



# Self-efficacy of Elementary School Teachers on Numerical Literacy

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**Abstract.** One of the instruments used in the National Assessment in Indonesia is the Minimum Competency Assessment (MCA). In MCA, two types of competencies are measured, one of which is numerical literacy. In the process of developing numerical literacy skills for students, one of the determining factors is the teacher. The purpose of this study was to describe the self-efficacy of elementary school teachers in Tuban Regency, East Java Province towards numerical literacy. This research is quantitative descriptive research. The subjects in this study were elementary school teachers in Tuban Regency, totaling 96 people from the Tuban city, Central Tuban, South Tuban, West Tuban, and East Tuban areas. The instrument used is an observation sheet and a self-efficacy scale for numerical literacy. In this study, the data collection technique used survey techniques and the research instrument used a numerical literacy self-efficacy questionnaire. The data analysis technique used descriptive analysis with a quantitative approach. Based on data analysis, the results showed that the self-efficacy of elementary school teachers in Tuban Regency towards numerical literacy was at the medium level.

**Keywords:** Self Efficacy · Numerical Literacy · Elementary School Teachers

## 1 Introduction

The assessment process in the National Assessment is obtained from three main instruments, namely the Minimum Competency Assessment (MCA), the Character Survey, and the Learning Environment Survey [1]. In MCA, there are two types of competencies that are measured, namely reading literacy and numerical literacy. From the two types of abilities tested in the MCA, it can be seen that literacy skills are very important to develop. This ability is considered important because the performance of Indonesian students in the international arena for literacy skills in PISA (Program for International Student Assessment) and TIMSS (Trends in International Mathematics and Science Study) is still low. For scientific literacy, the 2018 PISA results show the average science score for OECD countries is 489, while Indonesia has only achieved a score of 389 [2]. As for mathematical literacy, the results of the PISA and TIMSS tests, two organizations under the OECD (Organization for Economic Cooperation and Development) show that Indonesia is still below the average score of OECD countries. The results of the mathematical literacy test of Indonesian students at PISA 2018 were 379 whereas

the average score of OECD countries was 487 [3]. Meanwhile, from the 2016 TIMSS results, Indonesia got a score of 395 out of an average score of 500. The highest score was obtained by Singapore with a score of 618 (50% higher than Indonesia) [4]. The low PISA and TIMSS results achieved by Indonesian students make literacy skills a competency that will be measured in the MCA, focused on reading literacy and numerical literacy.

Numerical literacy is defined as daily life and analyzing the information displayed in various forms (graphs, tables, charts, etc.) and then using the interpretation of the results of the analysis to predict and make decisions. Numeracy can be defined as the ability to apply number concepts and arithmetic operations skills in everyday life (for example, at home, work, and participation in community life and as citizens) and the ability to interpret quantitative information that surrounds us [4, 5].

In the process of developing numerical literacy skills for students, one of the determining factors is the teacher. From several sources on educational psychology, it is stated that teachers are included in the factors that affect student achievement [6–9]. Because of the importance of the teacher's role in improving students' abilities, one thing that needs to be reviewed is how knowledge about numerical literacy is because they will be part of the numerical literacy learning process for students. Teachers must be sure that they can overcome numerical literacy skills well.

Belief or assessment of his ability to be able to achieve a goal is known as self-efficacy [10]. In this context, the assessment of one's own ability to be able to overcome numerical literacy is called numerical literacy self-efficacy. A study showed that there was a positive relationship between math self-efficacy and math performance [11]. From the results of some of these studies, it is important to look again at how beliefs and assessments of one's abilities are to be able to master numeracy literacy. In this context, the assessment of one's own ability to be able to master numeracy literacy is called numeracy literacy self-efficacy. The purpose of this study was to measure the numeracy literacy self-efficacy of elementary school teachers in Tuban Regency, East Java Province. By knowing the numeracy literacy self-efficacy of elementary school teachers in Tuban Regency, information will be obtained on how the confidence and ability of teachers in teaching numeracy literacy to students is also the first step to improving the numeracy literacy of elementary school students in Tuban Regency.

## 2 Methods

This research is quantitative descriptive research. Its activity was carried out in Tuban Regency, East Java Province. The subjects in this study were 96 elementary school teachers who were selected by random sampling from the Tuban city, Central Tuban, South Tuban, West Tuban, and East Tuban areas. The instrument used in this activity is a self-efficacy measurement questionnaire.

The procedures in this research are: identifying problems, formulating and limiting problems, determining research designs and methods, compiling instruments and collecting data, analyzing data, and presenting results and the final procedure is interpreting the findings.

The questionnaire for measuring the numeracy literacy self-efficacy of prospective mathematics teachers was measured using a Likert Scale. The answer choices are

Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). As for the negative statement items, the opposite applies. The number of initial items before validation is 24 statement items for 4 indicators of self-efficacy. Before being used for research, the Self-efficacy questionnaire was validated in terms of language by colleagues and then the questionnaire was tested on students to see validity and reliability. The results show that out of 24 statement items, only three items are invalid, namely items 4, 11, and 19. These three items were not used in the study. For reliability, the calculation results show the number 0.812. This value is included in the category of high reliability.

The data analysis technique used descriptive data analysis, namely by determining the percentage of prospective mathematics teacher responses to each statement from the self-efficacy questionnaire, and the results were displayed in tabular form.

### 3 Findings and Discussion

Self-efficacy about numerical literacy is a person's assessment of his ability to be able to understand numerical literacy and teach it. To measure the numeracy literacy self-efficacy of elementary school teachers, a questionnaire with a total of 21 statements was given to the teacher. Four sources are measured, namely: (1) Mastery experiences (personal experience); (2) vicarious experiences (experiences of others); (3) verbal persuasion (social or verbal approach); and (4) Psychological states (psychological index). Many questions for mastery experiences (personal experience) have 7 questions, vicarious experiences (experiences of others) have 3 questions, verbal persuasion (social or verbal approach) has 4 questions and Psychological states (psychological index) has 7 questions. The percentage of teacher responses for the four sources can be seen in Table 1.

Self-efficacy is very important for a teacher to have. Someone who has self-efficacy means having confidence in his ability to be able to succeed in completing a task. More specifically, a teacher who has self-efficacy in numerical literacy means that teacher has confidence that he is capable of numerical literacy. Mastery experience is the experience of mastering something or achievements that have been achieved in the past. Previous experience is an important source of information for a person's self-efficacy. In addition to past experiences, self-efficacy can also be formed through learning by looking at the experiences of others, and vicarious experiences. Another source to bring up self-efficacy is the support of people around. A person who is supported by those around him will find it easier to believe in his abilities. Self-efficacy is also influenced by the emotional and physiological states that a person feels in certain situations. Rising emotions, as well as tension and pressure on a person, will show the appearance of the behavior he does.

In this study, it was found that 13.33% of primary school teachers in the Tuban district had high self-efficacy, meaning that they had a strong belief that they could succeed in learning numeracy literacy. This is because teachers who have high self-efficacy tend to do a task, even though the task is difficult, and consider it a challenge that must be achieved [12]. They will also try to prevent failures that will arise because individuals with high self-efficacy will assume that the failures that arise are the result of their lack of effort. There is a positive relationship between mathematical self-efficacy and the ability to complete mathematical tasks [11]. Research from Herizal [13] also shows the

**Table 1.** Percentage of Elementary School Teacher Responses to Self Efficacy Questionnaire

Source	Item to	Percentage of Student Response (%)			
		Strongly Disagree	Disagree	Agree	Strongly Agree
Mastery Experiences	Item 1	1,3	9,3	68	21,3
	Item 2 (–)	1,3	50,7	38,7	9,3
	Item 3 (–)	6,7	46,7	41,3	5,3
	Item 4 (–)	6,7	44	41,3	8
	Item 5	1,3	5,3	56	37,3
	Item 6	0	4	25,3	70,7
	Item 7 (–)	45,3	44	8	2,7
Vicarious Experiences	Item 8 (–)	44	42,7	10,7	2,7
	Item 9	4	24	49,3	22,7
	Item 10 (–)	9,3	61,3	24	5,3
Verbal Persuasion	Item 11 (–)	13,3	37,3	37,3	12
	Item 12 (–)	9,3	21,3	50,7	18,7
	Item 13	1,3	4	30,7	64
	Item 14 (–)	25,3	53,3	14,7	6,7
Psychological States	Item 15	0	2,7	54,7	42,7
	Item 16	0	9,3	60	30,7
	Item 17 (–)	21,3	42,7	24	12
	Item 18 (–)	20	57,3	17,3	5,3
	Item 19	5,3	22,7	56	16
	Item 20 (–)	14,7	28	48	9,3
	Item 21 (–)	10,7	42,7	41,3	5,3

same results, namely those who have high self-efficacy tend to have good mathematical performance, in this case, their mathematical communication is also high.

Research from Herizal [13] also shows the same results, namely those who have high self-efficacy tend to have good mathematical performance, in this case, their mathematical communication is also high. Belief or assessment of his ability to be able to achieve a goal is known as self-efficacy [10]. Self-efficacy is an individual's belief in his abilities and competencies for a given task, achieving a goal, or overcoming an obstacle. These beliefs will determine how a person feels, thinks, motivates himself, and behaves. Bandura [10] reveals that a person tends to run something if he feels competent and confident and will avoid it if he feels less competent. Changes in a person's behavior are based on a change in a person's self-efficacy. Bandura [10] mentions that there are four sources of developing a person's self-efficacy, this can show how a person's level

of self-efficacy is high or low, namely mastery experience, vicarious experience, verbal persuasion, and psychological and affective states.

The teacher with medium self-efficacy is the dominant one in this study. More than half of the research subjects fall into the category of medium self-efficacy. This means that their level of confidence, when faced with numerical literacy questions is medium. They will not shy away and despair when given numerical literacy questions. This is to the results of Sunaryo [14] who says that those with medium levels of self-efficacy in principle will not easily give up when the teacher gives assignments, only if they have tried seriously but cannot be completed then they give up.

Good results were obtained from filling out the questionnaire, namely that none of the teachers had low self-efficacy. This is an important basic capital for elementary school teachers to have, because if their self-efficacy is weak, then the tendency that arises is that they will also find it difficult to learn numeracy literacy. That's because they already have the view that they are not able to master numeracy literacy let alone teach it.

The results of previous studies have shown that there is a relationship between mathematical performance and one's self-efficacy [15, 16]. Therefore, the dominant self-efficacy at a medium level is a good start for elementary school teachers to continue learning the material and learning to cultivate confidence that they will be able to teach/integrate numeracy literacy in later learning.

## 4 Conclusion

Based on the results of the study, the self-efficacy of primary school teachers in Tuban Regency in dominant numerical literacy is at a medium level, meaning that the level of confidence of elementary school teachers, when faced with numerical literacy questions or conditions that require the need for numerical concepts, is medium. Therefore, it is necessary to improve the quality of teachers in mastering numerical literacy. Good mastery of numerical literacy will lead to high self-efficacy for teachers to teach numerical literacy to students. One way to improve mastery of numerical literacy for elementary school teachers is to provide structured training as well as assistance in the classroom.

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