



Mathematics Learning Strategy for Dyscalculia Students in Elementary School

Winda Amelia^{1*}, Asep Supena²

^{1*}Elementary School Teacher Education Study Program, Universitas Trilogi

²Postgraduate Basic Education Program, Universitas Negeri Jakarta

*Corresponding Author. Email: winda.amelia@trilogi.ac.id

Abstract: This study aims to determine the implementation of mathematics learning for dyscalculia students, the role of teachers and parents in helping dyscalculia students in online learning, and the impact of learning strategies for dyscalculia students on mathematics learning. The research method used is descriptive qualitative method with data sources one teacher, three students, and 3 parents of students. Interactive model data analysis includes data collection, data reduction, data presentation, and drawing conclusions. Data collection techniques are observation and interviews. The results of this study indicate that teachers carry out mathematics learning by preparing Learning Implementation Plans (RPP), syllabus and special notes for students with dyscalculia. The teacher uses three learning approaches in helping dyscalculia students, namely the direct approach, group approach, and individual approach. Furthermore, the impact of the teacher's strategy in student learning with dyscalculia can be seen in the cognitive, affective, and psychomotor aspects, which have positive progress.

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Introduction

Basically, education is a right every citizen who his goal is humanize personal humans, including child in need special (Hermanto & Supena, 2020). Mathematical skills play an important role in increasing the education level of a country. Unfortunately, there are students in the school who are mentally normal functioning, but have varying degrees of math disabilities, which can ruin their entire lives. Digital blindness is called digital blindness (Abdoul, Hamouda, & Fawzy, 2020). Mathematics is part of education that can train students to think critically (Damayanti, 2020).

Learning disabilities arise from neurological differences in brain structure and function and affect a person's ability to receive, store, process, retrieve or communicate information (Cortiella, 2014). NJCLD (National Joint Committee of Learning Disabilities) states that learning difficulties are a general term for various types of difficulties in listening, speaking, reading, writing, and arithmetic. This condition is not due to physical or mental disability, nor is it due to the influence of environmental factors, but because of the difficulty factor from within the individual himself when perceiving and processing information on the objects he senses (Lam & McMaster, 2014). Not all children with learning difficulties have the same set of challenges. Most had difficulty. Learn to read, spell and write. Other children may also have problems with math or with receiving information and assignments. Some have difficulty with all academic areas (Kirk, Gallagher, Coleman, & Anastasiow, 2009). This figure represents 36.7% of all school-age children with disabilities and about 5% of the total school-age population. As a result of the different methods used by states to diagnose learning disabilities, the percentage of children served in this special education category



varies widely, from a low of 2.3% of the school-age population in Kentucky to a high of 8.5% in Iowa (US Department of Education, 2013).

Characteristics of students who have learning difficulties have the following characteristics: a) Shows low learning outcomes, in the sense that the average value obtained is below their academic potential. b) Learning outcomes are not balanced with the efforts they do. c) Slow in carrying out learning tasks, always lagging behind his friends in completing assignments. d) Expressing inappropriate behavior, such as indifference, opposition, pretending, lying and other negative attitudes. e) Showing inappropriate behavior such as truancy, arriving late, not doing homework (PR), often interrupting inside or outside the classroom, or isolating oneself) Showing symptoms of emotions that are not natural in dealing with certain situations, for example, do not feel sad or regret the value is low (Jamaris, 2015).

Problem in ability study on student very common at school. Issue in ability learn to be serious for the observers and practitioners throughout the world, including in Indonesia. Indonesian government commitment against disability study enough good, as evidenced by the existence of regulations and policies which seriously dealing with disability learning for students at school. However, government policy about student persons with disabilities at school not immediately running as it should. Of course, not all teacher school understand the problem of students with learning difficulties (Azhari, 2017). One of the problems that students often face is learning disabilities. This problem can occur at school or outside of school. Overall, 5% of 8% of students with learning disabilities, students with poor memory or cognitive impairments have problems learning math concepts.

Dyscalculia comes from the Greek language, the prefix dys means "bad". Calculia comes from the Latin word *calulare*; which means "to count" (Kirk, Gallagher, Coleman, & Anastasiow, 2009). More specifically, the term calculation refers to the ability to represent and manipulate numerical quantities nonverbally on an internal number line (Keong, 2016). Difficulty learning to count is also known as *dyskulia*. Difficulty learning to count is called *akalkulia* severe. According to Abdurrahman, *dyskulia* is a learning disorder that affects mathematical ability. A person with *dyskulia* often has difficulty solving mathematical problems as well as basic arithmetic concepts. Dyscalculia is also known as math difficulty. This is because this symptom involves a disturbance in the ability to calculate mathematically. This difficulty can be reviewed quantitatively which occurs in the form of difficulty in counting and calculating (Arisandi, 2014).

Dyscalculia is called number blindness (Abdoul, Hamouda, & Fawzy, 2020). Dyscalculia is the most common type of learning difficulty found in elementary school children in addition to reading skills, even though reading and numeracy skills are important tools for mastering other fields of study (Azhari, 2017). There are many ways to classify students with numeracy disorders, according to Zillmer, Spiers and Culbertson (2008), the classification of learning difficulties is learning disabilities related to the ability to read (*dyslexia*), arithmetic (*dyslexia*) and written expression (*dyslexia*). However, in this study, we will focus our discussion on learning difficulties in mathematics (*dysfunction*). Learning disabilities negatively affect a child's ability to communicate and cope with educational challenges. Children with learning disabilities represent 7% of 15% of students and constitute one of the largest groups of children referred to psychiatric services (Zillmer, Spiers, & Culbertson, 2008). Students with dyscalculia in their interactions with other students are often considered as "stupid" children, even though they are still able to count if they are taught well. The teacher's role in dealing with students with *dyslexia* is most important in shaping

the personality of different students. Special treatment of teachers is a matter of great concern because it greatly affects the future of students (Sinaga & Simarmata, 2020).

Learning mathematics is a very important lesson that must be mastered by children. According to Arisandi (2014) difficulty learning mathematics or what is called the term dyscalculia is a learning difficulty experienced by children in counting. Numerical reasoning and computation pose major problems for many students with learning difficulties; they performed lower than normal students performing on every type of math problem at every grade level, problems in picking up a number of facts and solving story problems were obvious. As with reading and writing, research shows that systematic and explicit instruction of carefully sequenced skills that incorporate guided practice, fluency training, and feedback can improve the math performance of students with learning disabilities (Misquitta, 2011).

The inability of children with dyscalculia is seen with the inability to calculate mathematical elements such as concepts, skills and problem solving (Sinaga & Simarmata, 2020). Things that cause dyscalculia in children can be influenced by a phobia of mathematics, weak eyesight, inability to sort numbers, inability to imagine, inability to integrate knowledge and experience and understand story problems. Many students have been labeled as children with learning difficulties because they are underachieving in school and there is no clear reason for their lack of success (Franklin, 2018, Good, Kaminski, & et al, 2011)Based on these problems, an analysis was carried out which aims to determine the mathematics learning strategies of dyscalculia students in elementary schools.

Research Method

This research is qualitative. This research uses descriptive qualitative research. Study descriptive Qualitative research is research that uses a study method or approach case. This research strong focus on subject certain that being studied as the case. Data for case studies can collected of all stake holders, namely in study these are collected from various sources. This research was carried out at the South Jakarta Administrative City State Elementary School with the subject study sample is teacher, students, and parents. A sample of 7 respondents consisting of 1 homeroom teacher for grade VI Elementary School, 3 students for grade VI Elementary School, and 3 parents of students.

Table 1. Teacher Research Subjects

Respondent	Gender	Class
Homeroom teacher	Woman	VI A

Table 2. Student Research Subjects

Respondent	Gender	Class
Student I	Woman	VI
Student 2	Woman	VI
Student 3	Man	VI

Table 3. Research Subjects Parents

Respondent	Gender	Profession
Parents of Students 1	Woman	Private sector employee
Parents of Students 2	Woman	Housewife
Parents of Students 3	Man	entrepreneur

Data collection techniques using observation and interviews. Observation activities were carried out online by joining the WhatsApp class and Google Classroom class VI Elementary School groups. When the teacher conducts learning using zoom media, the



researchers follow the learning process. Researchers also analyze documents such as lesson plans, syllabus, student textbooks to examine the material studied by teachers and students. Furthermore, in the process of collecting data through interviews by asking informants to explore and collect information about the required data. For interviews using interview guidelines, the researchers compiled research questions based on the desired information needs and equipped with documentation. Analysis data collection uses the Milles and Huberman (2013) model with 3 stages, namely data reduction, data presentation, and drawing conclusions.

Results and Discussion

Based on research results obtained of three main line research that can outlined in this study based on the results of interviews, observation, and literature review, and strengthened by studies the orifical from different survey references. Three track research will outlined in findings and discuss on study, that is; First, the process of implementing mathematics learning for students dyslexia, second, the role of teachers and parents in helping children dyslexia can learn by online, third, the impact of learning strategies for students with learning difficulties Mathematics.

Table. 4 Observation Results

Aspects Observed	Description of Observed Aspect	Conclusion
1. The process of implementing mathematics learning for dyscalculia students	<p><i>Monday, November 8, 2021</i> The teacher in the process of implementing mathematics learning in class prepares several aspects of learning mathematics for dyscalculia students, namely: lesson planning which includes preparation of Learning Implementation Plans (RPP), syllabus and special notes regarding the material taught to students with special needs or dyscalculia students so that learning implemented can be understood and meaningful to students.</p> <p><i>Tuesday, 09 November 2021</i> In the implementation of mathematics learning for dyscalculia students, the teacher contacts the students' parents to accompany their children in the ongoing learning process. Special learning for students with dyscalculia, the teacher separates the teaching time for students with special needs with non-disabled students in general, so</p>	The teacher in the process of implementing mathematics learning in the classroom prepares several aspects of learning mathematics for dyscalculia students, namely: lesson planning which includes preparation of Learning Implementation Plans (RPP), syllabus and special notes regarding the material taught to students with special needs or the dyscalculia students. By complying with the health protocol, the teacher also conducts direct and structured learning with dyscalculia students.



	<p>that the dyscalculia students really understand the material that will be delivered by the teacher. Furthermore, it is said that the teacher procedurally when teaching still contains special material that will be delivered to students. In the learning approach during the pandemic, occasionally teachers also conduct direct learning at students' homes and continue to adhere to health protocols and keep a distance. For example, in this learning, the teacher takes a thorough learning approach that emphasizes direct and structured mathematics teaching.</p>	
<p>2. The role of teachers and parents in helping dyscalculia students in learning mathematics online</p>	<p><i>Wednesday, November 10, 2021</i> In essence the role of teachers and parents in helping dyscalculia students in learning mathematics, first the teacher is not monotonous in explaining via online (WhatsApp) or other media used, but here teachers and parents still try to hold direct meetings at students' homes because it makes it easier for students to more understanding especially mathematics subjects which of course many formulas used, it requires the teacher to continue to have direct meetings with these students and coincidentally the number of dyscalculia students in class VI is 3 people. To make it easier to meet directly with these students, I did it on a rolling basis with the 3 students.</p> <p><i>Thursday, November 11, 2021</i> Furthermore, to find out the abilities and changes in the student's learning process, the teacher took a group approach, namely by carrying out</p>	<p>The role of teachers and parents in helping dyscalculia students with learning difficulties in mathematics takes three approaches, namely: a direct approach using online and offline, a group approach, and an individual approach. This method is done because it makes it easier for dyscalculia students to understand the material taught, especially mathematics, uses more formulas.</p>



	<p>mathematics learning with 3 students who experienced the dyscalculia. This approach is done so that students have the same learning motivation when they see the enthusiasm of the way they learn when they study together. Furthermore, the teacher stated that the three parents brought their children to the teacher's house when the schedule set by the three was carried out.</p> <p><i>Friday, 12 November 2021</i> Apart from the group learning approach and face-to-face meetings, the teacher also takes an individual approach, this allows the dyscalculia students to understand clearly and the teacher can find out where the strengths and weaknesses experienced by these students are. In this individual approach, sometimes teachers and parents assist in online meetings and sometimes facilitate in-person meetings.</p>	
<p>3. The impact of learning strategies for dyscalculia students in dealing with learning difficulties in mathematics</p>	<p><i>Monday, November 15, 2021</i> From the initial explanation by the teacher regarding the methods, approaches and processes of learning mathematics for dyscalculia students, the impact of the strategies used can be seen from the cognitive aspects of students, students' affective and psychomotor aspects. The teacher further stated that the three aspects, for example, that in the cognitive aspect, students have shown the ability to think, understand some of the material that has been delivered and can memorize and analyze the mathematics material that has been taught to students.</p>	<p>Based on the explanation by the teacher related to the method, approach and implementation of mathematics lessons for dyscalculia students, the consequences of the tactics used can be seen from the cognitive aspects of students, students' affective aspects and psychomotor aspects. Furthermore, the teacher revealed these three aspects, for example, that in the cognitive aspect, students have shown the ability to think, understand some of the material that has been presented and can</p>



	<p><i>Tuesday, November 16, 2021</i></p> <p>Apart from that, there are things that teachers really need to pay attention to when teaching students dyscalculia, namely: first, in general, students with special needs or students with dyscalculia must be accompanied or mobilized because apart from low thinking skills, these students' learning methods are unique and different. This allows a teacher to first pay attention to the needs of students in implementing their learning.</p>	<p>memorize and analyze the mathematics material that has been taught to students.</p>
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Table 5. Interview Results

Interview Aspect	Answer/Conclusion
<p>1. What is known about dyscalculia students or with students with learning difficulties in mathematics?</p>	<p>Dyscalculia (dyscalculia), also known as arithmetic development disorder or what we are familiar with students who have learning difficulties that involve difficulties in mathematical calculations. Therefore, these students in the learning process must be given special treatment.</p>
<p>2. How is the teacher's process in carrying out mathematics learning for dyscalculia students online, because this is a pandemic season?</p>	<p>According to the teacher, in the process of implementing mathematics learning in class for dyscalculia students, the teacher first prepares a Learning Implementation Plan (RPP), syllabus and special notes regarding the material being taught to students with special needs or dyscalculia students so that the learning carried out can be understood and meaningful to the students. student.</p>
<p>3. In the learning process, does the teacher combine dyscalculia students with other students in general?</p>	<p>According to the teacher, the teacher in the implementation of mathematics learning for dyscalculia students, the teacher contacted the parents of the students to accompany their children in the ongoing learning process. Then in the teaching and learning process the teacher sometimes combines the students with special needs or dyscalculia with students at school generally. In order to know the ability and understanding of students.</p>
<p>4. What is the learning approach for dyscalculia students during this pandemic?</p>	<p>The approach used by the teacher is that the teacher is not always monotonous in online learning practices but at a certain time</p>



	according to the agreement of the parents of the students, the teacher can approach students directly, considering that students are in difficult situations in learning mathematics.
5. Are there other learning approaches apart from the direct approach?	The approach used apart from a direct approach to students during this pandemic is the teacher taking a group approach and an individual approach. Group approach by combining the three dyscalculia students with students in general, then an individual approach is carried out so that students are known to their strengths and weaknesses in terms of how to learn, how to read, understand, and how students respond to what the teacher says.
6. Judging from what has been explained previously, the last question is what is the impact or effect? of the strategies that have been carried out?	From the initial explanation by the teacher regarding the methods, approaches and processes of learning mathematics for dyscalculia students, the impact of the strategies used can be seen from the cognitive aspects of students, students' affective and psychomotor aspects. The teacher further stated that the three aspects, for example, that in the cognitive aspect, students have shown the ability to think, understand some of the material that has been delivered and can memorize and analyze the mathematics material that has been taught to students.

The Process of Implementing Mathematics Learning for Dyscalculia Students

Teacher who implements mathematics in class preparing certain aspects of math for student with metabolic disorders, namely: so that students understand and understand learning. In the process of learning mathematics for students who have learning difficulties, teacher contacting student's parents to support their child so that can do well learning process At the moment. In special student learning dyslexia, teacher separates time educate students with special needs with non-disabled students at generally, so that student dyslexia really understand material that is being studied. Children are given training which is repeated in the learning meeting for it to happen changes in behavior intellectual (Arisandi, 2014).

Besides that, it is said that teachers, in the educational process, by systematically presenting special material to student. During the learning process in Century pandemic, teacher sometimes also do learning face to face from student home and permanent respect the rules of social distancing and health. For example, in the process learning, teacher apply deep learning methods, emphasize teaching mathematics in a direct and structured manner. Santrock stated that the in ability learning is a child's learning ability in the form of difficulty in understand and use language oral and write which appears in the form of difficulties and limitations in the ability to hear, think, an think. and spells. This difficulty too covers ability



study mathematics and by because of that must supported by the learning process (Arsana, 2017).

The Role of Teachers and Parents Helping Dyscalculia Students in Online Mathematics Learning

School-age children have some form of disturbing memory or cognitive deficit ability to learn the concept or process in one or more mathematics, so that hopefully the teacher can lead learning process by using method and strategies for help student in study. computing glitches at Can improve cognition mathematical with learning disabilities. While studying the role of teachers and parents in helping students learning dyslexia mathematics online, especially first of all, teacher doesn't provide an explanation that monotone Through the internet (Whatsapp) or other applied means, where teachers and parents always trying to meet with students face to face because this is possible students to better understand especially math, Of course, there are many formulas must applied so this requires teacher to keep in touch with students and coincidentally the number of students in grade 4who have dyslexia is 2.Forfacilitatemeetingface to face with students, teacher stake turns with two other students.

The role of teachers and parents in support child with computing difficulties who have difficulty learn math revolves around three approach, namely: direct approach using on line and offline, and approach group and individual approach. Method this used because it makes it easier for students the hard one understand the material taught, especially mathematics that uses more formulas. By because of that, by Patricia & Zamzam (2019), teacher need monitor process good study in class and regularly apply assessment and learning methods new to be able to immediately recognize students who have difficulty while studying, studying math and have practice which right for follow the material be delivered by the teacher. To face student dyslexia, better teachers and parents not only develop strategies learning, but also develop special learning models for student dyslexia so that students learn to understand and interpret the material presented (Akmal Rijal, 2019).

The Impact of Learning Strategies for Dyscalculia Students in Dealing with Difficulties in Learning Mathematics

Student with counting disorders face problem learn differently from student average on generally. Therefore, a teacher must choose, designing and implement ideal learning strategies for students with computational glitches. The right learning strategy will help student with computing glitches in solving learning problems to achieve goals learning (Arsana, 2017). Based on the teacher's explanation about method, approach and implementation learning math for students with counting disorders, the consequences can be seen from strategy used on aspect cognitive, emotional well-being and student psychology. Besides that, the teacher reveals the three aspects it, for example in students' cognitive aspects have been demonstrate the ability to think understand some of the material presented, as well as being able to remember and analyze Analyzing mathematical material presented has taught. student.

According to Kemp explained that learning strategies are learning activities that must be carried out by teachers and students in order to achieve learning objectives effectively and efficiently (Arsana, 2017). It is also stated that learning strategies are a set of learning materials and processes that are used together to produce learning outcomes for students. Learning strategies for students with dyslexia. The effect of mathematics learning strategies on students with numeracy disorders can be seen from the cognitive, affective, and psychological aspects. It is a cognitive field (creative field), such as the intellectual capacity



of students' low intelligence. Affective domain (feel), such as unstable emotions and attitudes. Psychomotor (intentional domain), such as disturbances in the senses of sight and hearing (eyes and ears) (Lou, 1985).

Conclusion

Based on the results and discussion in this study, it can be concluded that the teacher in the process of implementing mathematics learning in the classroom prepares several aspects of learning mathematics for dyscalculia students, namely: lesson planning which includes preparation of Learning Implementation Plans (RPP), syllabus and special notes regarding the material taught to students. students with special needs or students with dyscalculia.

By complying with the health protocol, the teacher also conducts direct and structured learning with dyscalculia students. The role of teachers and parents in helping dyscalculia children with learning difficulties in mathematics is by taking three approaches including a direct approach, a group approach, and an individual approach. The impact of learning strategies for dyscalculia students in dealing with learning difficulties in mathematics can be seen from the cognitive aspects of students, students' affective and psychomotor aspects. the three aspects, for example, that in the cognitive aspect, students have shown the ability to think, understand some of the material that has been presented, and can memorize and analyze mathematical material that has been taught to students. In the affective aspect, there are changes in students' feelings, interests, attitudes, emotions, and values which are shown in their preference for mathematics. The psychomotor aspect shows a change in students' abilities related to the ability to observe, imitate, get used to and adjust to an object.

Recommendation

Based on the results of this study, it is expected that teachers and schools can develop more learning strategies for students who have learning difficulties, especially students with dyscalculia. So that there is a positive impact and is able to follow the same learning as other normal students.

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