

The Outcomes of Learning Mathematics in Mathematics Classroom

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Abstract.

well-implemented education is very influential on the success in the learning process of students in school. Current interest in mathematics learning that focuses on understanding, mathematical reasoning and meaning making underscores the need to develop ways of analyzing classrooms that foster these types of learning. Mathematics becomes a fundamental part of human knowledge and one of the central planks of the modern technological revolution. In this paper, the authors show that the constructs of social and socio-mathematical norms, which grew out of taking a symbolic interactionist perspective, The emergence of mathematical meaning, interaction in classroom cultures. In this paper the standard aims of school mathematics are acknowledged, but so too are the unexpected and unintended outcomes for some or all students. These are primarily the unplanned and unintended values, attitudes and beliefs that students develop during their years of schooling. Motivation learning is one of the strengths that make students willing to learn and develop what is there for the sake of achieving a learning goal. In other words, if someone has a strong motivation to learn, especially learning math then the learning outcomes will be satisfactory and the goal of learning will be achieved.

Keywords: learning, learning mathematics, mathematics classroom

Introduction

Current emphasis on mathematical reasoning as central to what it means to engage in mathematical activity [1] coupled with similar emphasis on classroom discourse as a primary means of mathematical learning [2]. [3] has resulted in growing interest in investigating explanation, justification, and argumentation in the mathematics classroom. Issues of what it might mean to explain and justify and develop arguments, and how students might learn to do so, are of primary concern to researchers and classroom teachers alike. Science that has an important role for the advancement of human civilization is mathematics. The importance of learning mathematics is inseparable from its role which is very important in various aspects of life. Therefore, by studying mathematics students will get used to thinking systematically, using logic, being critical, and being able to increase their creativity in their daily lives.

Methodology

In this paper, effective steps that can be taken by a teacher in class, namely [5]:

- a. Shows acceptance of different ideas from students. In this case, students are allowed by the teacher to think critically and logically about the problems they face, by using the solutions and algorithms needed to solve the problem. This certainly helps students to be able to explain how to find solutions and what methods are used.
- b. The teacher asks students challenging and interesting questions. This is done with the aim of stimulating students' curiosity in depth towards the problem and further encouraging students to carry out further investigations.
- c. Provide an explanation of the advantages of mathematics and instill confidence in students that they are able to understand mathematics well

Result and Discussion

The Standard Aims of Learning Mathematics in Mathematics Classroom

The purpose of mathematics learning contains formal and material mathematical values. Mathematics is one of the lessons that help you think systematically. The purpose of learning mathematics in each level of education is classified into (1) a formal purpose, the goal that emphasizes the arrangement of students

reasoning and personal formation; (2) material objectives, goals that emphasize the application of mathematics both in mathematics itself and beyond mathematics. It is very important in living life, both in work and daily.

In general, the aims of mathematics in basic and general education are: 1. Providing provisions for students to be able to deal with changing circumstances in aspects of life and the world that continues to develop, through actions based on systemic, critical, and logical thinking, ways of thinking that are scientific and rational, careful, honest, effective and efficient of course. It aims to be as forming and as guiding mindsets given the importance of mathematics in everyday life. 2. Preparing students to use mathematics and mathematical thinking patterns in everyday life in learning and studying various disciplines that are developing in the world

Unintended Outcomes of School Mathematics

In my opinion, one of the characteristics or characteristics of mathematics is to have objects that are still abstract. It is this abstract nature that causes many students to experience difficulties in learning mathematics. Furthermore, most students have difficulty in applying mathematics to the problems of daily life and other things that cause students to still difficult to understand mathematics because it is influenced by the way the teacher teaches and explains the material in class. Thus, in connection with the above problem, in a question and answer about what is desired from teaching and learning mathematics in the community is closely related to what are the undesirable results of school mathematics? There are several assumptions about the belief in mathematics, including about who will succeed in implementing mathematics, about what important things are valued in mathematics, can be seen from the following details:

1. The science of mathematics is universal, free of values, and free of culture
2. Mathematics is the subject of abstract theory which is cut off from society and everyday life
3. Abstract and eternal mathematics, fully objective and very certain

As detailed above, the trust that has been built in the assessment of mathematics is wrong, especially the part that states that Mathematics is the subject of an abstract theory that is cut off from society and everyday life. Of course, this will be controversial and rejected by many people. Because in fact today, many have found the use of mathematics associated with other fields of science and its benefits in various aspects of life [6]. The increasing number of researchers and teachers who disagree with this belief is a positive side that has been generated. Related to the above, although far from universal it can be said that about pessimism about the ability to understand mathematics and about the still many students developing negative traits is wrong. This is certainly very influential on students' mentality. Moreover, the main influence on students' attitudes and perceptions about Mathematics and their own abilities is what has happened in class so far. During this time, found that there are still many students who do not understand in solving math problems. This can be caused by the low quality of students' understanding of mathematics by the learning process that is not right. As we have learned from sports, attitude is very important to determine success, and of course this also applies to fellow students the inability in optimism to always believe in their own abilities, especially the ability to master their understanding of mathematics can be satisfying prediction for themselves, becoming a cycle of failure.

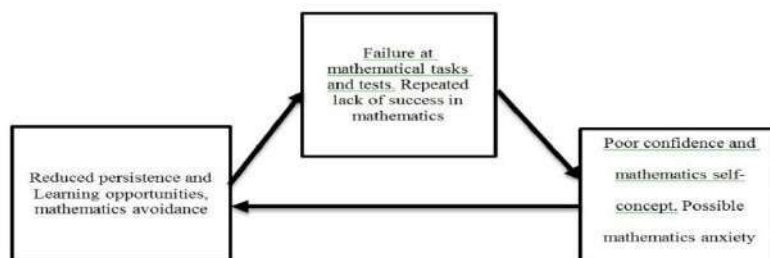


Figure 1. The failure cycle (adapted from)[7]

The table above shows that students can experience repeated failures on math assignments and tests given by the teacher, and overall result in a lack of success in mathematic subject. This phenomenon may direct to a reduced level of self-confidence and poor mathematical learning concepts. Too many failures that occur with humiliation in a small number of cases can cause anxiety in mathematics. People will do many things to avoid risks including threats to personal self-esteem. Thus, these results lead to reduced persistence, willingness and opportunities to learn. The consequences of this can certainly lead to further failure and lack of success in mathematics. One way to overcome this obstacle is to have broader and more visionary goals

for learning mathematics in schools [4]. The broader goals here, can be done with the concept of motivation and learning actions.

Motivation and Action Learning at the Primary and Secondary Levels

We understand that the right way to teach mathematics to students at various levels is to use through applications rather than using old lectures, emphasizing the formalism of mathematical machines. Real-life knowledge applications keep people concerned about staying motivated when learning mathematics. Motivation can be considered a reliable process at various ages, ranging from natural childhood curiosity in elementary school to true intellectual curiosity at the college level. However, from the age of students, one can see curiosity as motivation "to obtain or change information in circumstances that do not offer direct adaptive value for the activity" ([11], p. 76). (that is, curiosity and motivation are closely related psychological traits.

Motivation in learning mathematics is an encouragement that can give students a sense of interesting things that are known from mathematics. The basic concept can be felt to be very sophisticated for students and return to the idea that takes it further when they gather these experiences. For example, they are given in action learning based on the level of instruction. The examples provided with are emphasized on concrete goals, which in turn motivate students.

Visionary Goals for School Mathematics

The function of school math is as a media or means of students in achieving competence. By studying mathematics materials students are expected to master a set of competencies that have been established. Therefore, the mastery of mathematical material is not the ultimate goal of learning mathematics, but the mastery of mathematical materia6 s only the way to achieve competency control. Other functions of school mathematics are also as: tools, mindset, and science or knowledge. The three functions of mathematics should be used as a reference in school math learning. By knowing the mathematical functions are expected teachers of mathematics education can understand the relationship between mathematics with various other sciences or life. As a follow-up it is desirable that students be given an explanation to see examples of mathematical use as a tool for solving problems in other subjects or issues in everyday life. But of course must be adjusted to the level of student development, so it is expected 10 help the process of learning mathematics in school. For greater achievement and success in solving mathematical problems, students need to develop the following high-level orientation and abilities about mathematics [4]: (1) Confidence in mathematics and (2) Mathematical creativity through problem-solving abilities with appropriate methods.

Raising this issue for a purpose should not be surprising given its importance to be achieved. We attach to attitude as part of incidental results from school mathematics learning. The direct result of learning mathematics is knowledge and abilities that effectively rely on freedom from negative attitudes towards mathematics. Beliefs in mathematical abilities include confidence in personal knowledge of mathematical concepts, feelings of being able to use and apply them, and confidence in acquiring new knowledge and skills when needed, as well as building feelings of empowerment, empowerment and enjoyment in learning and using mathematics. The latter leads to persistence in solving difficult mathematical problems, as well as in the willingness to accept difficult and challenging assignments. Correspondingly, but reversing the failure cycle discussed above (Fig. 1) becomes a virtuous success cycle.

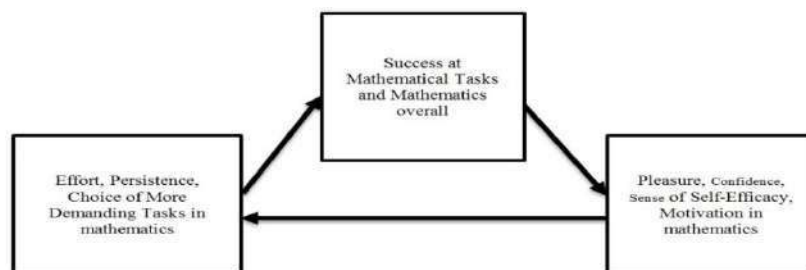


Figure 2: The success cycle (adapted from) [7]

Figure 2 above explains how much influence business, confidence, and choice to focus more on completing a mathematical task on its success in doing math tasks as a whole work on math problems and related to learning mathematics as a whole. Of course, it will lead to pleasure, self-confidence, increased self-efficacy, and motivation for mathematics for students. To stimulate students' enthusiasm in learning

mathematics, there must be a strong motivation from within themselves and motivation from outside. Thus, learning motivation is the power that makes students want to learn and develop the potential that exists for the achievement of learning objectives. The impact arising from motivation leads to increased effort, perseverance, and more demanding task choices in mathematics. The growth of a positive attitude, achievement in understanding mathematics, will certainly be able to perfect a positive success cycle. Famous psychologists, including Howe [8], state that things that are important factors in developing exceptional students' talents and abilities can be done by following the mechanism as shown in Figure 2. This cycle illustrates the intrinsic mechanism that can attract students to the pleasure of being successful and improving themselves. One step that can be taken at school is to focus more on how the quality of the way the teacher teaches in front of the class which will certainly affect the quality of understanding and learning experiences of students and other efforts that can be done is to reduce the focus on the process and results of the test. This can be seen from a machine. Like a machine, once the cycle starts in the right direction, it continues to move on its own. Therefore, the best way to increase student willingness and learning initiatives is to motivate students by engaging in classroom dialogue, motivating students to understand mathematics by not assuming that there are complicated things.

Dialogic vs. Authoritative Discourse

Dialogue is a conversation between people who are embodied in interpersonal relationships, openness to each other, honest and rely on goodness. This dialogue approach can help teachers make meaningful learning for students, because in this approach learning is as much as possible centered on the students. So in this approach, students are trained to gain knowledge, experience, find concepts, and solve problems through deep dialogue and critical thinking with teachers and fellow students.

This dialogue approach is also an effective way to do it in class. Dialogue activities carried out in this class certainly provide benefits directly to students through intense interaction, between teacher and student. In fact, lately in the teaching and learning process in class, the only listeners are students, while only those who are able to conduct lecture activities are teachers. In this concept, the better the quality of students is characterized by the more students understand the material being taught, it is believed by doing the following things: students follow well what is taught by the teacher, understand and listen well to what the teacher writes on the board write, and not make trouble or keep order in class. Many countries in the Americas, Europe and even Asia are still doing this activity which certainly has an attraction that is still being discussed [15].

Based on the interpretation of [9], [10] explains that the Authoritative Approach emphasizes the discipline and enforcement of authority. This method is important to train and foster aspects of discipline, accuracy of students. There are learning activities and work rules that must be followed to achieve certain goals in a learning process. In practice, an authoritative approach can be combined with a competency approach. In this Authoritative Approach the teacher is required to be more authoritative because of the authority both based on the ability and the power given. Such teachers are usually characterized by the ability to effectively govern students and the pleasure of inviting students to collaborate when needed to do things to achieve the best efforts in organizing Teaching and Learning in the classroom. Authoritative teachers are teachers who have the basics of knowledge both knowledge of specific fields of study and general knowledge. In other words, in this case students are required to be able to do things the right way, achieve certain mastery. Furthermore, when compared with activities such as conducting dialogue, in dialogue efforts are made by hearing voices or statements from others, understanding the response of the voice given, which makes a close relationship to teaching [5].

it is very similar to the language of teacher and math books. In this discussion, not allowed to participate if the students who are not familiar with this language [11]. Thus, as with the things I mentioned earlier, I describe the state ment that with a discussion ,it can make significance for classroom instruction. This aims to make students more active and the classroom atmosphere to be more lively and orderly .About how to interpret the results of discursive activities in the classroom, the view of meaning about how the ability of logic or reasoning of these students certainly has an important impact to consider. Because, through the process of interpreting the social interactions of students in the class, it is sought to know by understanding each student's personalities that are formed from within themselves. About how students interact with other friends socially in class, of course strongly influenced by each individual. But apart from that, normative understanding has been formed [12].

Students can develop interpretations of their abilities through normative understanding that has formed in each individual. When there is evidence that students do through dialogue in class and activities that are

interpreted by students, this is what is meant by normative understanding. Thus, from this concept students are considered to belong together who are able to carry out normative understanding [13].

In this article raises the explanation and justification of social theory as an individual construction. In this case the theory is considered as an aspect of discourse that explains the communicative function and interactive meaning that is formed between the teacher and students. Explanation and justification are distinguished, in part, by the function they describe. Students and teachers provide mathematical explanations to clarify aspects of their mathematical thinking that they understand that may not be easily seen by others. They provide authentic justification in response to the challenges of real violations of normative mathematical activity [14].

Classroom norms that relate to mathematical explanation and justification are both social and socio-mathematical in nature. A Norm is a sociological construct and refers to understandings or interpretations that become normative or taken-as-shared by the group. Thus, a norm is not an individual but a collective notion. One way to describe norms, in our case 2 ss room norms, is to describe the expectations and obligations that are constituted in the classroom. We were also able to identify normative 2 pects of interactions that are specific to mathematics. These we called socio-mathematical norms [15]. Normative understandings of what counts as mathematically different, sophisticated, efficient and elegant are examples of socio-mathematical norms. Similarly, what counts as an acceptable mathematical explanation and justification is a socio-mathematical norm. The distinction between social norms and socio-mathematical norms is subtle. For example, the understanding that students are expected to explain their solutions is a social norm, whereas the understanding of what counts as an acceptable mathematical explanation is a socio-mathematical norm [20]. In my opinion, it can be concluded that one way to solve the problem of overcoming students understanding is with cognitive structure, and increased creativity.

The cognitive structure of mathematics and science subjects (CSMSS)

The cognitive structure of mathematics and science is the knowledge related to the structure developed in understanding mathematics and science. Mathematical modeling often includes extensive cross-disciplinary knowledge, specifically, understanding about mathematics and science. The cognitive structure of mathematics and science subjects is the foundation used in mathematical modeling and the collection of background knowledge [16]: CSMSS can assist in the modeling process by selecting related information and problem schemes, arranging appropriate for 4 presentations for questions, and finding strategies that are suitable for mathematical modeling. [17], [18] stated that many students had enough knowledge needed to apply mathematical modeling methods to solve realistic problems, but they were not able to make their own models without getting directions.

Creative inclination

Creative inclination is an active psychological disposition of persons which reason them to make activities related to those 4 dimensions: the features of adventure, interest, imagination and challenge. Researchers [19] explained that the characteristics of creative inclination (excepting for curiosity) and the total score had significant correlation with student's academic accomplishment, and at last reproduced as the state of student's cognitive structure of mathematics and science subject.

What should the students be doing?

In an effective mathematics classroom, students should do the following things so that the activities of learning mathematics in the classroom become more effective [5]:

- a. Actively involved in carrying out mathematical activities. Students must actively work on their own math assignments, not see other people do the math for them or in front of them.
- b. Solve problems as challenging activities. Students must investigate meaningful real-world problems if possible. Mathematics is not a monotonous activity related to textbooks, but rather a dynamic way of building meaning about the world around us, generating new knowledge and understanding of the real world every day.
- c. Making interdisciplinary connections. Mathematics is not a separate field from the other world. Students learn best when they connect mathematics with other disciplines, including art, architecture, science, health, and literature.

- d. Share mathematical ideas. Students need to have the opportunity to discuss mathematics with each other, refine and criticize each other's ideas and understandings. Communication can occur through small group work in pairs, or class presentations.
- e. Using manipulative tools and others. Students, in particular the middle class, have only just begun to develop their abstract thinking. Concrete models, such as manipulatives, can give students a way to bridge from the concrete understanding of mathematics they bring from elementary school to the abstract understanding that will be needed from them when they study algebra in middle school. Teachers teach their students how to use manipulatives, and support the use of manipulatives to solve meaningful problems that are aligned with the learning objectives.

Conclusion

Education in this sophisticated era is very important to note. Well-implemented education is very influential on the success in the learning process of students in school. Success in learning mathematics is not far from the teacher who acts as an informer, communicator, and facilitator. Teaching methods applied by teachers in front of the classroom can affect the interaction between teachers, students, and learning achievement. Mathematics lesson is a compulsory subject in every level of education. But often math lessons become the most boring and saturating, which makes students lazy and do not want to learn math, also a lesson that is unpopular. It has an impact on the success of learning mathematics, so in learning mathematics there must be motivation to spur the spirit of students in learning mathematics. "Motivation to learn is a force that makes students want to learn and develop the potential that existed for the achievement of learning goals". Motivation learning is one of the strengths that make students willing to learn and develop what is there for the sake of achieving a learning goal. In other words, if someone has a strong motivation to learn, especially learning math then the learning outcomes will be satisfactory and the goal of learning will be achieved. In addition, motivation can serve as a driver of business and achievement of results. The achievement of learning mathematics is clearly strongly influenced by motivation. Motivation contributes to the ability to solve problems. Learning motivation components are: curiosity, confidence, attitude, needs, competence, and external motivator from the family environment. Thus, all the expected results of students in learning mathematics in the classroom can be achieved optimally, such as: students have a systematic mindset, logic thinking more developed, trained to count, and able to deductively deduce, be thorough, careful, and patient.

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