

## Student's Mathematical Critical Thinking Ability and Self-Efficacy Through SAVI Learning Model

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### ABSTRACT

This study aims to analyze the increase of critical thinking skills and mathematical self-efficacy of junior High School students through the SAVI learning model (Somatic, Auditory, Visualization, Intellectually). This research is a quantitative study with a pretest-posttest control group design. The population in this study is the Junior high school students in Bekasi with the sample of 84 students being assigned with a cluster random sampling technique. The results of this study came to the conclusion that the increase in critical thinking skills and mathematical self-efficacy of the students whose learning process used SAVI learning models is better than the students whose learning process did not use the SAVI one.

**Keywords:** Critical Thinking Ability, Self-Efficacy, SAVI Learning Model

### INTRODUCTION

Mathematics is the science that relies on one's mindset to solve a problem. In mathematics, students are faced with a problem to be solved. To solve a problem in mathematics, the students need to have an important basic skill to produce the right and logical answer. One of the basic capabilities the students must have is critical thinking skills.

ATC21S (Assessment and Teaching of 21st Century Skills) stated that the study of mathematics in the 21st century has a purpose with 4C characteristics, namely; Communication, Collaboration, Critical Thinking and Problem Solving, Creativity and Innovation [1]. This is in line with the results of research being conducted by more than 250 researchers from 60 institutions worldwide who become the members of the ATC21S (Assessment and Teaching of 21st Century Skills) grouping 21st century skills in four categories, one of which is a way of thinking [1]. The ability of thinking becomes one of the important capabilities that students must have to support their learning process in modern times as it is today. Critical thinking skills enable people to learn the problems they face systematically, to face various challenges in an organized way, to formulate innovative questions, and to devise original solutions [2].

Thinking skills can't develop naturally, because thinking skills should be enriched by various environmental stimuli and diverse atmospheres [3]. Therefore, the environment is very important in developing one's ability to think. Critical thinking ability is basically able to develop self-efficacy. Self-efficacy is a person's beliefs about oneself ability to produce an accurate problem solving which affects their lives [4].

How do people behave in a particular situation depends on reciprocity between the environment and cognitive conditions, particularly the cognitive factors related to the belief that he or she is able or unable to perform a satisfactory action, Bandura calls this self-confidence or expectations as self-efficacy [5]. The right environment and varied atmosphere can develop thinking skills as well as one's self-efficacy in one time. Therefore, one of the factors to know and determine one's self-efficacy is to know how a person thinks [6].

However, in reality, the critical thinking skills of students in Indonesia are still at the low level [7]. In his research indicates that mathematical critical thinking ability of the students in junior high is still at the low level. The average value of mathematical critical thinking skills of Junior High School students is only 68 in the 0-100 scale. The value is still included in the category of enough. In addition to that, based on a preliminary study [8], of the 30 students, only 2 students in junior Ar-Rahman Percut were

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able to answer the critical thinking skills critical test mathematically correctly and completely, while others were simply guessing the answer.

In the PISA report, it is also stated the same thing, that mathematical literacy skills of the Indonesian students were in the bottom group of all participating countries. In PISA 2009, mathematical literacy of Indonesian students is in the 60th position out of 64 participating countries with a score of 375 [9]. In PISA 2012, Indonesia was at the 64th position out of 65 participating countries with a score of 375 [10]. In PISA 2015 Indonesia was at the 62th position out of 70 participating countries and luckily it increased the score to 386 [11]. In PISA 2018, Indonesia was at the 73th position out of the 78 participating countries. Unfortunately, Indonesian mathematics PISA score was decreased to number 379 in 2019 [12]. Mathematical literacy being defined is the ability of students in the analysis, reasoning and effective communication at the time of displaying, solving and interpreting mathematical problems [9]. The results of PISA 2009 report also showed that self-efficacy of mathematics of the Indonesian students is very low compared with the students from other countries, except the students from Brazil, Thailand, and Tunisia [9].

Cabera stated that the mastery of critical thinking skills is not sufficiently targeted as educational purposes only, but also as a fundamental process that enable students to cope with the uncertainty of the future [13]. Critical thinking skill is also necessary for life, so that the students can filter the information and respond critically any information they get, and can choose the good from the bad for the future life as well as anticipate all the things that could endanger their lives.

The low level of mathematical critical thinking can give a significant impact on cognitive development of the students because the students tend to being incapable of solving the problem the teacher gives, then as a result, the students cannot effectively participate in teaching and learning process.

The weak of mathematical critical thinking skills level of the students can be caused by several factors [14]. Mention one factor that caused the mathematical critical thinking skills is learning process being implemented. Learning mathematics should actively engage and facilitate students to be able to use their critical thinking skills [14]. In addition to that, if the students are allowed to train their thinking ability, the training will form a habit to be able to distinguish between true and untrue, allegations and reality, fact and opinion, as well as knowledge and belief [2].

Factors causing weak critical thinking skills are also expressed that students often have difficulty in solving problems which require the students to think critically because the students are rarely trained on how to solve problems which require critical thinking skills. Therefore, to improve critical thinking skills and mathematical self-efficacy, students need an appropriate learning model.

Sumarmo says, in order that learning process can maximize the learning process and results of mathematics, teachers should encourage students to engage actively in discussions, ask and answer questions, think critically, explain each answer given and to give reasons for any proposed answer [13], so that teachers play an important role in creating an optimal and fun learning so that students can actively involve in the learning.

Stated "it is the time the old learning pattern is replaced by SAVI (Somatic Auditory Visual Intellectual). Somatic as learning by moving and doing (learn by moving and doing). The auditory is learning by talking and hearing (learning by speaking and listening). Visual is interpreted as learning by observing and picturing (learning by observing and describing). Intellectual means learning by problem-solving and reflecting (learning with problem-solving and doing reflection [15]. SAVI learning model is expected to improve critical thinking skills and mathematical self-efficacy of the students.

SAVI learning is the learning that emphasizes the meaningful learning through listening, listening, speaking, presenting, arguing, expressing, and responding, as well as using other thinking (minds-on) to increase the concentration of the mind through reasoning, investigating, identifying, locating, creating, constructing, solving and implementing the problems [16]. Learning mathematics using SAVI learning model is expected to make the students more enthusiastic in following the subject matter because by using SAVI learning model, it will create teaching and learning process more active than conventional learning models.

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Based on the problems that have been described, learning using the learning model of SAVI can become one of the ways to improve critical thinking skills and mathematical self-efficacy of the students. It is thus, the research on "Student's Mathematical Critical Thinking Ability and Self-Efficacy Through SAVI Learning Model" becomes very important to conduct.

#### Aim of Study

The purpose of this study is to determine whether there is an increase in critical thinking skills and mathematical self-efficacy of the students through the SAVI learning model (Somatic, Auditory, Visualization, Intellectually).

#### LITERATURE REVIEW

Learning is a process of interaction between students and educators [17]. Each individual can always take the learning in every event that happened to the changes in his or herself. Learning can happen anywhere and anytime. Learning can be in formal institutions such as in school. In school, students are required to solve the problem that is given by the educator.

##### *The ability of Critical Thinking Mathematically*

Ability is the main capital of a person from the birth to be able to complete a job. The abilities and skills a person has are certainly in accord with the level of education they follow, the higher a person's education is assumed the higher the knowledge, skills, and abilities they got [18]. Based on that statement, the ability can be interpreted as the effort of a person to improve his or herself in order to become a better person.

Glaser defines critical thinking as: (1) an attitude would think deeply about issues and many things being within the reach of one's experience; (2) knowledge about the methods of examination and logical reasoning; and (3) a kind of a skill to apply these methods [19]. So it can be interpreted that critical thinking is a skill or attitude of a person to solve the problems using the method of examination and logical reasoning.

According to Ennis critical thinking is a thinking that is reasonable and reflective focusing to decide what should be believed or done [19]. By thinking critically we can determine what is right and wrong by considering the reasons that make sense.

Richard Paul argues that critical thinking is a method of thinking - about something, any substance or matter - in which the thinker improves the quality of his or her thinking by handling skilfully the structures being inherent in his or her thinking and applies the standards of intellectual to him or herself [19]. It has been suggested that critical thinking is a method of thinking to solve a problem by applying intellectual standards.

Critical thinking is thinking to investigate systematically the thinking process itself, which means that it is not only thinking on purpose but also examining how do we and others use the evidence, assumptions, and logic [2].

According to Susanto mathematical critical thinking is thinking activity about the idea or ideas related to the concept or problem being given [8]. Meanwhile, according to Ennis critical thinking is a process which named at so that we can make logical decisions so that what we consider the best about the truth can be done in the right way [20]. It is from both opinions above; it can be concluded that the ability of mathematical critical thinking is a higher-level thinking processes to be able to identify a problem to obtain a rational conclusion from the results examined.

Some of the critical thinking skills which are very important are as follows: (1) to identify elements in the case under consideration, in particular, the reasons and conclusions; (2) to identify and evaluate assumptions; (3) to clarify and interpret the statements and ideas; (4) to assess the acceptability, in particular, credibility and the claims; (5) to evaluate the arguments of various types; (6) to analyze, evaluate, and produce explanations; (7) to analyze, evaluate and make decisions; (8) to draw inferences; (9) to produces arguments [19].

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### *Self-Efficacy*

Efficacy is a self-assessment, whether to take action is good or bad, right or wrong, can or can't do as required [5]. Efficacy is different from the aspirations (ideals), because the aspiration is describing something that should be achieved (achievable), whereas the efficacy is describing the assessment of one's capability [5].

Self-efficacy is an individual belief concerning his or her ability to organize and complete a task which is required to achieve a particular result [21].

According to [21] the four main sources which give an impact on a person's self-efficacy are:

- a. Experience success of someone in the face of certain tasks at an earlier time. If someone has successfully completed the task in the past so when he or she encountered problems in the future he or she will be able to complete the task which signifies that his or her self-efficacy is getting higher and higher. However, contradictory with that, if someone experienced failure in the past then when he or she meets the current problems in the future, one self-efficacy becomes decreasing.
- b. The experience of others. Individual who sees the success of others in doing the same activities and same ability can increase self-efficacy of that person, otherwise if the person who sees the failure, then it can decrease that person's self-efficacy.
- c. Verbal persuasion, ie information about the person's ability conveyed verbally by influential people can increase confidence that the capabilities he or she has can help him or her to achieve what is desired.
- d. Physiological condition is a state of physical and emotional conditions. The physiological state of a person can affect the belief in her abilities in the face of the task. If the condition of a person in a state of good, it will reduce the level of self-efficacy. Contradictory with that, if someone is in prime condition, this will contribute positively to the development of self-efficacy.

In addition to the above factors, there are other factors such as age, because the older the person the higher self-efficacy he or she has if it is compared with his or her previous one [22]. As for the measurement of self-efficacy in this study, this study focused on four characteristics being adapted from [23] as follow:

- a. To believe in the ability of one self, namely a belief in oneself against all the phenomena related to the individual's ability to evaluate and overcome the phenomenon occurred;
- b. To act independently in taking decision, that is the ability to act in making decisions about what is done independently without involving others. In addition to that is the ability to believe action being taken.
- c. To have a positive self-concept, that is the good judgment of the self, both from the view and the action taken, then it rises a positive sense to the self.
- d. To have the courage to express their opinions, namely the attitude to be able to express something in oneself which is disclosed to others without coercion or disclosures that may restrain those feelings.

### *SAVI Learning Model*

SAVI is a model of learning that involves movement, such as the physical movement of certain parts of the body such as speaking, listening, seeing, observing, and using the intellectual ability to think, describe, connect, and make conclusion [24].

According the elements of this learning model (Somatic, Auditory, Visualization, Intellectually (SAVI)) is consisted of Somatic ie learning with physical activity, moving, and doing (hands on) [25].

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Stated "it is the time that the old pattern is replaced by SAVI (Somatic Auditory Visual Intellectual). Somatic as learning by moving and doing (learn by moving and doing). The auditory is learning by talking and hearing (learning by speaking and listening). Visual interpreted learning by observing and picturing learn by observing and describing). Intellectual means learning by problem-solving and reflecting (learning with problem-solving and reflection [15].

According to Meier and Colin in [16], SAVI has the characteristics in each element of learning, through the elements of somatic are: (a) to make the concept of learning in a process or procedure, (b) to physically move and demonstrate the various components in a process or system, (c) to train ]active learning (simulations or learning games), (d) to gain experience and to discuss and reflect on it and apply it, (e) to provide and receive explanations in line with the following ways, (f) to express emotions through body language, (g) to conduct various learning activities (reviewing field, writing, drawing, interviewing, competing or gaming, and others), (h) to conduct creative activities such as making the crafts (the concept of mind mapping), coming forward to explain or present the results of the work, playing or competing through the educative games and so on.

Through elements of auditory were: (a) to say aloud what is and has been studied, (b) to learn through listening to the radio, watching the drama, and watching and participating in debate, (c) to make a dialogue (receive and deliver information) through words (verbal) (d) to express emotion verbally through changing tone or vocal, (e) to handle projects the basis of the procedures, to debate the issue, to overcome the problem verbally, (f) to remember better and to memorize the words or ideas that have been spoken, (g) to respond better when hearing than reading information, (h) to do creative activity such as singing, storytelling, playing music, making a dialogue, debating, and others.

Through the visual elements are: (a) to emphaze on reading, watching, and observing the situation then summarizing, (b) to accept the explanation whose emphasis is more on the use of visual media such as images, maps, photographs, and others, (c) To state emotions through facial expressions, (d). to do creative activities such as; writing, drawing, painting, designing, and others.

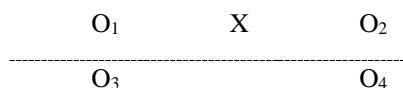
Through the intellectual elements are: (a) to formulate the question, (b) To find and filter information, (c) To analyze the observations, (d) To undertake strategic planning, (e) To produce creative ideas, (f) to solve the problem. Besides the characteristics, SAVI learning also has many other stages of learning such as preparation, delivery, training, and appearance of results.

SAVI learning model (Somatic Auditory Visual Intellectual) is a learning model that prioritizes vision and auditory senses in the learning process in order to create learning atmosphere which is fun and exciting to maximize the gestures, the function of the senses, the intellectual, and emotion in acquiring the material concept and importance of excitement in learning.

**RESEARCH METHOD**

This research is a quantitative type of experimental research with a group pretest-posttest design. The experimental research method can be interpreted as the research methods used to find a specific treatment effect against the other in under control condition. This type of research used was Quasi-Experimental Designs for researchers in this design can't control all external variables that affect the course of the experiment.

The research design was pretest-posttest control group design. The design is [26].



- Information:
- X : Treatment using SAVI learning model
  - O1 and O3 : pretest
  - O2 and O4 : posttest

In this design, the grouping of research subjects was done randomly and selected two classes, namely as a control group and the experimental class, the experimental class was treated of learning by using SAVI learning model (X), and class control was treated by using conventional learning models, then

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each research class was given pretest and posttest (O). O1 and O3 is the result of critical thinking skills and mathematical self-efficacy of the students before treatment. O2 is the result of critical thinking skills and mathematical self-efficacy of the students after being treated and O4 is the result of critical thinking skills and mathematical self-efficacy of the untreated students.

This study population was all students of class VIII 14 of Junior High School in Bekasi. Sample of this study were 84 students, consisting of 42 students who obtained SAVI learning and 42 students who obtained conventional learning.

To obtain the data, this study used a test instrument which consists of a written test to observe mathematical critical thinking skills of the students and the questionnaires of self-efficacy which contains a set of statements to know self-assessment of the students in general that should be filled by the students to choose answers having been provided. From the study, the data obtained are thus of two kinds namely test critical thinking skills data and that of self-efficacy questionnaire.

The improvement of critical thinking skills and self-efficacy of the students thus is reviewed based on normalized gain value (n-gain). N-gain value is determined using the following formula [24]:

$$N - gain = \frac{skor\ post\ tes - skor\ pre\ tes}{SMI - skor\ pre\ tes}$$

The high or low value of n-gain is determined based on the following criteria:

Table 1. Criteria Value N-gain

Values of N-Gain	Criteria
$N-gain \geq 0.70$	High
$0.30 < N-gain < 0.70$	Moderate
$N-gain \leq 0.30$	Low

## RESULTS AND DISCUSSION

Based on data obtained from the research results, it can be concluded that the increase in critical thinking skills and mathematical self-efficacy of the students through the SAVI learning model is better than the increase in critical thinking skills and mathematical self-efficacy of the students through conventional learning models.

### The Increase Ability of Critical Thinking Mathematically of the Students

To understand whether there are differences in the increase in critical thinking skills in experimental and control classes then t-test using statistical tests Compare Mean Independent Sample Test is conducted. The results of complete calculation can be presented in Table 2 below.

Table 2. The mean score of N-Gain Critical Thinking Mathematical Ability of the Students

Aspect	Class	Average	Kolmogorov-Smirnov <sup>a</sup>			t	Df	t <sub>table</sub>	Sig	H <sub>0</sub>
			Statistics	Df	Sig.					
N-gain Critical Thinking Skills	Experiment	0,6460	0.169	42	0,004	4,593	82	1,989	0.0000	Rejected
	Control	0,3440	0.262	42	0,000					

Based on Table 2 the average score gain critical thinking skills mathematically the experimental class is classified into the medium category, while the average score of gain of mathematical critical thinking skills in the classroom control is classified into the low category. Then, to know whether there are differences of the average, can be seen that the value of  $t_{hitung} = 4.593 > 1.989 = t_{table}$  with significant value (p-value) of 0,000. 0,000 significance value  $< 0,05$ . So it can be concluded that H<sub>0</sub> which states there is no difference between the increase in critical thinking skills and the experimental class control

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class is rejected. This shows that the increase of mathematical critical thinking skills of the students whose learning applied mathematical SAVI models is better than those whose learning applied conventional learning models.

### The Increase of Self Efficacy of the Students

To know whether there are differences in the increase of critical thinking skills in experimental and control classes then the t-test using statistical tests Compare Mean Independent Sample Test is conducted. More calculation results can be presented in Table 3 below.

Table 3. Normality Test Scores N-Gain Self Efficacy of Students

Aspect	Class	Average	Kolmogorov-Smirnov <sup>a</sup>		
			Statistics	Df	Sig.
N-gain Self Efficacy	Experiment	0,1796	0,169	42	0,004
	Control	-0,3172	0,262	42	0,000

Based on table 3 on the experimental class the average score of n-gain of self-efficacy of the students is still relatively low, while the control class the score of n-gain of the students is low as well. In the data normality test n-gain in experimental class, the score obtained is Sig 0,004 smaller than 0,005 and the data n-gain of control class the score obtained is Sig. 0,000 less than 0,05. Therefore, it can be concluded that self-efficacy data of the students are not normally distributed. Hypothesis testing is done by using a non-parametric test because in non-parametric tests data are not required to be normally distributed. Test averages then is done by using test Independent-Samples T-Test for non-parametric statistics (Mann-Whitney U-Test) with significance level of 0,05.

Mann Whitney test is done to know whether an increase in self-efficacy in both groups is significantly different or not. Comparative test is conducted with n-gain value of the students with the help of software IBM SPSS Statistics 24. The following is a summary of the results of the Mann-Whitney test:

Table 4. Results of Mann-Whitney Self Efficacy of Students Experiment Group and Control

	SE
Mann-Whitney U	599,000
Asymp. Sig. (2-tailed)	0,011

Based on Table 4.13 it can be seen that the value of Asymp.Sig. (2-tailed) of 0,011 is smaller than  $\alpha = 0,05$  then based on decision-making in the Mann-Whitney test if it rejects  $H_0$  and accepts  $H_1$ , thus it can be concluded that the increase of self-efficacy of the student who obtain SAVI learning model of self-efficacy is better than the students who obtain conventional learning.

### CONCLUSIONS

The increase of mathematical critical thinking skills and self-efficacy of the students who applied SAVI learning models is better than mathematical critical thinking skills and self-efficacy of the students with conventional learning models.

### REFERENCES

- [1] Arifin, Z., "Developing Critical Thinking Skills Gauge Instruments Students in the 21st Century Learning Maths Theorems, vol. 1, no. 2, pp. 92-100, 2017, <https://doi.org/10.1016/j.neulet.2013.10.065>
- [2] Johnson, E.B., *Contextual Teaching & Learning: Making Entertaining Learning Teaching-Learning Activities and Meaningful*. Bandung: Kaifa, 2014.
- [3] Ariyati, E., Based Learning Lab to Improve Students Critical Thinking Skills. *Journal of Mathematics and Science*. vol. 1, no. 2, pp. 3, 2010.
- [4] Laili, NI, & Azizah, U., Implementation of Problem Based Learning Model (PBM) to Melatihkan Critical Thinking Skills and Self-Efficacy on Main Material Factors Affecting Reaction Rate of Class XI SMA Negeri 4 Sidoarjo. *Unesa Journal of Chemical Education*, vol. 4, no. 1, pp. 62-68, 2015.

Proceeding books:

The 2<sup>nd</sup> International Conference of Education on Science, Technology, Engineering, and Mathematics (ICE-STEM 2020)

- [5] Alwisol, *Personality Psychology*. Malang: UMM Press, 2009.
- [6] Hanifah, N., & Agustini, R., Improved Self Efficacy and Critical Thinking Through Application of Inquiry Learning Model Topic Acid Base Class XI SMAN 9 Surabaya [Increase In Self Efficacy And Critical Thinking Through Implementation Model Study of Inkuiry on Subject Matter of. *Unesa Journal of Chemical Education*, vol. 1, no. 1, pp. 27-33, 2012.
- [7] Syahbana, A., Upgrades Critical Thinking Mathematically Junior High School Students Through Contextual Teaching and Learning approach. *Edumatica*, vol. 02, pp. 45-57, April, 2012.
- [8] Jumaisyaroh, T., Napitupulu, E.E., & Hasratuddin, H., Upgrades Critical Thinking Mathematically And Smp Student Learning Independence Through Problem-Based Learning. *Kreano, Creative Innovative Mathematical Journal*, vol. 5, no. 2, p. 157, 2016, <https://doi.org/10.15294/kreano.v5i2.3325>.
- [9] OECD, *PISA 2009 Results: Executive Summary*, 2010, retrieved from <https://www.oecd.org/pisa/pisaproducts/46619703.pdf>
- [10] OECD, *PISA 2012 Results in Focus 2014*, retrieved from <https://www.oecd.org/pisa/keyfindings/pisa-2012-results-overview.pdf>
- [11] OECD, *PISA 2015 PISA Results in Focus 2018*, retrieved from <https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf>
- [12] OECD., *PISA 2018 Results Combined Executive Summaries Volume I, II & III*, 2019.
- [13] Fachrurazi, Application of Problem Based Learning To Enhance Critical Thinking Skills and Communication Mathematical Elementary School Students. *UPI Education Research Journal*, vol. 1, pp. 76-89, 2011, Retrieved from <http://jurnal.upi.edu/penelitian-pendidikan/view/637/>
- [14] Happy, N., & Widjajanti, D.B., Judging PBL effectiveness of Critical and Creative Thinking Skills Mathematical and Junior High School Students Self-Esteem. *Mathematics Education Research Journal*, vol. 1 no. 1,p. 49, 2014.
- [15] Mariya, D., Mastur, Z., & Pujiastuti, E., Effectiveness Of Learning Tool Figure Savi Aided Ability To Resolution Info Articles Abstract. *Unnes Journal Of Mathematics Education*, vol. 2, no. 2, 2013.
- [16] Wahyuni., Savi Learning Model Application To Improve Skills In Primary Resolution Sri Wahyu Kusumawati PGSD FIP Surabaya State University. p. 2014.
- [17] Annisa Mustika, and the S.S., Through the application of contextual learning Hands On Probelem Solving Material and Beam Cube Class VIII SMP Negeri 10 Banda Aceh. *Journal of Mathematics Education*, vol. 1, pp. 49-58, 2016.
- [18] Sagala, S., *The concept and meaning of learning*. Bandung: Alfabeta, 2012.
- [19] Fisher, A., *Critical Thinking An Introduction*. Jakarta: Erland, 2009.
- [20] Ismaimuza, D., Critical Thinking Skills Beginning Knowledge Mathematical Viewed from Students. 2 (class VIII), pp. 11-20, 2011.
- [21] Bandura, A., *Self-Efficacy The Exercise of Control*. New York: WH Freeman and Company, 1997.
- [22] Students, M., Man, I.N., Maulida, F., Alminingtias, N., Soro, S., & Hand, I., Relationship With Self-Efficacy Of Learning. vol. 01, pp. 365-371, 2018.
- [23] Hendriana, Learning with metaphorical Thinking Approach to Improve Understanding of Mathematical Ability, Communication Confidence Maths and Junior High School Students. *Dissertation UPI Bandung*, Unpublished, 2009.
- [24] Lestari, K.E., & Yudhanegara, M.R., *Mathematics Education Research*, Bandung: PT. Refika Aditama, 2015.
- [25] Wardani, D., Use of Instructional Model Somatic, Auditory, Visualization, and Intellectually (Savi) To Improve Understanding of Concept Style. *Use of Instructional Model Somatic, Auditory, Visualization, and Intellectually (Savi) To Improve Understanding of Concept Style*, vol. 2, 2013.
- [26] Sugiyono, *Quantitative Research Methods, Qualitative and R & D (Mixed Methods)*, Bandung: Alfabeta, 2016.