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Climber, Camper, and Quitter: How Solve Ethnomathematics-Based Mathematics Problem

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ABSTRACT

Problem-solving ability is the capacity to think critically and determine solutions for specific problems. This study aims to assess the problem-solving skills of students in tackling High Order Thinking Skills (HOTS) problems, focusing on students with different Adversity Quotient (AQ) types: quitter, camper, and climber. A qualitative descriptive method was employed to evaluate the students' abilities in solving Systems of Linear Equations in Two Variables (SPLDV) problems. The subjects of this study were students categorized into quitter, camper, and climber AQ types. Data collection methods included: 1) written tests to evaluate problem-solving skills, 2) questionnaires to assess AQ levels, and 3) interviews to clarify students' confidence levels. The results indicated that students with the quitter AQ type could only complete one stage of problem-solving. Those with the camper AQ type managed to complete two stages, while students with the climber AQ type were able to successfully complete all four stages of problem-solving, despite encountering minor errors in the process.

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1. INTRODUCTION

Education can be said to be a very important role in preparing human resources in building a nation. Subjects that are considered the main in education and have a very important role are mathematics subjects. Students are expected to have the ability in mathematics subjects not only to calculate and memorize, but students also to have logical, critical, creative, and innovative minds in applying them in everyday life. The presentation of material in subjects that are often associated with problems that exist in everyday life can hone the abilities of students such as having the ability to think logically, critically, creatively, and innovatively in taking a problem solution.

The Programme for International Student Assessment (PISA) is a study of assessment programs in international standard students and is organized by the Organizatio for Economic Coorporation and Development (OECD) which aims to assess students over thirteen years of age and above, where the age must be required to study and must have broad insights and have good skills in participation in the community at this time (Kurnia et al., 2019).

The study of PISA (Programme for International Student Assessment) in Indonesia has been ongoing from 2000 to 2015. Indonesia last participated in the PISA study in 2015, and the results indicated that the

country's performance was below the expected standards for the program. These outcomes highlight significant areas for improvement in Indonesia's education system, particularly in developing students' critical thinking and problem-solving skills. Continued participation in international assessments like PISA can provide valuable insights and benchmarks to help guide educational reforms and policies in Indonesia.

According to the results of an international study conducted by the Trend in International Mathematucs and Science Study or it can be said to be TIMSS conducted in 2015, it was determined that the State of Indonesia was in 44th place out of 49 countries and got a score of 397 and the score was far from expectations from the predetermined international average score of 500 (Mullis, 2011). In 2018 Indonesia ranked 73rd out of 79 countries whose score results were obtained by 386 from the average score issued by the OECD of 489, the data obtained from PISA pioneered by the OECD (OECD, 2019). This stipulates that in Indonesia the score obtained has not been achieved optimally and the order of the Indonesian State is still far from other countries.

With the rankings and scores owned by the Indonesian state still low and far away, of course there are separate factors that cause why this can happen. The factor that causes the low results obtained is because students in solving problems are not used to solving them and the factor of students' skills has not been proficient in carrying it out so that it makes a very important factor and becomes an evaluation for the Indonesian nation to improve it (Kusaeri & Aditomo, 2019).

Problem-solving ability can be interpreted as the ability that an individual has in utilizing the knowledge gained and the experience he has, so that the individual can create the solution he is facing (Edy et al., 2017). Meanwhile (Nuramalina et al., 2020) said that problem-solving ability is an effort to train mentally or cognitively which is carried out by combining concepts and regulations owned. Therefore, researchers draw conclusions from the purpose and purpose of problem-solving ability is a person's step in making decisions using the skills he has and based on the experience of that person. By being given questions that are in accordance with problem solving, students will find it easy to solve existing problems and students will assume mathematics is a definite or real science and can be used in everyday life (Hanifah & Nuraeni, 2020).

With the existence of mathematics in real life, it makes it easy for students to understand the meaning of mathematics. However, seeing the reality now students are actually indifferent and do not care about the surrounding environment, especially in the aspects of social values in their daily lives (Ayuningtyas et al., 2018). This is due to the negative impact of the current era, thus tearing down morals and decreasing cultural values in Indonesia. As a result, now the State of Indonesia has become an impressionable and easily divided country. The lack of self-awareness and the importance of maintaining cultural values in their area are very dominant factors. Therefore, according to (Marsigit, 2016) having a view of the abilities of a teacher is very important in learning mathematics. Especially in improving students' ability to solve problems and fostering student awareness of their culture. (Finariyati et al., 2020) said that in improving problem-solving capabilities, new innovations are needed. One of the keys is that in improving the quality of educators, the government carries out many programs to improve the quality of educators. Therefore, connecting learning in mathematics with culture is expected to be able to attract students' sense of care for cultural values.

Basically, mathematics learning cannot be separated from culture because in a culture there are also mathematical concepts that are applied to daily life. Ethnomathematics is also a form of mathematics based on culture. Through the application of ethnomathematics in the world of education, it is intended that in the future students can easily understand mathematics and understand their culture, and from educators it is also easier to instill cultural values themselves in students.

The presence of new findings in learning also has a very significant influence in the world of learning, because it can make the learning interesting and enjoyable for students. This is in line with the statement (Sohibun & Ade, 2017) which says that in the process of understanding students experience difficulties, thus causing low learning outcomes obtained. The level of difficulty that students have varies and the way in solving a problem for each student varies according to their own way. Students have the ability to

change the difficulties they face and are used as new challenges that must be resolved can be referred to as adversity quotient. When linked to problem-solving skills, AQ is the intelligence needed by students in dealing with a problem related to problem solving (Nilasari et al., 2019).

In his explanation according to (Isnaini Handayani & Afifah Fitria Ramadhani, 2020) said that the meaning of Adversity Quotient talks about the level of intelligence that an individual has in solving a problem or difficulty he faces. Adversity Quotient can be said to be the response of an inidividu in facing a problem that is carried out to use his potential (Utomo, SP., Marmoah, S., 2020). So it can be concluded that the meaning of adversity quotient is an ability to solve a problem in his daily life. With the existence of AQ, it can be used in the mathematics learning process, namely by seeing the extent to which students are able to solve the problems they face. There are three types in AQ, namely the first with quitter, the second camper, and the third is climber.

Students with an Advertisy Quotient climber type usually tend to be challenged by new things, as well as finding problem-solving problems that are difficult to solve. Students with the climber type have more potential than other types of Advertisy Quotient (Purwasih, 2019) and this is in line with (Suhandoyo, 2016) which is to say that the better the AQ owned by students, the better the results. This is also in line with the opinion (Stoltz, 2018) he explained that the type of climber when encountering new things feels challenged and they want to solve it. When other students encounter problems and think that they cannot solve their problems, students with climber types have different characteristics that they have thoughts and hopes in order to solve the issues they are facing. From some of the issues obtained, a study can be formulated, namely about the analysis of problem-solving ability by students and can also be used by teachers to measure students' ability in terms of solving a mathematical problem. This is also in line with research (Purwasih, 2019) that students who have the ability of Adversity Quotient type Climber have good and correct problem-solving skills, and are not easily discouraged in solving math problems.

2. METHODS

2.1 Descriptive Qualitative

The method used in this study is descriptive qualitative. The research design used in this study is a case study. Case studies can be interpreted as a method to review the background of the current situation as well as the interactions of individuals, groups, or environments. Qualitative research is research that can be used in researching objects in natural conditions (Taqiya et al., 2021). In this study, the subjects studied were 2 students, namely from class VIII-D at SMP Negeri 22 Surakarta.

2.2 Data Collection

The use of data collection techniques in this study was written tests, questionnaires, and interviews. The written test in this study is in the form of a description story question with ethnomathematics-based Higher Order Thinking Skill (HOTS) type questions on the material of a two-variable linear equation system. The questionnaire given to students was thirty-two questions. Furthermore, interviews are used in order to find out the mindset of students and the way of solving used in solving problem-solving problems.

2.3 Data Analysis

The use of data analysis techniques used in this study is the use of concepts from Miles and Huberman which include data reduction, data presentation, and drawing conclusions (Sugiyono, 2011). The data from the results of this study are in the form of; 1) Data collection using written tests in accordance with problem-solving abilities, namely; understand the problem, plan the problem solving, execute the plan, and re-examine. 2) Data collection uses questionnaires from the Adversity Quotient to find out the categories of students from the Adversity Quotient category, namely quitters, campers, and climbers. Qualitative data analysis in this study, namely; 1) Data reduction which is a stage of inferring and focusing on research results, as well as eliminating unpolated data. The data that has been collected

and selected in accordance with the research objectives. 2) Display data, data that has been reduced and presented in the form of a brief description, so that it is easy to read. 3) Conclusion drawing, which is a conclusion taken based on the results of the data analyst that has been obtained.

2.4 Experiment Design

In this study, it is to use written questions that are in accordance with problem-solving abilities and the second is a questionnaire instrument to find out the type of Adversity Quotient in students. Indicators of such solving ability are as follows:

Table 1. Aspects of Problem-Solving Ability

No	Aspects of Problem-Solving Ability	Description
1	Understanding the issue	Students are able to write down what is obtained from the problem of the questions obtained.
2	Plan for troubleshooting	Students are skilled in determining the formulas, methods, algorithms that will be used to plan strategies in problems.
3	Executing the problem	The student is able to carry out from what he planned and applied in the next step.
4	Checking back	Students are expected to be able to prove the final result obtained that the result is correct and correct.

(Hidayat et al., 2018)

Furthermore, the questionnaire instrument is used to measure the level of student intelligence in dealing with a problem. There are dimensions and category classifications owned by the *Adversity Quotient* sourced from (Alyani & Zahra, 2020) which are as follows:

Table 1. Dimensi Adversity Quotient

No	Dimension	Indicator	Favorable	Unfavorable
1	Control	Attitude towards bad events/things that have been experienced	1,16	19,28
		Positive and optimistic thinking	25,29	8,9
2	Origin and Ownership	Acceptance of issues/matters	7,10	20,31
		Sense of responsibility	21,26	18,32
3	Reach	Response to difficulties	6,27	13,22
		The extent to which the problem has no impact on aspects of life	4,14	11,17

4	Endurance	The presumption of how long the difficulty will last	2,23	3,24
		Endurance through adversity	15,30	5,12

Table 3. Adversity Quotient Classification

Type	Value
Quitters	$0 \leq x \leq 69$
Campers	$70 < x \leq 109$
Climbers	$110 < x \leq 150$

For the last step is the use of the interview method with a semistructure. With this interview, it is intended to get sufficient information and how the subject steps in carrying out the work, so that with the questions carried out can get the right results.

3. FINDINGS AND DISCUSSION

This research was carried out in class VIII-D of SMP Negeri 22 Surakarta. The number of samples in this study was 20 students. The 20 students were given test and non-test instruments. The next step for students to do test questions with the subject matter of the Two-Variable Linear Equation System and non-test is the Adversity Quotient questionnaire, which is as follows.

Table 4. Hasil *Adversity Quotient*

Adversity Quotient (AQ)			
Type	To leave	Camper	Climber
Score	$0 \leq x \leq 69$	$70 < x \leq 109$	$110 < x \leq 150$
Number Of Learners	2	14	4

Based on Table 4, two students obtained scores between 110 and 150, indicating their strong ability to handle challenges. These students demonstrate eagerness to advance, confidence in their abilities, and perseverance. In contrast, 14 students, categorized as campers, scored between 70 and 109. These students show a relatively good defensive attitude and resilience but tend to give up when faced with more difficult problems. Lastly, four students scored between 0 and 69, indicating a lack of enthusiasm and determination. These students fall into the quitter category, struggling significantly with problem-solving. According to Risnawati et al. (2018), the study highlights distinct levels of Adversity Quotient among class VIII students at SMP Negeri 22 Surakarta, demonstrating varying degrees of resilience and problem-solving abilities.

The test instruments carried out on this study are analyzed based on the steps of the problem-solving ability. The results of the student's test instrument can be explained from the results obtained:

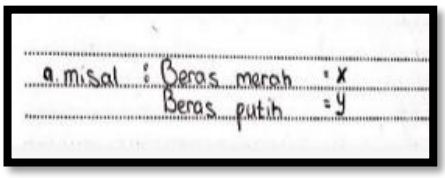
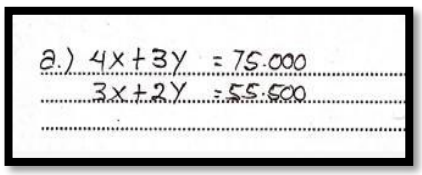
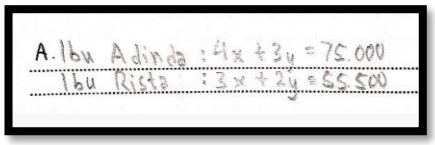
Type Quitter	
Type Camper	
Type Climber	

Figure 1. C1 workmanship on indicators understands the problem

At the stage of understanding the problem, students with a quitter type cannot explain what is obtained from the problem obtained. The results of the student's work seem to only write down the excuses of the questions obtained, the work obtained is far from the desired expectations of the questions, namely writing down the equations obtained from the questions. This shows that, students with AQ quitter have not been able to understand the problem at hand. For camper-type students in understanding problems do not have difficulties in working on, the student does it correctly and precisely. In the process, the student states the information correctly, so that camper-type students are able to meet the stages of understanding the problem.

Furthermore, siswa who has an AQ category of climber type has the ability to show that the student is able to solve existing problems. Although the questions given were relatively difficult, the student showed his enthusiasm to finish. It can be seen from the results of the work that it is able to complete the results of its work with indicators of understanding the problem. In the picture, students with quitter type can be seen feeling discouraged in solving the problems they encounter, unlike the case with camper and climber type students they are able to solve problems with indicators of understanding the problem correctly and precisely. Students of the camper and cllimber types seem to meet the indicators of understanding the problem and both show an attitude of enthusiasm, not easily discouraged in solving problems, and are eager to achieve a goal they want.

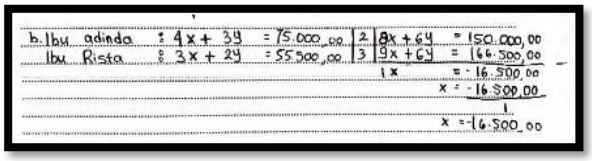
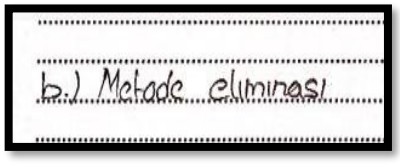
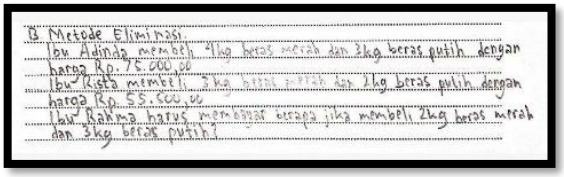
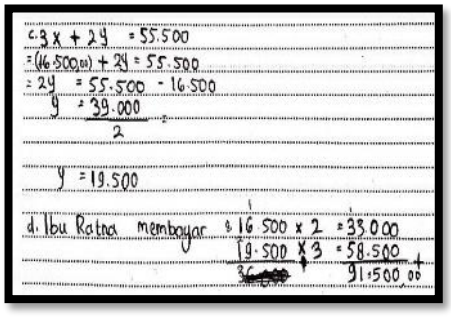
Type Quitter	
Type Camper	
Type Climber	

Figure 2. Results of Working on Indicators planning problem solving

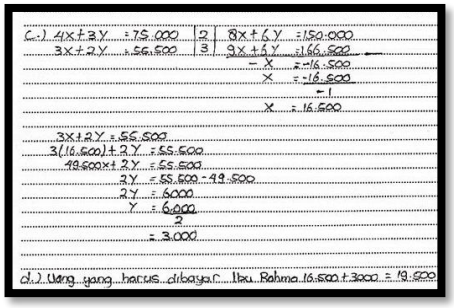
At the stage of planning problem solving students with a quitter type are able to perform this stage, it is clear from the results of the work that the subject can make excuses easily and correctly, as well as write down the planned strategies in order to solve the problems he faces. From the results obtained, the student is able to write down the given method of solving and meet the indicators of problem-solving ability. Camper-type students have not done their plans properly and correctly. The subject simply writes down the method used without including the steps to solve it. Camper-type students cannot meet the indicators of planning problem solving, because in working on the subject finds it difficult to use what method should be used.

Furthermore, subjek with the type of climber in solving a problem has no difficulty at all, because they have a high confidence that every problem must have a way out. The subject also does not give up easily and does not despair no matter how difficult the problems he faces until they find success or in getting the right answer. Even though the given question is difficult, the subject still tries to solve it completely. The subject of the climber is able to solve the problem with indicators of planning problem solving. It can be seen from the results of the work that they are able to solvethe problem correctly. The student has the ability to have a strong desire to try to solve the problems he faces and is always motivated to be enthusiastic in achieving his goals.

Type Quitter



Type Camper



Type Climber

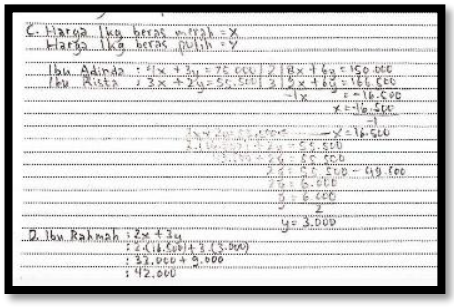


Figure 3. Results of Work on Indicators

At the stage of carrying out the plan of the student with the quitter type it is seen from the results obtained that he is unable to carry out the planning that he has compiled correctly using the methods of elimination and substitution, but from the results obtained it does not appear that the process of solving the problem correctly. Based on the results of his work it can be concluded that the subject has not been able to carry out the plan by means of its completion correctly. For students with a camper type , it can be seen from the results of the answers obtained that they are able to solve a problem they

face. The subject was able to carry out the existing plan, but in determining the price of Mrs. Rahma the subject made the final result not quite right. In addition, he also did not write down his mathematical model first at the stage of determining money from Mrs. Rahma, so the steps taken were not right.

For students with the climber type , it can be seen from the results of their work being able to solve problem solving ability problems with indicators of implementing plans properly and correctly, namely writing down the steps of the work and being able to complete them easily. The student solves the problem using the right way and in accordance with what is conveyed by the teacher. Climber-type students write down in detail the stages to get the correct answer. They are able to write down what plans will be carried out. This is in accordance with the characteristics of climber-type students who have strong endurance and never give up in the face of isolation.

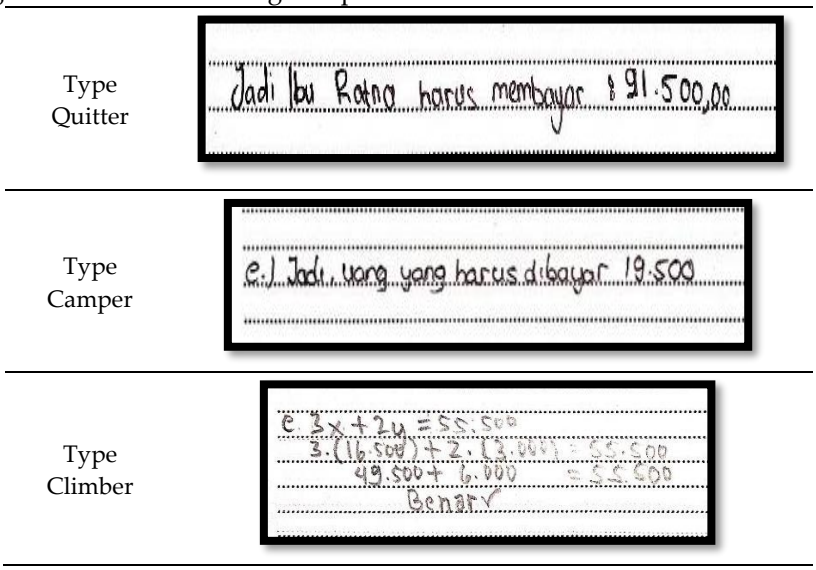


Figure 4. Indicator Work Results Rechecking

At the stage of re-examining students with quitter type are unable to write down the results obtained and the results are not quite right. The student does not understand how to re-examine the answers he did, but the student made a conclusion from the solution to the problem given, but the results obtained were not quite right. Students with a camper type of the answers obtained only write down conclusions on questions that are not considered appropriate. Based on the results of his work, it can be concluded that the student did not write down the final result of the problem-solving ability stage, namely re-examining. It was shown that the student was in a hurry in discussing the given questions.

Furthermore, for students, climbers are able to solve problems with indicators of re-examining and being able to solve them properly and correctly. The work of the student writes down from the results of x and y obtained and then entered into the equation and can be seen ifthe answer is appropriate and correct. He already understands how to write down the conclusions of the problems obtained. The results of the answers of climber students can be concluded that the achievement of problem-solving ability with re-examination indicators has been achieved well.

Based on the results obtained through data triangulation, it was found that subjects classified as quitters could only complete the problem-solving process up to the stage of understanding the problem. This finding aligns with Darmawan et al. (2019), who noted that these students tend to regret their outcomes and struggle with planning, implementing, and reviewing problem-solving strategies due to a lack of thoroughness and understanding. Furthermore, this limited capability reflects their inability to apply critical thinking skills effectively. Consequently, these students are unable to progress beyond the initial stages of problem-solving, highlighting a significant need for interventions to enhance their problem-solving abilities.

Students who have a camper-type Adversity Quotient can be seen from the results of student work the results obtained tend to be better than students of the quitter type. Students in solving problems of problem-solving ability of these students can only complete two of the four stages of problem solving. Of the two stages that have not been mastered by students are at the stage of planning problem solving and re-examining. This can be seen in the way students do the stages of planning problem solving only writing the method and at the stage of re-examining only writing the final result without writing down the steps. This is in line with what was said by (Aini & Mukhlis, 2020) where students with this type of camper have not been fully able to complete indicators of problem-solving ability at the stage of planning problem solving and re-examining.

For students who have a climber-type Adversity Quotient level from the results of the work obtained, it can be concluded that the student is able to master all four stages of problem-solving ability. The subject in solving problem solving ability problems does not have any difficulties at all, precisely with the existence of these questions students with climber types feel challenged to be able to solve the problems they face. This is also in line with the results of research that has been carried out by (Widyastuti, 2015) which states that students who have an Adversity Quotient with a climber type show the results obtained that the student is able to solve problem solving skills with indicators, namely; understanding problems, planning problem solving, implementing problems, and re-examining.

4. CONCLUSION

Based on the analysis and discussion of the research data, it can be concluded that students' problem-solving abilities vary significantly by type. Quitter-type students are only able to complete the planning stage of problem-solving. Camper-type students can progress through understanding the problem and implementing a plan, but they struggle with more complex problem-solving stages. In contrast, climber-type students successfully navigate all stages of problem-solving without difficulty. Future research should focus on providing teachers with strategies to improve students' problem-solving skills, ensuring they do not encounter difficulties or confusion. Additionally, incorporating new and diverse teaching techniques can prevent monotony and enhance the learning experience.

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