Teacher Belief : Views, Components And Role in Learning

**N Irfani1 and E Retnowati2**

**1** Mathematics Education of Postgraduate Program, Yogyakarta State University, Colombo Street, Yogyakarta, Indonesia

**2** Department of Mathematics Education Faculty, Universitas Negeri Yogyakarta

[nurirfani.2019@student.uny.ac.id](mailto:nurirfani.2019@student.uny.ac.id)

**Abstract-**One that has the potential to facilitate students in developing skill in the 21st and facing challenges in the current era of the industrial revolution 4.0 improve the quality of teaching staff, namely teachers. In its development the teacher is very influential towards the success of an educational goal, because it is the teacher who delivers the material to be students learn and set what learning models will be used. Discuss about the quality of the teacher is of course very closely related to the teacher himself, how can the teacher be sure against him that the teacher is able to teach the material to his students as well how the teacher believes in the knowledge he will teach. Of course there are many factors there is something to do with that belief. Therefore, this literature review article is aimed at to analyze what factors are related to the teacher’s beliefs. The literature used in the study were obtained from various database like GoogleScholar, SpingerLink, ResearchGate, and ScienceDirect using keywords and the inclusion criteria that have been defined. There are four themes which was found in this study regarding teachers’ beliefs, namely : internal components of teachers’ belief, teachers’ belief in learning mathematics, factors affecting tecahers’ belief in mathematic learning, teachers’ belief ca increase self-efficacy students. Those themes show that teachers’ belief is something we need study. Explanataions related to these themes are described further is this article.

**Keywords :** *teachers’ belief*, *mathematic learning, teachers’ belief in mathematic learning*

Introduction

The development of the times which is increasingly rapidly raises challenges related to the increasingly complex abilities that everyone must possess or master. There are 3 knowledge and skill that everyone have it if want be a succes there are (1) life and career skills, (2) learning and innovation skills, and (3) information, media and technology skills [1]. Learning and innovation skills is about critical thinking skill, problem solving, thingking creatively and innovatively. Information, media and technology skills as part of digital literacy. One effort in preapring students to face these challenges is through the provision of education, icluding learning activities.

In learning activities, of course the role of the teacher is needed. Where the teacher is the spearhead of learning. As easy as any material must be learned, if the teacher or eduactor cannot convey it well then the material will be very difficult. Therefore we need the proficiency of teacher in teaching in the classroom. Improving teacher skills in teaching can be done trough training. Teachers who have been trained will feel themselves more capable of deliver the material and also believe that students will get good grades well. This feeling of confidence in his abilities is what is commonly known as teacher confidence of teachers’ belief.

Belief is a translation of the world which comes from English. Lexically, in the Oxford dictionary, belief is defined as a feeling strong about the turth of existence of something of believe that something good or right. Gramatically, in everyday language belief is synonymous with the terms attitude, disposition, opinion, perception, philosophy, establishment, and valid [2]. From this description, it is explained that lexically belief is a feeling strong about truth of something, therefore teachers’ beliefs are not only related the way the teaches but also with the subject matter taught. In this article it will be discussed about teachers’ belief in mathematic education. So focus on this article is the belief of the math teacher. As many people have said that mathematics is a difficult science to learn, even when tecaher explains it on in front of the class many students have difficulty understanding the material. This is of course will be a separate obstacle for math teachers to change the mindset. What a math teacher can do is how he or she views mathematics alone. Of course the teacher’s view of mathematics will be the basis of how a the question will be solved. In this case the teacher will view mathematics as scientific or as nature mathematic.

In addition, there are several categories of belief that also influence teacher belief. In its development, the strengthening of teacher belief has had a positive effect against students’ abilities. The existence of this positive influence needs to be studied further how teacher belief gives this influence. Through a learning model how and what kind of view is used by teachers in mathematics so that can have this positive influence. Then what aspects show an impact the plus is for example cognitive abilities. Therefore, this study was conducted for examines in more detail how the influence and application of teachers’ beliefs in the process learning mathematics in class.

Method

This article is the result of a literature review that aims to investigate the effect of teacher’s belief in mathematic learning. To get the result of this study by followig the steps like : selecting or reviewing topics, searching literature, analyze and synthesize literature, and write reviews [3]. Literature reviewed for achieve this goal obtained from several database namely GoogleScholar, SpingerLink, ResearchGate, and ScienceDirect.

Result and Discussion

* 1. **The Components in Teachers’ Belief**

The first themes as a result of the analysis carried out on the existing literature is related to teacher belief and components that support teachers’ belief. Teachers’ belief are systems of integrated personal views about the nature of the teaching material, students, learning and studying [4]. Teacher belief is a teacher belief system which will affect the learning process and outcomes. Because of the teacher belief is a system, so teacher belief has different components building that system. This is an accordance with the oinion that belief itself is categorized into four things that will affect teachers’ belief [5]. The components affecting teachers’ belief show in the table 1.

|  |  |  |
| --- | --- | --- |
| **Table 1.** Components affecting teachers’ belief. | | |
| Belief Category | Definition |
| Belief about intelligence | Belief how someone believes about how intelligence comes |
| Belief about self | This belief will have an impact on student self-efficacy |
| Belief about mathematic | Belief in how mathematcs is viewed, there are two views about mathematics, namely belief about nature mathematic and belief about mathematic learning |
| Belief about matheamtic teaching | Belief in how the teacher will present math material in the classroom |

3.1.1 Belief about intelligence

There are two theory that discusses belief in intelligence [6],[7]. The first theory is incremental theory and entity theory. Incremental theory views that intelligence can be changed and increased gradually. It means someone’s intelligence is not derivative and it can be obtained through certain efforts. The second theory is entity theory. This theory believes that intelligence is a hereditary factor and cannot be changed. So when someone is born with less intelligence then he will not be able to change or increase that intelligence. Views will this intelligence will have an impact on a person’s minset. Someone who agrees with incremental theory it will have a growth mindset, where it will always be trying to be able to increase the intelligence it has. While those who are agree with entity theory, it will have a fixed mindset, where it will gave up when he faced difficulties in doing the problem because he thought that it was a problem it was beyond his means. From this description, it can be understood that belief about intelligence is someone’s understanding or belief about where intelligence comes from originated.

3.1.2 Belief about self

Learning is the result of the interaction of several variables in learning, one of the things they expressed was self-confidence. There are 3 basic components that are very influential significant to the learning process, namely self, behavior, and environment [8]. Belief about self its means when student has confidence in himself, it will increase self-efficacy and self-confidence in him, and will affect his performance in the learning process.

3.1.3 Belief about mathematic

Mathematics in the learning process itself can be believed through 2 beliefs namely mathematic as a dicipline and nature mathematic.mathematic as a dicipline means mathematics is only as knowledge taught is school. Meanwhile, mathematics as pure science (nature mathematic) is defined through several views, namely:

|  |  |  |
| --- | --- | --- |
| **Table 2.** Views in *nature mathematic*. | | |
| Belief Category | Implementation in learning |
| Instrumentalist | The view that mathematics is a collection of facts, rules, and skills |
| Platonist | The view that mathematics is static and composite of some knowledge and mathematics it is found, is not it created |
| Problem Solving | The view that mathematics is something dynamic |

3.1.4 Belief about mathematic teaching

In teaching mathematics the tecaher has his own way of conveying it mathematics. There are two basic views used by the theacher in conveying mathematics during the learning process, namely absolutis and falibilis. Tecaher who teach material mathematics with an absolutist view would be highly theoretical and would lead to lack of interaction with students, but with this absolutist view the teacher has can determine the turth of the material because in the absolutist view of the turt mathematics is absolute. Meanwhile, if the tecaher tecahes with a falibilis view which emphasizes that mathematical truth is obtained through empirical and is not absolute it will be very difficult to be able to determine the truth in material that is abstract.

However, in teaching mathematics the teacher must be able to develop both view, as he been done in several studies that the way teachers convey mathematics and its truth will have a profound effect on beliefs or beliefs of teacher and also beliefs of students so that it as an impact on the results student study in learning.

* 1. **Factors affecting teachers’ belief in mathematics learning**

From the results of the analysis carried out on the references used, also found the factors that can affect belief in a teacher. The variable used to count percentage of teacher confidence is the tecaher’s belief in the benefits of mathematics in daily life tecahers’ day and beliefs in teaching mathematics. Several factors were identified among other are [9]:

3.2.1 Education strata

The level of education of a teacher is also very influential the belief of the teacher, a teacher who has a lower level of education compared to their peers, they will feel inferior and less confident about knowledge and knowledge the ability it has. The teacher confidence in benefits mathematics in everyday life-day for D3 (2.24) S-1 (2.13) and S-2 (2.39). The teacher confidence in teaching mathematics D3 (2.74) S-1 (2.97) and S-2 (2.97. From this two teacher’s faith get the average for every education strata is D-3 (2.49) S-1 (2.55) and S-2 (2.68), it shows that the beliefs of high school tecahers are deep learning mathematics sequentially S-2 education is better tha S-1 and D-3.

3.2.2 Type of school

The school where the teacher teaches also has asignificants effect on self-confidence, based on the data of the [8] shows that the teachers’ beliefs are from school public was higher than those from private schools.

3.2.3 Length of teaching

The length of teaching is related to the teacher’s experience in delivering material or solving questions, the data of the [8] shows that the teacher’s belief is deep mathematics learning is increasing from 0 years to 20 years, but it happens decline at the time of more than 20 years.

3.2.4 Participation in training

The participation in training will increase the knowledge and skills of teachers in teaching, based on the data [8] shows that the belief of the mathematics teacher in mathematics learning based on participation in training is constant for 0 to 2 training, but increased for 3 trainings.

* 1. **Teachers’ belief can increase students’ self-efficacy**

The teacher's confidence in his ability to teach in the classroom is proportionalstraight with the trust of students in their teachers. Teachers who pick the teachers' belief thatheight will make students more eager to learn. This is because of the momentteachers have high teachers' belief , hence the way they teach in the classroomwill look so convincing and controlling. This will make sure his students thatthe teacher really mastered the material, so they will be more excitedto learn. When they are enthusiastic about learning, their inner abilities willincreased. Likewise, when the teacher applies several categories of beliefs that he believes into students, for example, that intelligence is not hereditary and can bemodified through certain efforts. Then students will be more excited to learn.This will have an impact on self-efficacy or self-efficacy. Self-efficacy refers to an individual’s belief in it ability to be succesful in doing something [10]. The self-efficacy of students will increase and have an impact on improving student learning outcomes.

Conclusion

The development in the 21st century and the era of the industrial revolution 4.0 demands to facilitate students develop abilities such as the ability to think critically, collaborate, and communicate. Answering these challenges, the need to improve the quality of learning Improving the quality of learning means improving the quality of facilities and education infrastructure, including the most important thing is to improve the quality of teachers or teacher. Improving the quality of teaching staff means increasing the belief of the educator or teacher in himself because when he believes in himself then he can convince others. In this case it persuades its students to study math. Because after being studied there are so many benefits from *teachers' belief* and there are also many components that build up this *teachers' belief.* But there are still many constraints in increasing *teachers 'beliefs* or *teachers' belief* , therefore Support from various parties to increase teacher confidence is very much needed for example, by holding teacher training.

References

[1] B. Trilling,& C. Fadel, 21st Century Skills: Learning for Life in Our Times. San Francisco, CA: Jossey-Bass, 2009.

[2]G. C. Leder, & H. J. Forgasz, “Measuring Mathematical Beliefs and Their Impact on the Learning of Mathematics. In G. C. Leder, E. Pehkonen, and G. Törner (Eds.), Beliefs: A Hidden Variable in Mathematics Education?” (pp. 95-114). *Dordrecht: Kluwer Academic*

*Publishers,* 2002.

[3] P. Cronin, F. Ryan, & M. Coughlan, “Undertakinga literature review: a step-by-step approach,” *British Journal of Nursing*, 17(1): 38-43, 2008.

[4] A.F. Artzt and E.A. Thomas, “A Cognitive Model for Examining Teachers’ Instructional Practice in Mathematics: A Guide for Facilitating Teacher Reflection”, *Spinger Link,* 1999.

[5] E. Pehkonen, “The State of Art in Mathematical Creativity,” *SpingerLink,* 1997.

[6] C.S. Dweck, *Self-theories: Their role in motivation, personality and development.* Taylor & Francis: Philadelphia, PA, 2000

[7] C. S Dweck, & E. L. Leggett, “A social-cognitive approach to motivation and personality,”

*Psychological Review*, *95, 256-273*,1988.

[8] A. Bandura, *Self Efficacy –The Exercise of Control(Fifth Printing, 2002).* New York: W.H. Freeman & Company, 1997.

[9] S. Sutiarso, “Teachers’ Belief Dalam Pembelajaran Matematika dan Faktor-Faktor yang Mempengaruhinya,” *JPPM,*2017.

[10] A Bandura, *Social foundations of thought and action: A social cognitive theory,* Prentice-Hall, Englewood Cliffs, NJ, 1986.