Teachers' Perceptions of Autistic Children's Maths Learning Difficulties at Talenta Kudus Inclusive School

Shofi Nuril Ulya*[1]; Saidatun Ni'mah[2]; Fina Tri Wahyuni[3]
[1,2,3]Departement of Mathematics Education, Faculty of Tarbiyah,
UIN Sunan Kudus, Indonesia
shofinurulya@gmail.com*[1], saidatunnikmah5@gmail.com[2],
finatriwahyuni@iainkudus.ac.id[3]

Abstract

Teachers have a central role in the success of inclusive education, especially in dealing with the learning difficulties of autistic students. This study aims to examine teachers' perceptions of difficulties in learning mathematics for autistic children at Talenta Kudus Inclusive School. The method used was descriptive qualitative with data collection techniques through interviews, classroom observations, and documentation. The research subjects consisted of class teachers, subject teachers, and special assistant teachers. The results showed that teachers perceived the main difficulties to be students' focus disorder, limited understanding of symbolic or abstract instructions, and obstacles in transferring mathematical concepts. Teachers expressed the need for concrete, visual approaches, as well as the use of repetition and direct assistance. Despite the limitations of training and teaching media, teachers showed high commitment by adjusting the curriculum based on children's abilities and applying the principle of learning "until you can". This study emphasises the importance of a collaborative role between teachers, parents and schools in supporting the mathematics learning process for children with autism in inclusive classrooms.

Keywords: *Teachers' Perceptions; Mathematics Learning; Autistic Children; Inclusive School.*

Abstrak

Guru memiliki peran sentral dalam keberhasilan pendidikan inklusi, khususnya dalam menghadapi kesulitan belajar siswa autis. Penelitian ini bertujuan untuk mengkaji persepsi guru terhadap kesulitan dalam pembelajaran matematika pada anak autis di Sekolah Inklusi Talenta Kudus. Metode yang digunakan adalah kualitatif deskriptif dengan teknik pengumpulan data melalui wawancara, observasi kelas, dan dokumentasi. Subjek penelitian terdiri dari guru kelas, guru mata pelajaran, dan guru pendamping khusus. Hasil penelitian menunjukkan bahwa guru memandang kesulitan utama terletak pada gangguan fokus siswa, keterbatasan memahami instruksi simbolik atau abstrak, serta kendala dalam mentransfer konsep matematika. Guru menyatakan perlunya pendekatan konkret, visual, serta penggunaan pengulangan dan pendampingan langsung. Meski menghadapi keterbatasan pelatihan dan media ajar, guru menunjukkan komitmen tinggi dengan menyesuaikan kurikulum berdasarkan kemampuan anak dan menerapkan prinsip belajar 'sampai bisa'. Penelitian ini menekankan pentingnya peran kolaboratif antara guru, orang tua, dan sekolah dalam mendukung proses belajar matematika bagi anak autis di kelas inklusi.

Kata Kunci: Persepsi Guru; Pembelajaran Matematika; Anak Autis; Sekolah Inklusi.

*Correspondence:
Email: shofinurulya@gmail.com

INTRODUCTION

Education is a basic right of every citizen regardless of physical, emotional or mental conditions. Law No. 20/2003 on the National Education System Article 5 paragraph (2) states that students with physical, emotional, mental, intellectual and/or social disabilities have the right to special education. One of the implementations of this regulation is the presence of inclusive schools, which are schools that accommodate the diversity of learners, including children with autism.

Inclusive education is a form of education service that accommodates all learners, including children with special needs, to learn together in the same educational environment. In this system, schools are required to provide equal access to education, without discrimination, by adjusting learning approaches, content and methods to suit the characteristics and needs of individual students (Kamid & Ramalisa, 2019). One of the biggest challenges in inclusive education is when teachers have to teach academic subjects, such as maths, to children with cognitive and social barriers, including students with autism spectrum disorder (autism).

Autistic children are one of the categories of children with special needs who have developmental challenges, especially in the aspects of social interaction, communication, and repetitive behaviour (Hidayah et al., 2021). In the context of learning mathematics, these challenges often appear in the form of difficulties in understanding abstract concepts, limited focus and difficulty following verbal instructions. Ramadhani & Supena (2021) explain that although autistic students show potential in mastering spatial abilities and the ability to sort objects, they still experience significant obstacles in understanding mathematical symbols in the abstract and often require concrete activity-based learning approaches such as arranging blocks or real objects. Maths, as a subject full of symbols and abstractions, requires a specific and adaptive way of delivery, especially for students with special needs such as autism.

The problem becomes more complex when regular teachers in inclusive schools have not all received specialised training in dealing with autistic students.

This creates a gap between the demands of the curriculum and the actual needs of students. Hidayah et al., (2021) pointed out that teachers often feel overwhelmed due to a lack of in-depth knowledge about the characteristics of autistic children, emphasising the importance of individualised learning and the role of *shadow teachers* in accompanying children intensively.

On the other hand, research by Mayda Yusnita et al., (2024) highlighted that teachers' understanding of the conditions of children with disabilities, including autistic children, must be accompanied by positive attitudes, flexibility and adaptability. Teachers who are able to show empathy, adapt learning approaches and build effective communication have the potential to create a more humanised and meaningful learning experience for autistic children.

Teachers as the main facilitators in the teaching and learning process have an important role in creating inclusive learning (Ndasi et al., 2023). However, the reality in the field shows that not all teachers have an adequate understanding or readiness to deal with the diverse characteristics of students, especially in teaching autistic students in regular classes. Many teachers still experience difficulties in designing appropriate learning strategies, managing student behaviour, and assessing the learning achievements of students with special needs. In such conditions, teachers' perceptions become an important aspect that needs to be researched to understand how they interpret the experience of teaching autistic children, especially in the context of learning mathematics.

The researcher felt the need to raise this topic as a focus of study in the study because research on teacher perceptions of learning mathematics for children with autism is still relatively limited, especially in the context of inclusive schools in Indonesia. Most studies focus on the effectiveness of learning methods or media, while the perceptions and personal experiences of teachers as the main actors of learning have not been explored (Shobirin et al., 2024). In fact, teachers' perceptions greatly influence their decisions in choosing strategies, addressing challenges and determining appropriate educational interventions.

Talenta Kudus Inclusive School is one of the primary schools that has implemented inclusive education, including accepting students with special needs

such as autism, down syndrome, and tunagrahita. Based on the results of observations and initial interviews conducted by researchers, it was found that in the process of learning mathematics, teachers face challenges in explaining concepts, maintaining students' attention, and in interacting effectively with autistic students. This shows the importance of research to explore teachers' perceptions of these difficulties, so that it can be the basis for designing training, developing teaching media, and educational policies that support inclusive mathematics education.

Thus, this study aims to further explore teachers' perceptions of the barriers that arise in learning mathematics for children with autism and to describe teachers' efforts in adjusting mathematics learning to suit the needs of students with autism. This research is expected to provide a real picture of the challenges faced by teachers and become a reference for the development of more inclusive and effective mathematics learning strategies.

RESEARCH METHODS

The type of research used in this study is descriptive qualitative method. This study aims to describe in depth the teacher's perception of difficulties in learning mathematics experienced by children with autism in an inclusive school environment. The sampling technique used was purposive sampling, which is the selection of subjects based on certain criteria set by the researcher. The subjects in this study consisted of class teachers as well as mathematics teachers who have experience teaching autistic students at Talenta Kudus Inclusive School.

Data were collected using three main techniques: interviews, observation and documentation. Interviews were conducted in-depth using a semi-structured guide that was prepared based on indicators of teachers' perceptions of mathematics learning difficulties. Observations were conducted *non-participatively* by observing the learning process in the classroom when autistic students attended mathematics lessons, while documentation was conducted to collect supporting data such as learning tools, teacher notes, and teaching media.

This research was conducted for one day, on 16 April 2025, at Talenta Kudus Inclusive School.

Data analysis in this study used the Miles and Huberman model, which includes the stages of data reduction, data presentation, and conclusion drawing. To maintain data validity, researchers used source triangulation techniques, reconfirmation to informants, and compiled detailed descriptions of the findings obtained in the field so that the data presented could be scientifically accounted for.

RESULTS AND DISCUSSION

This study aims to explore teachers' perceptions of difficulties in learning mathematics for autistic students at Talenta Kudus Inclusive School. Data were obtained through interviews with classroom teachers as well as mathematics teachers, as well as direct observation in the classroom. The findings were categorised into five major themes: curriculum adjustments and classroom patterns in learning mathematics, characteristics of autistic children, learning strategies and teacher adaptation techniques, learning evaluation and the role of parents, and obstacles in learning, especially mathematics.

1. Curriculum Adjustment and Individualisation of Learning

   The curriculum at Talenta Kudus Inclusive School consists of two approaches: Merdeka curriculum for regular students and inclusion curriculum for students with special needs, including autistic children. In the context of mathematics, the inclusive curriculum focuses on basic materials such as counting, number recognition, simple arithmetic operations, and the use of concrete media. These adjustments are not only in the content of the materials, but also the form of delivery, time of implementation, learning approaches and assessment methods. The inclusive curriculum allows teachers to adjust learning based on children's actual abilities, not based on grade level or chronological age (Irawan & Febriyanti, 2018).

   Teachers mentioned that in the regular curriculum, students are required to master abstract concepts such as fractions, power numbers and

complex geometric shapes. However, in the inclusive curriculum, teachers put more emphasis on basic and functional numeracy skills, such as naming numbers, recognising shapes, counting concrete objects, and understanding the concept of "bigger" or "smaller" through hands-on activities. This adjustment is made so that students remain actively involved in the learning process despite having cognitive or attentional limitations.

The class grouping system based on ability level rather than age allows teachers to develop more personalised and contextualised learning plans. For example, a 12-year-old with the same numeracy skills as a 6-year-old would be placed in the same class, with similar achievement targets. This model provides a more inclusive space, where children do not feel left behind or required to match other students who are not at the same level of ability.

Furthermore, teachers also said that maths learning is done flexibly, and one teacher can even teach with different methods in one session depending on the needs of each student. For example, one student is given the task of matching numbers and pictures of objects, while another student is trained to write number sequences. The teacher does not use one method for the whole class, but rather adapts to the uniqueness of each child. This reflects the real implementation of differentiated learning.

This adaptation is an important foundation in inclusive education, as emphasised by Okta Kisti & Dafit, (2023), that education services should be based on personal needs and abilities. An inclusive curriculum that is flexible, adaptive and responsive to the needs of children with autism is key to making mathematics learning meaningful and reaching the potential of each child.

This individualised learning model allows autistic children to receive interventions that are appropriate to their actual conditions. One of the teachers said that a 12-year-old student who could not count would be paired with a younger student as long as their abilities were similar. This is different from the classical approach in regular schools which is age-based. This strategy also provides a safe space for students to learn without feeling left

behind. Teachers recognise that this kind of adjustment requires great flexibility in lesson planning and assessment.

2. Cognitive Profile of Autistic Children in Maths

Autistic children have a variety of information processing characteristics that have a direct impact on how they understand mathematical concepts. From observations and interviews, it was found that some students showed exceptional numerical memorisation skills. They were able to name sequences of numbers up to hundreds of thousands, but when asked to write or read the numbers, they experienced significant barriers. The teacher said that this shows the difference between passive numerical intelligence (such as memorisation) and active academic ability (such as writing or understanding the context of the problem).

Some students were not even able to copy the numbers correctly, and could only bold the numbers provided by the teacher. There were also students who did not understand the meaning of mathematical symbols or commands such as “circle” or “tick” and had to be physically guided by the teacher to execute the commands. This indicates that the limited receptive and expressive language of autistic students greatly affects their ability to process symbolic and abstract mathematical instructions.

In addition, symptoms such as repetitive behaviour, sensory overload and a tendency not to focus on one activity for long periods of time, also hinder the learning process of mathematics. On the other hand, there are also students who show unique abilities, such as understanding more than two languages, while still showing difficulties in basic maths. This phenomenon reinforces the spectrum character of autism, which explains that each individual has a very different profile of strengths and weaknesses.

This explanation is in line with the views of Devy Wahyu Cindy Mulyani, (2021) who state that autistic children have a tendency to excel in pattern recognition and numerical memorisation, but lack in symbolic logic understanding and contextual problem solving. Therefore, learning

mathematics for children with autism requires in-depth mapping of cognitive profiles so that teaching approaches can be optimally adapted.

3. Teacher's Learning Strategies and Adaptation Techniques

Teachers at Talenta Kudus Inclusive School use strategies that are adapted to the characteristics of each autistic student. The main principle is learning from concrete to abstract. Teachers realise that autistic children will more easily understand mathematical concepts if they are delivered through real activities that can be felt and seen directly. Therefore, in the learning process, teachers utilise various concrete media such as fingers, real objects around the classroom, number cards, visual images, and simple counting aids.

For example, in teaching subtraction, the teacher does not directly introduce the "-" symbol, but rather asks children to count the number of fingers, then fold some fingers as a symbol of subtraction. The student is then asked to say the number of fingers remaining. In other cases, teachers provide pictures of apples that must be matched with numbers, or arrange coloured blocks according to the number of numbers mentioned. Teachers also often use counting songs and chants to help students who are more responsive to auditory stimuli.

The use of clear and operational instruction language is also key. Teachers prefer sentences such as "write down one number after two" rather than "write down the number three", as the former is more concrete and can be related to physical activities. The teacher also says that repetition (drill) is very important, as many students need to practice many times to understand one simple concept.

In addition to methods, teachers also adjust the rhythm and timing of learning. Autistic students generally have short attention spans, so teachers divide learning time into small, flexible sessions. If the student shows signs of stress or loss of focus, the teacher will pause and take an emotional approach. This reflects the application of the social-emotional approach to learning.

The teacher's adaptive learning strategy is in line with the view of (Mayda Yusnita et al., 2024) that multisensory methods and contextual

teaching can increase autistic children's engagement in learning mathematics. (Ramadhani & Supena, 2021) also emphasise the importance of teachers' creativity and flexibility in dealing with the dynamics of autistic students' behaviour and needs. Although not all teachers have formal training, they still try to adjust strategies through direct practice and daily observations in the classroom. (Subagyo et al., 2024) states that mathematics learning that is tailored to children's needs can improve their ability to understand basic mathematical concepts.

4. Ability Evaluation and Parent Collaboration

Evaluation of learning outcomes in mathematics for children with autism is done with a more flexible and humanistic approach. Instead of relying on written tests, teachers use formative assessment and direct observation in class. The aspects assessed include the ability to recognise numbers, count, perform basic addition and subtraction, understand symbolic instructions such as circle or sort, and accuracy in solving simple problems with the help of concrete tools.

Each student's progress is documented through daily notes or progress journals compiled by the teacher. This report becomes an evaluation material as well as a means of communication with parents. Teachers say that if parents have doubts about their children's achievements, they will show them the learning process in class. This transparency is part of the effort to build trust between teachers and parents.

In addition, teachers consider that the home environment also influences the success of autistic children's mathematics learning. Some students who have difficulty focusing have inappropriate food consumption patterns, such as excessive sweets that trigger hyperactivity. For this reason, the school implements a therapeutic diet that is expected to help stabilise students' emotions and concentration while learning. Parents are involved in this programme through regular socialisation and education.

Collaboration between teachers and parents is also established through regular parent-teacher meetings, monthly reports, and non-academic

development assessments. The active role of parents in accompanying children at home, attending additional therapy, and complying with recommendations from teachers greatly influences children's achievement in mathematics.

5. Constraints in Learning Maths for Autistic Children

Teachers face various obstacles in delivering mathematics materials to autistic students, as explained by (Ulva & Amalia, 2020). Impaired focus, short-term memory and repetitive behaviour are the main challenges. One teacher said that students can understand the material in one session but forget it the next day. This requires a learning strategy that is not only consistent, but also flexible and repetitive.

In addition, some teachers stated that the available mathematics teaching media are not friendly to children with autism. Teachers have to modify their own tools such as large number cards, counting blocks, or using real objects from the surrounding environment. Another obstacle is the lack of special training for teachers in teaching maths to children with autism. Most of the strategies implemented come from direct experience rather than formal training (Ramadhani & Supena, 2021).

Pressure from parents is also a barrier. Some parents demand that their children be able to multiply or divide immediately, without understanding that autistic children's abilities vary greatly and require a gradual approach. The teacher emphasised that in the inclusive class, the principle used is 'until they can', not 'equally'.

Overall, the results of this study show that teachers have realistic and reflective perceptions of the difficulties of learning mathematics with autistic children. They recognise the importance of individualised approaches, innovative methods, support for learning facilities and special training as keys to successful mathematics learning in the context of inclusive education.

CONCLUSION

This study shows that teachers at Talenta Kudus Inclusive Primary School have realistic and reflective perceptions of the difficulties of learning mathematics for children with autism. They perceive that the difficulties stem not only from students' cognitive limitations, but also from the challenges of delivering abstract material, managing children's behaviour, and the limitations of appropriate teaching media. Teachers realise that autistic children have a certain numerical potential, but require a concrete, visual, repetitive and patient approach to learning. In addition, teachers perceive that environmental factors, diet and interaction patterns greatly influence children's readiness to learn mathematics. Teachers' perception of these difficulties is also reflected in the way they adjust the curriculum, evaluate students' achievements individually and maintain active communication with parents. Despite these obstacles, teachers remain committed to assisting autistic children in understanding mathematics concepts with the principle of 'until they can'. Thus, teachers' perceptions not only illustrate the technical difficulties in teaching mathematics, but also demonstrate professional, empathic and solutive attitudes in the context of inclusive education. Based on teachers' perceptions of difficulties in learning mathematics for children with autism, it is recommended that teachers be given special training that focuses on adaptive, visual and multisensory mathematics learning strategies for students on the autism spectrum. This training is important so that teachers can be more confident and purposeful in facing challenges in the inclusive classroom. Schools are expected to provide mathematics teaching media that are suitable for the characteristics of children with autism, and build a flexible curriculum system that is based on ability, not age. Parents are also advised to be actively involved in supporting the learning process, both through dietary supervision, monitoring children's routines at home, as well as involvement in school communication and evaluation. Further research needs to be conducted to explore the perceptions of teachers from different levels of education and different regions to gain a broader and more in-depth picture of mathematics learning practices for children with autism in inclusive schools

REFERENCES

Devy Wahyu Cindy Mulyani, A. (2021). Strategi Pembelajaran Peserta Didik Anak Berkebutuhan Khusus (ABK) di SDN Antar Baru 1 Maraban. *Jurnal Pendidikan Hayati*, *7*(4), 197–216. https://mathdidactic.stkipbjm.ac.id/index.php/JPH/article/view/1597

Hidayah, R., Solichah, N., Yatun Solehah, H., Alfi Rozana, K., Psikologi, F., & Maulana Malik Ibrahim Malang, U. (2021). Persepsi dan Peran Guru Terhadap Pembelajaran Anak Berkebutuhan Khusus Teacher's Perception and Role of Learning for Children with Special Needs. *Psikoislamika: Jurnal Psikologi Dan Psikologi Islam*, *18*(2), 2655–5034. https://doi.org/10.18860/psikoislamika.v18i2..15702

Irawan, A., & Febriyanti, C. (2018). Pembelajaran Matematika pada Siswa Berkebutuhan Khusus di Sekolah Inklusi. *Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*, *2*(1), 99. https://doi.org/10.31331/medives.v2i1.509

Kamid, K., & Ramalisa, Y. (2019). Pengembangan Modul Pembelajaran Matematika SMP Berbasis Budaya Jambi Untuk Siswa Autis. *Edumatica : Jurnal Pendidikan Matematika*, *9*(1), 75–84. https://doi.org/10.22437/edumatica.v9i1.6515

Mayda Yusnita, Elsa Hijriati, Nadia Nur'izzati, & Opi Andriani. (2024). Kehidupan ABK di Sekolah: Guru Menghadapi dan Memahami ABK. *Dharma Acariya Nusantara: Jurnal Pendidikan, Bahasa Dan Budaya*, *2*(1), 50–55. https://doi.org/10.47861/jdan.v2i1.737

Ndasi, A. A. R., Iko, M., Meo, A. R., Bupu, M. Y., Dhiu, M. I., Inggo, M. S., Jaun, A. Y. R., & Wogo, R. (2023). Peran Guru Dalam Memberikan Layanan Pendidikan Bagi Anak Berkebutuhan Khusus Di Sekolah Dasar. *Jurnal Pendidikan Inklusi Citra Bakti*, *1*(2), 173–181. https://doi.org/10.38048/jpicb.v1i2.2106

Okta Kisti, M., & Dafit, F. (2023). Upaya Guru dalam Mengatasi Kesulitan Belajar Siswa Autis. *Murhum : Jurnal Pendidikan Anak Usia Dini*, *4*(2), 454–463. https://doi.org/10.37985/murhum.v4i2.344

Ramadhani, S. P., & Supena, A. (2021). Persepsi Guru Dan Orangtua Strategi Mengajar Anak Autism Saat Covid-19 Di Sekolah Dasar. *Jurnal Basicedu*, *5*(4), 2461–2471. https://doi.org/10.31004/basicedu.v5i4.990

Shobirin, M., Tarbiyah, F., & Kudus, I. (2024). *Peran Bimbingan Guru dengan Teknologi Asistif untuk Anak Autis*. *4*(4), 203–215.

Subagyo, R. A., Masruroh, U., Dewi, I. K., Minsih, M., & Ernawati, E. (2024). Optimalisasi Pembelajaran Matematika Untuk Siswa Autis Di Lingkungan Sekolah Dasar Negeri. *Jurnal Guru Sekolah Dasar*, *1*(2), 26–33. https://doi.org/10.70277/jgsd.v1i2.4

Ulva, M., & Amalia, R. (2020). Proses Pembelajaran Matematika Pada Anak Berkebutuhan Khusus (Autisme) Di Sekolah Inklusif. *Journal on Teacher Education*, *1*(2), 9–19. https://doi.org/10.31004/jote.v1i2.512