

The Effect of Dysgraphia on the Students' Mathematics Learning Results of Class IV at SD Negeri 173189 Sosorpahu Sub-district of Sipahutar North Tapanuli Regency in Academic Year 2018/2019

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Abstract—In learning, communication plays an important role. Therefore, communication indicates the level of a learning success of the children. By communication, a child is able to improve both the knowledge possessed and the knowledge learned. Without communication, the knowledge will never be obtained by children through learning. Writing, reading, listening and speaking are one component of communication that cannot be separated from one another. The research questions of this research are: (1) What factors are the cause of dysgraphia?; (2) Is there an effect of dysgraphia on students' learning outcomes? (The influence here is seen / analyzed based on the results of students' answers on the answer-paper and the results of the interview. Analysis is carried out by triangulation) The research objectives are: (1) To examine the factors that cause dysgraphia; (2) To assess the effect of dysgraphia on students' learning outcomes. The subjects of the research were grade IV students of SD Negeri No.173189 Sosorpahu sub-district of Sipahutar North Tapanuli Regency in the Academic Year 2018/2019, while the objects were dysgraphia and students' results. The method used in data processing is triangulation of the 24 students who took the test, there were 5 students who made the most mistakes (almost all the questions were answered incorrectly). From the overall results of the interviews with the five students, it can be grouped into two parts that cause mistakes made in working on the problem / question given, namely the first error due to lack of vision and poor memory, while the second is an error due to lack of clear hearing. Dysgraphia influences student's learning outcomes.

Keywords—Dysgraphia, Mathematics Learning, Tapanuli Regency.

I. INTRODUCTION

Learning for children is a very basic provision. By learning, a child is able to develop. By learning, a child is able to enrich himself/herself and be able to reach a higher standard of living. Learning can result in a child experiencing change. Changes due to expected learning are positive changes, namely changes that increasingly lead to the level of maturity and do not violate the norms that are applied in society. So that changes due to learning lead to maturity and do not violate the norms of society, then a child absolutely needs a companion in learning. The companion is expected to function as a tutor and educator of children's learning.

Teachers, parents and the community can also be called companions. In addition to being a companion, children's learning requires facilities and infrastructure. Facilities and infrastructure are needed to support learning, so that children's learning is expected to grow and develop according to the expected needs. A forum in the community that provides infrastructure, and a special companion for children's learning is school. The schools that are available, not only provide various facilities, infrastructure, and accompaniment, but are also intended specifically for various levels of child development and various physical conditions of children and various learning goals of

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children. In learning, communication plays an important role. Therefore, communication can indicate the level of learning success of children and be able to grow their knowledge, both the knowledge possessed and the knowledge learned. Without communication, knowledge will never be obtained by children through learning. Writing is one important component in communicating besides reading, listening and speaking. The ability to write a child shows the capacity of knowledge it has. A child is writing, it means that the child is conducting an exploration of knowledge and pouring it into written form. The complexity and perfection of children's writing reflects the complexity and perfection of the concepts of knowledge they possess. Children's high knowledge capacity can facilitate the emergence of children's ideas that can lead to the compilation of a copyrighted work, one of which is a written work of copyright.

The Research Problems

The research problems are: (1) What factors cause dysgraphia?; (2) Is there an effect of dysgraphia on students' learning outcomes? (The influence here is seen / analyzed based on the results of students' answers on the answer paper and the results of the interview. Analysis is carried out by triangulation)

II. LITERATURE REVIEW

The factors that cause dysgraphia in preschoolers do not originate from outside the children (external conditions),

but originate from within the child itself (internal conditions). During the assessment, the authors have not found any clues that external conditions cause dysgraphia in children, but internal conditions. Examples of internal conditions that cause dysgraphia are certain parts of the child concerned with writing activities, such as parts related to the sense of sight, parts related to memory, and so on. Internal conditions apparently affect the dysgraphia. Before discussing more about the internal conditions, the author will remind a little about the theory of information processing (information - processing Theories of Learning) expressed by Gagne, namely about the development of information process models that occur in a person. Based on information processing theory, the information processing model contains structural units. The structural units together form a whole, each of which plays a role as both a recipient and a conduit of information. The structural units in question are:

1. Sensory devices (receptors)
2. Center for collecting sensory impressions (sensory - register)
3. Short-term memory
4. Long-term memory
5. Reaction / answer planning center (response generator)
6. Center of implementation (affecter) (Winkel, 1991: 206)

or:

Structural unit	Sub-process
<i>Receptor</i>	Receive stimuli from the environment and turn them into neural stimuli.
<i>Sensory register</i>	Accommodate sensory impressions and selection, so that a perceptual roundness is formed.
<i>Short – term memory</i>	Accommodate the results of perceptual processing and storing it. Certain information is stored longer and processed to find its meaning
<i>Long – term memory</i>	Accommodate the results of information processing in short-term memory and save it as ready-to-use information, when needed. Information can be returned to the short - term memory or directly to the reaction / answer planning center.
<i>Response generator</i>	Hold information stored in long-term memory and convert it into a reaction / answer plan.
<i>Effector</i>	Accommodate the results of planning and implementing plans in the form of actions or deeds. Given the achievements that reveal learning outcomes. The subject gets feedback through observing the effects of his actions or through other people's comments.

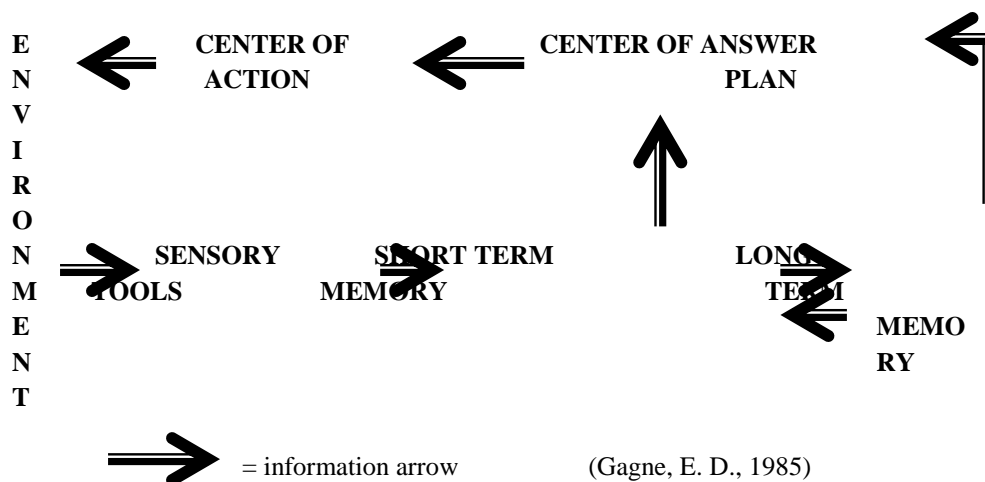
In this paper, the author does not write in detail about the task mechanism of each structural unit above. The reader is

welcome to review again in the information processing theory revealed by Gagne. But the processing model

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scheme below is useful to help to clarify a little about the direction of information travel in the structural units above.

Because, it is related to the causes of dysgraphia or writing activities.



Related to writing activities, the role of structural units can be explained as follows. When doing writing activities, children will try to explore all their knowledge based on needs, both existing knowledge and existing knowledge. New or existing knowledge is knowledge that is stored in short-term memory. Meanwhile, existing knowledge is old knowledge stored in long-term memory. For example, the child will do the writing activities number 2 and 4. In order for the writing activity to occur, the child will try to explore the knowledge of numbers 2 and 4. The process of extracting knowledge is carried out in two ways.

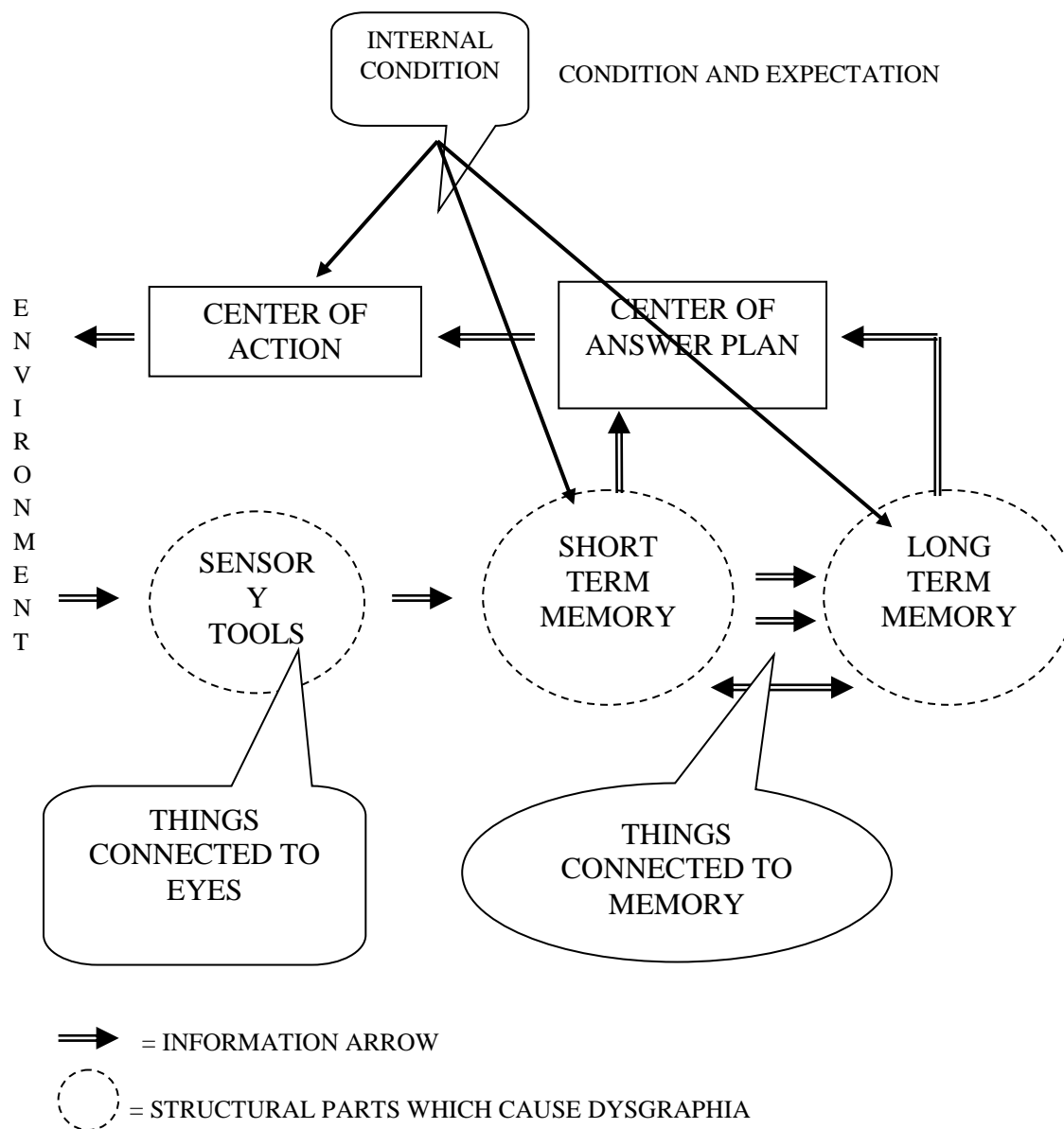
First; Exploration of knowledge that children do not have knowledge of numbers 2 and 4. There, children will try to get knowledge of numbers 4 and 2. That knowledge is obtained by the child through searching first (for example reading a book) and obtained by the child through direct observation of objects. The knowledge acquired will be stored in a short-term memory and saving it is not continued until the long-term memory. The acquired knowledge is then excavated by the child and transmitted through the nerves of the brain (short-term memory) to the motor hand. Only then, that knowledge is poured into written form.

Second; Exploring the knowledge of children who already have knowledge of numbers 2 and 4. In this case, the child simply explores the knowledge of numbers 2 and 4 without difficulty searching first as the child did in the first

statement. That knowledge has long been obtained and stored in long-term memory. Only then, the knowledge extracted is written. Of course, knowledge before reaching memory, both short-term memory and long-term memory in the information above, is first processed through the sensory unit as a direct recipient of the environment and the central structural unit for sensory impressions. Knowledge that has reached the structural unit of memory, both short-term memory and long-term memory, is continued to the central structural unit of answer planning. There will be determined form of motor movements that are given. The form of motor movements determined plays a role for the next structural unit, the center of implementation. After the form of motor movements is determined, knowledge is conveyed to the central structural unit of implementation to produce the type of action or action expected. Later, the actions produced are witnessed by those around him as evidence that learning outcomes have been achieved. Based on that, the child's writing ability is possessed. Thus, there are three requirements for writing activities to take place in children. The three conditions are: (1) There is information about the object of view; (2) There are information suppliers; (3) There is a device for receiving and distributing information. Furthermore, Carpenter (1991: 74) says that the structural units in the information processing model that cause dysgraphia are two. The two structural units are: (1) The part which is related to the sense of sight, namely the eye; (2) Parts relating to memory, both short term memory and

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long term memory. The dotted circle below shows the structural units that are causing dysgraphia.



Eyes

The eye is a sense of sight that plays an important role in the process of reading someone. When reading, children are observing reading objects. When reading too, the child's eye lens captures various information from the reading object. Furthermore, the acquisition of information from the object observed was captured by the eye, the retina. Information captured by the retina is in the form of object shadows. Under normal circumstances, the image of an object received by the retina is in accordance with information

received by the eye lens; that means if the information received by the eye lens is in the form of a vertical line, then the shadow of the object received in the retina is also in the form of a vertical line; or if the information received by the eye lens is a number "2", then the image of the object received on the retina is also a number "2". Once in the retina, the shadow of the object is continued to the part of the brain for processing. There is a case that under abnormal circumstances, the above conditions do not apply. The case explains that the image of the retina directed at the brain,

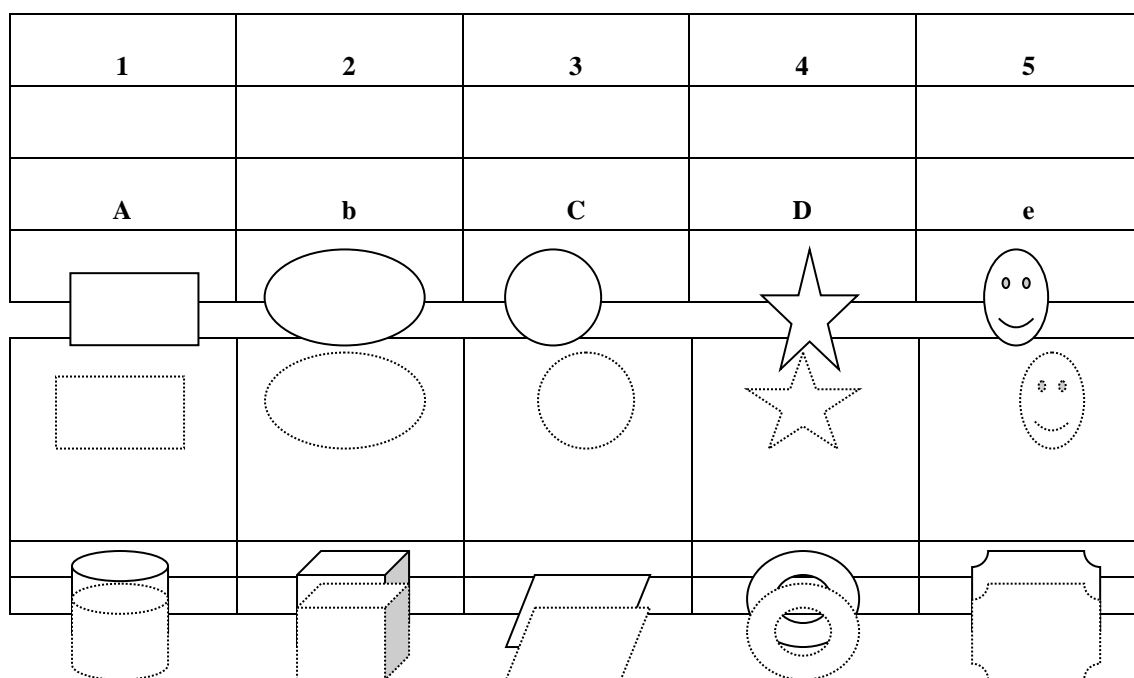
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specifically the back of the brain, is different from the image the lens of the eye receives. The hindbrain is called occipital. By the back of the brain, the image received is not very clear. For example "b" becomes "d", "was" becomes "saw", "m" becomes "w", "circle" becomes "oval", and does not know the location of left and right (Carpenter, 1991: 43). The causes are: (1) The shadow in the retina changes; (2) Disruption of function of the occipital part of the brain. Furthermore, Carpenter (1991: 74) says that cases like the one above also occur in children with astigmatism, namely sufferers of rejection of the right. The cause of astigmatism is minimal dysfunction of the brain or impaired concentration of attention (Intisari magazine, 1999.a: 48). From the overall explanation above, the information on objects received by the next structural units is different. Because it relates to writing activities, the children's writing results are also different from the actual object information.

The Efforts to Overcome Dysgraphia children

The main goal of trying to help overcome dysgraphia children is to overcome the inability of children to write well. There are two approaches that researchers propose for this purpose. The two approaches are as follows. (1) The

The example below is one of the suggested auxiliary media contents.



approach through treatment of medicine; (2) The approach through special therapy, that is the remedial teaching method.

Approach Through Special Therapy With Remedial Teaching Method

Remedial teaching methods in dealing with dysgraphia children are needed in the long term. Changes in children's writing outcomes that are expected through special therapy are changes that are permanent, not like changes in the results of children with dysgraphia expected through treatment. Permanent means changes in children's writing results that occur are not as changed as the original writing results. Even if training through this special therapy is stopped / stopped altogether the results did not return to normal. The implementation of the remedial teaching method is recommended in the form of a training assignment. The exercise is needed in the form of writing activities. The goal is to train the child's fine motor hands. The remedial teaching method is applied to children who are still having difficulty in writing, and arithmetic (Intisari Magazine, 1999.a. ; 91). Furthermore,

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How to use the media examples above is very simple. You do this by telling and guiding children to write along the dotted line under each object of view. The dotted line is useful to guide the child's hand movements.

III. RESEARCH METHODOLOGY

The Research Subjects and Objects

The subjects of the study were grade IV students of SD Negeri No.173189 Sosorpahahu -district of Sipahutar Utara Tapanuli North in academic year 2018/2019, while the object was dysgraphia and students' results.

The Types and Data Sources

The type of data in this study is qualitative data obtained through interviews with students based on mistakes made in solving questions / questions and test results data to obtain data about students' answers to errors in solving the questions / questions.

The Research Location

This research was conducted at SD Negeri No.173189 Sosorpahu sub-district of Sipahutar Utara Tapanuli North in academic year 2018/2019. The reason for selecting the location of this research is that in addition to similar research that has never been done, the author already knows a little more about the background / condition of students at the school.

IV. FINDING AND DISCUSSION

In relation to the research questions in chapter I, in order to answer the research questions, discussions were held in the form exposure and analysis of the location of each students' answer errors that are used as research subjects. In this chapter, it is stated about the results of student work in the form of answers while working on questions, interview excerpts and analysis. Based on the results of tests of the fourth grade students at SD Negeri No.173189 Sosorpahu sub-district of Sipahutar North Tapanuli in academic year 2018/2019. In solving questions, out of the 24 students who took the test, there were 5 students who made the most mistakes (almost all questions answered wrong). From the interviews it was found that the mistakes made by the first, second and third subjects in answering questions were caused by not seeing the questions clearly (their eyesight was interrupted). The first subject does not clearly see the numbers so it is difficult to distinguish the actual numbers in the problem, it is difficult to distinguish the sign "+" with

"X", the sign "_" with "+", the sign "<with>", it is difficult to distinguish the rank with multiplication, they can not distinguish the letters "C" with "G", "M" with "W", "R" with "K". From the subject's answers to questions during the interview, it was very encouraging, everything was answered smoothly and correctly, where when the researcher asked his willingness to be interviewed and answered the question, the first subject asked that the researcher mention the question in words. From these explanations it can be concluded that the first subject has visual impairment so that if learning that uses a lot of symbols, students have difficulty in learning. For this reason questions must be clearly expressed / recommended so that they always use verbal (words) with clear pronunciation, and lots of practice working on questions especially remembering symbols, letters, and number. From the interview results, it is known that the mistakes made by the fourth and fifth subjects, during the interview, each time researcher spoke, the fifth subject always paid attention to the researchers mouth, then saw what the researcher wrote. From the results of interviews and the mistakes in answering questions, it happened because they did not understand the teacher's explanation because the student couldn't listen to what was said by the teacher. From the overall results of interviews with the five subjects of the study, it can be grouped into two parts that caused the mistakes made by the subject in working on question given, namely the first error due to unclear vision and lack of memory, while the second is an error due to lack of clarity hearing. During the interview the subject paid attention to what was said and written by the teacher, and the subject finally gave a satisfying answer. This can be said, if the explanation is given slowly while writing down what is said, the subject can hear what is being said and see what the teacher is writing clearly, then the subject can solve the problem properly and correctly.

Conclusion

1. Dysgraphia is generally preceded and experienced in preschoolers. The main causes of dysgraphia are disruption of internal conditions in children, namely certain parts of the child concerned with writing activities caused by lack of vision due to disruption of the tissues and organs of the sensory organs of the eye and memory, lack of hearing due to disruption of the tissues and organs of the ear and memory.

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2. Dysgraphia influences children's learning outcomes. Children with dysgraphia have difficulty and weakness in solving problems / questions. The difficulty in counting is mainly due to distinguishing two symbols of certain number operations. For example, it cannot distinguish the "x" operation symbol from the "+" operation symbol, or the ">" operation symbol from the "<" operation symbol, or other symbols. Cannot distinguish numbers "1" with "7", numbers "9" with "6" and others if the numbers are written on the blackboard, so the answers written by students will be different from what is desired in the problem. Students also have difficulty with the letter M with W, O with Q. Children with dysgraphia is slower when compared to children without dysgraphia. In addition, dysgraphia children have difficulty in writing objects with one, two and three dimensions. For example, straight lines drawn curved, oval-drawn circles and so forth. Not only having difficulty in writing / drawing, but also having difficulty in distinguishing two objects in certain dimensions. For example, dysgraphia children cannot distinguish a circle from an ellipse, or cannot distinguish a square from a rectangle, or cannot distinguish a beam from a cube.

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