AKSIOMA: Jurnal Program Studi Pendidikan Matematika
Volume 11, No. 1, 2022, 538-549

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

WHY I AM CONFUSED TO APPLY MATHEMATICS CONCEPT: STUDENT PERSPECTIVE OF MATHEMATICS ROLE IN LIFE

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Received 04 December 2021; Received in revised form 07 March 2022; Accepted 17 March 2022

Abstrak

Matematika merupakan mata pelajaran yang memiliki banyak manfaat untuk memecahkan masalah dalam kehidupan sehari-hari, namun banyak siswa yang masih bingung menggunakan konsep matematika dalam kehidupan sehari-hari. Penelitian ini bertujuan untuk mengidentifikasi perspektif siswa tentang peran matematika dalam kehidupan sehari-hari, penyebab munculnya perspektif siswa, dan strategi untuk mengatasi perspektif tersebut. Penelitian ini merupakan penelitian fenomenologis. Pengumpulan data dilakukan dengan wawancara dan kuesioner. Analisis data dilakukan dengan pendekatan Bogdan & Biklen. Hasil penelitian menunjukkan bahwa siswa berpendapat hanya matematika dasar yang digunakan dalam kehidupan sehari-hari. Penyebab perspektif siswa tersebut adalah siswa tidak merasa konsep matematika yang dipelajari di sekolah dapat digunakan untuk memecahkan masalah dalam kehidupan sehari-hari dan siswa terlalu fokus untuk menyelesaikan masalah tanpa mengintegrasikan matematika dalam kehidupan sehari-hari. Strategi yang digunakan untuk memperluas perspektif siswa adalah memberikan siswa lebih banyak contoh penggunaan matematika dalam STEM, menggunakan model pembelajaran berbasis kontekstual, dan memberikan tugas proyek kepada siswa terkait dengan aplikasi matematika

Kata kunci: bingung, kehidupan sehari-hari, konsep matematika

Abstract

Mathematics is a subject that has many benefits to solve problems in daily life, but many students still confused using mathematical concepts in daily life. This study aims to identify student perspective of mathematics role in daily life, the cause of the student's perspective, and the strategy to overcome the perspective. The study is phenomenological research. The data were collected using interview and questionare The data analysis was done using Bogdan & Biklen approach. The results of the study show that students argue only basic mathematics is used in daily life. The cause of these students' perspective is that students do not feel the mathematical concepts learned at school can be used to solve the problems in daily life and the students are too focused to solve the problem without integrating mathematics in daily life. The strategy used to improve students' perspective are giving students more examples of the use of mathematics in STEM, using contextual based learning models, and providing projects assignment to students related to mathematical applications.

***Keywords**: confused, daily life, mathematical concept*

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

INTRODUCTION

Mathematics is a subject that has many benefits to solve problems in daily life. Learning that has a real life situation design will utilize their understanding of various concepts to interpret, reasoning, and conjecture about (Kemp & Vidakovic, 2021). The learning really happens if there is a relationship between students' cognition and the world context (Kim et al., 2014). Mathematics learning also basically has effective goals namely as real world meaning to learner (Szabo et al., 2020). The experience of using mathematics in the real world can develop knowledge, understanding, and skills, and reflect the characteristics of mathematics.

When students involve mathematics learned in schools with mathematics that is used outside of school, students tend to have positive curiosity and motivation to learn mathematics (Giardini, 2016). This is because students are faced with problems related to personal, social, work, and scientific issues in daily life related to the application of mathematics. If students master mathematics well, it can help in solving the problem.

Learning mathematics in schools is useful for translating mathematical knowledge, making students' behavior more positive, and involving students in learning. Mathematics learning curriculum in several schools aims to model real situations mathematically, solve problems, and interpret whether the solutions obtained are realistic that will be useful for connecting knowledge with the application of mathematics in the real world (Karakoç & Alacacı, 2015).

Actually, about real life problems, students have often found them since elementary school. but students have had difficulty solving story problems since elementary school. The reason is that students have difficulty understanding the words in story problems and convert them into mathematical sentences, students try to solve problems without a thought process, and students do not read the questions carefully and students do not like to read long problems (Phonapichat et al., 2014). Whereas the way students solve problems in elementary school will affect the way students solve problems at the next level (Yılmazer & Masal, 2014). For junior high school students prior knowledge in elementary school will affect learning in junior high school. (Rachmatullah et al., 2021). This is like a snowball, where previous math learning will have an effect on future math. (Haser et al., 2022).

Some of the mathematical characteristics in the learning process that take place in secondary schools are objects that are studied abstractly, the truth is based on logic, learning is multilevel and continuous, there is a link between the material, using symbolic language, and can be applied in other fields of science. During secondary school students still organize information by transforming schemas, tables, diagrams or pictures (Gasco et al., 2014). Secondary school students are expected to be able to make decisions, determine strategies, find their own concepts, associate between concepts, use symbols in thinking, and communicate the concepts they get when learning takes place.

In the world of Education for more than 50 years, there has been an increase in the use of everyday life in learning mathematics (Hoogland et al., 2016). Improving mathematics learning can be done by developing and

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

connecting experience to learning and illustrative learning (Wang & Hsieh, 2017) because mathematics in schools is influenced by formal practices while in the world it is influenced by culture (Gravemeijer et al., 2017).

The role of a mathematics teacher is as a connector between students and mathematics, building knowledge, learning experiences and understanding the diversity of students (Retnawati, 2017). Teachers must be able to organize all class discussions, ask deep questions, and pose tasks that help students to reflect and build their thinking at this time must prepare students to apply mathematics in all kinds of work situations and daily life in mathematics learning (Gravemeijer et al., 2017). Although mathematics is increasingly influencing everyday life, mathematics remains the most unpopular subject in school to make scientific topics easier to understand, interesting and relevant for students because there are still many mathematics displayed in abstract, deconstextual terms.

Students have difficulty answering National Examination questions because of lack of understanding of concepts, difficulty in calculating and choosing information, stuck with obstacles, and not accustomed to working on complex questions, contextual presented in numerical form or narrative text and inaccurate student calculations (Rajala, 2015).

In overcoming these problems there have been many learning models that enable students to solve problems in various situations and actual real-world contexts such as contextual learning, realistic mathematics education, and problem based learning. Learning that helps students in connecting learning material with the context of the lives of students so that they can find deep meaning in what is being learned. So that complex real-world situations can be simulated using digital tools that can support interactive and scaffolding (Hillmayr et al., 2020) but the use of technology often makes students lazy to think.

Failure to apply the methodology depends on immature planning, testing and implementation (Buentello-Montoya et al., 2021). This will be one of the reasons still many students who have difficulty in solving real life problems (Kusuma et al., 2021; Angateeah, 2017; and Siniguian, 2017). Based on the description of the problem that has been stated, the purpose of this study is to identify students' perspectives on the role of mathematics in everyday life, the causes for the emergence of student perspectives, and strategies to overcome these perspectives. This research will be the basis for methods, strategies, and approaches to learning mathematics so that teachers use more problems in real life. So the learning can be fun, creative, and can be motivated by scaffolding (Maksić & Jošić, 2021) and teachers can connect mathematical ideas and embed them in the larger world of mathematics (Mamolo, 2018).

METHOD

This study is qualitative research using phenomenological approach (Creswell, 2014). The research was conducted in August 2018. The data were obtained through an open questionnaire to 29 students of SMA N 1 Bantul, Yogyakarta in with high mathematical abilities. The data were collected through questionnaires and interview. The questionnaires consisted of the student's perspective on

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

mathematics at school, student's perspective of role mathematics in daily life, the mathematics material that relates to students' lives, the relationship of mathematics to technology, and activities that the teacher teaches mathematics. The interview was conducted in a semi structured manner to teacher. The materials for the interview include the teacher challenges in implementing the mathematics learning and efforts of students to feel the role of mathematics in everyday life. Data were analyzed using Bogdan & Biklen approach (Bogdan & Biklen, 1982), through reducting data, categorizing the data into themes and sub-themes, and then making conclusions as results.

RESULT AND DISCUSSION

The information about student perspectives on mathematics at school through questionnaires on student perspective on mathematics at school. The information about student perspectives on mathematics role in daily life was obtained by student on mathematics role in daily life perspectives, the mathematics material that relates to students' lives, mathematical relationships with technology. The information about teacher strategies about the challenge was obtained through the activities carried out by the teacher in teaching mathematics.

3.1. Student perspective of mathematics at school

According to the students, the prespective of mathematics at school would be presented in Table 1.

Table 1. The prespective student about mathematics

Result Data Rduction and Data Display	Theme	Inter-Theme Appropriateness
Mathematical lessons in schools is difficult Mathematics is confusing lessons Students are not interested in learning mathematics Mathematics is not related to the future	Students have not felt comfortable in learning mathematics	Students are confused in using mathematical concepts. This shows that students do not understand the concept of mathematics and do not know when to use the concept because students only memorize the formula.
Mathematics makes hard thinking Mathematics is to use formulas Mathematics is science with count as the basis Mathematics is only used in schools Mathematics is learning counting Mathematics is for university entrance tests	Students do not know the purpose of mathematics learning	

Based on the data presented in Table 1, students still consider mathematics as learning that uses formulas only and feels confused when

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

working on math problems. Asking more deeply the teachers who taught, it was found that students were still experiencing difficulties and confusion to use the concepts learned. The teacher chooses to use modules that contain material, examples of solutions and practice questions. Whereas for word problems it is very rarely found, especially the application and role of mathematical material in daily life. So it is not wrong if there are still many students who experience confusion to apply the mathematical concept to the application problem in the previous test. Students find it difficult when the questions given are different from those that have been done before (Lin et al., 2018).

Mathematics in secondary schools teaches knowledge more than understanding, different tasks between mathematics in school and the role of mathematics in real life. Though mathematics is not just a subject that applies formula, but for high school students can recognize and use connections to mathematical ideas, understand connectedness between various mathematical ideas, and applying mathematics to the outside context of mathematics if students can understand the relationship between mathematics and life and are more interested in learning mathematics.

3.2. Student perspective of mathematics role in daily life

The connection of a material learned in school to the real world context can increase students' motivation and interest in these subjects. Learning that prioritizes context can be an opportunity for students to learn mathematics, develop insight into the usefulness of mathematics, and strategies in problem solving (Wijaya et al., 2014).

Students will be able to develop reasoning skills, improve problem solving skills, and their analytical thinking skills when prioritizing the context in learning. This is because students will more easily develop mathematical concepts for problems, students conclude and interpret mathematical concepts and can relate to each other (Wijaya et al., 2014). When students know the role of mathematics in everyday life, it will make the material more meaningful and in accordance with the real objectives of mathematics learning. The results of the research in detail can be seen in table 2.

After reducing students' opinions on the role of mathematics in daily life, it is concluded that students think mathematics does not play a significant role in their lives. The results in table 2 show the answers given by students to find out how much students understand about the role of mathematics in everyday life, such as mathematical material that is often used in everyday life. The result is that students can only mention basic math materials such as profits, buying and selling, multiplication, addition, subtraction, division, discount, savings, statistics, guessing age and building area. These results are in accordance with the results of the study that three types of material used in life are related to time, finances and counting calculations (Karakoç & Alacacı, 2015). Whereas the participants of this study were high school level two who had known a lot of other complex mathematics materials while the material mentioned by them was elementary and junior high school material. Participants are also students

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

in schools that have high quality. This shows that students still have not found high school mathematics material that plays a direct role in their lives. So that it corresponds to the previous question which states students are still confused in using mathematical concepts in the role of mathematics in everyday life.

Furthermore, students argue that the word problem used by the teacher are unreasonable, unrealistic, absurd, impressed, and the numbers used are chosen so that they are easy to calculate. Students also put forward the opinion that technology has developed so that the basic mathematics taught in schools is no longer useful. Students also argue that mathematics material does not play a significant role in solving the problem but logic and other factors that are more instrumental in solving the problem.

Students' opinions illustrate that students have not felt the role of mathematics in everyday life, the reason for using logic as a solver of their life problems is not realized by students that this is part of the application of mathematical material, especially mathematical logic. Students have not been able to represent the mathematical concepts that have been learned to solve problems in everyday life. Even if students have been able to apply mathematical concepts in their daily lives the problems faced in real life tend to have many solutions and many influencing factors.

Table 2. Student prespective of mathematics role in daily life

Result Data Reduction and Data Display	Theme	Inter-Theme Appropriateness
Not all mathematical material is used in everyday life, for example trigonometry In life only need basic mathematics Learning in school is too difficult and not worth the application in life. Do not use mathematical formulas to solve everyday problems	Solving problems in daily life does not use complicated mathematics	Students think mathematics does not play a significant role in their lives.
Problems are not solved by mathematics but in their own way Mathematics is more for reasoning and logic while formulas are only in school Did not find life problems related to mathematics Technological progress makes math useless Learn mathematics to get good grades and not remedial	Students are not aware of the use of mathematics in daily life	

3.3. Teacher strategies about the challenge

The teacher has an important role in the learning process. According to the teacher the cause of students' confusion in using mathematical concepts is because teachers still have difficulty using learning models that can help students recognize the role of mathematics in daily life. Examples are Contextual learning, Problem Based Learning or Realistic Mathematics Education. This is because the teacher feels that the learning models waste a lot of time and in the end students will also ask the teacher to explain in front

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

of the class even though learning is oriented towards the student center.

In addition, teachers also have difficulty in finding examples of the application of mathematics in everyday life because the mathematics material in secondary schools is more abstract and not all materials in secondary schools are suitable for using real-world contexts such as the composition of functions and inverse, squared inequality, limits, integral, polynomial, etc.

Furthermore, the teacher agrees to the students' opinion that the story questions made by the teacher are actually absurd because the function used is not based on real context and prioritizes numbers that are used round so it is easy to calculate and work on. The teacher argues that the teacher still lacks understanding of other subjects, according to the teacher if he wants to associate with STEM then he should at least learn other subjects such as physics, biology, chemistry, engineering and other subjects which of course will take the teacher's time while the teacher has other duties besides teaching.

However, at the end of the interview the teacher gives advice so that students know more about the role of mathematics in their daily life and are able to apply the concepts that have been learned by giving projects at the end of the semester which is to make papers on the application of mathematics in daily life. According to the teacher, this assignment was quite effective because many students tried themselves to apply mathematics learning. For example, there are students who make the application of trigonometric material to measure tree height without having to measure using a meter but using elevation angles, trigonometric comparisons with clinometer media. The numbers used are also based on the results of observations so there is no procurement of numbers so that they are easy to calculate.

Based of confirming the students about the assignment, according to them the refinement of the application of mathematical material in daily life indeed made students able to apply the mathematics that was learned in school which would lead to the meaning of learning. However, because the task is devoted to the final semester assignments and students may choose one of the materials that has been studied for application so that not all material is known to play a role in daily life.

Learning mathematics will be abstract if learning continues to show the abstractness of mathematics and will affect the use of students' mathematical concepts. Teachers can connect mathematical ideas and embed them in the larger world of mathematics. (Mamolo, 2018) so that mathematics learned in school not only relies on algorithms and formulas but will cause students to realize that in this life they have used mathematics. So that learning needs to show the role of mathematics in the lives of students so that students have a sense of the mathematical concepts that have been learned. If students only rely on real life with mathematics from math books, this is not enough (Salout et al., 2013). This is because there are other relationships such as social and cultural between mathematics and real life that the solution is not only one. Learning can begin with the theme of the role of mathematics that is used is the use of mathematics related to the work to be taken by students. Besides that, contextual problems represent problems

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

in realistic contexts such as biology, physics, engineering (Gravemeijer et al., 2017). If this is done, there is a possibility that the learning time will be delayed because students will need time to remember other learning materials. This can be overcome by starting pre-learning prerequisite material contained in the module, allocating special time, assigning tasks, and integrating prerequisite material into the teaching and learning process

Mathematics is effective when students can transfer mathematical knowledge between fields of application so that students can solve problems in a variety of situations and contexts that are real-world real (Salout et al., 2013). The role of mathematics in real life will be more felt by students when they can apply mathematics by themselves. Integrating mathematics with other learning materials is very important for the future success of students in a global era that is increasingly high-tech and competitive (Lange, 1987). The way that is done is by connecting with other material between science and other disciplines every day. Learning that brings together mathematics and other subjects in school has also been a concern by the organizations of the School of Science and Mathematics Association (SSMA), the National Council of Teachers of Mathematics (NCTM), the American Association for the Advancement of Science (AAAS), and National Research Council (NRC). Teachers should teach application of mathematics that is learned for everyday life based on the topic, relevant, meaningful and authentic. The teacher can also use contexts that reflect real situations rather than artificial situations so that they are easy to calculate. The results of the research in detail can be seen in table 3.

Table 3. The Strategies so that students feel the role of mathematics in everyday life

Student Perspective	Teacher's Perspective	Strategies
Students do not understand the concept of mathematics and do not know when to use the concept because students only memorize the formula.	Teachers are not used to using learning that links real context. The teacher considers the use of context-based learning models to be a waste of time	Students are more often given assignments to apply material mathematics in daily life that has been learned. The teacher motivates students that in developing knowledge mathematics is needed as a basic.
Students think mathematics does not play a significant role in their lives.	Teachers rarely provide examples of the application of mathematics in everyday life	More students are given examples of the application of mathematics in life
The role of mathematics in life has been replaced by technology	The teacher has not linked mathematics to technology and other subjects	The teacher associates mathematics with other subjects especially in the form of STEM Students use technology / software to solve mathematical problems

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

DOI: https://doi.org/10.24127/ajpm.v11i1.4534

Technological progress will make it easier for humans to carry out activities, but that does not mean that they will forget the knowledge base that forms the technology. Students must remember that mathematics is not only able to solve problems using formulas that have been studied but mathematics can make students think critically in mathematical calculations so that there will be better technology development. The development of the role of mathematics with problems related to STEM and integrated science can be used as objectives in the education system (Northcote & Marshall, 2016). Moreover, mathematics used in everyday life does not always reflect the formal calculation process taught in schools (English, 2016). Mathematical education must prepare students to apply mathematics in all kinds of work situations and daily life. It does not make a gap in the thinking of society digitizing between schools and workplaces in the future. The role of mathematics in digital society which is taught in primary, secondary education may not be visible because almost all work can be done by computers but mathematics is still important to be studied as a change (Gravemeijer et al., 2017).

When working on math problems in real life students should involve steps to recognize mathematical positions, translate problems into mathematics, solve problems, and interpret and evaluate the results obtained (Northcote & Marshall, 2016) The majority of teachers think that teaching mathematics in a real-world context will require more time than teaching abstractly and making real-world relationships difficult to cover all the national curriculum topics that are determined. This can be overcome by using and linking the role of mathematics with the real world at the beginning or at the end of the math lesson and adjusted to the nature of (Karakoç & Alacacı, 2015). Change needs to be done if it will bring students better understanding of concepts. The development of learning by giving students a context to better feel the role of mathematics can motivate, improve the transfer of mathematical knowledge from context and real life. Students are able to generalize mathematics in the role of life from the results of discussions generated by the task, openness, negotiation and interpretation, and students are given a degree of autonomy (Fitzsimons, 2019).

CONCLUSION

Mathematics has a role in everyday life, but students feel that only basic mathematical material plays a role in everyday life, while more complex mathematical material does not play a role. Technological progress is also one of the reasons students perceive that the mathematics learned at school is no longer relevant. The cause of these students' perspective is that students do not feel the mathematical concepts learned at school can be used to solve problems in everyday life and the students are too focused to work on the problem without integrating mathematics in daily life. The strategy used to improve students' perspective shows that students are more examples of the use of mathematics in STEM, using contextual based learning models, and providing projects assignment to students related to mathematical applications.

ISSN 2089-8703 (Print)
ISSN 2442-5419 (Online)

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ISSN 2089-8703 (Print)
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