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MATHEMATICS LEARNING DIFFICULTIES OF MIDDLE SCHOOL STUDENTS IN CHENNAI

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Abstract

Learning Disabilities in Mathematics or dyscalculia are a frequent and disruptive problem within schools. Nevertheless, this problem has received little attention from researchers and practitioners, if compared with the number of studies published on disabilities in reading. Mathematics is not a collection of separate topics, but it is a thorough and interconnected science or connection. Therefore, teachers do not have enough guidance to help children overcome their difficulties. Consequently, educators, practitioners and teachers are in need of some guidelines which help them choose teaching methods that are adapted for children with LDM. This paper proposes an interventional framework for improving skills in children who show problems in learning basic mathematics. Concretely, it suggests some guidelines which are focused on number sense, it is one of the most important mathematical areas in learning.

Keywords:

Learning disabilities, Students, Middle school, Mathematics, Educational guidelines, Number senses.

1.Introduction

Mathematics is one of the basic instrumental tools of learning and, along with language, contributes to enhancing logical thinking as well as being a fundamental basis for which other fields of knowledge relies on. Therein lays the importance of teaching mathematics in Elementary Education, which should be regarded as an essential goal to be achieved at this schooling stage. While important to work on, such efforts should not deny a full mathematics education to otherwise capable students.

LDM are also called dyscalculia that is, difficulties in the production or understanding of quantities, numerical symbols or basic arithmetic operations. The prevalence is considered to be around 6% and its symptoms become evident in about the second grade of Elementary Education (Shalev, 2007). Current data indicate that this learning disability is a brain-based disorder with a familial-genetic predisposition (Shalev & Gross-Tsur, 2001). Here fore, the main goal of this paper is to present a brief review about some general strategies and guidelines research-based from Cognitive Psychology (e.g.: Artigas, 2011; Cohen, Dowker, Heine, Kaufmann, & Kucian, 2013; Defior, 1996; Ortiz, 2009; Sans, 2008) and the Neuroscience (see interesting review Radford & André, 2009). However, as Butterworth, Varma, & Laurillard (2011 p. 1051) pointed out: "Although the neuro science may suggest what should be taught, it does not specify how it should be taught". Similarly, Bruno, Noda, Aguilar, González, Moreno, & Muñoz (2006) highlighted there are not many papers that focus on explain specific strategies and materials for children with special needs. In this sense, the present review aims to contribute to cover the gap between research and practice and offer some methodological strategies to compensate the learning disabilities in mathematics.

Dyscalculia

Dyscalculia is a learning issue that impacts mathematics and the challenges show up everywhere-with homework, class work and tests and everyday tasks. Students with dyscalculia have weaknesses in skills related to mathematics. They may have trouble learning to count and recalling math facts. They may also have poor number sense and not understand math concepts like "greater than" and "less than." And they may struggle with remembering phone numbers or keeping track of scores when they're playing sports. Sometimes, these challenges can make students with dyscalculia feel anxious about having to do math-related tasks. But dyscalculia is not the same as math anxiety. Math anxiety can make students question their abilities in mathematics, even if they have strong skills and although it's not a learning issue, it can certainly get in the way of learning mathematics.

Dyscalculia Signs and Symptoms

Dyscalculia can cause different types of math difficulties. So symptoms may vary from students to students. Observing student and taking notes to share with teachers and doctors is a good way to find the best strategies and supports for our school students. Dyscalculia often looks different at different ages. It tends to become more apparent as students get older. But symptoms can appear as early as preschool to high school.

Preschool

- Student's trouble learning to count and skip over numbers long after students the same age can remember numbers in the right order.
- Struggles to recognize patterns, such as smallest to largest or tallest to shortest.
- Has trouble recognizing number symbols.

- Doesn't seem to understand the meaning of counting. For example, when asked for five blocks, she just hands you an armful, rather than counting them out.

Middle School

- Struggles with math concepts like commutativity ($3 + 6$ is the same as $6 + 3$) and inversion (being able to solve $3 + 27 - 27$ without calculating)
- Has difficulty understanding place value.
- Has trouble writing numerals clearly or putting them in the correct column.
- Has trouble with fractions and with measuring things, like ingredients in a simple recipe.
- Struggles to keep score in sports games.

Mathematics Anxiety

Mathematical anxiety, also known as math phobia, is a feeling of tension and anxiety that interferes with the manipulation of numbers and the solving of mathematical problems in daily life and academic situations. School students with math anxiety are so worried about the prospect of doing mathematics that their fear and nervousness can lead to poor performance on math tests. Some students may have both math anxiety and dyscalculia.

- Both dyscalculia and math anxiety can impact students' performance in mathematics.
- They can show up in similar ways, and a child can struggle with both.
- Understanding the difference can help you respond best to your child's challenges.

Math Learning Disabilities

While student with disorders in mathematics are specifically included under the definition of Learning Disabilities, seldom do math learning difficulties cause student to be referred for evaluation. In many school systems, special education services are provided almost exclusively on the basis of students' reading disabilities. Even after being identified as learning disabled (LD), few students are provided substantive assessment and remediation of their arithmetic difficulties.

General Strategies of Intervention

As in the case of other learning disabilities, the first step is to plan a specific educational intervention to identify the child's particular deficits and abilities. This identification is comprised from both the assessment results and the error analysis. Once the attainment of the student has been defined, the teacher will be able to work with some clear and quantifiable objectives. As noted Alsina i Pastells (2007), the traditional methodology based on the repetition of mathematical activities makes no sense. Sometimes even the repetition of activities is applied as a punishment for their poor performance, which has emotional consequences beyond academic scope. In this respect, the solution lies on activating mental processes

involved in the different math activities, specifically, the general strategies of intervention (Kaufmann, 2008; Martínez, 2010; Sans, 2008) should be based on:

The usual use of contexts that simulate problems and arithmetic operations relevant to their daily life.

- Procedures that include guidance by direct demonstration along with verbal instructions and/or consecutive attempts by the child with feedback (e.g. making rules explicit in order for the child to achieve autonomy).
- The assurance that all necessary previous knowledge is well developed before starting to learn new content
- Include scaffolding teaching practices of the content, using a multi-sensorial approach.
- A learning process built on sequences which go from abstract to concrete things.
- Include, from time to time, review exercises which represent varied topics and different situations so that the child can fully master the ability
- The suggestion of individual assignments to support specific difficulties.
- Give extra time to solve mathematical tasks at home and at the school, since children with LDM have not yet automated the basic processes.
- Treatment of possible associated disorders such as dyslexia (Gross-Tsur, Manor & Shalev, 1996) and/or attention deficit hyper activity disorder (Monuteaux, Faraone, Herzig, Navsaria & Biederman, 2005).

Number Sense

Number sense is the ability to think flexibly and critically about numbers and their operations. Prior research has shown that the core of the deficit presented by children with dyscalculia is an inappropriate development of the concept of number or number sense (e.g. Butterworth, Varma and Laurillard, 2011; Dehaene, 1997; Otálora Sevilla & Orozco Hormaza, 2006). The first step to reinforcing the concept of number sense is to strengthen basic concepts which were taught in previous stages of education (e.g. in kindergarten).

Mark the biggest number

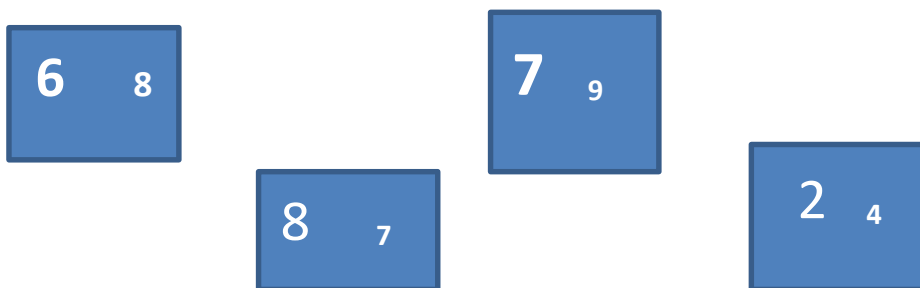


Figure 1. Activity to reinforce the number magnitude.

The mental number line can be reinforced by using real number tables and lines available in the classroom or written in the students' exercise books. Likewise, it would be useful for them to count objects or events connected to real life such as lists of attendance, items available in class, schedules, votes, heart beats or Parcheesi. An example of an activity to improve writing numbers using templates is shown in Table 1

Table 1 Example thought to improve the writing of numbers by means of templates (Adapted from Martínez, 2010)

Activity A. Write the number in figures

Three thousand four hundred and sixty eight 3 4 6 8

Three thousand four hundred and sixty

Three thousand four hundred and eight

Three thousand four hundred

Three thousand and sixty

Three thousand and eight

Basic Arithmetic Operations

It is important to take into account that to achieve automatization, repetitive practice is required and that children with LDM will need a higher number of repetitions. There are some materials and software very advisable to encourage this practice in a motivational environment. Some examples of strategies which are useful in teaching are the following:

- Efficient computation: when doing an addition, it is better to start by the figure of higher value. For example, we will add three to the number 9 in the operation $3+9$.
- Understanding and using composition and decomposition out of context. For example, using tens to do an addition, e.g. $3+9=2+10=12$.

Mathematics Strategies and Suggestions

Some of the following math strategies and suggestions may help students who are experiencing problems with mathematics. Identify strategies that will help our students and teacher about using some of the strategies in school.

- Maintain consistency and communication across school and home settings: Parents, tutors, and classroom teachers should coordinate and use the same instructional approach.
- Teach basic concepts using concrete objects: Understanding concrete materials, pictorial representations, and abstract number representations
- Give opportunities to students for connect mathematical concepts to familiar situations
- Provide access to programs or tutors that can help a student improve his or her math skills: Tutors can assist student with weak math sub-skills, such as multiplication and division. Provide tutors during summer months or after school to boost performance and ensure that the student retains his or her skills.

Conclusion

This relative neglect might lead parents and teachers to believe that arithmetic learning problems are not very common, or perhaps not very serious. However, approximately 6% of school-age students have significant math deficits and among students classified as learning disabled, arithmetic difficulties are as pervasive as reading problems. This does not mean that all reading disabilities are accompanied by arithmetic learning problems, but it does mean that math deficits are widespread and in need of equivalent attention and concern. Evidence from learning disabled adults belies the social myth that it is okay to be rotten at math. The effects of math failure throughout years of schooling, coupled with math illiteracy in adult life, can seriously handicap both daily living and vocational prospects. In today's world, mathematical knowledge, reasoning, and skills are no less important than reading ability.

References

- Alsina i Pastells, À. (2007). Por qué algunos niños tienen dificultades para calcular?: Una aproximación desde el estudio de la memoria humana. *RELIME. Revista Latinoamericana de Investigación en Matemática Educativa*, 10(3), 315-333.
- Artigas, J. (2011). *Trastornos del Neurodesarrollo*. Barcelona: Editorial Narbona.
- Blakemore, S.J., & Frith, U. (2007). *Cómo Aprende el Cerebro. Las Claves para la Educación*. [How the Brain Learns. Keys for Education]. Barcelona: Ariel.
- Butterworth, B., Varma, S., & Laurillard, D. (2011). Dyscalculia: From brain to education. *Science*, 332(6033), 1049-1053. doi: 10.1126/science.1201536
- Gross-Tsur, V., Manor, O., & Shalev, R. S. (1996). Developmental dyscalculia: Prevalence and demographic features. *Developmental Medicine and Child Neurology*, 38, 25-33. doi: 10.1111/j.1469-8749.1996.tb15029.x
- Gurganus, S.P. (2007). Excerpt from Math Instruction for Students with Learning Problems. 54-57.
- Jiménez-Fernández, G. (2016). How can I help my students with learning disabilities in

Mathematics? *REDIMAT*, 5(1), 56-73. doi: 10.4471/redimat.2016.1469

Kaufmann, L. (2008). Dyscalculia: neuroscience and education. *Educational Research*, 50(2), 163-175. doi: 10.1080/00131880802082658

Otálora Sevilla, Y., & Orozco Hormaza, M. (2006). ¿Por qué 7345 se lee como "setenta y tres cuarenta y cinco"? *RELIME. Revista Latinoamericana de Investigación en Matemática Educativa*, 9(3), 407-433.

Monuteaux, M.C., Faraone, S.V., Herzig, K., Navsaria, N., & Biederman, J. (2005). ADHD and dyscalculia: Evidence for independent familial transmission. *Journal of Learning Disabilities*, 38 (1), 86-93. Doi: 10.1177/00222194050380010701

<https://www.understood.org/en/learning-attention-issues/child-learning-disabilities/dyscalculia/understanding-dyscalculia>

<http://www.ldonline.org/article/5896/>

<http://www.pbs.org/parents/education/learning-disabilities/types/mathematics/math-strategies/>

