PERCEPTIONS OF PRIMARY SCHOOL TEACHERS ON FUN MATHEMATICS LEARNING

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Abstract

This research aims to provide an overview of practical approaches to teaching mathematics to children, often perceived as complicated. A significant challenge teachers face is the difficulty in presenting engaging mathematics material due to their adherence to traditional teaching patterns learned during their primary education. Using a descriptive quantitative method, this study employed a GF questionnaire administered to primary-level teachers—specifically, PAUD and MI teachers—in An Nuur, Sleman Regency, Yogyakarta. The collected data was then processed and analyzed in conjunction with relevant theories. The findings reveal that 55% of teachers associate mathematics with the ability to solve problems quickly and accurately. Additionally, 51% of teachers do not believe that the number of correct answers solely determines success in mathematics. Moreover, 72% of teachers disagree that children learning mathematics should strictly adhere to the sequence outlined in the curriculum. Furthermore, 52% of teachers do not support that mathematics must be evaluated solely through standardized tests, and 62% reject the idea that mathematics should rigidly adhere to prescribed curriculum guidelines. Overall, primary teachers in An Nuur exhibit a novel understanding that diverges from the previous curriculum, presenting a challenge in devising new, more engaging teaching strategies crucial for children's future endeavors.

Keywords: Math, learning, teacher perception, fun

1. Introduction

As a universal science, mathematics plays a role in various disciplines, develops human thinking, and underpins modern technology development. The urgent need for mathematics is to be given to all students from primary school to high school. It equips students with the ability to think logically, analytically, systematically, critically, and creatively and to solve problems they face in everyday life [1]. Mathematics is a fundamental subject that has a vital role in the formation of intellectual skills of the younger generation [2]. At the primary school level, the basics of mathematics are taught to form a strong foundation of understanding for students [3]. Therefore, understanding the teacher's perception of mathematics at this level is essential [4] to enhance mathematical teaching and learning.

Teaching mathematics at the primary school level often faces challenges such as low student motivation, a negative perception of math, and a lack of interest in these subjects [5], [6]. Understanding the teacher's views and perceptions of fun mathematics can help overcome this challenge. Various fears of learning subjects, and teachers perceive mathematical learning objects as a big challenge. Also, individual mathematics ability in Indonesia is still low for students and teachers [7], [8].

Mathematical learning can awaken an effective, pleasant condition and indicator in the learning material. Teachers can pay attention to learning principles with innovative learning methods and media. The awakening process involves three elements: the teacher as a designer, the student as an executor, and mathematics as an object to be studied [9]. The purpose of learning mathematics is five things: (1) students can think critically, logically, and systematically in generalized conclusion and isolation of a proof; (2) Teach students to perform calculation and measurement operations carefully, accurately, and thoroughly; (3) students can use concepts and procedures in solving mathematical problems effectively and efficiently; (4) Teach children to think communicatively by expressing their ideas and ideas through tables, diagrams, and other symbols; (5) Train children to have a high curiosity and ability to try to solve mathematical problems [9].

The main goal of creating an enjoyable mathematics learning experience in primary schools is the main basis for developing appropriate learning models and methods. By making math learning more exciting and entertaining, students are expected to be more engaged and motivated to understand mathematical concepts better [10]. Fun math is strongly influenced by teachers' perceptions in the classroom.

Teachers' perceptions are instrumental in influencing students [11]. Teachers' perceptions of mathematics can influence the way they teach and their interactions with students [12]. When teachers have a positive perception of mathematics as fun, they may be better able to inspire and guide students in understanding the subject better. Unfortunately, primary school teachers claim that math is a difficult subject because they are not math teachers (Sznitman et al., 2022). Previous research shows that a fun approach to teaching mathematics can have a positive impact on students' academic achievement and their interest in the subject [14]. Therefore, it is important to explore teachers' perceptions in this regard.

Understanding teaching approaches, strategies, and methods that can create a more enjoyable math experience for students is important. Teachers can play a key role in creating a positive and enjoyable learning environment (Nahdi et al., 2021). There are various challenges that teachers face in trying to integrate playful approaches into mathematics teaching. Understanding these barriers can help design strategies to overcome them. The main problem is that teachers have not been able to present mathematics materials in a fun way because they still remember the pattern of teaching mathematics that they used to learn in primary school. Teachers carry out three strategies in the *brain-based learning* model, namely (1) creating a classroom atmosphere that is able to stimulate children's thinking abilities; (2) bringing students into a pleasant environment; (3) creating an active and meaningful atmosphere for children [17], [18].

The position of this research is that there is a need to better understand how primary school teachers perceive the concept of mathematics fun, including the definitions, elements, and strategies that teachers consider fun. New research can help paint a clearer and more detailed picture of creating enjoyable mathematics learning in primary schools. This includes identifying the most effective strategies, methods, and approaches. There needs to be research on more creative and innovative math teaching methods that make math more interesting and fun for students at the primary school level. This includes exploring various techniques that have not been widely used. There is a lack of research on how a fun approach to teaching mathematics in primary schools can concretely affect students' academic achievement and interest in learning. It is necessary to understand the barriers teachers face in implementing more playful strategies and approaches in teaching mathematics or applications that can enhance playful approaches in teaching mathematics. Studies that compare teachers' perceptions of mathematics in primary schools across different countries, cultures, or educational contexts could provide additional insights and useful comparisons.

2. Method

The study involved primary-level teachers of PAID and MI in An Nur, Sleman, Yogyakarta. The sampling technique was purposive sampling based on the teacher's teaching level. A total of 29 respondents were selected as subjects for the study. The research method used is quantitative with data collection techniques using *Google Forms*, observation, and documentation. The instrument guidelines were adopted from a previous study, including two dimensions, namely instrumental and relational learning, along with teaching beliefs [19]. A specially designed questionnaire was used to collect data from primary school teachers. The questions focused on their perceptions of fun math, the strategies they use, the obstacles they face, and their expectations for the implementation of more fun methods in math teaching. Direct observation of teachers during math teaching sessions to understand their teaching practices, use of fun strategies, and interactions with students. This can provide insights into the implementation of fun practices in mathematics learning. Collecting and analyzing documents related to mathematics teaching in primary schools, such as curriculum, textbooks, and learning materials. This analysis can provide insights into the approaches and strategies used in mathematics teaching.

3. Results

This study provides an overview of the understanding of primary level teachers (PAUD and MI) in An-Nuur, Sleman, Yogyakarta, Indonesia on 5 things, namely:

Ability to Correctly and Quickly Solve Mathematical Problems

The questionnaire results in Figure 1 show that 56.2% of teachers have understood that math is needed to solve problems in everyday life, so math does not need to be avoided.

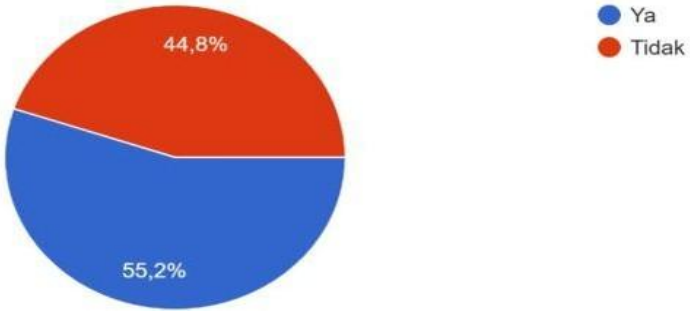

Figure 1. Teachers' understanding that children must be able to solve problems

An indicator that children can solve problems means that the child has mathematics well. The core of mathematics learning is problem-solving because mathematics does not only study concepts but emphasizes the development of thinking skills and methods.

Redefining Success in Math: Beyond a Tally of Right Answer

Figure 2 shows the disapproval of 51.7% of An Nuur teachers who stated that success in mathematics is not always shown in the correct answer. The process of reaching the answer is influenced by many factors. The process of children's thinking cannot continue to flow, so children understand must be appreciated for the efforts made. In general, teachers are result-oriented when it is not necessarily the correct answer, it could be the wrong process.

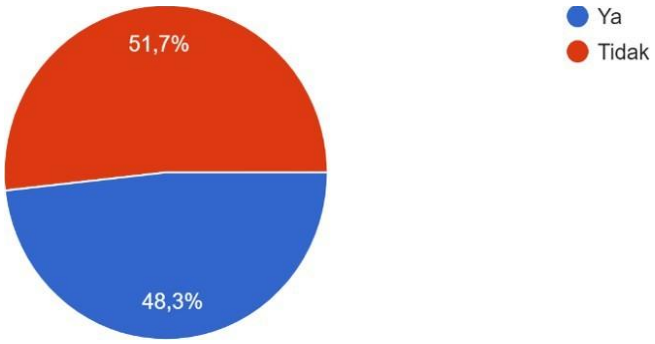

Figure 2. Teachers' understanding of success criteria based on correct answers

Unlocking Math's Potential: Breaking the Chains of Sequential Learning

The opinions of 72.4% of primary teachers at An Nuur regarding the mathematics curriculum are not necessarily in order. It shows in Fig.3. Teachers can modify the material according to the theme that is built, so that the order of the material contained in the curriculum can be flexible.

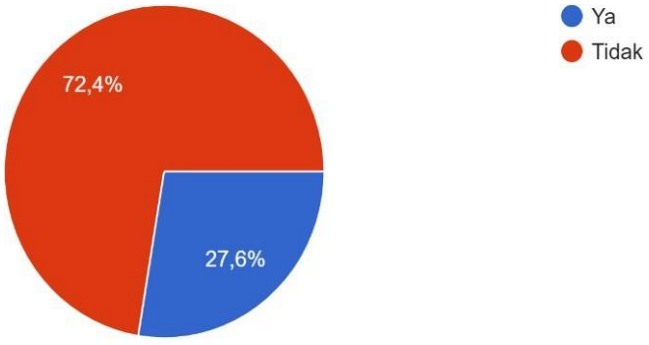

Figure 3. Teachers' understanding that children must follow the order of math materials

Breaking the Mold: Mathematics Beyond Standardized Testing

The figure in Fig. 4 shows that the teacher's perception of the math exam, does not become a graduation if the minimum standard. The percentage of teachers as much as 52.2% of teachers understand the exam is not everything, because those who learn math are important in understanding the process, not the exam results.

In the mathematics curriculum, teachers often find that they are trapped in the applicable curriculum outlines. Teachers understand that they must be implemented and must not get out of their guidelines.

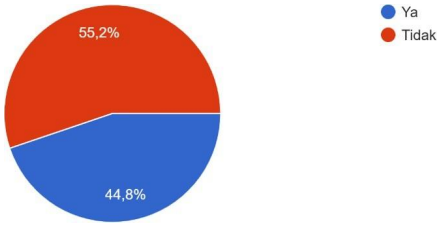

Figure 4. Teachers' understanding that children must take standardized tests in math

Mathematical Materials: Overcoming Curriculum Restraints

In this study, from Fig. 5 there are 62.1% of An Nuur teachers who thought that they understood that the mathematics material taught needed to be combined with conceptual realities in the surrounding environment so that the outlines of the curriculum were flexible and could be implemented.

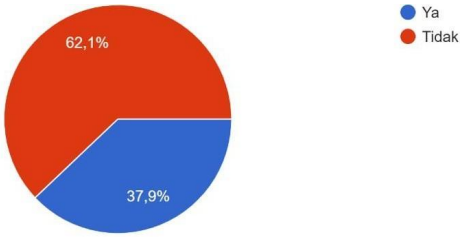

Figure 5. Teachers' understanding of the mathematics material taught should not be out of the curriculum

4. Discussion

Ability to Correctly and Quickly Solve Mathematical Problems

The core of mathematics learning is problem-solving because mathematics does not only study concepts but emphasizes the development of thinking skills and methods. Without realizing it, children have applied mathematics through knowledge and problem-solving skills to be useful in everyday life. Problem-solving contains four steps, namely understanding the problem, planning the solution, solving the problem according to the plan, and re-examining all the steps that have been done [20].

The findings on this indicator are that the ability to solve problems in mathematics quickly and correctly is an important aspect of developing a strong and effective understanding of mathematics. This ability includes an understanding of mathematical concepts, logical thinking skills, speed of thinking, and efficiency in applying appropriate strategies. A good understanding of basic mathematical concepts such as arithmetic operations (addition, subtraction, multiplication, and division), fractions, decimals, percentages, ratios, proportions, and exponents is a necessary foundation for solving mathematical problems quickly and correctly [21].

Every child in solving problems in everyday life is not the same. The speed in solving math will train children's ability to solve different problems so it is necessary to understand that children must be trained continuously. This can help children contextually in everyday life [22]. Mathematics lessons are an exact science lesson whose answers must be correct because if the answer is wrong just one number, then the answer is wrong. It shows the need for a high level of accuracy and accuracy. Children who are able to go through it are expected to have sharper cognitive abilities [23].

Knowing and understanding various problem-solving strategies, such as applying mathematical models, applying multilevel problem-solving, applying logical thinking strategies, and using visual representations, helps in identifying the best approach to solve problems quickly. Practicing intensively and repetitively helps to increase speed in solving math problems [24]. Through consistent practice, the brain becomes more familiar with certain types of problems, resulting in a faster problem-solving process. Improving logical thinking skills helps in identifying patterns and relationships between mathematical concepts. This makes it possible to formulate solutions more quickly and accurately.

Redefining Success in Math: Beyond a Tally of Right Answer

The process of reaching the answer is influenced by many factors. The process of children's thinking cannot continue to flow, so children understand must be appreciated for the efforts made. In general, teachers are result-oriented when it is not necessarily the correct answer, it could be the wrong process. Teachers' accuracy in seeing

children's difficulties can determine the right stimulation for each child because children are unique [25]. Teachers' understanding of success criteria in the context of correct answers to mathematics problems is very important in improving the effectiveness of mathematics teaching and learning. This includes recognizing and interpreting correct answers, analyzing types of errors, and providing meaningful feedback to students [26]. Teachers need to have a deep understanding of the criteria for success in the math problems they give to students. This includes clearly understanding what is expected in a correct answer. Teachers need to be able to correctly assess whether the answer students reflect a good understanding of the mathematical concepts being taught.

Every effort and educational process must be able to see and work on all human potential. This means that the potential of human abilities can be seen in the learning process [27]. The assessment that has been still seeing the success of children is only easiest from the results of the work/test. It turns out that the exam results are not always equivalent to the development of human potential. Indeed, there are those who succeed by being shown with grades, but achieving that value is a lost process. Teachers try to change the mindset that the right answer does not always make children successful, but how children get the answer (right and wrong) becomes the focus of the teacher in realizing the meaningfulness of learning.

Not only that, teachers must understand the mathematical concepts being taught and the logical steps needed to solve mathematical problems [3]. This allows teachers to recognize correct answers and be able to provide clear explanations to students regarding the correct solution process. Teachers should be able to identify the types of errors that students often make in answering math problems. By understanding these errors, teachers can provide appropriate feedback to guide students toward the correct answer. Teachers must have the ability to provide constructive and specific feedback to students on their answers. This includes providing information on mistakes made and providing guidance on how to improve their answers to match the success criteria.

Children must Follow the Sequence of Materials in the Math Curriculum

Teachers can modify the material according to the theme that is built, so that the order of the material contained in the curriculum can be flexible. This answers the challenge that misconceptions often occur, teachers are expected to avoid them and anticipate optimally so that the "real" learning objectives of mathematics are achieved [28]. This contradicts the opinion that it is very important to learn math material coherently. Teachers' understanding of the importance of children following the sequence of mathematics materials is essential in the teaching and learning process [14]. A good sequence of mathematics materials ensures that students build a solid foundation in understanding mathematical concepts, which provides a foundation for understanding more complex concepts at the next level. Teachers understand that mathematics materials should be organized in a progressive and structured manner, where basic concepts are introduced first, followed by more complex concepts. This helps students to build a gradual and logical understanding.

Learning mathematics requires a long process to complete, the initial stages must master basic mathematics to develop further knowledge. Children's cognitive levels in learning math are different at each age stage. Child development in its stages can change the way children view the importance of knowledge and how to learn. Factors that influence children's cognition are the use of models, methods, and variations of learning that are presented according to the child's level. Therefore, the role of cognitive approaches can be the basis for teachers to carry out teaching and learning activities so that the learning process becomes effective, efficient, and goals are achieved [29].

Teachers should realize that building a strong foundation in mathematics is essential. Understand the relationships and continuity between mathematical concepts. They ensure that students understand how previous concepts form the basis for more complex concepts, allowing students to see the connections that exist between the concepts. Following the sequence of mathematical materials helps students in developing abstract thinking abilities gradually [30]. They start with concrete concepts and slowly move to more abstract concepts, helping students to understand and apply mathematical concepts to more complex situations.

The role of teachers is to understand that ensuring students understand mathematical concepts deeply is more important than just surface understanding. Therefore, they ensure that students not only follow the sequence of materials but also understand and are able to apply the concepts well. Teachers understand that each student has a different learning style. Therefore, they try to teach using various methods and approaches that can facilitate the understanding of mathematics concepts for students with various learning styles.

Math Requires Passing a Standardized Test

Those who learn math are important in understanding the process, not the exam results. The community has increasingly realized that there is more to education than report card exams, the quality of education is not only seen from the exam numbers. Educational output is expected to have the ability to solve problems, adapt and master life skills [31].

It was found that some teachers have an understanding that children taking standardized tests in mathematics is important in an educational context. A mathematics standardized test refers to a formal test or evaluation that assesses students' understanding and mastery of mathematical concepts according to established standards [32]. Teachers understand that the mathematics standardized test is the main assessment tool to measure students' academic progress in understanding mathematical concepts. The results of these exams provide an overview of the extent to which students understand the material taught and how well they can apply those concepts.

Teachers are aware that mathematics standardized tests allow comparison of student achievement with national or international standards [33]. This helps assess the extent to which student achievement is at the expected level nationally or even internationally. Teachers use math standardized test results to identify students' weaknesses and strengths in mathematical understanding. These results help teachers plan more effective lessons that are focused on individual learning needs. Teachers' understanding of the mathematics standardized test helps in the development of a curriculum that meets the objectives of the evaluation. Teachers can adjust teaching methods and materials to ensure that students are well prepared for the mathematics standardized tests. Mathematics standardized tests help teachers to measure the achievement of established learning objectives. The results of these exams allow teachers to evaluate the effectiveness of their teaching and adjust teaching strategies when necessary.

Mathematical Materials: Overcoming Curriculum Restraints

Most of An Nuur teachers thought that they understood that the mathematics material taught needed to be combined with conceptual realities in the surrounding environment so that the outlines of the curriculum were flexible and could be implemented. Problems arise when teachers choose to buy lesson plans because compiling their own learning is a waste of time. Teachers tend to like to duplicate existing lesson plans, resulting in poor learning (Mayasari, 2020). Teachers are expected to pay attention to 3 things in teaching strategies, namely (1) learning stages; (2) use of teaching models/approaches; (3) use of teaching principles [34].

Teachers understand that the mathematics material taught must be aligned with the educational standards that have been set. Educational standards set the expected achievement goals at each level of education, including the mathematical concepts that students should understand. Although mathematics materials should be in line with the curriculum, teachers should also consider the needs and abilities of their students [35]. Teaching should be adaptable to meet individual students' learning needs, while still adhering to the existing curriculum structure.

There were findings about teachers' assumption to follow the curriculum outline. Mathematics curricula are usually organized systematically, with interrelated concepts from lower to higher levels. Teachers must ensure that the material taught follows the correct sequence according to the level of difficulty and complexity. Teachers understand that following the curriculum helps maximize student learning outcomes [36]. Curriculum-aligned materials help students to understand and master mathematical concepts that are important for their skill development.

Each school or educational institution may have a different curriculum, depending on the school's policies and the needs of the students in that environment [37]. Teachers understand the specific curriculum applicable in their school and teach the materials accordingly. Teachers understand that the curriculum includes methods of evaluating and measuring student progress. They need to ensure that the materials taught are in line with the evaluation requirements, and students are prepared to face exams or assessments that are in line with the curriculum.

5. Conclusion

The understanding of fun math learning among Annur teachers is approximately 58%, indicating that about half of them recognize the significance of incorporating enjoyment into mathematics education. Consequently, these educators are less rigidly bound by the confines of a fixed curriculum. However, the prevalent influence of undergraduate education, accounting for around 72% of Annur teachers, has hindered the implementation of more engaging math teaching methods. This limitation restricts the translation of mathematical symbols into contextual, real-world applications for children, potentially making math less daunting in everyday scenarios. It is challenging to foster creativity and research for optimal problem-solving approaches continually. Yet, teachers with a solid grasp of these concepts have significant potential to innovate and craft enjoyable, meaningful learning experiences. To enhance teaching strategies, educators must prioritize three aspects: (1) learning stages, (2) utilization of teaching models/approaches, and (3) adherence to teaching principles.

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