The effect of students’ self-concepts and anxiety towards students’ mathematics achievement for students of 5th grade elementary school

**Abstract**. This study aims to determine (1) the effect of self-concept on mathematics learning achievement; (2) the influence of learning anxiety on mathematics learning achievement; (3) the influence of self-concept and anxiety learning on students' mathematics learning achievement. This research is a correlational expo-facto study. This study involved 172 5th grade elementary school students in Tamalate, Makassar. Determination of the sample was carried out by using a disproportionate stratified random sampling technique. Data collection techniques were taken through learning outcomes test, documentation and questionnaires. The research instruments used were in the form of tests of student mathematics learning outcomes, self-concept questionnaires and student anxiety questionnaires with a Likert scale assessment, alternative answers consisted of four choices namely: strongly agree (SS); agree (S); disagree (TS); very not agree (STS). The data analysis technique in this study is descriptive analysis. The results of this study indicate (1) there is a significant effect between self-concept and students’ achievement, (2) there is a significant effect between students’ anxiety and students’ achievement (3) there is a significant effect between students’ self-concept and anxiety with students' achievement in mathematical learning.

1. Introduction

Learning is a process in which teacher and students do interaction or reciprocal relationship in educational situation to achieve certain goals. The specific purpose meant is the purpose of education which is to help students become independent individuals and can be useful for others. The Law of the Republic of Indonesia number 20 of 2003 [1] concerning the national education system states that national education aims to develop the potential of students to become human beings who believe and fear the Almighty God, are noble, healthy, knowledgeable, capable, creative, independent and become citizens democratic and responsible in order to educate the nation's life. Therefore, to develop the potential of students needed a proper environment for the achievement of personal development and intelligence of students in accordance with their interests and talents in the learning process.

In the learning process the teacher will be faced with a number of characteristics of diverse students [2]. There are students who can take or take part in teaching and learning activities smoothly, and on the other hand there are also students who have difficulty in participating in the activities. Thus, a learning process is needed to be designed to facilitate and help students acquire their knowledge, skills and expertise in accordance with the characteristics of students faced in class [3]. Mathematics is one lesson that is considered difficult and even scary for some students [4]. Learning difficulties faced by students can be caused by several factors, namely internal factors (factors within the students themselves) such as talent, interest, motivation, self-concept etc, as well as external factors (factors outside the students) namely factors at home and the surrounding environment [5].

Self-concept is one of the internal factors which is also one of the foundations that greatly determines one's success [6]. It is not only success in the academic field, but more important is the success of life because self-concept is a person's view of himself. Self-concept can be formed from a person's experience obtained from family, school and community [7]. Sukmadinata [8] states that feeling of self-worth is very important in mental health because they are based on other mental health components. In addition to self-concept there is also student anxiety factor that is identified as causes of low student’s learning achievement [9]. The number of researches conducted state that student anxiety also influences student achievement, one of which Sarason's research that proves students with high levels of anxiety do not perform as well as students with low levels of anxiety on some types of tasks, such as tasks marked with challenges, difficulties, performance evaluations, and time limits [10].

As self-concept, anxiety greatly affects achievement or cognitive abilities [11]. Data collected by Spielberger [12] show that at the stage where school work is most challenging for students (not too difficult or too easy), students with low levels of anxiety perform better than students with high levels of anxiety. Badjeber [13] states that mathematics is formed as human thought that deals with ideas, processes and reasoning. The main characteristic of mathematics is deductive reasoning, namely the correctness of a concept or statement obtained as a logical consequence of previous truths so that the link between concepts or mathematical statements is consistent.

In the process of learning mathematics, the formation of a positive attitude towards mathematics must be considered because not a few children find it difficult and even anxious when they hear the word "mathematics". This condition raises a state of discomfort that arises when facing mathematical problems in relation to fear and anxiety [14]. Children feel afraid and do not have desire to learn because they do not see the benefits of the subject matter they must master. As long as they cannot see the benefits, their minds will be closed. Thus, anxiety can cause less self-control and isolate themselves or close themselves to a particular situation and situation [15]. This is the task of the teacher to give stimulus to students so that they can think, ask, answer questions, give opinions and discuss ideas about solving mathematical problems and explain the benefits of learning mathematics. Stimulus or intervention provided by the teacher in order to reduce the level of anxiety must be adjusted to the characteristics of each student [16]

1. Method

This research was a correlational expost-facto study. The researcher in this case explored the causal relationship and tested the hypothesis that had been formulated previously among self-concept, student anxiety and mathematics learning achievement of students. This study involved 35 elementary schools in Tamalate Sub-district, Makassar City. The sample in this study was determined using *disproportionate stratified random sampling* technique in which each selected elementary school was randomly assigned to each class V to represent the school as the research sample. From the sampling activity, 172 research subjects were obtained.

The research design used was collecting data related to the variables studied using questionnaire. This questionnaire is structured systematically related to students' self-concept and anxiety. The questionnaire used in this study is closed because the choice of answers to each question in the research questionnaire has been provided so that respondents only choose one of the choices given. It was constructed from indicators of mathematics self-concept and student anxiety developed from several theoretical studies of both.

For the sake of data analysis, each answer choice is given a weight with a Likert Scale, as for weighting on the questionnaire about self-concept and student anxiety with alternative answers namely 5 = very often, 4 = often, 3 = sometimes, 2 = rare, 1 = never. While for data about student’s achievement was taken from the accumulation of student learning outcomes for two semester. The data obtained were then analyzed using descriptive analysis to see an overview of self-concept, student anxiety and students’ mathematics learning achievement.

1. Result and Discussion

The following is general description of self-concept and student anxiety with mathematics learning outcomes of fifth grade students in Elementary School (SD) in Tamalate Sub-district, Makassar City.

* 1. Self-concept

Based on the results of the research that had been carried out, the data on self-concept had a theoretical score range of 20-80. The research results showed that the highest score obtained by respondents was172 and the lowest score was 50. The mean score was 63.4, Median was 63, Mode was 65, and Standard Deviation was 4.2. To be clearer, the frequency distribution and percentage of students' self-concept categories in elementary schools in Tamalate District, Makassar City are presented in table below.

**Table 1**. Frequency and Percentage of Level Category of Student Self-concept

|  |  |  |  |
| --- | --- | --- | --- |
| Score interval | Frequency | Percentage (%) | Interval category |
| 70-74 | 29 | 12.5 | Very high |
| 65-69 | 48 | 38.9 | High |
| 60-64 | 47 | 37.5 | Moderate  |
| 55-5950-54 | 2622 | 8.32.8 | LowVery low |
| total | 172 | 100 |   |

From the Table 1. above it can be concluded that the results of the student questionnaires related to the students' self-concept showed that there were 48 students of fifth grade in Makassar who had the level of self-concept in "high" category. By seeing a high enough percentage, this confirmed that students had a tendency to self-concept in "high" category. If described using histograms, the picture of student self-concept can be described in detail as follows.

**Figure 1.**Histogram of Self-concept Frequency

Based on the histogram in **Figure 1.** above, it can be seen that self-concept score which was in "very high" category was 29 students with percentage of 12.5%, in "high" category was 48 students with percentage of 38.9%, in "moderate" category was 47 students with percentage of 37.5%, in "Low" category was 26 people with percentage of 8.3%, and 22 students or 2.8% were in "very low" category.

* 1. Student Anxiety

Based on the results of the research that had been carried out, data on student anxiety had a theoretical score range of 20-80. The results showed that the highest score obtained by respondents was 74 and the lowest score was 50. The mean score was 63.4, Median was 63, Mode was 63, and Standard Deviation was 4.3. To be clearer, the frequency distribution and percentage of student anxiety categories are presented below.

**Table 2.** Frequency and percentage of student anxiety level categories

|  |  |  |  |
| --- | --- | --- | --- |
| Score interval | Frequency | Percentage (%) | Interval category |
| 70-74 | 25 | 7 | Very high |
| 65-69 | 44 | 33.3 | High |
| 60-64 | 54 | 47.2 | Moderate  |
| 55-5950-54 | 2722 | 9.82.7 |  lowVery Low  |
| total | 172 | 100 |   |

From the table above it can be seen that student anxiety score which was in "very high" category was 25 students, in "high" category was 44 students, in "moderate" category was 54 students, in "Low" category was 27 people and 22 students were in "very low" category. By looking at the frequency distribution, the highest frequency which was in the range 60-64 was 54 students. This number was greater than the number in the other ranges. It indicated that student self-anxiety towards mathematics learning tended to be in moderate category. Next, the description of student self-anxiety using a histogram can be described in detail as follows.

**Figure 2.**Histogram of student anxiety frequency

Based on the histogram in Figure 2 above, the information obtained were that 25 students or 7% got scores in "very high" category, 44 students or 33.3% got scores in "high" category, 54 students or 47.2% were in "moderate" category, 26 students or 9.8% were in "Low" category and 22 students or 2.7% were in "very low" category.

* 1. Student’s Learning Achievement

Based on the research results that had been carried out, data on learning outcomes had a theoretical score range of 35-100. The results showed that the high score obtained was 90 and the lowest score was 65. The mean of student learning achievement was 75, the median was 75, the mode was 78 and the standard deviation was 6.3. Distribution of frequency and percentage of class V student learning outcomes can be seen in the following table.

**Table 3.**Frequency and percentage of student learning achievement

|  |  |  |  |
| --- | --- | --- | --- |
| Interval Score | Frequency | Percentage (%) | Interval category |
| 87-100 | 55 | 6.9 | Very high |
| 65-86 | 117 | 93.1 | High |
| 55-64 | 0 | 0 | Moderate  |
| 37-50 | 0 | 0 | Low  |
| 0- 36 | 0 | 0 | Very low |
| Total | 172 | 100 |   |

Based on the frequency distribution Table 3 above, it can be seen that the data of student learning achievement in the very high category were obtained by 55 students or 6.9%, data of high category were obtained by 117 students or 93.1%. Thus, it can be concluded that in general the mathematics learning achievement of Class V students at the Tamalate Elementary School of Makassar City was "high". Furthermore, to see the description of students learning achievements using a histogram can be described in detail as follows.

**Figure 3.** Histogram of frequency of learning outcomes

Based on the histogram above, it can be explained that there were 55 students whose learning achievements were in the score range of 85-100 with percentage of 6.9%. Meanwhile, 117 students with percentage of 93.1% were in the range of 65-84. This indicates that the tendency of student learning achievement was in the range of 65-84 with the category of student learning achievement at high level.

1. Conclusion

The description of the data above shows that there is a positive and significant influence between self-concept and the negative influence between student’s anxiety on student’s mathematics learning achievements. The higher the student's self-concept is, the higher the mathematics learning achievement of fifth grade elementary school students in Tamalate Subdistrict, Makassar is. Conversely, at the student's anxiety level, the higher the student's anxiety is, the lower the student's mathematics learning achievement is. Based on the results of this study, it can be stated that improving the quality of teaching and learning process is as an effort to increase students' enthusiasm in learning mathematics. By paying attention to self-concept and student's anxiety in learning mathematics in the class, a teacher can deliver students to improve their mathematics learning achievements.

1. Acknowledgments

We would like to express our deepest appreciation to all those who provided us the possibility to complete this report. A special gratitude we give to Kemenristek dikti and LLDIKTI Wilayah IX who had funded this research in the scheme “Penelitian Tesis Magister” with contract number 1632/L9/AK/2019, May 15, 2019.

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