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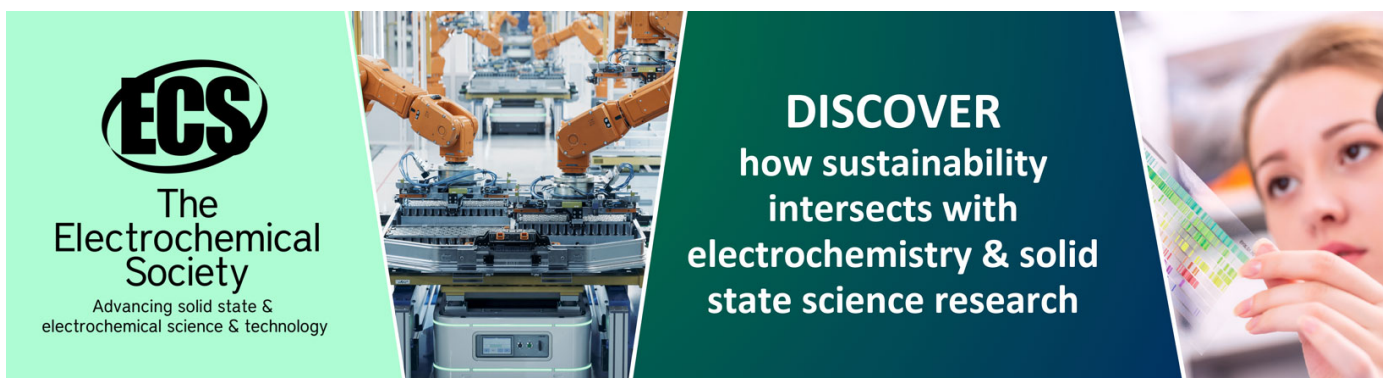
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A profile of vocational high school students' adversity quotient towards mathematics

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Abstract. This study aims to discover the adversity quotient of Vocational High School students towards mathematics, which is divided into three categories namely climber (high), camper (average) and quitter (low). Adversity quotient is influenced by four dimensions including control, ownership, reach and endurance. This survey study had 132 respondents taken from the tenth grade of Vocational High School students, specifically from four departments (office administration, accounting, multimedia, and management). There were 60 items in the questionnaire used to collect the data about the students' adversity quotient. The questionnaire was arranged using Likert scale which had reliability score of 0.92. The result showed that 27% of students were in climber category, 72% of students were in the camper category and 1% of students were in the quitter category. Based on the percentages, adversity quotient of Vocational High School students towards mathematics is quite good, but improvement is necessary because learning mathematics requires higher adversity quotient.

1. Introduction

The goal of mathematics learning in Vocational High Schools is to form a logical and systematic thought, as well as to develop an ability to solve problems. Mathematics enhances students' ability to think rationally, logically, critically and efficiently [1]. There are some characteristics of mathematics in SMK (Indonesian Vocational High School): (1) the object is abstract, (2) the truths are based on logic, (3) the learning process is gradually and continuously, (4) has relations between the materials (5) using symbols and (6) applied in other fields of knowledge [2]. Vocational High School is a formal education institution that prepares students to face the working life when they graduate with special expertise in the field where they are engaged. Vocational High School offered several programs represent students' areas of expertise, such as technology, agriculture, accounting, industry, finance, etc. Learning material given is highly related to each programs, as students be able to develop various skills required by their desired job [3]. Vocational High School is a formal education institution that prepares students to face the working life when they graduate with special expertise in the field where they are engaged. Learning mathematics is not an easy thing for every student, many students have



difficulties in mathematics learning process. Struggling for learning mathematics is very necessary for someone to achieve the success.

In psychology, besides spiritual quotient, emotional quotient, and intelligence quotient, the adversity quotient can also determine the success. Adversity quotient was first introduced by Dr. Paul Stoltz in 1997 [4]. There is not only intelligence quotient or emotional quotient which determines students' success, but also adversity quotient which has a tremendous influence in the success of students' learning [5]. Adversity is a difficult situation or an event that brings challenges in life [6]. Every student must have faced difficulties in their lives, even in learning activities. The ability to deal with these difficulties is called adversity quotient. Adversity quotient is the ability that makes people able to face challenges and various situations in their lives [7]. It explains why some people survive better and easier than others when facing some adverse situations [8]. In this competitive era, facing challenges in education and career requires extra struggle. The power of Vocational High School students to struggle can develop along with the challenges they will face, especially in working life [9].

The students of grade X as the 1st year in Vocational High School are still in young age. During this age, they are emotionally unstable and are easily to get stress. However, they are ready to find and develop their identity [10]. For Vocational High School students, adversity quotient needs to be developed because it has become one of the aspects to be considered in job recruitments. Based on the results of a research by Markman and Baron (2003), workers who have high adversity quotient are considered as valuable talent because adversity quotient significantly influences a person's performance [11]. Besides, adversity quotient also affects many other things. Based on the results of a study, adversity quotient affects academic ability, achievement motivation, social skills, performance, and leadership abilities [12]. Adversity quotient also has a positive effect on academic achievement, social ability, motivation, and work performance [6].

Teachers are people who have direct interaction with the students. They have most important role in developing their students' adversity quotient [13]. Student level according to the adversity quotient is divided into quitter, camper, and climber [14]. A consideration of students' adversity quotient level and its effect on learning can provide better understanding and achievement in academic [7].

Based on the description above, it can be concluded that adversity quotient is the ability of students to survive in facing various challenges and keep struggling when they have difficulties in the learning process and in various situations in their lives. For Vocational High School students, adversity quotient needs to be developed because it has become one of the aspects to be considered in working recruitments. Therefore, the aim of this research is to discover the profile of adversity quotient towards mathematics of the Vocational High School students.

Dimensions of Adversity Quotient

The level of students' adversity quotient consists of four dimensions that influence it, including control, ownership, reach, and endurance [12].

1.1. Control

How far the students are able to deal with their difficulties. Control refers to the degree that influence or control over a particular situation or life and to predict some events that fosters the preparedness [15].

1.2. Ownership

How far the students consider themselves to be the cause of their difficulties. Ownership refers to the degree of students' ability to admit adverse situation which they encountered. It also shows how far the students are responsible to rectify the current situation [15].

1.3. Reach

How far the difficulties reach the other aspects of students' lives. It is the perception of the students on the adverse situation [16]. Reach refers to the degree of students' perceives the adversity can influence the other aspects of their life.

1.4. Endurance

Students' perception of how long the difficult situation happened. Endurance refers to the students' perception of how long the adversity duration will last, and the cause of the adversity.

Indicators of each dimensions are mentioned in the table 1 below [17].

Table 1. Indicators of adversity quotient.

Dimension	Indicator
Control	Resilience, health and tenacity
Ownership	Accountability, responsibility, action and engagement
Reach	Stress, burden, energy and effort, it tends to have cumulative effect
Endurance	Hope, optimism, and willingness to persevere

2. Method

This study applied survey method, with 132 students of grade X at a Vocational High School in South Jakarta in the academic year of 2018/2019 as the respondents. Respondents came from four departments including office administration, accounting, multimedia, and management. This survey study used close questionnaire by Septiana that contained 60 items of statements about adversity quotient with Likert scale (strongly disagree, disagree, hesitate, agree, and strongly agree) [18]. The questionnaire reliability coefficient was 0.92. The data from the questionnaire was used to categorize students based on the level of their adversity quotient. The criteria for grouping the students based on adversity quotient can be seen in this following table 2.

Table 2. Criteria for grouping students according to adversity quotient.

Interval	Score (X)	Category
$x > Mi + 1Sdi$	$x > 220$	Climber
$Mi - 1Sdi \leq x < Mi + 1Sdi$	$140 \leq x < 220$	Camper
$x < Mi - 1Sdi$	$x < 140$	Quitter

Explanation:

$$Mi = (\text{minimum score} + \text{maximum score})/2 = \left(\frac{60+300}{2}\right) = 180$$

$$Sdi = (\text{maximum score} - \text{minimum score})/6 = \left(\frac{300-60}{6}\right) = 40$$

3. Result and Discussion

According to the categories, adversity quotient has three categories: low is called quitter, average is called camper, and high is called climber [12]. The results of the study are described in the table 3 and figure 1.

Table 3. Descriptive statistics of students' adversity quotient.

	N	Minimum	Maximum	Mean	Std. Deviation
AQ	132	139.00	264.00	2.0157E2	26.09735
Valid N (listwise)	132				

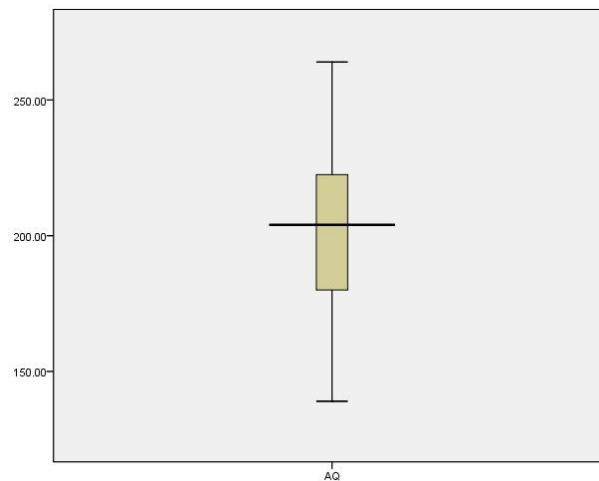


Figure 1. Box plot of students' adversity quotient.

The ideal minimum score is 60, and the ideal maximum score is 300. Based on the results of the study, the lowest score was 139, and the highest score was 264. Overall, the average score was 201.57. Therefore, the average adversity quotients of students were at the moderate level.

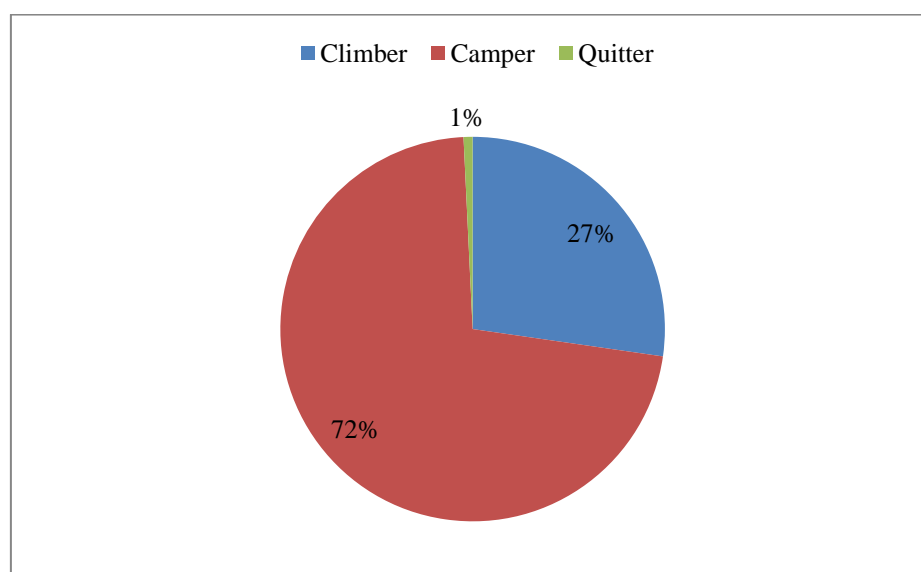


Figure 2. Pie chart of Vocational High School students' adversity quotient based on Stoltz's category.

Based on the result above, in responding the difficulties, there are three types of students based on their adversity quotient.

3.1. Climber

Students with high adversity quotient assume that adversities are temporary and they have many solutions to overcome them [16]. Climber students are they who are always optimistic; can see opportunities, chance, and hope behind the despair; and always have willingness to move forward. Climbers are not influenced by the environment, but with their creativity. They try to control the environment. It has been found that students with high adversity quotient level have greater responsibility to fix their problems, and do not blame others for their setbacks [19]. Climbers tends to

always think about the alternatives or solutions of the problems, and consider existing difficulties and obstacles as opportunities to improve their capability. In mathematics learning activities, climber students, when experiencing difficulties in understanding the concept, have high power to struggle overcoming the difficulties until they successfully understand the concept. They even have the desire to learn deeper about the concept. Based on the results of the study, 27% or 36 of 132 students had adversity quotient at this level. Mathematics is a subject that requires high ability and struggling power in learning because it involves understanding of concepts, reasoning, communication, representation, and problem solving which require every student to have high level of adversity quotient.

3.2. *Camper*

Campers are called as satisfiers. Students who belong to this category are satisfied with what they have, and tend to not develop themselves. The campers like to be in their comfort zone [20]. The students in this group also do not have high capacity to deal with change because they are driven by fear and only seek for the comfort. They already have the desire to face their problems and challenges, but they see the journey is enough [14]. At least, campers have stepped up and responded the challenges although once they reach a certain stage, they easily give up although there is actually another chance to develop. In mathematics learning, when camper students experiencing difficulties in understanding a concept, they have power to struggle until they understand the concept. Based on the result of the study, 72% or 95 of 132 students had adversity quotient at this moderate level. It indicates that most of the power to struggle owned by the students in learning mathematics is good enough, but it can be more improved because mathematics learning requires the high struggle power.

3.3. *Quitter*

Quitters are students who choose to quit, avoid obligations, back off, and stop when experiencing difficult situation. This type of students decide to stop in the middle of the settlement process, they are easily discouraged or give up. The quitter students tend to resist the problems and challenges that happened [14]. Quitters are often stuck on their psychological and safety needs [21]. Students in this type are easily satisfied and tend to be passive. Thus, they will lose a lot of valuable opportunities in life. In mathematics learning process, if quitter students experience difficulties in understanding a concept, they are easily discouraged or give up. In solving more complex mathematics problems, quitters tend to be effortless to try because they consider themselves as incapable [22]. Based on the result of the study, only 1% or 1 of 132 student was in this level, it describes that Vocational High School students have the good struggle in learning mathematics.

The three categories mentioned above can be the description of the levels of adversity quotient or the struggle power of Vocational High School students in mathematics subjects. Adversity quotient can be used as mental guidance for teachers and students to avoid psychological problems. It can also help students to see something from the positive side, and become more willing to take risks. Thus, the demands and expectations become the supports. The existence of adversity quotient in class helps to improve the ability and learning achievement of students if it becomes the concern of teachers as the facilitators.

4. Conclusion

Based on the result and discussion above, it can be concluded that the average adversity quotient of Vocational High School students was in the moderate level (camper) which reached 72% of the total sample. 27% of the total students were in the high level (climber), and 1% of the students were in the low level (quitter). It indicates that most of the adversity quotient of Vocational High School students is good enough, but needs to be developed because mathematics requires high adversity quotient in the learning process. By developing the adversity quotient, students can understand how to face the challenges and adversities in their lives.

References

- [1] Suryadi B and Santoso T I 2017 *Int. Educ. Stud* **10** 12. doi:10.5539/ies.v10n10p12
- [2] Bunga D E and Wijaya A 2018 *5th Int. Conf. Res. Implement. Educ. Math. Sci. Proc.* 257–262
- [3] Suhartini and Santoso R H 2014 *J. Ris. Pendidik. Mat.* **1** 69–76
- [4] Marie J, Cando D, and Villacastin L N 2014 *Int. J. Sci. Basic Appl. Res.* **18** 354–367
- [5] Sudarman 2012 *AKSIOMA* **1**. no. 1 pp.55-62
- [6] Singh S and Sharma T 2017 *Procedia Comput. Sci* **122** 86–93
- [7] Bakare B M 2015 *ICEE* 2–109
- [8] Bautista M J C 2015 *Int. J. Sci. Res. Publ* **5** 1–6
- [9] Effendi M, Mohd E, and Khairani A Z 2016 *Indian J. Sci. Technol.* **9** 1–8
DOI:10.17485/ijst/2016/v9i47/108695
- [10] Pangma R, Tayraukham S, and Nuangchalerm P 2009 *J. Soc. Sci.* **5** 466–470
DOI: 10.3844/jssp.2009.466.470
- [11] Shen C 2014 *J. Glob. Bus. Manag. ISSN 1817-3179* **10** 19–32
- [12] Hema G and Gupta S M 2015 *Int. J. Indian Psychol.* **2** 49-64
- [13] Firmansyah A H, Djatmika E T, and Hermawan A 2016 *IOSR J. Bus. Manag.* **18** 45–55 DOI: 10.9790/487X-1805014555
- [14] Hastuti T D, Sari S D R, and Riyadi 2017 *Conf. Ser. J. Phys.* **983** 1–6
doi:10.1088/1742-6596/983/1/012131
- [15] Ng T 2013 no. 65 pp. 81–86. DOI: 10.7763/IPEDR
- [16] Somaratne C S N, Jayawardena L N A C, and Perera B M K 2017 *Trop. Agric. Res.* **29** 45–54
- [17] Shivaranjani 2014 *Int. J. Bus. Adm. Res. Rev.* **1** 181–189
- [18] Septiana A 2015 *Proceeding Int. Conf. Res. Implement. Educ. Math. Sci.* 17–19
- [19] Rathee N and Sharma S 2018 *Int. J. Humanit. Soc. Sci. Invent.* **7** 33–36
- [20] Dina N A, Amin S M and Masriyah 2018 *IOP Conf. Ser. J. Phys.* 947 1–5 doi:10.1088/1742-6596/947/1/012025
- [21] Venkatesh J and Shivaranjani G 2015 *Glob. J. Eng. Sci. Res.* **2** 49–56
- [22] Sari C K, Aryuna D R 2016 *J. Res. Adv. Math. Educ.* **1** 36–48
DOI: <https://doi.org/10.23917/jramathedu.v1i1.1784>