



Role of Learning Mathematics in the Character Building

Muhammad Irfan

Universitas Sarjanawiyata Tamansiswa Yogyakarta, Indonesia

muhhammad.irfan@ustjogja.ac.id

Abstract: Mathematics is one of the important science and studied starting from elementary education. Learning mathematics plays an important role in various fields of knowledge, one of them in the character building. In this paper, we will examine how the role of mathematics in the character building so as to develop the values of life. The conclusion of this paper, the learning of mathematics also influence in forming the character of students. Characters that can be built from teaching and learning mathematics among other things: discipline, honesty, fair and wise, assumes good faith, perseverance, logical and rational, and critical and creative. The hope to be enables teachers to convey the values of life when teaching and learning mathematics so that students have a strong character.

Keywords: mathematics, character building

The character of a nation depends on the character of every citizen. The character of a nation can be defined as a characteristic of a nation and the advantages of these nations. It means that a nation should be able to maintain the original character of his country in many ways. The loss of the character of a nation will be a great loss of the nation. Without the original character, a nation will only be a “follower” of another nation because too many characters of other nationalities who come in and become the character of the nation's citizens. “*Bangsa pengekor*” more potential to absorb negative charges and are always busy and spends all his time with various efforts to overcome a variety of problems, instead of building a nation (Agung and Pramono, 2010).

At this moment in Indonesia happen many irregularities norms that adorn the life of the nation. Of course this is the world of education into the spotlight, because education is considered as the leading contributor to the formation of personality, intelligence, and religious. Ironically many violations marred the nation's character performed by teenagers/school age. Brawl between students, immoral, illegal drugs, dishonesty, and lack of discipline often the news highlights. Along with the proliferation of these violations, the character of the Indonesian nation being eroded and replaced with a culture of a foreign nation. The world of education was considered a failure in its efforts to establish and develop the human character.

The formation of character is one of the national education goals. Article 1 of Law 2003 National Education System declared that one of the goals of national education is to develop the potential of learners to have the intelligence, personality and noble character. Act 2003 National Education System intended that education is not only establish Indonesia intelligent beings, but also personality or character, so that will be born generation of people who grow up with a character that breathes noble values of the nation and religion. The Hardiknas theme of "Civilization Character Education for Nation Building was popularizing in 010. In 2011 the theme Hardiknas is "Character Education as a Pillar of the National Awakening (Achieve High Performance uphold Budi Character)". Since 2010, the government has tried to focus on the formation of national character through school education. Even in 2013 the character education curriculum had been included in each subject, one of which is mathematics.

Mathematics is one branch of science learned since elementary school. Math learned from elementary school because one branch of which is a significant contribution to shaping the mindset of the individual. According Soejadi (1999), mathematics education as a vehicle not only can be used to achieve one goal, for example to educate students, but also to shape the personality (character) students. Mulyono (2003) suggested that mathematics is a way to find answers to the problems facing humans; a way to use the information, using the knowledge of shapes and sizes, using knowledge of the count, and the most important thing is to think of a human being itself in seeing and using the connections.

Mathematics with all the characteristics need interactive learning, innovative, and creative. Mathematics can form a human with a learning mindset. In other words, the learning of mathematics had a big contribution in forming the human character with due respect to the affective and integrate with local knowledge and religion. Unfortunately, teachers tend to be concerned with aspects of cognitive and psychomotor and affective aspects less attention. In Al-Alaq Allah says *iqra bismirobbikal ladzi kholaq*. Einstein argued that religion without science is blind, and science without religion paralyzed. It means that in studying science should be associated with a religion that human character remains intact, not eroded and irregularities.

Based on the previous description, the author attempts to discuss more about the role of the learning of mathematics in forming of character. The main focus will be studied is how the role of the learning of mathematics in forming of student character and the character of what can be built on students in mathematics.

LEARNING MATHEMATICS

In the process, mathematics is no longer considered only as an inexact science, but also in the social sciences clumps. This is because; math was instrumental in forming the human mind. A mathematical concept is also capable of being used in all aspects of life such as: language, culture, games, etc. Herman (2009: 96) explains that the essence of mathematics in respect of ideas, structures, and relationships are governed by a logical sequence. The scope of mathematical work is described by Herman (2009: 96-97) that the mathematical work consists of observation, guess and test hypotheses, look for analogies, and finally formulate theorems starting from assumptions and elements that are not defined.

The properties of mathematics is abstract, making mathematics requires meaningful learning to be easily understood by students. Learning will be meaningful if it is able to connect with the culture and norms that are around, integrating mathematics with other sciences. According to Bishop (in Nyimas Aisha, 2011), there are three categories of grades in mathematics, namely the value of public education, the value of mathematics and mathematics education values. Learning activities need to use principles: (1) centered on the learner, (2) develop the creativity of learners, (3) create favorable conditions and a challenging, (4) uncharged values, ethics, aesthetics, logic, and kinestetika, and (5) provides a diverse learning experience through the application of various strategies and methods of learning fun, contextual, effective, efficient, and meaningful (Wahyudin, 2013).

We know that the purpose of learning mathematics by Permendiknas 22 of 2006 include: 1) understand the mathematical concept, explain the link between concepts and apply concepts or algorithms in a flexible, accurate, efficient, and precise in problem solving, 2) using the reasoning in the patterns and nature, perform mathematical manipulation in making generalizations, compile evidence, or explain mathematics ideas and statements, 3) to solve the problem; 4) communicate ideas with symbols, tables, diagrams, or other media to clarify the situation or problem, and 5) have an attitude appreciate the usefulness of mathematics in life, an attitude of curiosity, attention, and interest in studying mathematics, as well as a tenacious

attitude and confidence in problem solving. Briefly, the learning of mathematics include cognitive, psychomotor, and affective.

Usually, the cognitive domain stills a priority for teachers, and the exclusion of the affective domain. As a result, students lack knowledge about the usefulness of mathematics in everyday life, lack of confidence in learning mathematics, lack of interest, concern and curiosity. It certainly can be influential in the personality of the student. Therefore, teachers must be able to convey the norms of life, the surrounding culture through the learning of mathematics.

CHARACTER BUILDING

Character is characteristic of every human being. The Ministry of National Education (2010), propose a definition of the character as follows: "Character is nature, disposition, morals, or personality are formed from the internalization of virtues (virtues) who believed and used as a basis for perspective, thinking, acting, and acting. Berkowitz (1997) defines character as "an individual's set of psychological characteristics that Affect that person's ability and inclination to function morally. Indeed, the basic concept of character (character) is taught in religion which is human nature. In Islam, there are four characters that have been exemplified by Muhammad namely: sidiq (honest), amanah (responsibility), tabligh (communication skills), and Fatonah (smart). Those aspects better known as cognitive aspects (Fatonah) psychomotor (tabligh), and affective (sidiq, trust) in the world of education.

Character education is essentially a process of built of the behavior of each individual or people to get used to behave well and appreciate the importance of valuing, desiring the good that comes from loving the good (Rukiyati, 2013). The purpose of the character education basically encourages the birth of a good man, has a charming personality, ethical, unpretentious, honest, intelligent, caring and tough (Sudarsono, 2008).

In 2016, the government launched a program of mental revolution to improve the character of the nation. In the area of education, character building into the structure kurtilas. Hopefully, teachers can collaborate on subjects with a range of knowledge and values of life that is the original culture of Indonesia. Nyoman (in Indra, 2015) convey, dimensions of life in the world of education would be more meaningful to each other, because each individual complementary (take and give, share and respect, belief and trust). In fact, education in Indonesia is still promoting the value which results in the competition. Therefore the affective aspect is often neglected. In fact, the affective aspect is the part that allows teachers to develop the mental character of students in learning.

Indeed, in 1922 through Tamansiswa founded by Ki Hadjar Dewantara, has provided the basic concept of education that guide a teacher known as Patrap Triloka. Patrap Triloka has elements (in Javanese), namely: (1) Ing ngarsa sung tuladha (which is in front exemplary / sample); (2) Ing madya Mangun Karsa (in the middle of the building initiative / spirit); and (3) Tut wuri Handayani (from the back support). If teachers follow the teachings Tamansiswa, then the teacher is not only in charge of teaching, but it also must be able to be a role model for students, is able to build a spirit, and always supports the activities of students.

ROLE OF LEARNING MATHEMATICS IN THE CHARACTER BUILDING

Mathematics learning in the classroom can be done by encouraging students to undertake reflection and appreciation. In this way, the learning of mathematics can instill and strengthen motivation, appreciation or reward students towards mathematics, the contribution of students in learning, interests, beliefs, confidence and perseverance. Things were like this has been lost

in the implementation of learning mathematics in the classroom. The loss of character values due to the value-oriented learning only, not of performance and processes.

Ing Ngarso Sung Tulodho (Giving ideals)

Learning mathematics can be used as a means to build character in students if the teacher / educator is able to provide exemplary students. In formal schools, there are many regulations that must be adhered to by students, but unfortunately, these regulations are not exemplified by the teachers. For example, if there is a rule that students must be disciplined, obedient, and to respect the teacher, then the teacher must give an example of discipline, obedience and love of students. Ironic if students can not smoke, but the teacher instead of smoking.

Nowadays, teachers in formal schools both state and private, have a lot of attention to character building. However, the portion given over private schools based on religion. Character is attached to religion, so that when it wants to develop the character of a person, would be studying religion properly. If we observe the religious-based schools, for example in Islamic schools, they try to integrate the contents of subjects with religious teachings. In this case, the teacher must continue to learn and read. *Iqra bismirobbikalladzi kholaq*. Humans have been instructed to read the name of God (Allah). Thus, learning is not just brain activity, but also careful to meaningful use.

Ing Madyo Mangun Karso (Giving Spirit / Initiative)

Ing Madyo means in the midst, *Mangun* means raising or evocative, and *Karso* means shaping the willingness and intention. So the meaning of *Ing Madyo Mangun Karso* is someone who is in the middle should be able to raise the spirit in order to create a strong will. Therefore, it must offer innovations within their organizations by creating an atmosphere that is more conducive and provide comfort. In addition to providing exemplary, teachers must also be able to give encouragement and a friend to the students. It is certainly not easy, given the tradition a teacher must be in front, teaching, and pamali if the teacher was a friend to the students.

A friend for students interpreted as a friend to discuss science. Often students are afraid and shy if you want to ask or discuss with teachers in subjects related problems. Teachers should be open and friendly to students, so that they are comfortable when going discussion. Not easy for teachers, on the one hand he should be a role model, a leader, but on the other he must be a friend of the students.

Tut Wuri Handayani (Providing Support)

Tut Wuri Handayani means when it is behind, he gave support. In this case, teachers do not always patronize, but he served as student support so that they can develop their potential. Of the three teachings Ki Hadjar Dewantara, it is important for teachers to be able to be three roles, namely: a role model, motivator and supporter. When learning takes place, it is the duty of teachers to educate students so that moral personality / character of students in accordance with religious teachings and character of the nation. To build one's character is not easy. It will be difficult to change the character of the people who have been entrenched, and it was widely followed by the younger generation.

An effective way to build character is from the family. However, in reality many families who are not or less provide character building for their children. Some of the causes include: they do not have enough knowledge, the bustle of the office, and no vision of building a harmonious family mawaddah warahmah. In the end, they give up education to schools.

Character education has long been true get into schools. Now, through one of the programs of the President Joko Widodo "Mental Revolution" requires every field of work repairing and building mental nation. In education, character building into the curriculum, and each subject should associate with the character.

Character building through Learning Mathematics

Based on the purpose of mathematics courses according Permendiknas 22, 2006, not only arithmetic mathematics, but mathematics is a social science. Students are expected to be able to resolve the everyday problems by using mathematical concepts. According Suwarsono (2011) deals with the noble values contained in mathematics that can be developed through the study mathematics, among others: (a) The value of logic in thinking, (b) The value of careful, thorough thinking and making decisions, (c) The value of discipline to obey the rules and agreements made, (d) the value of tenacity and patience in facing the problems, (e) the value of self-reliance in attitude, (f) the value of honesty in acting, (g) the value appreciation of time, (h) Value democratic.

Several mathematics concepts can be implemented in forming character of students, among others:

1. Discipline. Mathematics teaches students to be disciplined and obey the rules. Consequences if not disciplined and break the rules, it will cause one meaning and solution are not true. For example, the Fibonacci sequence (1,1,2,3,5,8, ...). Rules on the Fibonacci sequence to sum up the previous two terms. If this rule is violated, then the Fibonacci sequence is no longer obtained.
2. Honest. Honesty has now become a rare thing. Many people are willing to lie in order to make a profit. In one Hadith, the Prophet called the characteristic of the hypocrites one of them is telling a lie. Honesty can be taught through learning mathematics. For example, when the teacher asked the students, "Do the students already understand?" If students are not honest to say "understand" but it turns out they do not understand him, who will lose their own. When the material to the nth not understand, then that material all n + 1 will not understand, because interrelated. When lying, it will bring a lie - another lie to cover up a lie ago.
3. Fair and Wise. Fair and wise attitude can also be embedded through the learning of mathematics. For example in the material system of linear equations. Students must be wise in choosing the method of settlement (elimination, substitution, or mixed). Students also have to be fair when resolving a system of linear equations. If the right side minus 8, the left side will also be reduced 8.
4. Be good prejudiced / Khusnudlon. In mathematics can embed the nature of prejudice. Students must have faith that all issues must have a solution. *Fainna ma'al'usri yusro*, the real hardship comes ease. We can see the concept of absolute price and the concept of a number of squares. Whatever the number is, whether positive or negative, the result will be positive. $(-3)^2 = 9$; $|-3| = 3$.
5. Tenacious. Mathematics is abstract makes students less confident and less confident when work on the problems. Suppose there is a problem $\left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)\left(1 - \frac{1}{4^2}\right)\dots\left(1 - \frac{1}{2016^2}\right)$. If seen, the question of course will be very difficult to do. However, if the student is tenacious and willing to work hard, of course it will be successfully completed.
6. Logical and Rational. One of the subjects in mathematics is logic. Mathematical logic teaches us to logical thinking. Noting the premises before drawing a conclusion. After the conclusion, reflected back if the statement is true (tautology) or false (contradiction).

7. Critical and Creative. Critical and creative thinking is one of the characteristics mathematics. Critically and creatively to make students able to act effectively and efficiently by taking into account the possibilities and consequences.

CONCLUSION

Need a real effort to build national character through character building. Character education can be started from the family education, community, and school. Character education can be implanted through the learning of mathematics. Characters that can be built from mathematics learning among other things: discipline, honesty, fair and wise, assumes good faith, perseverance, logical and rational, and critical and creative. The hopes to be enable teachers to convey the values of life when learning mathematics so that students have a strong character.

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