

Adversity Quotient and Students' Problem Solving Skill in Mathematics

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Abstract. This paper reviews about the adversity quotient, including its characteristic and problem-solving skills of students in mathematics, and their connection to mathematics. We provide some theory about adversity quotient, problem-solving skill, including its definitions, dimensions, and characteristics then we try to find answers to the following: students' adversity quotient characteristics and its connections to students' problem solving skill; the effect of adversity quotient and problem-solving skill to their achievement in mathematics. Adversity quotient refers to student's ability to face a problem, in which mathematical problems. Based on their responds to face a problem, there are three types of student which are quitter, camper, and climber. This level of adversity quotient can determines the level of student thinking in solving mathematical problems given. The high level of adversity quotient will affect the spirit and ability of students in thinking to solve the problem. Problem-solving skill is also needed by every student and considered as one of higher-order thinking skill. This skill is required to understanding the existing problems. In addition, students should be able to seek settlement solutions and looking back in a solution that has been obtained. Therefore adversity question and problem solving skills in math is needed by students to improve their thinking skills and fighting spirit of students in solving a given problem.

INTRODUCTION

Mathematics tooks an important role in life, not just for ourself but to others and world. Students whom good in mathematics can be a person who will be successful and useful in society, also can reach their goal easily. NCTM [10] state that student need to understand and be able to use mathematics in everyday life because mathematics can be useful in many ways such as in society itself, as a part of cultural heritage, for students' future workplace or for development of science and technology. Therefore, student mathematics skill have to improves each day.

Despite its important role, many student often find it difficult to understand or even to like study mathematics. Even for some student, these difficulties makes them uninterested to study mathematics. In regard of adversity, Canivel [3] state that adversity reveals the truth about oneself, own weakness, and strengths. In mathematics, difficulties in learning and understanding mathematics can be seen as an adversity to the student. It will show how much the student struggle to learn, have spirit to fight themselves, by the means how much the student want to improves themselves.

Mastering mathematics required many kind of element such as willingness to learn and basic skill. One of basic skill in mathematics is problem-solving skill. Arslan & Altun [2] state that one of the major goals of mathematics education is the acquisition of the skill of learning how to solve. Therefore, student need to improves their problem-solving skill. Teacher take an important role to help student to improves themselves.

This study reviews about adversity quotient and problem-solving skill and their connection to mathematics. We provide some theory about adversity quotient, problem-solving skill, including its definitions, dimensions, and characteristics then we try to find answers to the following: students' adversity quotient characteristics and its

connections to students' problem solving skill; the effect of adversity quotient and problem-solving skill to their achievement in mathematics.

Adversity Quotient

Adversity can be defined in many ways such as a difficulty, failure, problem, or even misfortune. Stoltz [12] provided theories on adversity quotient of an individual on how to resolve such challenge and strive to overcome it so as not to affect deeply what he/she will accomplish in his/her work and towards life. He defined adversity quotient as the measure of one's resilience and ability to persevere in the face of constant change, stress and difficulty or adversity is simply a measure of how you respond to adversity. Nashori [8] state that adversity quotient is ability to use intelligence to direct things, change the ways of thinking and behavior when facing a problem. Leman [7] defines adversity quotient as simple as one ability to face a problem. In other hand, adversity quotient can be seen as one ability to overcome a crisis and change it to be a chance.

As said before, student often find it difficult to learn mathematics. Therefore, mathematics is a challenge for the student who learn it. Adversity quotient can predict how well student withstand to learn mathematics and to improve themselves, or even who will be failed and give up. Stoltz [12] state that there are four dimensions of adversity quotient. They are control, origin, reach, endurance. Control over an adverse event. People who respond to adversity as temporary, external and limited have optimistic explanatory styles and tend to enjoy life's benefits. With perceived control, hope and action are turned to reality or learned helplessness shall pass. The more control one has, the more likely one has to take positive action. In mathematics, student with a great control of themselves can retreat themselves from stress and unnecessary thought. In the end, student can learn easily, have an open minded over mathematics.

The second dimension is origin. This origin stand for something to do with blame. Blame has two functions which help one to learn from and adjust behavior causing improvement. Too much blame can be demoralizing and destructive which can destroy ones energy, hope, self worth and immune system leading one to decide to quit. The higher adversity quotient student has, indicates how much blame or responsibility student has.

The third dimension is reach. It indicates evaluating how far adversity gets into the areas of one's life. In Mathematics, reach can be seen as how much students can overcome a difficulties and turn in into something positive for themselves. It includes the feeling student has when learning mathematics such as panic, bitterness, dispirit, and easily give up or not.

The fourth dimension is endurance. It means endurance responding to the time adversities last. Canivel [3] said that endurance here means as how one see what attribute the problem has. For example, if student see mathematics is difficult because their lack of skill then they will improve their skill to make it easier for them to learn mathematics, but if student see mathematics such as something that just too impossible to learn then they will stop to learn, having exactly no interest in learning.

Furthermore, Stolz [12] divides three types of people based on their adversity quotient; quitters, campers, climbers. Student in quitter level has a lowest adversity quotient. They has no interest in complicated problem and enhance their mathematical skills. They don't even want to try to learn. They just take few step away from the problem. In mathematics class for examples, student in this type of adversity quotient doesn't pay attention at all when their teacher give an explanation about what they learn because they have no interest to process the problem and find the solutions.

Student in camper level has interest to challenges their self and to improve their skill, but stopped when they felt like unable to obtain the solution of the problem. Student in this level has a low motivations and curiosity to solve a problems. Student in highest level of adversity quotient, climber, continue to struggle to obtain a solution of problem. This level of adversity quotient can determines the level of student thinking in solving mathematical problems given. The high level of adversity quotient will affect the spirit and ability of students in thinking to solve the problem.

Problem-Solving Skill

Problem solving skills are required of students in overcoming the problem. Problems sometimes become unavoidable students when studying the subject matter of mathematics. According to Jonassen [4] "A problem is a situation or matter that presents a perceived difficulty". Difficulties experienced by these students should be assisted by way of finding a solution. Then Krulik & Rudnic [5] adds "A problem is a situation, quantitative or otherwise,

that confronts an individual or group of individuals, that requires resolution, and for the which the individual sees no apparent or obvious means or path to Obtaining a solution ".

To overcome the problems faced by young people, it takes a problem-solving ability. As its says Arslan & Altun [2], "One of the major goals of mathematics education is the acquisition of the skill of learning how to solve". The settlement can be obtained from various sources and in various ways. According Nitko & Brookhart [9] "problem solving Refers to the kind of thinking required when reaching a goal is not automatic and students must use one or more higher order thinking processes to do it". Through the good thinking and structured student should be able to determine which the right way to achieve the goals to be achieved. This is similar to Woolfolk [13] that define problem solving as formulating new answer, which is more than the simple application of the rules that have been studied previously to achieve a goal.

Students who are able to seek a solution to the problem given problem, will increase the spirit of learning and interest in learning mathematics. This happens because of the emergence of confidence in themselves that they were able to solve a problem. According to McIntosh, et al [8] has a problem-solving role as follows:

- 1) Solving the problem as the context, making the problem of connecting troubleshooting help students in explaining mathematical concepts
- 2) Problem solving as a skill, often placed in a hierarchy in which students are expected to master the routine problem-solving skills before attempting the problem is not routine
- 3) Resolution as art, illustrates the capabilities necessary to find new issues

Polya [11] said that in solving the problem takes a few steps. The steps in solving mathematical problems as follows. (1) understanding the problem, at this stage, students are required to understand the information provided and understand the intended destination. (2) devising a plan, then the student can write plans that will be done to solve the problem that has been given. (3) Carrying out the plan, the student must be able to determine the stage of the strategy will have to give explanations and instructions are meant to reveal the problem. (4) Looking back, where students are expected to revisit the settlement process for two reasons / considerations. The first reason provides an opportunity for students to evaluate and improve outcomes. The second reason to bring the solution into sharper focus.

From the opinion of the experts of the above, it can be concluded that the problem-solving ability is the ability of the students in understanding the problem to seek and find solutions mathematical tasks using the knowledge and skills possessed.

Adversity Quotient and Problem-Solving Skill in Mathematics

Seeing the importance of understanding adversity quotient for teachers, hence the need for awareness of the differences in each student. Teacher is expected to provide the best teaching methods for different types of students to see the level of students' adversity quotient. This needs to be done to obtain the learning process can proceed smoothly. Thus the material can be well so that students can follow the learning process well too. This can allow for the achievement of optimal learning results. Adversity quotient as a person's ability to deal with the problem is needed. This capability will lead students to solve the problem that there are natural, so students must accurately use these abilities to be able to resolve the issue properly. Students need to use his thoughts well by doing such things as understanding the problem, determine the right strategy in accordance with what is already known, implement these strategies in an effort to solve the problem, and check back in a solution that has been obtained.

Based on research conducted by Zhou Huijuan (2009) entitled "The Adversity Quotient and Academic Performance Among College Students At St. Joseph College, Quezon City "states" there is a significant relationship between adversity quotient of the respondents as measured by the major instrument of ARP Version 8.1 of the study and their academic performance as reflected in their GPA during the first half of the school year 2008- 2009 ". Furthermore, based on the research results Titin Masfingat in conclusion that the Adversity Quotient affect the thinking of students in solving mathematical problems, so that the adversity quotient student learning need to be considered. Then the thinking of students in solving mathematical problems vary according to the level of adversity quotient, resulting in problem-solving learning should be emphasized on individual approach based on students level of adversity quotient.

Research on adversity quotient and problem-solving has been widely studied before. One of them is research conducted by Lastri [6] about creative thinking process of junior tudents in solving mathematical problems based on Wallas' stages judging from adversity quotient. The results of this study support and strengthen the theory that we

write, where adversity quotient affects the ability of students in solving problems. First, high-ability climber students can fulfill aspects of the creative thinking process and be able to understand math problems well. Then students tend to be able to find other ways to solve the problem. Second, campers are only able to show a little initiative and fulfill aspects of the creative thinking process and are less able to understand math problems well. Students tend to be able to provide other solutions to their solutions or are willing to try to find other solutions even though students tend to give up eventually. Third, quitter students are only able to fulfill one aspect of the creative thinking process or not at all. Then students tend to be less able to understand the problem well and only able to understand the problem limited to what is stated in the matter. This has an impact on the inability of students to solve problems, let alone provide different ways of solving problems. When asked to look for other ways or answers students tend not to want to try for difficult reasons or do not know and surrender.

Further research conducted by Adisti [1] about students profile in solving comparison problem based on Polya's viewed from adversity quotient. The results of this study indicate that quitter students solve the comparison problem to the stage of understanding the problem. In understanding the problem, quitter students declare things that are known and asked to use the language of the problem and have not been able to determine whether the information contained in the problem is enough to solve the problem. The quitter student cannot develop a problem solving plan so that they fails at the stage of carrying out the completion plan and re-examining the settlement. Camper students solve comparative problems until the completion stage of the settlement plan. In understanding the problem, camper students state things that are known and asked to use their own language is simpler than the problem and can determine whether the information contained in the problem is enough to solve the problem. Then the camper students prepare a problem-solving plan correctly and can solve the problem according to the plan. In executing the student camper's skilled completion plan in calculating and operating the algebra in order to obtain the correct answer. However, the camper students have not been able to re-examine the results obtained.

Furthermore climber students solve the problem until the re-examination stage. In understanding the problem, climber students state things that are known and asked to use their own language which is simpler than the problem and can determine whether the information contained in the problem is enough to solve the problem. Climber students prepare a plan of completion correctly and can solve problems according to their planning. In executing the student climber completion plan skilled in calculating and operating algebra. Then the climber student can perform a re-examination of the results obtained by interpreting the results to the information contained in the problem.

Based on the above exposure, it can be concluded that adversity quotient affects the level of problem solving ability of students. The better the level of adversity quotient the student, the better the problem solving ability. In the end it will effect students' achievement in mathematics. Student with high level of adversity quotient can do better at solving a problems, which means they have great problem-solving skill. As stated before, student with great problem-solving skill will having better achievement in mathematics.

SUMMARY

From the above explanation, it can be concluded that adversity quotient has a relationship with problem solving skills. Each student will be facing problems in the study of mathematics, but the important thing is how the right way to overcome these problems. Students must be able to survive in the face of all sorts of trouble to find a settlement solution by changing the way of thinking and attitude towards these difficulties. One good way is to increase the students' problem-solving abilities. Troubleshooting can train students in the process of taking corrective actions in order to meet the goal. Furthermore, we noted that student belief about their mathematical ability can improve their adversity quotient which is good to improve their problem solving skill and vice versa. In the end, those situations will help student to get better achievement in mathematics.

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