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Analysis of elementary school students' mathematical resilience during learning during the covid 19 Pandemic

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Abstract. This research is motivated by a change in learning methods that were initially face-to-face to online learning that resulted from the COVID-19 outbreak. The purpose of this study was to analyze the mathematical resilience of elementary school students during learning during the COVID-19 pandemic. The method used in this research is descriptive method with 36 elementary school students as subjects in one of the primary schools in Majalengka district, West Java, Indonesia. The results of this study, mathematics resilience of elementary school students is in the medium category. The findings related to mathematics resilience of elementary school students namely resilience is not only influenced by the complexity of the material and changes in learning methods. However other factors such as the packaging of learning by the teacher, the media used by the teacher, and the communication used by the teacher also affect the mathematics resilience of elementary school students.

1. Introduction

The implementation of learning in primary schools in the 2019-2020 school year is not implemented as it should be done face-to-face which is carried out online-based learning. This started since the outbreak of Virus Disease (COVID-19) and based on circular No. 36962 / MPK.A / HK / 2020 dated March 17, 2020 issued by the ministry of education and education about courageous education and working from home. COVID-19 is a virus that spreads globally in various countries of the world. This COVID-19 starts in Wuhan city which starts in December 2019 [1].

Implementation of learning with methods that are different from usual will certainly have an impact on students both positive and negative impacts [2,3]. A positive impact is that children can learn from home with family and children can avoid COVID-19 exposure. While the negative impact is that 80% of children want to go back to school, children are bored with the work of their teachers, and the majority of students are not happy about distance learning [4]. In addition to the general impact that has been stated above, the specific impact on mathematics learning based on the results of interviews with students and teachers in one primary school in Majalengka Regency is that students find it difficult to understand the material delivered through distance learning, students are confused in completing assignments. math assignments, and students lack confidence when completing math assignments.

Based on the results of the interview, if allowed to drag on then it is feared that it will affect the decline in student achievement. Student learning achievement is influenced by internal factors and external factors [5,6]. Internal factors that influence learning achievement are factors originating from within students themselves such as psychological factors both innate or not innate. While external factors are factors originating from outside students themselves such as curriculum, methods, social and social conditions, environment, teachers, cultural conditions and so on. Based on this the focus of this



study is to analyze learning in the emergency COVID-19. This was carried out based on the results of previous studies on learning at the time the pandemic COVID-19 as the research of Almarzook [7] with the title Virtual learning during the COVID-19 pandemic, the results of his research revealed that learning through distance with various applications of technology provides benefits to the health and safety of students during the COVID-19 pandemic. Subsequent research was carried out by Jamaludin [8] about online learning of prospective teachers during the COVID-19 pandemic whose research results revealed that online learning requires habituation from both students and educators in order to take place properly. Subsequent research was carried out by Djalante [9] entitled the review and analysis of current responses to COVID-19 in Indonesia, the results of the research are processes during the occurrence of COVID-19 will certainly provide limits on the process of activities in daily life, but with the existence of a minimum technology these limits can be minimized by still pay attention to health protocols. From these various studies, there has been no research focused on learning specifically about analyzing student resilience during learning during the COVID-19 pandemic. Therefore, the focus of this study is to analyze the mathematical resilience of students while participating in learning during the COVID-19 pandemic.

Resilience is the ability of a person to maintain psychological stability when experiencing difficulties, pressures, problems, and challenges so that he can rise up and adapt healthily to these things. Resilience consists of seven indicators: 1) emotional regulation; 2) impulse control; 3) optimism; 4) the ability to analyze the causes of problems experienced accurately; 5) empathy; 6) self-efficacy; and 7) the ability of individuals to interpret and obtain positive aspects after problems, pressures, or obstacles befall them [10-14]. Mathematical resilience is an important concept in mathematics education because most students find it difficult to learn mathematics. Mathematical resilience is the ability of individuals to foster confidence in themselves when experiencing obstacles, pressures, and problems, especially in learning mathematics [15]. The results of previous research on mathematics resilience revealed that mathematics resilience can contribute to improving student academic achievement [6] and other research on high school students' mathematical resilience in the city of Cimahi is in the medium category [16]. Based on this, this study will analyze the mathematical resilience of elementary school students while participating in learning during the COVID-19 pandemic.

2. Method

The method used in this research is descriptive method with one variable, namely mathematical resilience. Selection of descriptive method is considered appropriate in research during the COVID-19 pandemic because it does not have to provide treatment but is able to explore the data completely [17]. The subjects in this study were elementary school students, one of the elementary schools located in Majalengka Regency, West Java, Indonesia, with a total of 36 students. The selection of the primary school is based on the reason that the school has actually implemented online-based distance learning. The instrument used was a questionnaire instrument based on seven indicators of resilience. Data processing and analysis in this study is by calculating the comparison of the average value of each indicator of student resilience with the determined Norm Reference Value (NRV) [16]. The reason for selecting instruments through a questionnaire was because the instruments were considered appropriate for use in research during the COVID-19 pandemic.

3. Result and Discussion

3.1. Result

The results of data analysis using descriptive analysis techniques using SPSS version 22 are as follows (Table 1).

Table 1. Descriptive statistics of Mathematical Resilience

	Indicator Number						
	1	2	3	4	5	6	7
Valid N	36	36	36	36	36	36	36
Missing	0	0	0	0	0	0	0
Mean	3,20	2,82	2,20	2,60	2,50	2,60	2,12
Category	Medium	Medium	Low	Medium	Medium	Medium	Low

Based on Table 1, from all resilience indicators there are differences in the average value with the highest average value is the first indicator, emotional regulation, while the lowest average value is the seventh indicator, namely the ability of individuals to interpret and obtain positive aspects after problems, pressures, or obstacles befall them. Judging from the category, almost all indicators are in the medium category and only two indicators are in the low category. The indicators are in the category of low are indicators into three namely optimism and indicators seventh namely the ability of individuals to interpret and obtain positive aspects after problems, pressures, or obstacles befall them. This shows that the students have a medium category which can be interpreted as the resilience of elementary school students' mathematics quite well.

Based on the percentage of the number of students in each indicator can be seen in the following Table 2.

Table 2. Percentage of Students based on Categories

	Percentase of student (%)						
	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Indicator 5	Indicator 6	Indicator 7
Very high	-	-	-	-	-	-	-
High	5	5	3	4	3	4	2
Medium	85	70	40	43	43	50	40
Low	7,5	12	42	42	41	36	45
Very low	2,5	13	15	11	13	10	13

Based on Table 2, the number of students in each indicator fits into various categories. The highest category is the highest in the first and second indicators with a percentage value of 5% each, the highest category is the highest in accordance with the category of the first indicator that is 80%, the highest low category is based on the seventh indicator with the percentage value by 45%, and the highest very low indicator based on the third indicator with a percentage value of 15%.

3.2. Discussion

Based on the results of the research that has been presented before, indicator 1 about the ability to remain calm in a condition that is under pressure or what is called emotional regulation is influenced by the characteristics of students. Primary school students based on the phase of social development are in the category of play so that when under pressure such as given assignments and questions as long as students can still play students will be calmer and not easily stressed [18,19]. Based on the results of the study indicators 1, 2, 4, 5, 6 included in the medium category. This shows that mathematical resilience is not only influenced by the complexity of the material and distance learning through online but other factors such as the packaging of learning by attractive teachers with innovative models and interactive media have positive impacts [20–22].

Based on the results of indicator 3 research the ability to believe that all things can change for the better and have hope in the future and can control the direction of life is called optimistic and indicator 7 the ability of individuals to interpret and obtain positive aspects after problems, pressures, or obstacles befall him in the low category. After analyzing this indicator it is influenced by student characteristics

and motivation during learning. Motivation of students both from teachers and parents can have a positive impact on student resilience [8,23–26].

In addition to these things, the learning model used by the teacher also has a positive impact, the more diverse models or methods used by the teacher, the more enthusiastic and happy students in learning [27–29]. The presence of information and communication technology (ICT) also has an impact on the development of learning. Learning to use ICT can provide opportunities for students to explore their knowledge [19,30,31]. Based on these findings, the mathematics resilience of elementary school students does not only depend on the complexity of the material and the change in learning methods from being a face to an online learning during the COVID-19 pandemic.

4. Conclusion

Based on the results of research and findings during the study, elementary school students' mathematical resilience was in the medium category. Learning during the COVID-19 pandemic through online has an impact on students' mathematical resilience. However, the effect is not very significant because students' mathematical resilience is not only influenced by online learning and the complexity of the material provided. Other factors also influence such as student characteristics, packaging of learning, environment, and teaching materials used. Therefore, this research is expected to have implications for teachers in improving competencies and skills in packaging effective, interesting, and efficient lessons during the COVID-19 pandemic, for students in optimizing mathematical resilience during learning during the COVID-19 pandemic, and for other researchers who will examine the mathematics resilience of elementary school students. It is hoped that further research can be carried out with broader subject matter so that broader generalizations can be made.

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