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Student's Self Concept, Self Regulated Learning, and Ressilience Mathematics During the Covid 19 Pandemic In Indonesia

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Abstract. The Covid 19 pandemic that has occurred throughout the world including Indonesia over the past two years is a global disaster that was never expected to happen. All efforts are being made by the Indonesian government to slow down the spread of this virus. Vaccination programs, regional quarantines, and restrictions on community social activities are some of the efforts made. Then again, adaptation efforts to the ongoing pandemic and in the context of the economic recovery the community, on June 1, 2020 the Indonesian government began to develop a new normal life order policy scenario in the midst of the COVID-19 pandemic situation. . One that is quite affected is the field of education where learning must change from face-to-face to online learning. The study used a qualitative descriptive method. The purpose of this study was to describe the mathematical self-concept, mathematics self regulated learning, and mathematical resilience of students related to mathematical problem solving abilities in mathematical modeling courses. The research subjects were students of the Mathematics Education Study Program which were divided into eight categories based on high and low categories in each variable. The results of this study indicate that student with negative mathematics self-concept has a significant effect on students' mathematics self-regulated learning than others.students, and student with high mathematical resilience had better problem solving abilities than students with low mathematical resilience.

INTRODUCTION

The COVID-19 pandemic in Indonesia, which has lasted for the last two years, has massively changed the way people live. As an effort to adapt to the ongoing Covid-19 pandemic, the Indonesian government has swiftly set up a new normal life order policy in all aspects. Through Presidential Regulation Number 82 of 2020 which was amended by Presidential Regulation Number 108 of 2020 concerning the Covid 19 Committee and National Economic Recovery, a new normal life order scenario was prepared in the midst of a pandemic in Indonesia (Perpres, 2020). Included in the scenario is the implementation of learning in schools. Learning that is usually done face-to-face in class is now turning to distance learning which is done online. This transition period is a difficult time, because all

components of learning, including teachers, parents, students, and principals, need to quickly prepare tools, facilities, infrastructure, and self-preparedness to support distance learning success.

According to Rina and Taufiq (2020) through their research on the implementation of online learning during the Covid pandemic in West Java Province, there were several obstacles found in the implementation of distance learning including for teachers the main obstacle was in preparation for learning, and difficulties controlling students during learning. As for schools, the impact of distance learning is curriculum targets that are not achieved and moral assessment is difficult to do. For students, the obstacles faced are the difficulty of solving problems in learning materials and the difficulty of finding information about learning (Kharisma and Denok, 2020). Adnan and Anwar (2020) stated that online learning proving is helpful in safeguarding students and faculty's health midth the Covid-19 pandemic, however it is not as effective as conventional learning. The research data shows that 78.6% of respondents from university students felt that conventional classes were more effective as compared to online learning.

Factors that affect the effectiveness of learning mathematics, especially in students' ability to solve problems, among others, are students' self-readiness to face changes in learning methods. Self-concept, mathematics self regulated learning, and students' mathematical resilience. In the research of Nita Della and Dian Cahyawati (2021) on self-concept and student mathematics self regulated learning, it was stated that during the Covid 19 pandemic, students' mathematical self-concept directly affected students' mathematics self regulated learning.

According to Hidayat (2017) in addition to the self-concept of mathematics and mathematics self regulated learning, one of the attitudes that is a factor in influencing the success of a person learning mathematics is mathematical resilience. Mathematical resilience is the ability of students to survive when faced with difficulties, collaborate collaboratively, and skills in expressing understanding in mathematical language (Wilder & Lee, 2010). Mathematical resilience is a mathematical ability that shows endurance and flexibility when studying mathematics (Agusmanto & Tutiarny, 2020). Mathematical resilience can be described as a student's "struggle" in dealing with and overcoming mathematical problems (Waxman, gray et.al., 2003). According to (Agusmanto & Tutiarny, 2020) when students with mathematical resilience have difficulty in solving mathematical problems, students will still have confidence that in the end Wilder & Lee (2010) stated that there are four factors in mathematical resilience, namely: (1) brain ability that can be grown, (2) personal understanding of mathematical values, (3) understanding of how to work in mathematics, and (4) awareness of peer support and other supporting facilities. Thornton & Satton (in Agusmanto & Turtiany, 2020) identify five key aspects of mathematical resilience, namely: (1) mindset development which is shown through behavioral changes such as learning from mistakes, (2) has metacognition that is displayed through a willingness to reflect on answers and solving processes. problems, (3) have the ability to adapt, which is shown through the ability to adapt, which is shown through the ability to try new strategies or start again, (4) have the interpersonal aspect, which is shown through the effort to ask critical questions due to awareness of the lack of knowledge possessed, and (5) have a sense of purpose which is indicated by the students' desire to find the meaning of their learning.

METHODS

The type of research used in this research is descriptive qualitative. This research was carried out on students of the STKIP PGRI Nganjuk Mathematics Education Study Program in the fourth semester of the 2020/2021 academic year. Several stages in this research are: research preparation stage, data collection and analysis stage, and report preparation stage.

At the preparatory stage, the following activities were carried out: (1) reviewing theories about mathematical self-concept, mathematics self regulated learning, and mathematical resilience of students related to problem solving abilities, as well as studies on the effectiveness of learning during the Covid 19 pandemic in Indonesia and the factors that influence it. . The results of the theoretical study aroused the curiosity of researchers of mathematical self-concept, mathematics self regulated learning, and mathematical resilience of students of the Mathematics Education Study Program of STKIP PGRI Nganjuk in the mathematical modeling course. (2) Conduct pre-research in the form of distributing online questionnaires via google form to fourth semester students of Mathematics Education study program STKIP PGRI Nganjuk to obtain an overview of researchers of mathematical self-concept, mathematics self regulated learning, and mathematical resilience of students, then compared with theoretical studies so that this activity encourage researchers to propose research problems. (3) To answer the problem, the researcher conducted a qualitative descriptive study. This study aims to describe the mathematical self-concept, mathematics self regulated learning, and mathematical resilience of students in solving mathematical problems in mathematical modeling courses. As a data collection tool, the researcher drafted an auxiliary instrument in the form of a written test of solving mathematical problems and interview guidelines, while to obtain the categories of mathematical self-concept, mathematics self regulated learning, and mathematical resilience, a questionnaire was prepared based on the theoretical studies that had

been carried out. The Mathematics Self Concept questionnaire used consists of 9 statements with alternative answers on a Likert scale with 5 answer choices. This questionnaire is the result of adaptation and modification of the MSC questionnaire proposed by Githua & Mwangi (2003). This questionnaire has a validity coefficient of 0.529 successively; 0.392; 0.302; 0.463; 0.356; 0.381; 0.314; 0.353; 0.416 with a reliability coefficient of 0.536; So it can be said that this questionnaire has good reliability with all valid statement items to be used as an MSC measurement instrument. Meanwhile, the Mathematics Self Regulated Learning questionnaire consisted of 13 statements with 5 alternative answers on a Likert scale. This questionnaire is the result of adaptation and modification of the MSRL questionnaire proposed by Purdie et al. (1996) where the coefficient of the validity of each statement item in this questionnaire was respectively 0.586; 0.699; 0.642; 0.572; 0.517; 0.408; 0.503; 0.599; 0.410; 0.681; -0.161; 0.561; 0.569 with a reliability coefficient of 0.792. Thus, the Mathematics Self Regulated Learning questionnaire has excellent reliability and all statement items in the questionnaire are valid to be used as an Mathematics Self Regulated Learning measurement instrument (4) After all the auxiliary instruments were valid, the researcher applied for a research permit at LPPM STKIP PGRI Nganjuk.

At the data collection and analysis stage, the following activities were carried out: (1) selecting research subjects that met the subject selection criteria for the fourth semester students of the Mathematics Education Study Program, STKIP PGRI Nganjuk, to complete the mathematical problem solving test of the first mathematical modeling course. (2) The researcher analyzed the results of the subject's written test and then conducted the first interview via whatsapp video call with the subject to clarify the answers given. Based on the results of this analysis, the research subject data was obtained for the first task-based interview. After a few days, the researcher gave a second mathematical problem solving test in the mathematical modeling course, which was similar to the mathematical problem solving test in the first mathematical modeling course, to the same subject. The results of the second problem-solving written test were analyzed and then a second interview was conducted via whatsapp video call with the subject to clarify the answers given. Based on the results of this analysis, the research subject data was obtained for the second task-based interview. (3) Next, time triangulation was carried out by comparing the results of the first and second task-based interview data analysis. If there is no significant difference between the first and second data, then the data is said to be valid. The valid data were then re-analyzed in more depth to obtain conclusions about the mathematical self-concept, mathematics self regulated learning, and mathematical resilience of the students of the Mathematics Education Study Program of STKIP PGRI Nganjuk in the mathematical modeling course.

The subjects in this study were 28 students of the fourth semester of the Mathematics Education Study Program, STKIP PGRI Nganjuk for the Academic Year of 2020/2021. The subject selection technique used purposive sampling method. The criteria for selecting the subject of this research are: (1) being in a mathematical modeling course, (2) being in the category of mathematical self-concept, mathematics self regulated learning, and mathematical resilience to be studied, namely high and low categories, (3) being able to communicate their thoughts orally well written.

Determination of subjects divided into eight categories, namely (1) subjects with high mathematical self-concept, high mathematics self regulated learning, and high mathematical resilience, (2) subjects with high mathematical self-concept, high mathematics self regulated learning, and low mathematical resilience, (3) subjects with high mathematical self-concept, low mathematics self regulated learning, and high mathematical resilience, (4) subjects with high mathematical self-concept, low mathematics self regulated learning, and low mathematical resilience, (5) subjects with low mathematical self-concept, high mathematics self regulated learning, and resilience high mathematics, (6) subjects with low mathematical self-concept, high mathematics self regulated learning, and low mathematical resilience, (7) subjects with low mathematical self-concept, low mathematics self regulated learning, and high mathematical resilience, and (8) subjects with mathematical self-concept low, low mathematics self regulated learning, and low math resilience. The relationship between variables can be described in Table 1 below.

Table 1. Relationship between Variables and Determination of Research Subject Categories

mathematical self-concept	Self Regulated Learning	Mathematical Resilience	
		High (1)	Low (2)
High (1)	High (1)	X_{111}	X_{112}
	Low (2)	X_{121}	X_{122}
Low (2)	High (1)	X_{211}	X_{212}
	Low (2)	X_{221}	X_{222}

Based on the above categories in this study obtained as many as 6 research subjects. Data and data sources can be obtained from the results of written tests and subject interviews. The data collection technique was carried out directly

by the researcher as the main instrument, and also through mathematical problem solving tests in the mathematical modeling course as the first auxiliary instrument and interview guide as the second auxiliary instrument.

Data analysis in this study is a process of searching and compiling and systematically describing the data obtained from the results of the first task-based interview and the second task-based interview result by reducing data, presenting data, and drawing conclusions (Miles and Huberman in Sugiyono, 2013). These results are then used as a description of the mathematical self-concept, mathematics self regulated learning, and mathematical resilience of students of the Mathematics Education Study Program of STKIP PGRI Nganjuk in the mathematical modeling course.

RESULT AND DISCUSSION

This study aims to describe the mathematical self-concept, mathematics self regulated learning, and mathematical resilience of students related to mathematical problem solving abilities in mathematical modeling courses. To see the categories of mathematical self-concept, mathematics self regulated learning, and mathematical resilience of each student, the scores from the questionnaire for each variable are grouped according to Table 2 below.

Table 2. Distribution of Students' Mathematical Self-Concept, Mathematics Self Regulated Learning, and Mathematical Resilience

Variable	Interval	Category	%
Mathematics Self Concept (Nita & Dian, 2021)	$1.00 \leq MSC \leq 3.00$	Negative	17.9
	$3.00 \leq MSC \leq 5.00$	Positive	25.0
Mathematics Self Regulated Learning (MRSL) (Cakir et al, 2016)	$1.00 \leq MSRL \leq 2{,}35$	Low	10.7
	$3.70 \leq MSRL \leq 5.00$	High	42.9
Ressilience Mathematics	$109 \leq RM \leq 140$	Low	7,1
	$171 \leq RM \leq 202$	High	46,4

From table 2 above, it appears that most of the subjects have a positive Mathematics Self Concept. Only a small percentage of students have negative Mathematics Self Concepts during online learning during the Covid-19 pandemic. In the Mathematics Self Regulated Learning variable, it appears that most of the subjects have high Mathematics Self Regulated Learning. Self-regulated learning can help students to form better study habits and strengthen their learning abilities (Wolters & Hussain, 2015). This data supports one of the main goals of higher education, namely to create lifelong learners who are independent and have self-regulated learning in finding, maintaining and processing knowledge (Jado, 2015). In line with Maksum & Lestari (2020); Dina & Nugraheni (2017) who found that the self-regulated learning profile of the students studied was at a good and good level, this study also showed that 42.9% of students had mathematics self-regulated learning at a high level. Sudiana et al. (2017) showed that the scores of students who received learning with virtual class were higher than students who received conventional learning. This research took place during the Covid-19 pandemic, where classroom learning was conducted online. Online learning during the Covid-19 pandemic was able to increase student self-regulated learning (Sadikin & Hamidah, 2020).

Furthermore, students' mathematical resilience in problem solving can be seen from table 2 that 46.4% of students have high level of mathematical resilience and 7.1% of students have low level of mathematical resilience. In relation to problem solving, based on the results of the first and second task-based interviews, it was found that students with high mathematical resilience had better problem solving abilities than students with low mathematical resilience. Students with high mathematical resilience are able to identify problems by writing down information obtained from the problem clearly and completely, able to describe the condition of the problem using pictures clearly and completely and understand well the intent of the problem, able to connect different elements of information obtained, able to apply previously learned mathematical concepts to create new knowledge that is useful in achieving solutions, and able to propose alleged problem-solving strategies but are not yet complete. The findings in this study are that in students with high resilience, in addition to being able to meet the five indicators mentioned above, the subject is also able to

meet other problem-solving indicators, namely being able to test assumptions in accordance with problem solving strategies that have been prepared appropriately and using relationships that have been identified. has been made to reach a solution, able to compile evidence against the solution obtained by writing down the calculation process in a systematic, complete, and clear manner so as to produce the right solution, able to provide logical reasons for the solution obtained, and able to draw conclusions appropriately. This is in line with research that has been done previously by Rizqa & Asih (2020) where students who have high resilience have better problem solving skills and are confident when faced with various problems, while students with moderate resilience are still lacking in solving mathematical problems because have not been able to achieve systematic steps, are less thorough, and tend to give up quickly when faced with difficult questions.

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