

Self-Concept of Junior High School Student in Learning Mathematics

Wahyu Septi Rahma Yus Sultra^{*1}, Budi Usodo², Ikrar Pramudya³

Postgraduate of Mathematics Education, Sebelas Maret University, Jl. Ir. Sutami No. 36A Surakarta 57126, Indonesia

Email: wseptirahma@gmail.com

Abstract. The current study aimed to find out the students' perceptions towards mathematics learning. Students' perceptions are described through the self-concept of mathematics learning in junior high school. Self-concept that focuses on personality building also impacts the learning outcomes in class. The self-concept is needed to foster the students' views, self-confidence and positive attitudes when solving mathematics problems. Self-concept of students in learning consists of positive and negative self-concept. This study used descriptive research method with technique survey with questionnaire to 31 eighth grade students of Masaran Junior High School 2. Based on the data analysis, it was found that 64.5% of the students possessed positive self-concept and 34.5% of them had negative self-concept. Meaning that there are still students who possess negative perception towards mathematics learning. Students who have positive self-concept tended to have more achievements in school than those with negative self-concept. Mathematics learning is needed to involve students actively and stimulate their self-concept so that they will be able to obtain optimal mathematics learning outcomes.

1. Introduction

The success in learning will be better if supported by a good process. The learning process requires active students with their perceptions or how they view the learning. This is related to students' behavior towards the learning they face. The students' behavior predicted by self-concept of the ability to determine what students do with the knowledge and skills they have [1]. Bloom (1995) states that one of the most important and stable indicators for student learning in the affective domain is self-concept [2]. Self-concept is a way how a person views and perceives himself, view the shortcomings and strengths he has, including planning a vision and mission of life [3]. Self-concepts are related to academic achievement and are defined as beliefs, feelings or perceptions of intellectual and academic skills [4]. The self-assessment concept of students in general skills, mathematics, reading, spelling, and writing [5]. Measuring self-concept from a student's perspective on the academic component needs to improve academic achievement [6].

Students have different self-concepts depending on their responses. Self-Concept impacts many students' critical behaviors such as learning, enthusiasm when facing problems and participation in learning [2]. Self-concept influences students' values in relation to the school where a student with low self-concept has a low tendency to achieve good grades in school [7]. Students' self-concept is

reduced, for example when students consider schools to be less important for them and do not give any importance to academic achievement at school, their enthusiasm for learning will decrease. This can make their achievement lower and have an impact on facing difficulties in getting employment opportunities after being involved in the community. Therefore, it is important to get a better understanding of motivated self-concepts and how to minimize negative self-concepts.

Low Self-concepts make students face difficulties in solving problems given by the teacher. One of the lessons that are still considered difficult by students is mathematics. Mathematics is one of the important sciences for human development nowadays. It is the study of rich patterns, relationships, and interconnected ideas, also a tool for solving problems in various contexts [8]. Mathematics is seen as a tool for humans in the face of increasingly rapid scientific and technological developments. In addition, it is considered to be able to be used as a way to think and solve problems in everyday life. Mathematics is one way to train students to think in a logical and systematic way in order to solve mathematics problems [9].

In learning mathematics in school, not all students have the same ability when solving mathematics problems. Self-concept has a direct and important effect on mathematics ability because schools do not only target cognitive aspects (eg. counting) but also aspects of motivation such as self-concept and focused task [10]. The development of mathematics learning skills in schools requires ideas, and self-concept [11]. Furthermore, mathematical self-concept is supporting school achievement, it can be used as a reference to determine educational and occupational choices [12]. Therefore, it is necessary to review and improve the aspects of different self-concepts in the mathematical abilities of each student during the mathematics learning process.

2. Research Method

This study used descriptive research method with technique survey used questionnaire. The used instrument was in the form of a self-concept questionnaire on mathematics learning. The study was conducted on 31 students of class VIII in Masaran negeri 2 junior high school, by administering the questionnaire of 48 developed items. Research data collection uses quistonnare and mathematics learning archivement. Data on the subjects learning achievement were obtained from the results of the Semester VII final examination. The questionnaire used based on the Likert scale as very agree, agree, disagree, strongly disagree. The survey method used is the method of collecting data from a number of questionnaire statements at the same time which aims to find out the description of the self concept that students have. Students' self-concept responses were classified into two, namely positive and negative self-concepts.

Table 1. Scale Item Self-Concept

Scale	Negatif Self-Concept Item	Positif Self Concept Item
Strongly Disagree	4	1
Disagree	3	2
Agree	2	3
Very Agree	1	4

Self concept students tend to be good or positive self concept if the of positive items is more than negative items. The percentage of positive and positive self concepts by using the following formula

$$\% = \frac{\text{students with positive/negative self concept}}{\text{number of students}} \times 100\%$$

3. Result and Discussion

3.1. Self Concept Indicator

The self-concept indicator adapted from Calhoun & Acocella (1995) described self-concept to consist of three aspects, namely knowledge of what individuals know about themselves, expectations about

the individual's view of the possibilities that occur to them, and an assessment of the achievement of individual expectations [3].

Table 2. Self Concept Indicator

Aspect	Indicator
Knowledge	Students perceptions towards mathematics learning. Students perceptions about the mathematical ability they possess.
Expectation	Students' expectations in learning mathematics in the future The benefits gained from learning mathematics.
Evaluation	The students' active role in learning mathematics. The students' interests towards learning mathematics..

Self-concept was classified into two, namely positive and negative self-concept. Calhtoun and Acoella state that self-concept is divided into two: positive self-concept and negative self-concept [3]: (1) Positive self-concept is more to acceptance Than to a the over pride about self. A positive self concept is stable and varied. Individuals who have a positive self concept are those who are very understanding of themselves, can understand and accept a number of very diverse facts about themselves in the form of strengths and weaknesses, evaluat themselves to become positive and can accept the existence of others. Individuals who have a positive self concept design goals in accordance with reality and have a high likelihood to be achieved, able to face life and assume that it is a process of discovery; (2) negative self concept is when an individual's view of himself is truly irregular, has no feeling of stability and self-integrity. The individual does not know who he is, including his strengths and weaknesses. In addition, negative self-concept also views itself as too stable and orderly. This can happen because individuals are educated in a very hard way, thus creating a self-concept that does not allow any deviation from a set of laws which in his mind is the right way of life.

3.2. Result

The questionnaires given to students were about their self-concept towards mathematics learning. Table 3 shows the results of students 'responses including those with positive self-concept and those with negative self-concept. Students' scores were obtained from their learning outcomes data on mathematics learning.

Table 3. Responses of Self Concept Towards Mathematics Learning

Self-concept	Students 'scores	Students 'responses	Percentage (%)
(+)	70-74	20	64,5
(-)	70-82	11	34,5

Based on Table 3 it can be seen that students who had a positive self-concept responses had better learning achievements than those who responded less self-concept. Students have different responses to the learning. Student learning related to mathematics can be seen from a number of positive statements as follows.

Table 4. Students Learning Statement

No	Statement
1	I feel it easy to do tasks related to mathematics.
2	If I try hard, I believe that I can do the math assignments given.
3	If I find it difficult to do a math assignment, I will still try to solve it myself while learn again.

From table 4, the first statement is related to students' views on their mathematical abilities. If students feel confident about their abilities they will be easier to do the assignments given. Second, related to student expectations in learning mathematics. The third statement is related to students' attention to

mathematical problems. Based on the observation of the learning process, students will be more enthusiastic when learning according to what they expect. Students are more enthusiastic when they can do tasks with their own abilities.

The table 5 below illustrates the responses of 30 students from gender (15 male and 16 female and self-concept aspects consisting of students' knowledge, expectations, and evaluation of themselves.

Table 5. Responses of Students With Positive Self-Concept

		Number of students
Gender	Male	5
	Female	15
Aspect	Knowledge	6
	Expectation	22
	Evaluation	22

Based on table 5, it is clear that more female students had positive self-concept compared to male students. Then the self-concept of students with aspects of knowledge received the least number of responses, there were only 5 students. This is related to students' knowledge and their confidence about their ability to solve mathematical problems. On the other hand, students had fairly good expectations and judgments about mathematics. One of the students' expectations in the mathematics lesson is "when I feel lacking in the math test, I will be passionate about learning harder".

3.3. Discussion

Self-concept is needed in mathematics learning to improve views, confidence when solving mathematical problems. A positive academic self-concept is often referred to as an important variable facilitating academic achievement where teachers can find out their views on mathematics and emphasize the importance of mathematics for their future careers [6]. When looking at the relationship between self-concept and mathematical abilities, it is very important to determine the learning outcomes of mathematics [10]. The success in learning is also supported by the self-concept possessed by students. Students with positive self-concepts tend to succeed in mathematics. It is also supported by some literature, there is an increase in students' achievement in the category of positive self-perception, high motivation, influence and attitude that can show a good tendency [11]. There is a positive relationship between self-concept and mathematical problem ability [13]. Relationships exist between self-concept students with the ability to solve mathematical problems where the higher the self-concept of students, the higher the ability of students in learning mathematics and the lower the self-concept of students, the lower their ability in learning mathematics [14].

In terms of the gender, female students tended to have more positive self-concept than male students. Girls have more characteristics and self-concept talents than boys [15]. This is because students' self-concept of mathematics differs according to the education program, nationality, gender, and place of residence [16]. Students with good self-concept or positive self-concept will be more optimistic with the results of their own work [17]. Students' self-concept influences their performance in learning mathematics [18]. The teacher must try harder to find out the relationship between self-concept, gender, ability, and level of students' learning to improve their academic performance [19].

The aspect of knowledge is one of the factors that causes students to still be less than optimal in their positive self-concept. There are many factors that influence students' self-concept. They include mathematics achievement, mathematical attitudes, motivation, parents' level of education, family socioeconomic level, quantity and quality of instruction, and classroom environment [2]. In addition, factors that can influence students' self-concept are, namely (1) physical condition and other people's assessment of the individual's physical condition which includes body shape, disability, etc .; (2) psychological factors such as intelligence, aspiration level, emotion name and nickname; (3) family factors which include parents' attitudes, family attitudes, family status and family socioeconomic status; (4) school environmental factors, including teachers, students, and extracurricular activities; (5) community factors such as cultural patterns and social status [3]. Self-concept contains elements such

as an individual's perception of his characteristics and abilities; individual perceptions and understanding of him in relation to others and his environment; individual perceptions of the quality of values related to his experiences and the objects faced; and perceived goals and ideals as something that has positive or negative values [20]. Students who have self-concept and high motivation have better achievements [21].

4. Conclusion

Self-concept is crucial for the success in learning mathematics in schools where each student has different abilities. This different abilities make students be able to view whether they are able to do their tasks well or not. The low self-concept of students tends to create less optimal work results. The achievement of mathematics learning is supported by the students' self-concept of the learning. Students who have positive self-concept learning outcomes tend to be good and vice versa students who have negative self-concept, learning outcomes tend to be less good. A good self-concept is expected to help students to improve their views, confidence when solving mathematical problems. High motivation and confidence are needed during learning so that the students' self-concepts are increased and their learning becomes more optimal.

Acknowledgments

The author expresses her sincere gratitude to Negeri 2 Masaran junior high school who have been willing to receive her doing the research and all parties who contributed in the process of writing this paper.

References

- [1] Kvedere L 2014 Mathematics Self-Efficacy, Self-Concept and Anxiety Among 9th Grade Student in Latvia *World Conference on Educational Sciences* (Latvia: Elsevier) **116** p 2687-2680
- [2] Erdogan F and Sengul S 2014 A study on The Elementary School Students' mathematics Self-Concept *ERPA International Congress on Education* (Turkey: Elsevier) **152** p 596-601
- [3] Sumartini T 2015 Mengembangkan Self-Concept Siswa Melalui Model Pembelajaran Concept Attainment *Jurnal Pendidikan Matematika* **5** p 1-10
- [4] Timmerman H, Toll S and Van Luit J 2017 The Relation Between Math Self-Concept, Test and Math Anxiety, Achievement Motivation and Math Achievement in 12 to 14-Year- Old Typically Developing Adolescents *Psychology, Society & Education* **9** p 89-103
- [5] Ceresnik M 2015 School Self-Concept of The Adolescents in The Relation to The Risk Behavior Age specifications *International Conference on New Horizons in Education* (Slovakia: Elsevier) **174** p 3500-3508
- [6] Lee C and Kung H 2018 Math Self-Concept and Mathematics Achievement Examining Gender Variation and Reciprocal Relations among Junior High School Students in Taiwan *EURASIA Journal of Mathematics, Science and Technology Education* **4** p 1239-1252
- [7] Schutte K, Zimmermann F and Koller O 2017 The Role of Domain Specific Ability Self-Concepts in The Value Students *Learning and Individual Differences* **56** p 136-142
- [8] Chambers P 2008 Teaching Mathematics Developing as a Reflective Secondary Teacher *SAGE Journal* **1** p 1-9
- [9] Eviyanti C, Surya E, Syahputra E and Simbolon M 2017 Improving the Students' Mathematical Problem Solving Ability by Applying Problem Based Learning Model *International Journal of Novel Research in Education and Learning* **2** p 138-144
- [10] Cai D, Viljaranta J and Georgiou G 2017 Direct and Indirect Effects of Self-Concept of Ability on Math Skills. *Learning and Individual Difference* **61** p 51-58
- [11] Boyer JC and Mailloux N 2015 Student Teachers' Self-Perception of Their Mathematical Skills and Their Perception About Teaching Mathematics *International Conference on New Horizons in Education* (Canada: Elsevier) **174** p 1434 – 1442
- [12] Nagy G, Watt H, Eccles J, Trautwein U, Ludtke O and Baumert J 2010 The Development of Students' Mathematics Self-Concept in Relation to Gender: Different Countries, Different Trajectories *Journal Of Research On Adolescence* **2** p 482–506

- [13] Musriandi R 2017 Hubungan Antara Self Concept dengan Kemampuan Pemecahan Masalah Matematis Siswa *Jurnal Dedikasi* **1** p 150-160
- [14] Wulandari S 2017 Hubungan Kepercayaan Diri Dengan Kemampuan Pemecahan Masalah Matematika Siswa Menggunakan Problem Based Learning *Jurnal Inspiratif* **3** p 103-108
- [15] Benolken R 2015 Gender and Giftedness Specific Differences in Mathematical Self-Concepts Attributions and Interests *Procedia - Social and Behavioral Sciences* **1** p 464 – 473
- [16] Kvedere L 2012 Mathematics self-concept of the 9th in Latvia *World Conference on Educational Sciences* (Lativa: Elsevier) **46** p 3380-3384
- [17] Waminton R 2016 Incorporating Learning Motivation and Self-Concept in Mathematical Communicative Ability *Canadian Center of Science and Education* **9** p 155-164
- [18] Anino A 2015 Self-Concept As A Correlate Of Secondary School Students Academic Performance In Mathematics *International Journal of Education and Practice* **3** p 235-240
- [19] Matovu M 2012 Academic Self-Concept and Academic Achievement among University Students *International Online Journal of Educational Sciences* **2** p 107-166
- [20] Rahman R 2012 Hubungan Antara Self-Concept Terhadap Matematika Dengan Kemampuan Berpikir Kreatif Matematika *Jurnal Ilmiah*, **1** p 1-12
- [21] Pan A and Guha A 2015 A Study On Self Concept And Achievement Motivation Of English Medium School Students Of Hooghly District *International Journal of Teacher Educational Research* **4** p 1-9