Correlation of self-efficacy on mathematical communication skills for prospective primary school teachers

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Abstract. Self-efficacy and mathematical communication skills are important things for prospective mathematics teachers in elementary schools. The purpose of this study was to analyze the effect of self-efficacy on the mathematical communication skills of prospective mathematics teachers in elementary schools. The research method used a quasi-experimental with purposive sampling technique. The research sample was students majoring in Elementary School Teacher Education at the Institut Pendidikan Indonesia. The data was collected by giving written tests and questionnaires which were then analyzed using Spearman correlation. The results showed that there was a correlation between self-efficacy and mathematical communication skills of prospective elementary school teachers.

1. Introduction
Self-efficacy is a belief in one's own ability to do certain tasks so that they can achieve the expected goals. In connection with the context of the world of education, self-efficacy is the teacher's personal belief in his ability to plan and carry out instructional goals so that mathematics learning can be successful [1]. Based on this, self-efficacy is not a competency but a person's belief in carrying out their competence. Prospective elementary school teachers who have competence without self-efficacy will affect their work results.

Many people do not believe in their ability to bring about what they want [2]. Often prospective elementary school teachers feel discouraged when working on math problems because they feel they are difficult or have failed in their previous experiences. This condition is influenced by a lack of self-efficacy. Therefore, self-efficacy has a very important role in the mathematics learning process, especially in achievement motivation and how to interact in the learning process. Self-efficacy is related to belief in one's ability to exercise control over events that influence what a person does.

There are four sources that can increase or decrease a person's self-efficacy, namely: personal success experiences, other people's experiences, verbal persuasion, and psychological conditions [1]. The success that has been experienced can increase one's self-efficacy to achieve the next achievement. Likewise, with other people's experiences, both positive and negative, have an impact on self-efficacy, especially if the one giving the experience is a trusted person. This condition causes verbal persuasion so that someone is able or not to do something. These three things are of course influenced by a person's psychological condition. Self-efficacy in teaching mathematics is influenced by a person's personality, experiences of himself or others [3,4].
Prospective elementary school mathematics teachers need to have self-efficacy to be sure of using their knowledge in teaching mathematics. The indicators of self-efficacy for prospective teachers are: belief in mastery of mathematics material, confidence in having sufficient skills to be able to teach mathematics effectively, confidence can help students experience difficulties during the learning process, and confidence in increasing student achievement in learning mathematics [1]. Self-efficacy of a teacher will be able to create innovative learning conditions. This will affect the formation of student self-efficacy.

Self-efficacy can provide motivation that can encourage someone to improve their abilities [2]. One of the abilities that needs to be developed is mathematical communication skills. This ability is a person's ability to communicate in the form of: a) expressing a situation, picture, diagram or real object into the language of symbols, ideas or mathematical models; b) explain mathematical ideas, situations and relations orally or in writing; c) listening to, discussing and writing about mathematics; d) reading with the understanding of a written mathematical representation; e) making conjectures, compiling arguments, formulating definitions and generalizations; and f) restating a mathematical description or paragraph in its own language [5].

Communication in general is a social interaction activity in the form of sharing ideas to be reflected, discussed, corrected, or maybe rejected [6]. Communicating mathematical ideas requires self-efficacy as motivation to reflect on the ideas you have. These ideas can be in the form of oral or written ideas. Therefore, the purpose of this study is to analyze the correlation between self-efficacy and mathematical communication skills of prospective elementary school teachers.

2. Methods

This type of research is a correlational research. The research method is quantitative to analyze the correlation between self-efficacy and mathematical communication skills of prospective elementary school teachers. The sampling technique used was purposive sampling by taking a sample of 53 students majoring in Elementary School Teacher Education at the Institut Pendidikan Indonesia. Data collection was carried out by giving written test questions about mathematical communication and self-efficacy questionnaires to the research sample. The data obtained were then analyzed using a statistical test, namely the Spearman test.

3. Results and discussion

Based on the results of data collection, a descriptive analysis was carried out as table 1 follows:

| Self Efficacy | Mathematical Communication Skills |
|---------------|----------------------------------|
| N             | 53                               |
| $\bar{x}$     | 2.94                             |
|               | 3.56                             |

Furthermore, the Spearman test was carried out, the following results were obtained on table 2:

| Self Efficacy | Mathematical Communication Skills |
|---------------|----------------------------------|
| Correlation Coefficient | 1.000 | .396** |
| Sig. (2-tailed)  | . | .003 |
| N               | 53 | 53 |
| Correlation Coefficient | .396** | 1.000 |
| Sig. (2-tailed)  | .003 | . |
| N               | 53 | 53 |
Based on table 1, it can be concluded that there is a correlation between self-efficacy and mathematical communication skills of prospective elementary school teachers. Self-efficacy is an asset for prospective elementary school teachers to develop mathematical communication skills. This effort needs to consider aspects of professional communication in teaching, reasoning standards, and affective aspects [7]. Professional communication in teaching is supported by conceptual and procedural understanding. Aspects of reasoning also need attention in developing mathematical communication skills. This aspect helps prospective teachers to construct meanings from abstract concepts so that they can be clearly communicated.

Self-efficacy as part of the affective aspect will help reduce the fear of prospective elementary school mathematics teachers to express themselves and provide positive encouragement when communicating ideas. Therefore, self-efficacy needs to be identified by universities when selecting new students [8]. This is quite clear because self-efficacy is an important aspect of the teaching profession. Teachers who have self-efficacy are key players in learning mathematics [9]. This shows that a teacher who has self-efficacy will be able to grow the self-efficacy of his students in working on math problems.

In addition to professional competence, teacher pedagogical strategies need to be developed through self-efficacy so that it can improve student achievement progress [10]. Having a high level of self-efficacy about a person's ability will encourage him to explore more, while a low level of self-efficacy will lead to poor performance [1]. A teacher who has high self-efficacy will continue to innovate when teaching. He will be able to design learning and communicate it effectively to students.

Self-efficacy and mathematical communication skills need to be developed as part of educational tasks. Someone who has high self-efficacy will also show a higher level of effort and persistence [11]. Someone who has self-efficacy will personally evaluate that he is able to communicate ideas in solving math problems. This assessment will be a strength in him to organize and implement actions to display competence. Therefore, Self-Efficacy has an effect on mathematical communication skills [12,13].

4. Conclusion
Based on the results of data analysis, it is concluded that there is a correlation of self-efficacy on the mathematical communication skills of prospective elementary school teachers. Self-efficacy provides motivation for someone to believe in their abilities. Someone who has self-efficacy will be able to communicate mathematical ideas both orally and in writing Self-efficacy is the initial foundation for prospective teachers to communicate mathematical ideas in teaching mathematics. The higher a person's self-efficacy, the higher the communication skills of prospective mathematics teachers.

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