = 3.596 while z = table = 1.64. Because z_value> z table can be concluded that the proportion of completeness of students 'mathematical problem solving ability in the class taught by the MEA learning model with contextual nuances is better than the proportion of students' mathematical problem solving abilities in the class taught with PBL.

The results of this study are in line with the research conducted by Harto, Agung, & Wibawa (2014) that the description of students'

mathematics learning outcomes who take lessons with the MEA learning model shows that most scores tend to be very high. This is also supported by the results of Palupi, Suyitno, & Prabowo (2016) research which states that the application of the MEA learning model is more effective than the expository learning model on students' problem solving abilities.

Of the 35 students in the experimental class who filled the Adversity Quotient questionnaire there were 4 students in the quitter category, 15 students in the camper category, and 16 students in the climber category. Each AQ category was taken by representatives of 2 students to analyze their problem solving abilities in depth. The selection of quitter category students was obtained from 2 students with the lowest AQ score. The selection of students in the camper category was obtained from 2 students with AQ scores whose scores were in the middle of the camper student category. Student selection in the climber category is obtained from 2 students with the highest AQ score. This method of selection is done to make a significant difference between students from the three AQ categories in solving Zalina's problem.

Based on the results of the study, the problem solving ability of students quitter, camper, and climber has different patterns. From research, information is obtained which shows that quitter students are only able to solve problems until they understand the problem. The pattern of students' quitter problem solving ability is as follows (1) quitter students can understand the problem, the level of understanding of students quitter problems is still lacking, and quitter students are able to mention things that are known and asked but are incomplete; (2) quitter students cannot solve the problem properly, they cannot mention what formulas are needed to solve the problem, the quitter students write some answers on the answer sheet, but there are many errors in solving the problem; and (3) quitter students do not state the answer correctly in accordance with what is asked in the question, quitter students are only able to solve the problem until they understand the problem, this indicates that quitter students have difficulties in solving the problem. This is consistent with the results of research from (Yani, et al, 2015) which states that quitter students have difficulties in solving problems. NCTM problem solving indicators that can be achieved by quitter students are only the first indicators, namely building new mathematics through problem solving, while the other 3 indicators cannot be achieved. Students are less able to reflect on the problem solving process using Zalina's steps properly.

Based on the results of the study, camper students can solve the problem until the stage states the answer. Hi this is in accordance with the results of the study (Widyastuti, 2013) which states that students camper are able to identify things that are known and asked, solve problems, and express answers. The following is a pattern of Zalina problem solving skills of camper students (1) camper students can understand the problem well and can determine the information that is known and asked about the problem well; (2) camper students do not experience difficulties at the problem solving stage, but camper students do not try their best in carrying out problem solving, camper students are satisfied with working on some questions that they consider are correct in the process; and (3) camper students are able to state the answers that have been obtained. Based on students' answers, camper students can achieve all NCTM problem solving indicators. This is also in accordance with research from Ismawati, Mulyono, & Hindarto (2017) which states that students' mathematical problem solving abilities in the AQ camper category are shown by students being able to build new mathematical knowledge through problem solving, students are able to solve problems in various contexts related to mathematics , students are able to develop a complete and systematic strategy so that students can solve problems. Students are able to reflect on the problem solving process using Zalina's steps quite well.

From the results of the study, climber students can solve the problem until the stage

states the answer. Following is the pattern of students' problem solving ability (1) Climber students can understand the problem well, they can determine the information that is known and asked in the problem well; (2) climber students are able to solve problems appropriately and are able to determine the formula that will be used to solve problems correctly, climber students try hard to find as many answers as possible; and (3) Climber students can state the answers obtained in accordance with the questions asked. From the description above, climber students have good problem solving abilities. This is consistent with research conducted by (Muna, 2014) which states that climber students can state the problem solving steps well. All NCTM problem solving indicators can also be achieved by Climber students. This is consistent with research from Ismawati, Mulyono, & Hindarto (2017) that students' mathematical problem solving abilities in the AQ climber category are shown by students being able to build new mathematical knowledge through problem solving, students are able to solve problems in various contexts related to mathematics, students are able develop a complete and systematic strategy so that students can solve problems. Students are able to reflect on the problem solving process using Zalina's steps well.

Based on the discussion about the pattern of students' problem solving abilities, quitter, camper and climber obtained information that students quitter solve problem solving until the stage of understanding the problem, while camper and climber are able to solve the given problem until the stage of expressing the answer. Comparison of quitter, camper, and climber students in solving problems using Zalina steps can be seen in Table 2 below.

Table 2. Comparison of Quitter, Camper and Climber Students in Zalina's Problem Solving

Zalina Problem Solving Steps	**Adversity Quotient Category**		
	Quitter	***Camper***	***Climber***
Understanding Problems	Quitter students have a little difficulty in understanding the problem	Camper students can understand the problem well	Climber students can understand the problem well
Solve the Problem	Quitter students don't solve the problem properly	Camper students solve the problem well even though sometimes it is not right	Climber students solve the problem well
Declare Answers	Quitter students do not state the answers obtained	Camper students state that the answers obtained are sometimes inappropriate	Climber students state the answers obtained

CONCLUSION

Based on the results of the study and discussion obtained conclusions (1) the quality of MEA learning models with contextual nuances of problem-solving abilities of class X MIPA SMA N 1 Gubug can be said good in terms of qualitative and qualified in terms of

quantitative, and (2) students' problem solving abilities Quitter only gets to the point of understanding the problem. Quitter students can write down information that is known and asked even though it is still incomplete. NCTM problem solving indicators that can be achieved by quitter students are only the first indicators, namely building new mathematics through problem solving, while the other 3 indicators cannot be achieved. Camper students can solve the problem until the stage of expressing the answer, however, camper students do not try their best to solve the problem. Camper students can achieve all NCTM problem solving indicators. Climber students can solve the problem until the stage states the answer. Climber students can carry out the stage of solving the Zalina problem properly. Climber students can achieve all NCTM problem solving indicators.

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