Adversity quotient of prospective primary school teachers in making scratch-assisted math application

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Abstract. The adversity question is one of the success factors in learning mathematics. This research is motivated by the low adversity question of students. The purpose of this research is to describe the picture of student adversity in making scratch-assisted mathematics applications. This research uses the descriptive qualitative method. Subjects studied were 107 prospective teachers of semester 2 elementary school in one of the private tertiary institutions in Cimahi City. The instruments in this study used non-tests in the form of questionnaires and interviews. The results showed that the majority of prospective elementary school teacher students were still in the camper category. Adversity question of students in making scratch-assisted mathematics applications needs to be improved. This is because there are still many students difficulties in making algorithms around logical thinking, determining ideas for later application in mathematical application concepts. Students must go deeper into mathematical concepts and have to learn more about adversity quotient because students will need them when they are already working.

1. Introduction
Elementary School is a place where someone starts to build basic knowledge that will be used at the next level of education. Therefore, a teacher at the elementary school level must be able to educate their students until they understand the basis of the material being taught, so that at the next level they will be easier to understand the material. This is where the ability of an elementary school level teacher and their resilience in solving problems is needed. The right effort to train a teacher's endurance is through experience when they become students, because the best way of learning is should be more optimized is the educator's experience in giving lessons [1-5]. The ability they must practice is an adversity quotient.

Adversity quotient or intelligence to overcome difficulties is needed by prospective elementary school teacher students because they will face various kinds of problems in elementary school. These problems can be in the form of students who have difficulty understanding a material so that they have to find solutions and endure these difficulties, students who cannot be managed so they need the patience to deal with it, and many more. This adversity quotient also has a very important role in daily life, because if someone has a high level of adversity quotient they will easily achieve what they are aiming for [6].

Adversity quotient plays a very important role in daily life. Success in learning mathematics is also influenced by this adversity quotient. In the English dictionary, adversity means misfortune or misery while quotient means intelligence or ability. Adversity quotient can be defined as the ability or intelligence to endure someone is facing various kinds of difficulties [7]. Adversity quotient is believed
to have the power to motivate someone to be able to solve the problems they face [8]. Adversity quotient can also be said to be the strength of one's struggle to solve a problem.

Adversity quotient can be developed through three aspects [9], namely: 1) as a new conceptual framework for understanding and improving all aspects of success; 2) as a measure of how someone responds to misery, and 3) as a device or tool to improve one's response to misery. Stoltz also categorizes adversity quotient into 3 parts, namely: 1) Climber, which has a high adversity quotient, is likely to remain in the face of problems and try as much as possible to get solutions to those problems; 2) Camper, who has a moderate adversity quotient, tends to give up when they have tried their best but found no solution to the problem; and 3) Quitters, which have low adversity quotient, tend to give up when faced with a problem, even without trying it they will immediately give up because they do not have high fighting power [9].

The indicator adversity question according to Slotz [9], namely: a) dimension of control, this measures how far someone can control an event, or how someone responds to a difficulty he faces, whether spontaneous or not; b) origin dimension, this measures how far someone knows the source of the problem at hand; c) ownership dimension, it measures how someone blames himself, but can still be responsible for overcoming the difficulties experienced; d) reach dimension, this measures how many other disturbances can affect it when solving a problem; e) dimension of endurance, this measures how long a person survives in the face of these difficulties.

But the reality Based on research conducted by Ristiana, the level of adversity quotient of elementary school teacher candidates is still not as expected, or it can be said that there are still many at the lower levels [10]. Expectations from prospective elementary school teacher lecturers have a high adversity quotient, but in fact, based on the researcher's experience there are still students when faced with problems (in this case college assignments), they are easily given up and don't want to try first to find a solution. Most students when they encounter difficulties, they tend not to maximize efforts to get a solution, they prefer to give up and run away from the problem so that the solutions obtained do not always match what is expected.

Scratch application is a media that can be one solution to overcome the adversity quotient of students who are still lacking. Scratch application is a visual language that is by creating projects using intermediaries in the form of images [11]. Scratch is a program that has many features that are about the environment and allows for varied education [12]. This application is almost similar to other game maker applications, it's just that this application is easier to use because the user is not required to memorize a command or coding to run a condition of the objects in the game. Users only need to enter the command or coding by moving a kind of puzzle that contains the commands into a column that has been provided to accommodate the command. Users only compile the logic of each object of the game that will be made what its condition will be. User creativity and endurance in working on the game project are the main keys to using this application. This is consistent with research conducted by Meerbaum-Salant, Armoni, and Ben-Ari which states that this application can develop the creativity and logic possessed by its users [13].

Based on this, the researcher wants to know the level of adversity question of prospective elementary school teacher students in making mathematical applications with scratch. So the purpose of this research is to describe the level of adversity of student qualifications in making scratch-assisted mathematical applications.

2. Method
The method in this research is descriptive qualitative research. This study aims to describe a clear and detailed picture of the level of student adversity question in making mathematical applications with scratch. The population in this study were all semester 2 elementary school teacher education students in Cimahi City, West Java, Indonesia. While the sample in this study was 107 second semester elementary school teacher education students at one private university in the City of Cimahi. The instruments used were questionnaires and interviews. The questionnaire instrument to see the adversity question was divided into 3 parts, namely climber, camper, climber [8-9]. The number of statements used in the questionnaire was 16 statements. While the number of questions used in the interview
instrument was 3 questions. The following questions on the interview instrument used to view adversity questions in making scratch applications in Table 1.

**Table 1. Questions on the interview instrument**

| No | Questions |
|----|-----------|
| 1  | In your opinion, if you want to create scratch-assisted applications you must understand the mechanism of scratch? Why? |
| 2  | What difficulties did you experience when creating scratch-assisted math applications? |
| 3  | How do you overcome the difficulties you find in creating scratch-assisted math applications? |

3. Result and Discussion

We used Google Sheets to analyse adversity quotient of prospective primary school teachers. Based on the questionnaire in the Table 2, we have 13 prospective primary school teachers (12.15%) in the quitter category, 77 prospective primary school teachers (71.96%) in the camper category, and 17 prospective primary school teachers (15.89%) in the climber category.

**Table 2. Results of adversity quotient questionnaire**

| Adversity Quotient Category | Total |
|-----------------------------|-------|
| Quitter                     | 13    |
| Camper                      | 77    |
| Climber                     | 17    |
| **Total**                   | **107** |

In the Google Form, after they answer the adversity quotient questionnaire then they fill an interview form. This interview form used to find out more about their adversity quotient when they making scratch-assisted math application.

Most of prospective primary school teachers answer question number 1 if we want to use scratch application, we should understand the whole mechanism of that application. But there are some people said that we shouldn’t understand the whole mechanism, we just should understand the mechanism that we want to use for making some math application. There is also mention that the important thing is we should understand the basic of scratch application first before we start creating something. By understanding the basic, we will know what steps should be taken first. Prospective primary school teachers in the quitter category said that they tend to understand the whole mechanism of scratch application instead think about what they need. This is the safest way to finish scratch-assisted math application, they won’t to face another difficulties. Whereas, they will still find a new problem when they try to make it.

For question number 2 and 3, the answer is vary. We pursed into several answers, they talk about logical thinking, determining an idea, adjustment with the scratch application, and internet network. But we will focused on logical thinking. The purpose logical thinking here is making an algorithm henceforth it is applied in scratch-assisted math application. Most of prospective primary school teachers in camper and quitter category are difficult to make an algorithm for their math application idea. When they found some difficulties, they will looking for the solution in the internet or ask to their friends or lecturer. Prospective primary school teachers in the camper category will try again if the solution is not the best solution, but when they really didn’t find the solution they will make the application not the best they have. However, prospective primary school teachers in the quitter category when they not find the best solution they tend to surrender and give the project to their friends. While prospective primary school teachers in climber category they tend to survive face their problems. When they find a new problem, they continuously looking for the best solution for their problems and it works. Eventually, they find the best solution for their problems and their projects.
Based on the results, we found that most of prospective primary school teachers are still in the camper category 71.96%. They find a dead end way, they tend to surrender and the projects or the problems will not have the best solution [14-18]. So that the projects will not perfectly done as expected. Prospective primary school teachers in the quitter category tend to surrender before they face it. They will give it to their friends to finish the projects. While prospective primary school teachers in the climber category won’t surrender until they find the best solution, this results is based on Stoltz research [9]. This shows that the prospective elementary school teacher students in the camper and quitter category have not been able to solve problems properly, they have not been able to find a way out of the difficulties of the problem by applying concepts and rules previously obtained to create new ideas [19].

4. Conclusion
Based on the results and discussion above, the researcher concludes that the majority of elementary school teacher candidates are still in the camper category. Adversity question of students in making scratch-assisted mathematics applications needs to be improved. This is because there are still many students difficulties in making algorithms around logical thinking, determining ideas for later application in mathematical application concepts. Students must go deeper into mathematical concepts and have to learn more about adversity quotient because students will need them when they are at work.

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