

# Analysis Self-Efficacy Prospective of Elementary School Teacher Education to Mathematics

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**Abstract.** Self-efficacy is one of the affective domains in mathematics that is very important because it is directly related to the student's self in accepting and studying mathematics. Therefore, this study was conducted to analyze student self-efficacy toward mathematics. The population in this study is all students of Elementary School Teacher Education STKIP Citra Bangsa Aceh Utara, and the sample is students of semesters 1 and 3 who are getting mathematics courses that is the basic concept of mathematics and high class mathematics education as much as 72 people. The results showed that overall students had a negative self-efficacy against mathematics. The findings of this study are expected to be used as a reference for lecturers related to mathematics can find a solution to improve students' self-efficacy toward mathematics to be positive for the purpose of mathematics courses can be achieved as planned.

**Keywords:** Self-efficacy, Mathematics

## 1 Introduction

Mathematics is a science that is continuously studied from the first time a person in the world of formal education that is elementary school up to college. The college, the mathematics studied is a mathematical concept related to the use or application of mathematics itself in a particular study program. The primary school teacher education, mathematics is studied in the subjects of basic concept of mathematics and high class mathematics.

Mathematics has three domains or three domains, namely cognitive domains, affective domains and psychomotor domains. The affective domain in mathematics learning consists of self-concept, mathematics anxiety, self-efficacy, effort and ability attribution, causal attribution, learning helplessness, motivation, autonomy, youesthetics [1]. Historically, many researchers in mathematics education such as [2][3][4] discussed about important aspects affecting mathematics learning. The main concerns in the learning process of mathematics are psychology, cognitive approach, and conceptualization of the affective domain. Therefore, it is concluded that self-efficacy is one of affective domains in mathematics that is very important [5].

The student's belief in his ability is important in improving student learning outcomes. A student's self-efficacy is necessary to develop. This is because through a strong confidence, a student will have a strong ability to develop the potential that is in him. This is in accordance

with Bandura [6] one's assessment of how great his ability to deal with a situation is called self-efficacy. Mathematical self-efficacy is a confidence in: the ability to represent and solve mathematical problems, how to learn/work in understanding concepts and completing tasks, and the ability to communicate mathematics with peers and teachers during learning. The ability is measured by level (difficulty level of problem), strength (endurance) in solving the problem, generality (breadth) area of the given problem [7].

Therefore, student self-efficacy is a student's positive attitude to his ability such as ability to solve math problems. One that can affect self-efficacy is the success or failure experienced by the student can be viewed as a learning experience. This learning experience will result in students' self-efficacy in solving problems so that their learning ability will increase, positive self-efficacy is required in the learning so that students can achieve their learning objectives and achieve maximum learning achievement.

The based on preliminary observations in the 1st and 3rd semesters the basic concepts of mathematics and high class mathematics education show that low mathematical self-efficacy abilities are seen when students are given a problem, so most students say they do not know how to solve them. In addition, some students ask about what formula is used to solve the problem, the numbers contained in the problem multiplied or divided, and so on. The most students do not have the confidence to answer the problem, so many of them are unable to solve it. Therefore, to ensure that it is done research on student self-efficacy analysis of mathematics, especially subjects of basic concepts of mathematics and high class mathematics education.

## **2 Literature Review**

### **2.1 Self-Efficacy**

Self-efficacy (SE) is defined as a person's judgment about his or her ability to achieve desired or determined performance levels, which will influence subsequent action [8]. According to Zimmerman [9], the SE is a personal assessment of a person's ability to organize and implement a work program in achieving a predetermined objective, and he seeks to assess the degree, authenticity, and strength of all activities and contexts. Therefore, SE is the opinion of a person about his ability to perform a certain activity. SE reflects how sure the student is about his or her ability to perform a particular task, so the high SE of a person in a certain section does not guarantee the high SE of someone on the other. SE indicates how strong a person's belief that they have the skills to do something, they can be sure that with other factors will make them succeed.

The SE also influences one's choice in behaviour settings, the number of their efforts to accomplish the task, and the length of time they endure in the face of obstacles. Finally, the SE affects a person's emotional reactions, such as anxiety and distress, and mindset. Thus, individuals with a low SE on a particular task are more thinking about their personal shortcomings than thinking about completing a task, which in turn will hinder the performance of successful completion of tasks [10]

The SE will make students motivated to learn through the use of self-regulation as a goal-setting process, self-monitoring, self-evaluation, and strategies used [10]. This is in accordance with the opinion of Bandura [2] who says that SE which is a central construction that will affect a person in decision making, and affect the action to be done. Someone will tend to run something if he feels competent and confident. It will also determine how far the

effort is, how long it will last if it gets into trouble, and how flexible it is in a less favorable situation. The bigger the SE person, the greater the effort, the perseverance, and the flexibility. SE also affects the mindset and emotional reactions. A person with a low SE will easily give up, tend to be stressed, depressed, and have a narrow vision of what works best to solve the problem. While the high SE, will help a person in creating a sense of calm in the face of difficult problems or activities.

The SE has three dimensions of magnitude, strength and generality. Each of these dimensions has important implications for one's performance. Magnitude refers to the sorting of tasks according to the degree of difficulty. Strength refers to the trust that exists within a person that can be realized to achieve a certain performance. Generality refers to the flexibility of SE which belongs to someone who can be applied in other situations [2]. Perception SE can be formed by interpreting information from four sources namely [3].

1. Authentic experience: is the most influential source, because the failure or success of past experience will decrease or improve a person's SE;
2. Experience of others: is the source of information needed to make judgments about oneself;
3. Social or verbal approach: it is an approach done by convincing someone that he/she has/does not have the ability to do something;
4. Psychological index: is the physical and emotional status that will affect a person's ability.

Based on the above explanation, the notion of self-efficacy in this study is one's confidence in; his ability to represent, solve mathematical problems he faces in the learning process of mathematics courses so that the desired goals achieved are measured based on 4 sources of authentic experience, other people's experiences, social or verbal approach, and psychological index.

## **2.2 Mathematics**

Mathematics is one of basic science, very necessary in human life both in daily life and science and technology. Mathematics can also be used for the provision of plunging and socializing in the community. Someone who has learned math is expected to absorb information more rationally and think logically in the face of the situation in society. Therefore, math needs to be taught at all levels of education, from elementary to university. The primary school teacher education, mathematics is studied in the subjects of basic concept of mathematics and high class mathematics.

## **3 Method**

This research is qualitative descriptive. Descriptive research aims to describe a phenomenon that occurs, without intending to take conclusions that apply in general (Hadi, 2000). Therefore, this study concludes about student self efficacy toward mathematics. The population of this research is all students of of Elementary School Teacher Education STKIP Citra Bangsa Aceh Utara. The sample in this study are students of semesters 1 and 3 who are getting subjects of basic concepts of mathematics and high class mathematics education which totals 72 people, but when the questionnaire 2 people were absent. The data collection in this study using questionnaires questionnaires filled by students. Methods of data analysis in this study using a questionnaire presented in the form of frequency tables and data interpretation.

## 4 Result and Discussion

The results of students' self-efficacy toward mathematics, especially the subjects of basic concepts of mathematics and high-class mathematics education can be described in Table 1 as follows:

Sources	Statement Number	Neutral Score	Self Efficacy Score
Authentic experience	1 s/d 9	3	3
.Experience of others	10 s/d 19	3	2
Social or verbal approach	20 s/d 29	3	3
Psychological index	30 s/d 40	3	3
Average		3	2,75

Table 1. The Scale Data Distribution of Self Efficacy

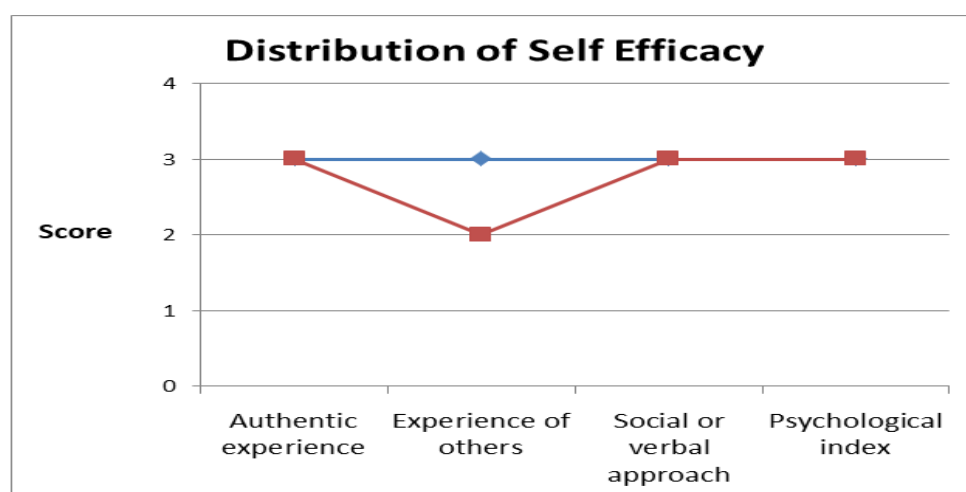


Figure 1. Data Distribution of Self Efficacy

From the table above, it is seen that in general the students showed negative self-efficacy to math. This can be seen from the average score SE students  $<$  average neutral score of  $2.75 <$  3. Similarly, when viewed for each aspect of SE. For the authentic experience source, social approach, and psychological index the average SE score of 3 students is equal to the neutral score of 3. For the experience aspect of others, the average SE score of 2 students is smaller than the neutral score of 3. Thus both in general and for every aspect, students have a negative self-efficacy towards math.

Analysis of self-efficacy scale scores indicates that students generally have negative self-efficacy toward math. This is a problem that requires a solution because self-efficacy is an important asset for better learning outcomes, because a person's belief that he or she is capable

of doing a particular task will influence the success of completing the task. To improve student self-efficacy, there are several strategies we can do:

1. the teach students with a special approach so as to enhance their ability to focus on their tasks.
2. the guiding students in setting goals, especially in creating short-term goals after they build long-term goals.
3. the provide rewards for student performance.
4. the combine training strategies with emphasis on goals and provide feedback to students about their learning outcomes.
5. the provide support or support to students. Positive support can come from teachers like the statement "you can do this", and others.
6. the ensure that students are not too anxious because it will actually decrease student self-efficacy.
7. the provide students with positive models such as peers and adults. Certain characteristics of the model can improve student self-efficacy. Modeling is effective for improving self-efficacy especially when students observe the success of peers who actually have similar abilities to them [7].

In addition, there is a group counseling model that is predicted to be effective in improving self-efficacy, ie cognitive behavior group counseling (KKKP). The KKKP model is seen to be effective because it suits the problems of self-efficacy, offers a specific and empirically tested technique, the time required is relatively short, and uses principles of learning such as reinforcement and social learning that can develop self-help. The KKKP model resulting from this research consists of: rational, objectives, key components, formats, sessions, counselor roles, counseling stages, and success indicators [8].

## **4 Conclusions**

The curriculum, affective aspects are aspects that should also be considered in learning. But when compared with cognitive factors, increasing affective factors is more difficult and takes a long time. The reality can be seen in this study that the low self-efficacy of students to mathematics. The results of the self-efficacy scale score analysis conclude that both in general and for each aspect affecting self-efficacy, students have a negative self-efficacy toward math.

Given the importance of self-efficacy the need to be given the understanding to change the paradigm that mathematics is difficult. In addition, given the solutions to improve students' self-efficacy towards mathematics to be positive. Because positive self-efficacy will affect students in making decisions, and influence the actions that will do. Someone will tend to run something if he feels competent and confident. It will also determine how far the effort is, how long it will last if it gets into trouble. The higher one's self-efficacy, the greater the effort, the perseverance, and the flexibility.

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