

## One of Dimensions of School's Well-Being: Self-Efficacy of Math, as Predictors on Achievement in Mathematics

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**Abstract.** School well-being nowadays becomes a hot issue, being prosperous in school is able to lead the students enjoying the teaching and learning process in the classroom and maximize their ability to achieve the goals. Based on the previous study Asmadi et al, (2015) states that the effective and efficient model of School Well-Being dimensions in predicting mathematics achievement is the relationship between self-efficacy and relationship between teachers and students. This study aims at analyzing and assessing the mathematics achievement of high school students based on their mathematics self-efficacy. This study applies quantitative approach using regression analysis. The subjects are 143 students of SMA X Surakarta who measured their Math learning achievement using the final grade of cognition in odd semester report. The Mathematics self-efficacy variables are measured using a scale. Based on the analysis, it can be concluded that the mathematics self-efficacy is able to predict students' mathematics achievement. The Mathematics self-efficacy has  $R^2 = 0.074$  or 7.4% on effective contribution. The Mathematics self-efficacy value of F is  $F = 11.255$  ( $p < 0.01$ ). This means that mathematics self-efficacy is able to predict students' mathematics achievement at school, so it can be concluded that through self-efficacy as one of dimensions of School Well-Being will increase students' achievement and students' well-being will be fulfilled at school.

**Keywords:** School Well-Being, Mathematics Self-efficacy and Mathematics Achievement

### Introduction

School is an institution where children develop themselves. At school they will learn to find a lot of new knowledge to add their experience. School well-being is an issue that began to be discussed, feeling prosperous in school can make children enjoy the process of teaching and learning in the classroom and making children can maximize their ability to achieve the ideals he wanted. WHO made a program that aims to promote school health in the United States and be structured. The World Health Organization (WHO) has encouraged all schools can improve mental health and wellbeing in schools with a variety of approaches, which uses the concept of creating a healthy environment emotionally and socially (Konu & Rimpela, 2002).

School well-being expressed by Konu & Rimpelä (2002) is a combination of concepts from a variety of literature that has been done, the study aims at outlining the concept of well-being theoretically based on subjective and objective indicators of well-being by evaluating the previous school programs. Health indicators that have been separated from a school development program, have been categorized into school concept of well-being more holistically. The results of the study done by Konu & Rimpelä (2002) shows a conceptual model of the school's well-being. This model complements of a previous definition (which has been proposed by Allardt, figure Sociology), namely: 1) school condition (having), 2)

social relationship (loving), 3) means for self-fulfillment (being), and 4) health status (health). Those are the four dimensions of school's well-being.

Konu, Lintonen, and Rimpelä (2002), in their following study show that the results of analyzing on the factors of school's well-being dimensions for school's conditions, social relationships, the means for self-fulfillment, and health status, are significantly correlated positively of the range 0.30 - 0.79 with internal consistency of 0.62 - 0.84. For the school conditions dimension, there are several variables that make it up, including the scope around the school, subjects, timetable, class size, penalties, security, service, health care, and cafeteria. Further, the social relationships dimension is made up in the form of school climate, group dynamics, teacher-student relationships, peer relationships, no bullying, and school relationships with cooperative house (parent involvement). In addition, for the means for self-fulfillment is in the form of appreciation for the work of the student, the student's ability to do something or self-efficacy, the encouragement or support from the school (teacher's support), involving in decision-making (student engagement), (self-esteem), and develop creativity. The next, for health status dimension is in the form of mental health, physical health, and the absence of psychosomatic symptoms.

Related to the academic achievement, a study conducted at the student grade of 7, 9, and 11, shows that academic achievement is positively correlated with school well-being (Konu & Lintonen, 2006). This achievement can be enhanced by students participation and engagement in school service. The result of this study also suggests that the provision of learning support can reduce the number of dropouts.

In 2012, the high school students who did not pass the National Examination (UN) was 7,579 students, from 1,524,704 participants of UN. It was derived from the final score of students who did not reach the average of 5.5 was 5,300 students (69.4%). Moreover, because there were one or more subjects scoring less than 4 (30.06%). The final score average is the total of pure UN score combined with school score, with each weighted score 60:40, and most students had less score or bad score on their Indonesian and Mathematics subject (Sulistyo, 2012). Based on the data above, it can be concluded that the academic achievement on mathematics still needs improvement in order to achieve maximum results.

The learning achievement is an important research in education, especially for the education policy makers who concern on curriculum and other school's regulations (Ryherd, 2011). The way to rate the students learning abilities can be seen from their academic performance in school. This academic achievement is considered as indicators of student understanding and also teachers success in transferring knowledge to students. There are many factors that make the students maximize their academic achievement, both in the social side and also within the individual themselves, and one of them is efficacy. On the last decade there are a lot of researches showing that the students' inside perception such as self-efficacy and goal orientation is considered as a strong predictor of academic motivation and performance in school, besides, there are also many studies that look at social factors affecting the students' motivation such as parents, siblings and peer (Ryherd, 2011).

The students need their self-efficacy as the ability to believe in their ability to manage their desire to succeed for their own actions. When the one has self-efficacy then he would understand more deeply what the needs are and what he will do, so it will lead to create his own ideals (Bandura, 1997).

Based on the previous study conducted by Asmadi et. al, (2014) state that an effective and efficient model of dimensions School Well-being in predicting mathematics achievement is the relationship between self-efficacy variables and relationship variable between teachers and students.

In Indonesia, mathematics is one of the subjects to be examined in national examination, that's why students need to understand the mathematics curriculum in accordance with the content and teacher's teaching approaches in order to achieve good result in the national examination. The problem is the pressure level in math is very high, so the students think that math is a very difficult subject for them. The theory of self-efficacy states that the student assessment toward what they can do with their skill is a mechanism used by students to achieve school success (Bandura, 1997). In this study, academic achievement will be limited on mathematics achievement.

Based on the above background, then the problem statement is whether mathematics self-efficacy can be predictors of students' mathematics achievement. The purpose of this study is to examine whether the mathematics self-efficacy can be predictors of students' mathematics achievement.

### Literature Review

According to Winkel (1996) study is a mental or psychic activity that takes place in an active interaction with the environment that can produce a variety of changes in terms of knowledge, understanding, skills, attitudes and values. Changes resulting from learning outcomes are relatively permanent and ever lasting in people's lives.

In addition, Thorndike (in Slavin, 2012) states that learning is a process of trial and error. There are three laws that must be considered in the learning process, they are readiness to learn something, practice and effect. Besides, Uno (2007) states that mathematics has logical, systematic, objective and exact characteristic. Mathematics is logical because it is a science that relies on the logic of truth, the conclusion of the work of mathematics should be explained, understood, and accepted by common sense.

Masrun and Martaniah (1984) explain that mathematics achievement is the acquisition of knowledge or skills developed by the subjects of mathematics, so the achievement is the result that has been achieved after learning and usually indicated by scores or grades given by the teacher. Student achievement is used as a measurement to determine the extent to which students can master the lessons. The learning achievement is usually expressed in the form of individual score such as the report card, STTB, or GPA (Anwar, 2004).

Further, Suryabrata (2002) classifies the factors that affect the learning achievement as follow:

a. External factors that come from outside the students, i.e non-social and social factors. Non-social factors include the state of the air, temperature, weather, time, place, aids in learning and also stationery from students. While for the social factors are factors related to humans, such as the presence of people at the time of study, these factors can interfere when there are many people are chatting when the students are learning or doing the test.

b. Internal factors that come from within the students themselves, this factor can be divided into two; physiological factors in learning and psychological factors. Physiological factors is the state of the physical tone in general including the students' nutrients to absorb the lessons, having less nutrients are able to make students sleepy and less motivated. The next is a chronic disease, if the student has a chronic disease then it will make them get difficulty in learning. The next physiological factor is physical function especially for students' sensory functions, if these senses are functioning properly, then it will be easier for the students to receive lessons maximally. The next is the psychological functions covering the following items:

1. the characteristic of being curious and investigating the wider world.
2. the characteristic of being creative in humans and the desire to move forward.
3. the desire to gain sympathy from parents, teachers, and friends.
4. the desire to correct the previous failures by doing more better efforts, either by having cooperation or competition.
5. the desire to have a secure condition during learning a lesson.
6. the existence of reward and punishment in the end of learning.

Based on the above explanation, it can be concluded that there are two factors affecting students' learning namely internal and external factors. External factors may include social and non-social factors, while the factors that come from within the students are physiological factors and psychological factors. The focus of this study is the internal factor especially on students' self-efficacy in mathematics.

The term of self-efficacy firstly was introduced by Bandura in 1977 in social learning theory which has become a social cognitive theory. Bandura (1997) defines self-efficacy as a belief in the ability of an individual to train some measurements of control over the functions themselves and events in their environment.

According to Schunk (2008), self-efficacy influences students in choosing activities. Students with low self-efficacy may avoid subjects that give many tasks, especially for challenging tasks, while students with high self-efficacy have a great desire to do the given tasks. Self-efficacy is a belief about the ability to do the given tasks. By having self-efficacy, the students will be more enthusiastic during their learning. In fact, there are some studies that show a correlation between self-efficacy and learning achievement.

Sengul (2011) defines mathematics self-efficacy as an individual's confidence in his ability to succeed in mathematics or successful performance in mathematical tasks. Many studies have examined the relationship between self-efficacy in mathematics and several variables (math achievement, math behavior, math anxiety and math interest, and math profession career). Some significant relationships have been found in several studies regarding to learning achievement in mathematics using self-efficacy (Migray 2002 & Moore, 2005;).

Bandura (1997) suggests that self-efficacy has three basic components or dimensions, namely:

1) Level (Level of task difficulty)

Self-efficacy in individual can be various, there is a low for an easy task, but it will be higher when facing a difficult task, whether a task is difficult or not, it indicates the level of various challenges to achieve success based on actions taken by someone. Based on the above explanation, it can be concluded that the level dimension is how big a student's level of confidence toward his own ability which is associated with the level of task difficulty.

2) Generality (scope of task)

Generality is related to how wide the scope of task is believed can be achieved by the individual. An individual may judge that he has a high self-efficacy and limite himself on special duty, or it may spread to many other task scopes. Based on the above description, it can be concluded that this dimensions of generality is an individual's belief on the ability based on the level of task scope.

3) Strength (Confidence Stability):

Strength can be defined as a concept whether someone's belief is strong or weak in achieving difficult tasks. This dimension is related to the rating strength about an individual's ability. Besides, it refers to the degree of individual stability against the beliefs or expectations made.

Based on the above description, it can be concluded that the dimension of strength can be defined as the way to measure an individual's confidence level toward his capabilities that related to his heart stability.

Bandura (1997) says that there are four sources of self-efficacy forming in human being, namely:

1. Enactive Mastery Experience

2. Vicarious Experience

3. Verbal Persuasion

4. Physiological and Affection State

Self-efficacy in education can be called as academic self-efficacy, it can be interpreted as a student personal assessment ability to organize and to carry out the actions which are intended for the academic performance (Bandura, 1997). Bandura (1997) hypothesizes that the students' successful conviction will affect the level of effort, perseverance, and the activities chosen; students who have high confidence on their success, then they will be easier to participate on the way to achieve academic achievement, they will work harder, and they will be last longer when they face difficulties comparing to students who doubt on their own abilities. Efficacy in academic will affect students' motivation to learn, give affection respond for the efforts in order to achieve their academic achievement.

Hence, (Caprara, et. al, 2012) describes self-efficacy as a powerful predictor for students in making a decision, there is an effort showed by the students and how they stand when facing adversity. Moreover, while working on their tasks, a major component in the value-expectancy theory of self-efficacy is the belief with  $R = 0.42$ . Some studies prove that self-efficacy for learning is positively correlated with the level of students as a solution to the arithmetic problem.

Bandura (1997) says that the students' confidence to succeed will lead them being able to manage their learning and become experts in the academic activities that will determine the students' aspirations,

level of motivation, and academic achievement. According to Schunk (2008), self-efficacy influences students in choosing the activities. Students with low self-efficacy may avoid subjects that have many tasks, especially for challenging tasks, while students with high self-efficacy have a great desire to do their duties. Self-efficacy will lead the students to select the options of behavior that they would do in order to achieve their success. Self-efficacy can have a diverse effect on student achievement. Students who have low self efficacy in learning tend to avoid completing the tasks, while those who consider themselves having ability, they are more enthusiastic in doing the tasks (Eggen & Kauchak, 2010).

Based on the above theoretical explanation, the hypothesis of this study is that the mathematics self-efficacy can be predictor toward mathematics achievement.

### Research Methods

The subjects of this study are 143 students taken from 5 classes of grade XI IPA at SMA X in Surakarta. They are selected based on the age; 17 to 18 years.

### Data Measurement

Variable of mathematics learning achievement is obtained through the documentation of the value of report cards on math, and math self-efficacy variable is measured with a scale based on the mathematical construct of self-efficacy theory from Bandura (1997) that uses a 3-dimensional (level, generality and strength). The reliability on mathematics self-efficacy scale is 0.823 in dimension one, 0, 800 in dimension two, and 0, 768 in dimension three. It means that the mathematics self-efficacy scale is reliable. The study applies a quantitative approach with regression analysis techniques. This study uses two variables, one variable as a predictor (mathematics self-efficacy) and one variable criterion (mathematics learning achievement).

### Finding and Discussion

The characteristics of the subjects are in the form of a maximum score, minimum score, the mean and standard deviation in statistical empirical data and statistical hypothetical data.

Table. 3 Description of Empirical Data and Hypothetical Data of Variable Research (n = 143 students)

Variabels	Hypothetical Data				Empirical Data			
	Score		Mean	SD	Score		Mean	SD
	Min	Max			Min	Max		
Mathematics Self-Efficacy	25	100	62,5	12,5	50	90	69,9	7,34
Mathematics Learning Achievement	0	100	50	16,6	71	91	78,6	3,2

The result of distribution normality of mathematics self-efficacy variables has a normal distribution with the Kolmogorov-Smirnov Z value (KS-Z = 0.493;  $p > 0.05$ ), with the value of the variable asympt sig of mathematics self-efficacy ( $p > 0.05$ ). Linearity test is used to determine the linearity of the relationship between the predictor variable relationship with the criterion variable. The linearity of the test result in this study can be seen on the table 4.

Table 4. The Linearity Linkage Test Result for Each Independent Variable with Mathematics Achievement

Variabel Independent	Variabel Dependent	The Linearity Test Result			Conclusion
		Deviation	Value F	Value P	
Mathematics Efficacy	Self-Learning Achievement	1,749	1,886	0,000 (deviation)	(p>0,05)

The hypothesis of this study is that the mathematics self-efficacy can act as predictor for mathematics achievement. The correlation value between variables is described as follows, mathematics self-efficacy and mathematics learning achievement  $r = 0.272$  ( $p < 0.01$ ),

Mathematics self-efficacy has  $R^2 = 0.074$  or 7.4% of effective contribution. Mathematics self-efficacy value of  $F$  is  $F = 11.255$  ( $p < 0.01$ ). It means that mathematics self-efficacy could predict mathematics learning achievement. Furthermore, based on the results of linear regression analysis, it is obtained a constant value as 78.685, the coefficient  $b_1$  for mathematics self-efficacy = 0.342. Based on this result, the line of multiple regression equation in this study is  $Y = 78.685 + 0,342 X_1$ .

Referring to the line of multiple regression equation above it can be concluded that:

a. Constant value  $b_x = 78.685$ , means that if the value of self-efficacy in mathematics and relationships with peers in students the value is 0, then the mathematics learning achievement value is 78.685.

b. The coefficient of  $b_1 = 0.342$ , illustrates that the mathematics self-efficacy has a positive role to the amount of mathematics learning achievement, means that if the mathematics self-efficacy is increased by 1 unit, the mathematics learning achievement will increase by 0.342.

The results from this study shows that mathematics self-efficacy is positively correlated with mathematics learning achievement, so the finding of this study supports previous research which states that students who have high self-efficacy in mathematics learning, then their mathematics academic achievement is also high (Caprara, Vecchione, Alessandri, Gerbino & Barbaranelli 2011; Nasiryan, Azar, Nuruzya & Dalvand, 2011). There are some significant relationships have been found in several studies concerning on mathematics learning achievement and self-efficacy (Migray 2002 & Moore, 2005;).

A significant positive correlation between mathematics self-efficacy and mathematics achievement becomes important for students to improve their mathematics learning achievement. Students can improve their self-efficacy in various ways, such as when they get information about the self-efficacy based on their appearance, observing the model (the vicarious experience), social persuasion forms, and physiological factors. Those sources of efficacy may be ways to improve the self-efficacy on students' mathematics learning. Students who are able to assess their own capabilities, then choose an activity that can improve their achievement by the help of social persuasion of people around them, so that makes them calm and confident in doing their tasks. As Schunk (2008) states that self-efficacy influences students in choosing activities. Students with low self-efficacy may avoid subjects that have many duties or tasks, especially for challenging tasks, while students with high self-efficacy have a great desire to do the tasks. By having self-efficacy, students will shape the options of behavior they would do in order to achieve what they believe in will be succeeded.

## Conclusion

The conclusion of this study is the factor of self-efficacy in mathematics may be a stronger predictor to improve mathematics learning achievement. The predictor variables (mathematics self-efficacy) provides effective contribution to mathematics learning achievement; it is about 7.4%. It means that mathematics self-efficacy could predict students' mathematics achievement in the school, so it can be said that self-efficacy variable as one of dimensions of School Well Being is able to increase student learning achievement and students will feel that school has accommodated their learning well.

## Discussion

This study has limitation in getting mathematics learning achievement score, at the beginning, the researcher wants to get score on the result of semester test based on the scores obtained by students in completing the test, but because of the remedial system make students who take remedial are getting a minimum score of KKM, so the score is not based on the students' direct scores in doing the test. Based on this situation, it is expected that for the further researchers who have same interest with this study should use the students' direct score in doing mathematics test.

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