

# Teacher Innovation Improves Mathematics and Student's Self-Efficiency

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## Teacher Innovation Improves Mathematics and Student's Self-Efficiency

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**Abstract:** The teacher in his role has a very important role in the development and success of students in learning. Teacher self-efficacy is very influential on students, it can be seen from the amount of motivation that teachers provide, teacher innovation in teaching, teacher competence in teaching assessed by supervisors and principals, and teacher teaching strategies. The results of the 2015 TIMSS study, Indonesia is ranked 44th out of 49 countries. This study was conducted to measure the teacher's need to innovate in learning mathematics accompanied by the help of guidance and counseling services in building student self-efficacy. The research was conducted using descriptive qualitative methods. The results of the study found that teachers who innovate in learning mathematics and are accompanied by group guidance services and personal guidance on self-efficacy in students are able to build self-confidence and minimize anxiety about mathematics subjects.

### I. Introduction

Teachers today are required to be able to adapt to changes and developments. The magnitude of the teacher's responsibility as an educator has developed in accordance with technological developments. The school's mission can also change according to the times, this makes students have to get special attention so that they are ready to compete in the midst of technological developments. Hsi-Chi (2011:31) teachers in their role have a very important role in the development and success of students in learning. Teacher self-efficacy is very influential on students, it can be seen from the amount of motivation that teachers provide, teacher innovation in teaching, teacher competence in teaching assessed by supervisors and principals, and teacher teaching strategies. Yonghong and Runjia (2021:35) through their research revealed that in carrying out various innovations a teacher really needs various supports, both from the principal, colleagues and all students. Confidence and creativity of teachers in developing teaching is very necessary to produce students who have a positive spirit towards the environment and towards educators. The magnitude of the role of teachers in the world of education is very influential on students, ranging from kindergarten education units to senior high schools, teacher innovation in various ways is very much needed. In their findings, Marjan and Rob (2018:769) the magnitude of the motivational process greatly contributes to the innovative behavior of teachers, innovative teacher behavior and the way teachers develop their professionalism are very important aspects to produce high-quality education. Their results show that satisfaction of basic psychological needs affects intrinsic motivation and job self-efficacy, and the latter strongly supports innovative behavior. In this case, teacher innovation cannot be built alone without the support of leaders and colleagues for teacher self-development. Self-efficacy is needed by students carrying out their duties as students. This fact is reinforced by Syamsul and Novaliyosi (2019:562) Trends in International Mathematics and Science Study (TIMSS) in order to compare the Mathematics and Science achievements of 4th and 8th graders in several countries, a study has been carried out. In general, TIMSS aims to monitor the results of the education system related to student achievement in Mathematics and Science. TIMSS is carried out regularly every 4 years, from 1995 to 2015. Indonesia is one of the countries that became the object of TIMSS in the last four periods. Talking about mathematics achievement, Indonesia's position is still below the international level, as reported by TIMSS. The results of the 2015 TIMSS study, Indonesia is ranked 44th out of 49 countries. In practice, teachers as educators not only provide knowledge to students, but also build self-efficacy in students. Self-efficacy is very important to be built in students, to be confident in solving various challenges given by the teacher. Etymologically, self-efficacy

consists of two words, namely "self" as an element of personality structure and "efficacy" which means self-assessment, whether you can do good or bad actions, right or wrong, able or not able to do something as required.

## II. Theoretical Framework

### Teacher Innovation

Improving the quality of learning should be carried out in an effort to meet the needs of students to live in society during times of competition with foreign nations that have begun to penetrate Indonesia. Adi and Nurida (2020: 56) explain that innovation is an effort in order to generate and realize ideas and ideas as a process from the results of developing the utilization and mobilization of knowledge, skills, and experience in creating or improving a product, process or system that is considered new. Innovation is carried out in order to aim to be able to provide meaningful or significant value. Teachers must innovate in learning, this applies to all subjects including guidance and counseling teachers. will face in the future. In the field of guidance and counseling, innovation is an attempt to realize an idea and idea, method, method, or means of tools created by school counselors and guidance and counseling teachers which have been previously observed as something completely new and is expected to be able to be used in achieving a certain goal as well as a solution to a problem solving in the field of guidance and counseling. Imayaty and Andi (2019:148) professional guidance and counseling teachers are required to continue to be able to develop their competencies according to the needs, demands of society, and the times. Currently the guidance and counseling teacher profession is not limited to education in schools, but the wider community also requires the role and presence of qualified guidance and counseling teachers who are able to prepare students as a quality generation of the nation and are able to develop their competencies. Said, et al (2016: 6) guidance and counseling services are one of the most important elements in the element of education, this service is present in schools aiming to support the achievement of educational goals. Guidance and counseling can prevent students from experiencing problems and can even relieve students of their problems. One of the efforts that need to be made to improve the effectiveness of guidance and counseling services is the development of guidance and counseling media. Innovating in counseling guidance services in accordance with the times is needed so that there is no saturation in these services. Various innovations in education are also needed to be able to make students have closeness to the subjects being taught, this is also an effort made by teachers and schools to develop a new paradigm in the world of education. One of the elements in the new paradigm that plays a significant role is the teacher. Waras (2011: 88) teachers are required to have a dual role, and not just as an instructor, but more importantly to act as a facilitator, collaborator, and mentor. This role must of course be accompanied by various developments as a form of innovation in teaching, including in carrying out guidance and counseling services.

### III. Self Efficacy

Einar and Sidsel (2010: 1059) Self-efficacy is based on a social theoretical framework of cognitive theory which emphasizes the development and training of human agents which are found that individuals can exert a certain influence on what they do. Ika (2013-219) self-efficacy is a perception that individuals are able to do something important to achieve their goals. This includes feeling knowing what to do as well as being emotionally capable of doing it. Reinforced Bandura (2006:1) argues that in self-efficacy an individual is self-regulating, proactive, self-regulating, and self-reflecting. From this perspective, self-efficacy affects one's goals and behavior and is influenced by one's actions and conditions in the environment. The magnitude of the role of self-efficacy in a person to be able to influence behavior makes self-efficacy a teacher must have in educating. Teachers must set an example for students, self-efficacy in teachers will build a positive figure, full of enthusiasm and fun so that they can be imitated and build student learning motivation. Based on social cognitive theory, teacher self-efficacy may be conceptualized as teachers' belief in their own ability to plan, organize, and carry out activities needed to achieve educational goals during the teaching and learning process. Heslin (206:705) Because self-efficacy is more specific and limited than self-confidence (i.e. a general personality trait related to how people feel confident and act in most situations), or self-esteem (i.e. the degree to which a person

likes himself), are also generally easier to develop than self-confidence or self-esteem. Self-efficacy is also a much stronger predictor of how effectively people will perform a given task than their self-confidence or self-esteem. Through this explanation, it can be seen that the role of self-efficacy is so large that it becomes a basic need for individuals to be able to develop themselves to the fullest. In a different study, Einar and Sidsel (2010:1060) found that the measure of teacher saturation is believed to affect subjective and objective health as well as teacher motivation and performance satisfaction. Emotional exhaustion and depersonalization will have a negative impact on self-assessment and teacher performance. The fact of the importance of teacher self-efficacy reinforces that in order to build student self-efficacy, teachers must first build self-efficacy.

#### IV. Math Ability

Hartatik (2020:33) reveals that students' numeracy abilities can be seen during teaching and learning activities in the classroom. During learning, a teacher must have the ability to explain the concept of numeracy from an early age. The numeracy culture itself, although still considered difficult, must still be comprehensive in all parts of education. Dhina, et al (2021:59) that numeracy skills are different from mathematical competence. The difference lies in the utilization of the concepts and understanding possessed, mathematical ability itself does not make a person have numeracy skills. However, it should be understood that numeracy literacy skills are different from mathematical competencies, where the difference lies in the use of concepts and knowledge possessed. Knowledge of mathematics is not enough to make someone have numeracy skills. Jenben et al., (2015: 32) who explain that anxiety about mathematics can be defined as a tense and anxious feeling that is very disturbing and manipulative in nature and is found in various kinds of life problems and students' academic situations. Gustavo and Lisa (2018:200) "Self-efficacy beliefs have become central to research into motivational factors that could affect students' interest in pursuing science, technology, engineering, or mathematics (STEM) majors. Findings of these studies show that students who felt that they had good mathematics preparation in their precollege academic experiences, which helped them to develop a high mathematics self-efficacy, were more likely to show interest in pursuing a mathematics-related major like engineering". In their research, they explain that self-efficacy is one of the motivational factors that can influence student interest in determining student interest in science, technology, engineering, or mathematics (STEM). This is certainly one indication that students who have good mathematics preparation will certainly have rich academic experience and will help them to develop higher mathematics self-efficacy.

#### V. Research methods

The method used in this research is a qualitative descriptive approach. Tjipto (2006:10) Explains that "Qualitative research methods have become a scientific tradition used in scientific research, especially in the social sciences, culture, psychology and education. Even in the applied research tradition, this method has been in great demand because its benefits are more understandable and can directly lead to policy action when compared to quantitative research". Galang (2016:145) that qualitative research will involve collecting data with empirical materials, such as case studies, personal experiences, introspection, interviews, observations, interactional and visuals.

#### VI. Results and Discussion

Some of the actions that are given by innovations that are carried out by teachers to students in order to build self-efficacy are by providing material on the meaning of self-efficacy and its benefits for students. Self-efficacy material is given by subject teachers in collaboration with Guidance and Counseling teachers which is carried out 3 times in 1 week. After the students receive the report cards of semester 1 learning outcomes. The Guidance and Counseling teacher reveals:

"Self-efficacy is needed by students today, considering that mathematics is unavoidable in the education unit. Students must have high self-confidence, even though their numeracy skills are lower than other abilities in themselves."

Then the interview continued as follows:

Table 1. Interview Results of Mathematics Subject Teachers and Guidance and Counseling

No.	Interview Questions	Interview result
1	Does the teacher have data on students' self-efficacy in mathematics?	Anxiety about mathematics does not only occur in adults, but also in students. Students who have anxiety about subjects, the environment, or any conditions and situations will certainly affect student behavior. Not infrequently students become loners and are not confident because of their anxiety. Guidance and counseling teachers have a big enough role to also build students' self-confidence, explaining that anxiety is a natural form as long as it can be controlled, even anxiety itself can be turned into a positive spirit to build self-motivation.
2	What kind of innovations do teachers do in mathematics learning activities?	Various innovations made by teachers in learning activities, the tasks given to students do not always complete the task with the classical method as outlined in the student workbook. Students are given the opportunity to complete in the form of excel, pdf, poster, presentation, or in the form of video. This innovation was able to build students' confidence in completing mathematics. Furthermore, individual guidance is carried out if it turns out that students' self-anxiety towards mathematics makes self-efficacy covered, then further action is carried out. Students then receive individual guidance to see their anxiety disorders. Some students experience math subjects, generally they are afraid of their parents because the grades do not match the minimum completeness criteria. Guidance and counseling teachers also need to call parents and provide education about intelligence to students.
3	Does the teacher explain about self-efficacy in students?	I need to give self-efficacy materials to students after I receive the results of semester 1 scores. All students receive self-efficacy materials, because I not only receive the results of math scores but all subjects. A good student's self-efficacy will certainly affect his confidence, self-efficacy is a foreign term for students. So there needs to be a delivery that is simple and easy to accept so that the self-efficacy material is conveyed properly.
4	What changes do students experience after the teacher makes learning innovations?	The value of subjects received by students is not only mathematics but all subjects. Overall, based on observations made by guidance and counseling teachers, students experienced an increased learning motivation graph. This can be seen from the presence of students who come on time for mathematics and the



		activeness of students in class. This is known based on the interview of the counseling guidance teacher to the mathematics subject teacher which is accompanied by documentation of learning activities.
5	What changes were experienced after students received an understanding of self-efficacy?	Finding students who have anxiety, especially in mathematics, is not always easy, because it cannot always be measured from the student's minimum completeness criteria. Assistance by guidance and counseling teachers to build student self-efficacy. This is done to prevent students' feeling of inferiority, initially the teacher conducts group guidance followed by personal guidance. From group guidance, if it is not finished, the Guidance and Counseling teacher gives himself to students to come and convey their anxiety. BK teachers re-build students' self-efficacy through individual guidance so that the results obtained are maximized.



Student group guidance activities on self-efficacy



Student interview activities after self-efficacy material

Based on interviews conducted on students after receiving self-efficacy materials, students revealed that when they made major changes to the assignments given to students, students became more creative and confident in completing math assignments. Balanced with group guidance and personal guidance from guidance and counseling teachers about self-efficacy, this makes students mentally more positive and self-confidence increases. Anxiety which is characterized as sweating, heart beating fast, and the desire to go to the toilet

gradually decreases. Students slowly begin to believe that mathematics is interesting and can be solved in various ways according to students' interests and competencies.

## VII. Conclusion

Self-efficacy in students is needed to be confident in carrying out any activities at school and in the community. Students' self-anxiety about mathematics is one of the problems that make students often absent from following these subjects. Innovation in giving assignments given by mathematics teachers is balanced with guidance on students' self-efficacy being able to build students' self-confidence and increase students' creativity in completing math assignments.

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