

Efforts to Overcome Mathematics Learning Difficulty for Dislexic Dyscalculic of Elementary School Students



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Abstract: For some people with dyslexia, success in the field of mathematics may be something that must be achieved with great struggle. There are various studies that report this problem that 10% of dyslexic children are geniuses in mathematics and show very good achievements in mathematics, but there are a majority of people with dyslexia experience dyscalculia or learning difficulties in mathematics. To overcome this requirement, an effort or strategy can make children absorb and understand learning mathematics well and can learn normally.

Keywords: Difficulty in Learning Mathematics, Dyslexia-dyscalculia

I. INTRODUCTION

Every child has a different character, as well as in terms of academic ability that is often called intellectual or intelligence. Some children have intelligence that is below average, even above average, and this affects children's performance in school. When a child is unable to perform well and satisfactorily based on his intelligence, the child is said to be a child with learning problems or learning difficulty. Learning difficulty can also be interpreted as the child's inability to complete the tasks given by the teacher. According to Masroza (2013).

This learning difficulty is a real disorder in children associated with general and special tasks, which are thought to be caused by neurological dysfunction, psychological processes and other causes so that children who have learning difficulties in a class show low learning achievement.

Children with learning disabilities have their own unique characteristics and different learning styles. Therefore, every child has the ability to succeed in their studies. Teachers are able to monitor their progress and implement various teaching strategies in the classroom. These students need special attention and are categorized as students with special needs¹

Students with special needs naturally experience learning difficulties. The learning process of children with learning difficulties requires several strategies or approaches that are adapted to the child's condition.

Difficulty in reading, writing expressions, and process of arithmetic is part of the learning difficulties in the academic achievement problems. Hallahan and Kaufman, as quoted by Mangunsong, stated that some characteristics that are generally possessed by students with learning difficulties, are grouped into six types of problems, namely the problem of academic achievement; perceptual, perceptual-motor, and general coordination issues; attention problems and hyperactivity; memory, cognitive, and metacognitive problems; social-emotional problems; and motivational problems. [Frieda Mangunsong, Psychology and Education of Children with Special Needs Volume One (Depok: LPSP3 UI, 2014), 201] From this classification of academic achievement problems are divided into terms of dyslexia, dyscalculia and dysgraphia. But in this study, it only explains the learning difficulties or dyslexia, dyscalculia

Specific learning difficulties include difficulty in reading, spelling and writing that are found in children with normal levels of intelligence or even in intelligent children. Dyslexia can also manifest as communication disorders or difficulties in mathematics. Difficulties in learning mathematics are referred to as persons with dislexion-dyscalculia.

There are various studies that report this problem. One researcher (Steeves, 1983) reported that many dyslexic children are geniuses in the field of mathematics. In contrast, Joffe (1990) reported that 10% of dyslexic children showed very good performance in mathematics, while the other 30% showed that there was no difficulty at all in the field of arithmetic counting. However, Miles and Miles (1992) report that most dyslexic people have dyscalculia.

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¹Sulaiman, dkk. 2008. *The Level of Cognitive Ability among Learning Disabilities Children in Malacca Malaysia*. Online: <http://www.ccsenet.org/journal/index.php/ijps/article/download/10747/7596>

Based on the explanation above, this paper will examine more about children who have difficulty in learning mathematics or dyscalculia and how the efforts or strategies to overcome them so that children can absorb and understand mathematics well.

II. DISCUSSION

1. Difficulty in Learning Math

a. Definition of Learning Difficulty

Learning difficulty is a multidisciplinary concept used in the fields of education, psychology, and medicine. In 1963, Samel A. Kirk for the first time suggested that the unification of names of child disorders such as minimal brain dysfunction, neurological disorders, dyslexia, and developmental aphasia into one name, learning difficulties (Takeshi in Abdurahman, 2003: 6). The definition of learning difficulty was first put forward by The United States Office of Education (USOE) in 1977 known as Public Law (PL) 94-142. The definition as quoted by Hallahan, Kauffman, and Lloyd is as follows:

"Specific learning difficulties are a disorder in one or more of the basic psychological processes that include understanding and using spoken or written language. The disorder may manifest itself in the form of difficulty listening, thinking, speaking, reading, writing, spelling or counting. These limits include conditions such as perceptual disorders, brain injury, dyslexia, and developmental aphasia. These limits do not cover children who have learning problems whose main cause comes from obstacles because of mental retardation, emotional disturbances, or because of environmental, cultural, or economic poverty". [Abdurrahman, Mulyono. 2009. Education for Children with Learning Difficulties. Jakarta: Rineka Copyright].²

While according to the Board of the Association for Children and Adulth with Learning Disabilities (ACALD),

"Specific learning difficulty is a chronic condition that is thought to have a neurological source that selectively interferes with the development, integration, and / or verbal and / or nonverbal abilities. Special learning difficulties appear as a condition of apparent disability in people who have average to superior intelligence, who have sufficient sensory systems, and opportunities for learning that are also sufficient. These conditions vary in their appearance and degree. These conditions can affect self-esteem, education, work, socialization, and / or activities of daily life throughout their life". (Lovitt in Abdurahman)³

Based on what has been stated above, it can be said that children who have learning difficulties can interfere with the development of intelligence and disrupt the emotional level to compete with friends in class or in the environment in knowledge in the daily life.

b. Difficulty in Learning Mathematics

Learning mathematics will train children to think logically and analytically. This is very useful for the process

of solving problems in their life journey. Therefore, learning difficulties (learning difficult-LD) mathematics in children must be quickly recognized and overcome. Learning difficulties and learning problems are terms that describe a child as having difficulty learning at school. In some countries it is also used as a synonym for learning disabilities. Everyone may experience mild and severe learning difficulties that are caused by internal or external factors. Children, who are equipped with educational programs under federal law, are in most countries distinguished from other children with learning difficulties for two reasons:

First, the basis of their scholastic problem is thought because of some neurological dysfunction. The LD category includes children who have learning difficulties as a result of visual, hearing or motor disability, mental retardation, emotional disturbances, or who are detrimental to the environment, culture or economy. This exception is one of the most debated issues in the LD field. Despite the fact that neurological dysfunction has not been proven, it is not possible to prove that the environment has a role in the creation of learning disabilities.

Second, to be diagnosed as a "learning disability," there must be a difference between the child's potential and achievement. Usually 50% of the difference is used as a criterion for identification. The 50% difference means that children only reach half of their expected potential.

2. Dyslexia-Dyscalculia

a. Definition of Dyslexia-Dyscalculia

Snowling defines dyslexia is a disorder of ability and difficulty that has an effect on the learning process, including disruption in the process of reading, pronouncing, writing and sometimes difficult to provide codes (coding) numbers or letters. In addition, it may be identified through the process of accuracy in the area of the brain that involves short-term memory, behavior, hearing, or visual perception, speech and motor skills. Dyslexia is a neurological learning disability that inhibits language processing and mastery.

For some people with dyslexia, success in the field of mathematics may be something that must be achieved with great struggle. There are various studies that report this problem. A researcher (Steeves, 1983) reported that many dyslexic children are geniuses in the field of mathematics. In contrast, Joffe (1990) reported that 10% of dyslexic children showed very good performance in mathematics, while the other 30% showed no difficulty at all in the field of arithmetic counting. However, Miles and Miles (1992) report that most dyslexic people experience dyscalculia. The mathematical difficulties often faced by people with dyslexia are quite varied, so that one dyslexic individual can show many difficulties, but another dyslexic individual may show mild dyscalculia only. Many people only know the term of dyslexia. This is because dyslexia in children is more easily recognized than dyscalculia. Dyslexia is a common problem that indicates a child that has difficulty in reading.

²Abdurrahman, Mulyono. 2009. *Pendidikan Bagi Anak Berkesulitan Belajar*. Jakarta: Rineka Cipta.

³ ibid

Dyslexia is easily recognized based on phonological skills in children when combining sounds and letters in forming words. This is different from children learning mathematics. According to *diagnostic and statistical manual of mental disorders*, Mathematical disorder is one of learning disorders. Mathematical disorder is grouped into four skills, namely: (a) linguistic skills (related to understanding mathematical terms and turning written problems into mathematical symbols), (b) perceptual skills (ability to recognize and understand symbols and sort groups of numbers), (c) mathematical skills (addition, subtraction, multiplication and division of basic and sequence of basic operations), (d) attentional skills (copy numbers correctly and observe symbols of operations) (Kaplan, 1997).

Research showed that elementary school children have two to six percent. The researchers found that children with dyscalculia often had neuropsychological and cognitive deficiencies, including poor performance in memory processing, visual perception and spatial visual abilities (Kaufmann, 2003; Shalev, 2004). A child may have reading and math difficulties, and there are cognitive deficits that are characteristic of these two types of difficulties, such as poor memory processing (Siegel, 2003).

A recent study found that dyscalculia is a learning problem that lasts long or continuously in many children; more than half of children still get poor grades in mathematics when they reach fifth grade (Shalev, Manor, & Gross-Tsur, 2005). Therefore, it is difficult to recognize that teachers in school need to build cooperation with children to help children minimize their dyscalculia. The dyscalculated child at school also feels depressed when he gets home. Parents do not understand the child's dyscalculia, children do not dare to report the results of learning mathematics in school. This is because children do not want to hear ridicule or even a punch just because they cannot solve math problems properly. Dyscalculia, children is usually more silent, withdraw from their friends because they feel themselves unable.

Children with dyscalculia are also rarely invited to play with their friends because their friends feel troubled. Even if they are invited to play, then the child usually only follows orders from friends who invite him to play. The lives of dyscalculous children show that there are children who need to be understood about their activities, but it is not uncommon for people to ignore this. Because children who are dyscalculia can be good, but they need the guidance in learning.

b. Aspects that are found in dyscalculia children

The following are various aspects of difficulties that may be found in children with dyscalculia:

- Read sentences in mathematics question
 - Dyslexic-dyscalculic children have difficulty in interpreting words / terms that often appear in mathematical problems. Children have difficulty in understanding the following meanings: 'more or less the same as', 'between them', 'parallel', 'other paths', 'as many as', 'on the edge', 'above from', 'below from', 'aside from', 'far from', 'balanced', 'equal to', 'greater than', 'higher than', 'in front of', 'in the corner of', 'estimate', 'less than', 'symmetrical lines', 'odd', 'even', 'symmetrical', 'average', 'to taste', etc.

- Read numbers, read numbers from the right, copy numbers
 - In accordance with the characteristics of the dislection, children often "see" the numbers, then copy them wrong. It is also often found that they cannot group numbers from the right to numbers with a large number of digits, for example: 752250, should be written as 752,250
- Understanding unit values, tens, hundreds make it difficult for writing, especially in other more complex calculation operations such as summing down operation, they arrange unit values in groups of tens, or values in hundreds of tens.
- Recognize the symbol of calculation operation
 - Dyslexic-dyscalculic children have difficulty understanding symbols (+), (-), (x), (:), and other more complicated symbols. Problems written with the symbol (-), may instead be done as the instructions (+). Even in some children with severe disorders, they feel unsure whether what is meant by "increase" or "decrease".
- Identify shape, even if the shape is inverted reverse (example : equilateral triangle, isoscale triangle)
- Know and understand the sign “,” as decimal sign
- Calculate forward and backward
- Calculate by rote
- Read, understand and remeber “time table”
- State days in a week, month and year
- State time and understand time concept
- Understangd money concept
- Use calculator well
- Use percentage
- Estimate
- Using formula
- Use formula for different question

Beside difficulty understanding the language of mathematics, dyslexic-dyscalculic children also have difficulty interpreting non-mathematical terms, this makes it more difficult for them to solve mathematical problems, especially those in the form of story problems.

Example :

- To learn making a robot, Father must pay one hundred thousand rupiah for four meetings where one meeting is 2 hours.
- Dyslexic children are confused about the terms "where", "duration"

3. Factors that cause dyscalculic dyslexia

Initially, researchers examined the main causes of dyslexia. Now many experts agree that there are many factors that might combine with each other because they have difficulty reading. The causes of dyslexia can be grouped into three main categories of factors, namely educational, psychological, and biological factors.

a. Education Factor

Teaching Method.

Many experts agree that dyslexia-dyscalculia is caused by the methods used in teaching reading and arithmetic. Especially, the "whole-word" method that teaches words as a whole rather than teaches that words are the sound form of writing. They think that the phonetic method, which rhymes children's letter names based on the sound, provides a good foundation for reading. They claim that children who learn to read with the phonetic method do not find it easier to learn new words. To recognize foreign words written as you spell the word writing after hearing the pronunciation. While other reading experts believe that combining the "whole word" approach and phonetic methods is the most effective way of teaching reading. By using both methods, in addition to recognize words as a unit, the child will learn how to apply phonetic rules to new words. However, whatever method is used, experts who believe that the practice of the use of that method basically causes reading difficulties. Therefore, strengthening the "beginning reading" program is an important effort to reduce the number and level of reading difficulties in children.

* English Characteristics

Many words in English do not follow the philosophy principle. So learning how to read and spell / pronounce this language becomes difficult, especially for dyslexic children. Words such as cough, was, were, and laugh are some examples of types of words that must be considered because the pronunciation is different from the writing. Meanwhile, each word contributes to reading problems. Such words are slight, so it is estimated that the words are not the main cause of dyslexia.

* Intelligence test

Commonly definition is that dyslexia-dyscalculia is difficulty reading and arithmetic in children whose intelligence is normal. This definition is based on the assumption that we can measure intelligence accurately. The results of intelligence tests that are usually in the form of IQ scores that must be interpreted with caution. IQ score can be influenced by many factors besides intelligence. IQ tests that must be done with the process of reading or writing will certainly cause problems for dyslexic children. The test score may reflect the child's weak language skills rather than his intelligence. Even tests that are deliberately designed for individual tests and require little reading and writing skills may not accurately measure intelligence. Dyslexic children often have a negative attitude towards all situations of the testing. In addition, test results are also influenced by many conditions, such as noise, fatigue, or certain things that might occur during the test. With so many possibilities that affect the IQ score, we must treat the IQ score like any other score. If the score is right it can reflect the scholastic skills of children, but if the score is not right then the score has no meaning. It even encourages us to give the wrong label to children.

b. Psychological Factor

Some researchers include dyslexia in psychological or emotional disorders as a result of lack of discipline, no parents, often change the schools, lack of cooperation with teachers, or other causes. Indeed, children who are less cheerful, are angry, or have a bad relationship with parents or

with other children may have learning problems. Stress might also cause dyslexia, but clearly stress can worsen learning problems. An effective treatment method can definitely reduce anxiety dyslexia-dyscalculia.

c. Biological Factor

A number of researchers believe that dyslexia-dyscalculia is a result of contact with the functioning of certain parts of the brain. It is believed that certain areas of the dyslexic child's brain are slower to develop than normal children. In addition, the maturity of the brain is slow. The theory used to be widely accepted, but recent evidence indicates that the theory has validity. Another theory states that dyslexia is caused by a disruption in brain structure. Some researchers accept that this theory is still believed to be held when a study of the dead dyslexic human brain. This brain study has revealed the characteristics of brain development. From there came the description that disruption of brain structure might result in a number of important cases of severe dyslexia. Genetic factors are also thought to play a role. Some studies show that 50 percent or more of dyslexic children have a history of dyslexic parents or other related disorders. Apparently, boys are more dyslexic than girls. This means that both genetic and environmental-social factors contribute to the learning problem.

4. Strategy for Handling Dyscalculia

To help children with special needs in learning mathematics or dyscalculia, it takes several strategies so that children can absorb mathematics well among others :

1. Provide concrete examples to ensure that children have a strong understanding before educators step into more abstract concepts. This will help children with dyscalculic disorders to visualize concepts. When giving story problems, it also gives children the opportunity to imagine situations in daily life or use tools that can help children visualize a concept, shape or pattern.
- 2 . Give the opportunity to children with dyscalculic disorders to use graphics, pictures, sentences or cards that can help children in understanding mathematical problems. Connect the problems in the problem with the love of everyday life.
- 3 . Develop a self-concept in children with special needs that "I can", as often as possible. Don't tell them that "Mom and Dad are not good at learning mathematics, don't be surprised if you do too". Remember that with a good atmosphere and a positive attitude everyone will be good at learning mathematics.
- 4 . Use a positive approach to children to introduce basic concepts of them. Choose a computer or card game media to master the initial concepts up to number 20 and using a multiplication table will also greatly help children with dyscalculic disorders in learning mathematics. Use 10 minutes a day, then rest assured that way will work.

5. Give assistance to children with special needs in the dialectic to learn symbols in mathematics and mathematical language. For example, think about the symbol (-) or minus, the meaning of going or missing, and for the symbol (+) which means to come or appear. The symbol (-) can also be interpreted by subtracting, fraction or negative integer.

6. Use remediation methods by demanding close collaboration between regular class teachers and those involved in supporting an improvement. Many children with special needs with mathematical achievements that meet the requirements so that they are legally mandated to get special education services in public schools.

III. EXPECTED GROWTH

Expected Growth in Mathematical Learning



IV. CONCLUSION

Dyscalculia is a difficulty in learning mathematics or in finishing calculation problems, most of which have difficulty in the visual process. In some cases, mathematics requires a set of procedures that must be followed in accordance with a sequential pattern. This is also closely related to the lack of memory. Many children who are diagnosed with learning difficulties in mathematics or dyscalculia eventually experience failure in learning mathematics and feel that they are not able to learn it. To deal with disorders in children with special needs of dyscalculia must be started early in children's education, although dyscalculic disorders that are usually not realized and difficult to detect early.

To overcome this, it requires learning strategies by a special approach so that it is expected to produce something good for students if the teacher or educator applies it consistently. So that learning difficulties in mathematics of dyscalculic disorders children can be overcome and they can learn normally.

If dyslexic-dyscalculic children get the right therapy, they are able to understand the concepts of calculation, and they will be able to do mathematical tasks correctly and finally show their genius in the field of arithmetic counting in accordance with the potential intelligence they have.

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