



## Multiple Intelligences and Learning Problems



Alberto Stalin Barcia Zambrano <sup>a</sup>  
Gema Alejandra Briones Zambrano <sup>b</sup>  
Gema Maria Mendoza Vergara <sup>c</sup>

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### Abstract

Today many researchers, especially educational researchers, are preparing to learn a little more about intelligence, its characteristics, and singularities. The purpose of this investigation was to carry out an analysis of multiple intelligences and learning problems in the students of the upper basic level, from an Educational Unit of the Province of Manabí, the investigation was carried out using the investigative bibliographic method, to know the foundations of multiple intelligences and the reasons for learning problems. The compilation of scientific information from reliable sources was made, carrying out an analysis based on the observation of the students, showing the difficulties that the students and teachers present in the teaching-learning process.

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### Corresponding author:

Alberto Stalin Barcia Zambrano,  
Pontificia Universidad Católica del Ecuador, Portoviejo, Manabí.  
Email address: [Abarcia7969@pucesm.edu.ec](mailto:Abarcia7969@pucesm.edu.ec)

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<sup>a</sup> Pontificia Universidad Católica del Ecuador, Portoviejo, Manabí

<sup>b</sup> Pontificia Universidad Católica del Ecuador, Portoviejo, Manabí

<sup>c</sup> Pontificia Universidad Católica del Ecuador, Portoviejo, Manabí

## 1 Introduction

The study of neuroscience has always been considered as a subject of extensive research, which involves not only the behavior of the human being; but also, in their unique abilities and capabilities, each member possesses various types of intelligence, but always stands out more than one. The researchers detected various problems in the educational field, in the results of the standardized tests, showing each educational cycle at the end of the twelve years of study. To assess meaningful learning in teachers, it is difficult to demonstrate when evaluating their knowledge, the tests also do not assess meaningful learning, as there are diverse criteria in the curriculum, making it difficult for the teacher to be optimal in the educational system. Taking into account these difficulties in class diversities, it has been possible to determine that multiple intelligences help to deepen the educational praxis solving the problems in the educational process.

Multiple intelligences lead to the understanding of why some students learn more easily, because others capture with images and not with texts, as some students can be excellent athletes, but they do not know how to solve mathematical problems, as with music they can be organized and passive. All these particularities of a classroom can be understood with the knowledge of multiple intelligences. Teachers must know about theories of multiple intelligences, through them significant learning can be obtained with students, guaranteeing a comprehensive and quality education, working every one of the intelligence of the student, without neglecting that each student is a different world and therefore they learn differently. By identifying the different types of intelligence in students, I facilitate the application of strategies, methodologies, and curricular adaptation, guiding them to the development of their knowledge to be active members of society.

## 2 Materials and Methods

The methodology used is the research-bibliography, in which a compilation of information acquired through scientific pages such as indexed journals, scientific texts, research articles, among others, has been made, from which classification and analysis of the information have been made.

## 3 Results and Discussions

Multiple intelligences respond to thousands of years of misunderstanding towards the different ways of learning that until a few years ago were taken as the inability of students to acquire specific knowledge. These multiple intelligences in the first instance were seven, in recent years one more was added: linguistic, logical-mathematical, visual-spatial, corporal and kinesthetic intelligence, musical, intrapersonal, interpersonal, and naturalistic ([Gardner, 2011](#)), in figure 1 the different theories of multiple intelligences are observed by the author.



Figure 1. Types of multiple intelligences  
Source: (Gardner, 2011)

Each type of multiple intelligence highlights a certain cognitive ability in the students, this awakens the disorders and the insight of an intellect that is sometimes considered hidden. Linguistic intelligence, the intellect based on grammatical philosophy, is the ability to understand between oral and written language, mastering the structure of expression in the use of syntax, phonetics, semantics, the use of pragmatic language (rhetoric, mnemonics, explanation, and metalanguage), their meanings and practical uses competently. This intelligence is seen in writers, poets, journalists, and speakers (Slavit, 2001).

The gift of language is universal and its development within the brain is based on the Brocca area, which is a section within the left hemisphere, is responsible for language from an early human age, adapting surprisingly in all cultures. The student by having this active intelligence can reason, capture information quickly and efficiently, achieving effective communication. Figure 2 describes a succession of activities that develop linguistic intelligence within the student's school process, both oral and written.

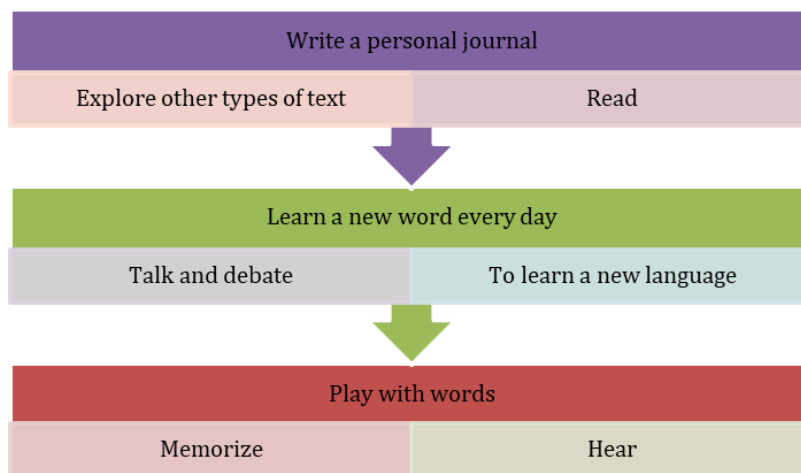


Figure 2. Linguistic Intelligence

Source: <https://www.psicologia-online.com/inteligencia-linguistica-caracteristicas-ejemplos-y-actividades-para-mejorarla-4699.html>

Logical-mathematical intelligence, (Ferrándiz et al., 2008), emphasizes that the problem-solving process allows using deduction, observation, patterns, relationships, resolution, efficiently; can find the solutions of logical-mathematical, before it is verbally articulated. This theory is formed from the early years of age but develops more from adolescence. Figure 3 shows the characteristics of people who have a high development in this intelligence.

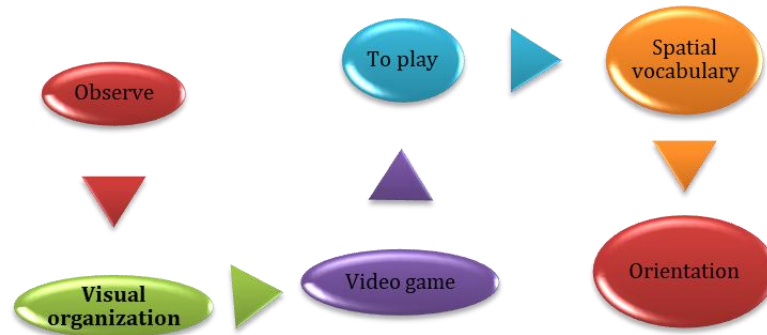


Figure 3. Logical-mathematical intelligence

Source: <https://www.psicologia-online.com/inteligencia-logico-matematica-caracteristicas-ejemplos-y-actividades-para-mejorarla-4700.html>.

Visual-spatial intelligence, Dziekonski (2003), highlights that spatial intelligence is the ability that a person has, this allows the student to form, imagine, visualize and represent mental ideas or graphics from different angles while making the individual reflect in three dimensions. This theory has to do with the rotation of objects in the mind since it implies the development of a mental image that is formed based on what the senses perceive (colors, lines, shapes, figures, and the relationship that exists between them. It is located in the part of the brain that is located in the right hemisphere. Figure 4 shows a series of activities that students develop within spatial intelligence.

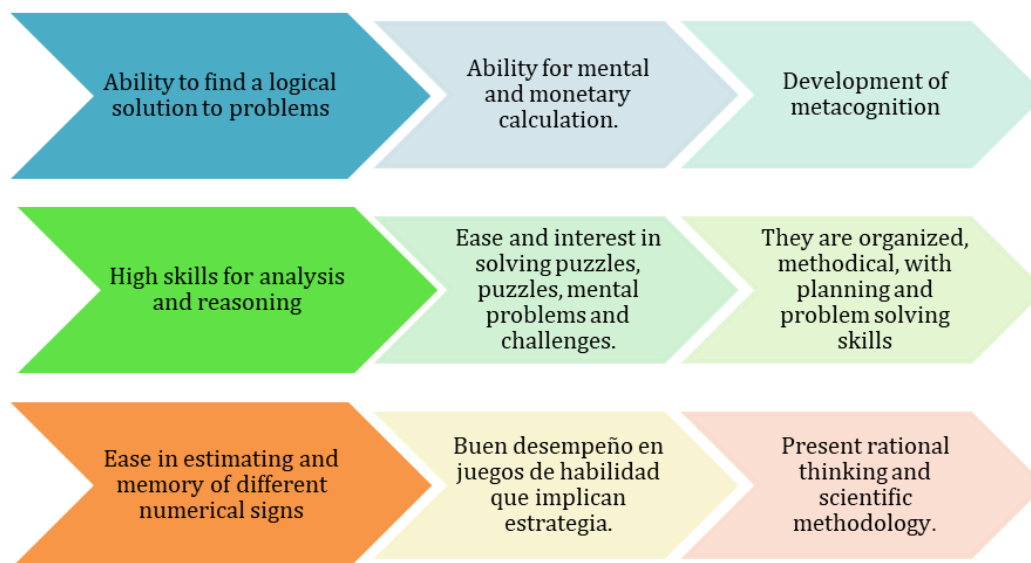


Figure 4. Visual-spatial intelligence

Source: <https://www.psicologia-online.com/inteligencia-espacial-visual-caracteristicas-ejemplos-y-actividades-4729.html>

Body and kinesthetic intelligence, the cognitive skill that the individual has, this intelligence allows the coordination between the mind and the body to achieve the optimization and improvement of physical performance to express ideas, feelings, regardless of age, social condition, or cultural relevance. However, body intelligence exposes

multiple benefits for people, such as enhancing brain connectivity and cognitive capacity, developing awareness, body control, and optimizing the body's processes, it develops from the first months of life. This kinesthetic intelligence is located in the cerebellum, the basal ganglia, and the motor cortex (Athassopoulos-Zamorano et al., 2017). In figure 5 the characteristics of body intelligence are mentioned

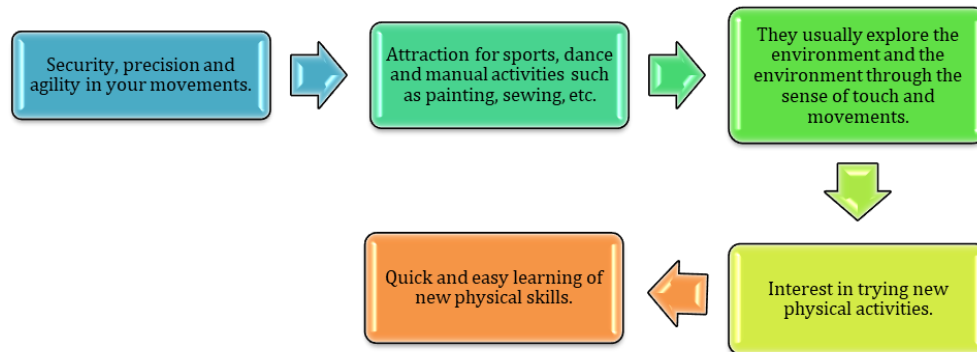


Figure 5. Body and kinesthetic intelligence

Source: <https://www.psicologia-online.com/inteligencia-corporal-kinestesica-que-es-caracteristicas-y-como-mejorarla-4701.html>

Musical intelligence, musical intelligence is found in all individuals in greater or lesser development, depending on age, it allows to distinguish, perceive, transform and express rhythms, emotions, feelings, tones, musical instruments, this theory proposed by Gardner helps the student to feel attracted by the sounds of nature and all kinds of melodies around you. Individuals with this intelligence are good at memorizing and learning songs, remembering melodies, rhythms, keeping time in a piece of music; This intelligence begins to develop from the birth of a person, Moran (2009), emphasizes that from the following life cycles, the human being begins to explore his sounds, depending on the cerebral location of the musical intelligence, the areas involved are found mainly in the right cerebral hemisphere, in the frontal and temporal lobe. Figure 6 shows that this intelligence has a strong component in children, some are born with a greater predisposition to excel in this regard, while others present great difficulties in developing skills related to musical interpretation and perception (Alcivaret al., 2020).



Figure 6. Musical intelligence

Source: <https://www.lifeder.com/inteligencia-musical/>

Interpersonal intelligence, this theory plays a fundamental role in the development of each person, to create a more fused mind, this intelligence manages to improve and understand the ability to understand mood and communication skills, promoting leadership among individuals in a society (Castelló & Autet, 2011). Some research mentions that interpersonal intelligence tends to be more present in outgoing people. It should be noted that introverts have less developed this type of intelligence, although both may appear together in all types of individuals. Figure 7 shows the qualities that the individual develops within interpersonal intelligence.

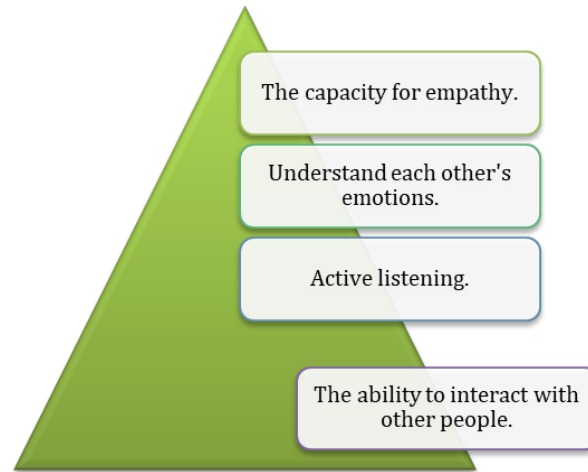


Figure 7. Interpersonal intelligence

Source: <https://blogs.imf-formacion.com/blog/corporativo/neuropsicologia/inteligencia-interpersonal-intrapersonal/>

Intrapersonal intelligence is linked to emotions, allows the individual to understand their intentions, motivations, desires, moods, emotions, capacities, and to relate to our person (Ernst-Slavit, 2001). Intelligence can see realistically and truthfully what we are and what we want, clarifying priorities and personal desires to act appropriately, people with this type of intelligence do not usually lie to themselves regarding their feelings or emotions, they know how to dominate them. At the same time, they can analyze the reason for their thoughts and attitudes, they can correct their behaviors and actions. It is for this reason that, it establishes real objectives that can be met in the short or medium term, it is located in the frontal lobes of the brain. Figure 8 shows the qualities that the individual has with intrapersonal intelligence.

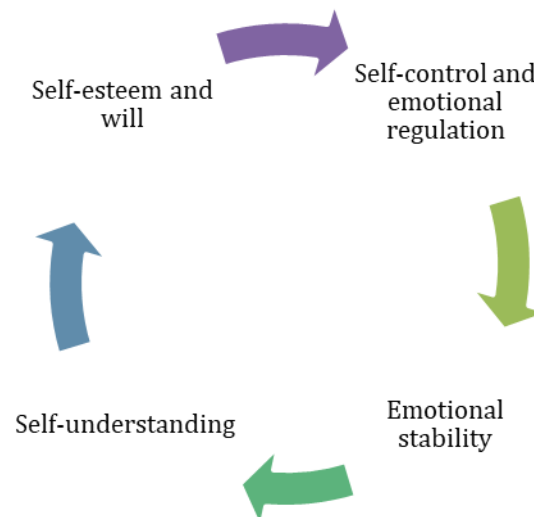


Figure 8. Intrapersonal intelligence

Source: <https://blogs.imf-formacion.com/blog/corporativo/neuropsicologia/inteligencia-interpersonal-intrapersonal/>

Naturalistic intelligence is the ability to understand, distinguish, and manipulate the elements of the environment. Indeed, it implies the ability to make connections and relationships between these components, intending to improve interaction with the environment through the information gathered, it is located in the left parietal lobe and the right hemisphere in the brain areas involved in the functioning of is intelligence (Sandoval et al., 2013). Figure 9 shows that there are different activities to help a child develop his naturalistic intelligence.

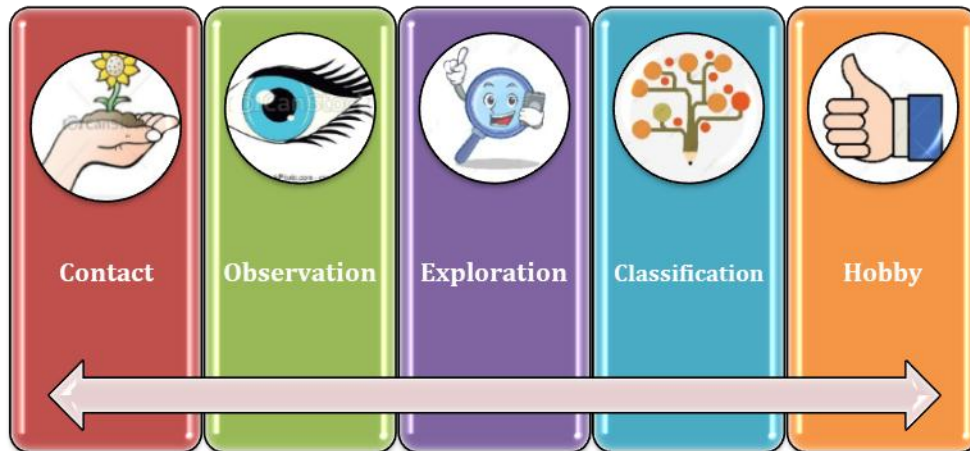


Figure 9. Nurturing intelligence

Source: <https://www.iberdrola.com/talento/inteligencia-naturalista>

As it has been possible to observe these 8 multiple intelligences play a fundamental role in the human being, since it helps in the cognitive and behavioral process of the student, the teacher must use tools, methodological, creative, and innovative strategies that promote the teaching processes - learner learning. For learning to be meaningful, it is necessary to investigate based on the needs and concerns of the individual, each intelligence responds to a set of intellectual competitiveness that is not only stated in a self-sufficient or relatively independent way but can be related to species with different brain structures as can be seen in figure 10.

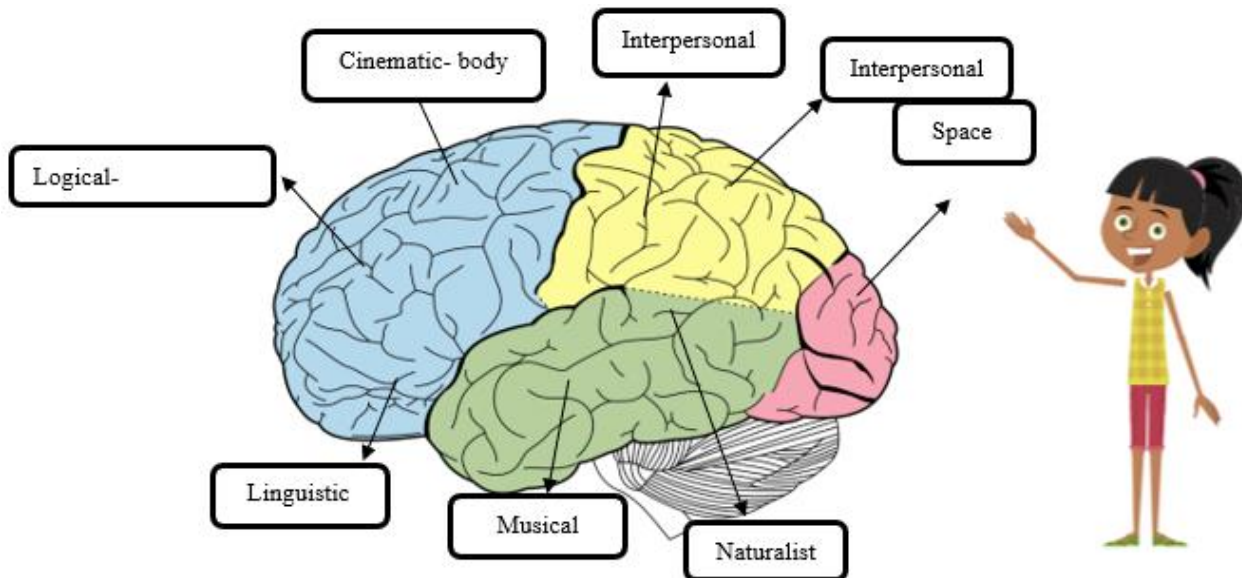


Figure 10. Intelligence and lobes

Source: <http://www.maestroalejandrosensio.com/2018/06/inteligencias-multiples-en-el-cerebro.html>

Learning problems, learning difficulty is defined as the disruption of one or more basic psychological processes involved in understanding or using written or spoken language. These problems can be evidenced in listening, speech, writing, reading, pronunciation, or the development of mathematical calculations (Coronado Hijón, 2002; McCloskey & Cohen, 1989). The term learning problem, made present in texts and scientific journals in the early 1960s, was used to refer to children with physical problems such as children with visual impairment, children with

cognitive disabilities or learning difficulties, caused by functions such as hearing, vision, motor coordination, among others (Tannhauser et al., 1998; Gambardella & Dorigo, 1995).

Learning problems arise from various aspects that can be, physical, psychological, social, adaptability, etc. According to Romero (2005), these problems can be:

School problems are usually presented by external factors of the student, which affect them circumstantially and that refer naturally or through tutorial action. They are disorders considered mild, which do not dominantly affect the student and are reversible according to the American Academy of Pediatrics (2017). School problems can be: pedagogical and behavioral. In figure 11 you can see the pedagogical problems that arise with the academic part in the education.

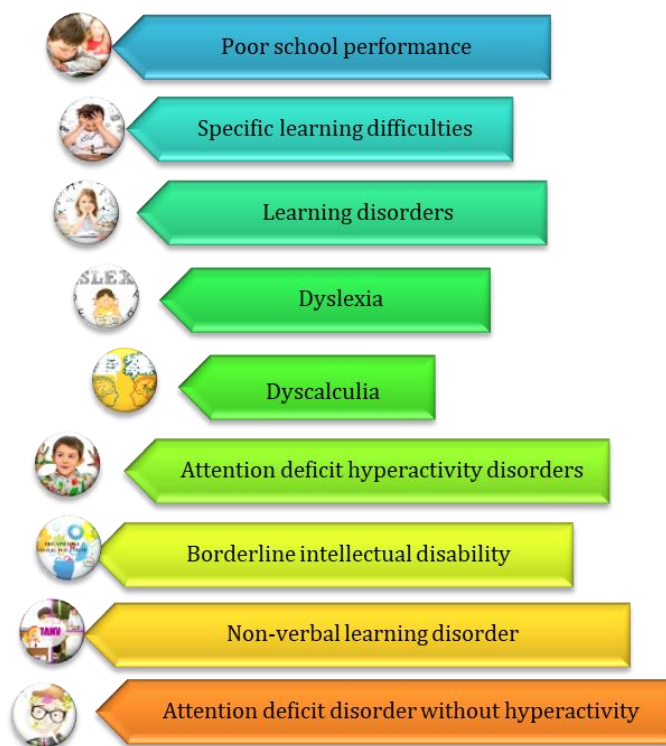


Figure 11. Pedagogical problems  
Source: (American Academy of Pediatrics, 2017)

**Poor school performance;** The causes are, in the first instance external to the student, although it is usually combined with personal characteristics that increase its importance, are problems of moderate severity and personal affection (psycholinguistic processes, motivation, metacognition), if necessary educational attentions are given accompanied by family attendance (Agero-Martínez-de-Artola, 2012).

**Specific learning difficulties;** the root causes of this disorder are independent of environmental conditions, but their development and the degree of importance they acquire are related to educational factors. Specific learning difficulties are moderately high, to the extent that they do not spontaneously subside, only through regular educational mediation, requiring specialized educational care for a long period; affectionation is moderately high, through appropriate early intervention programs and individual and specific curricular adaptations (Coronado Hijón, 2002).

Within behavioral problems, many of these are presented by factors inherent in students' family settings and other cases by behavioral disorders of children or young people, then a compilation of the types of disorders affecting students that in many cases are not visible, but whether they can be perceived or discerned in a classroom.

**Learning disorders;** Learning disorders are presented as pathologies, which in recent years are taken into consideration in educational processes, in, order to know how the brain works of students, but above all to improve the teaching-learning process (Castejón & Navas, 2013; Efklikes, 2006; Martín-Blas & Serrano-Fernández, 2009).



**Dyslexia**; is the most common learning disorder and is the most studied. 80% of children with learning disorders (TA) have dyslexia, and define as a neurodevelopmental disorder that generates problems in learning and the use of language, reading and writing, the basic areas of the phonological process, and the decoding of isolated words (Malaga, 2010) are affected. The term developmental dyslexia is used to differentiate what occurs in children during the school stage, from that which occurs later in life in patients who lose their reading skills due to acquired brain damage. According to the research carried out by Malaga (2010), dyslexics would have problems with phonological decoding, which means that they find it difficult to find correspondence between the basic elements of written language or graphemes and the basic elements of verbal language or phonemes. When children are learning to read and write it is common for them to confuse the letter "b" with "d", the number "6" with "9", and confuse words. This is not a vision problem, but the brain reverses or modifies the sequence of information it receives through the eye sense. Usually, this problem is overcome after seven years, in the case of dyslexic young people, reading problems persist (American Academy of Pediatrics, 2017).

**Dyscalculia**; is a learning disorder that causes the child difficulty solving math problems, in children with normal intelligence, emotional stability, and adequate academic training. It is a disorder that affects everyday activities, mathematics is necessary for the correct interpretation of the time scales, such as calendars, schedules, directions, money management and even to follow quantities of cooking recipes (Malaga, 2010). A wide variety of cognitive difficulties has been linked to dyscalculia, seen in children suffering from this condition, perceptual, visuospatial, and visio motor problems according to (Rossenberg et al., 1989; Strang & Rourke, 1985), cited by (Mendoza et al., 2019), perceptual-tactile alterations, mainly with the left hand, difficulties in interpreting facial emotional expressions, inadequate prosody of language and difficulties in the interpretation of nonverbal events.

These neuropsychological findings together suggest that it is a structural commitment to level of the right hemisphere where this disorder develops. This pathology is not curable, but it is treatable. With effective teaching, students can achieve arithmetic skills and devise effective adaptation strategies that enable them to succeed in adult life (Vesci et al., 2008; Chan & Elliott, 2004). Teachers are called in the first place to detect these disorders. A student who seems eloquent and intelligent, who expresses himself appropriately and that written tasks do not cause a problem, but who, when performing calculations or numbers, does not do so, who avoids doing them, may have dyscalculia.

Students with dyscalculia cannot intuitively capture numbers, do not automatically know that number is greater or less than another, nor recognize numeral patterns to be able to tell how many elements are in a group, even when there are fewer than ten units, they must count them one by one, they do not manage to round amounts either up or down, often have fingers, confuse similar numbers like 3 with 8 or 6 with 9, reverse numbers like 350 with 305, do not learn memory schedules, among other difficulties (Hudson, 2017). It is not known exactly because dyscalculia occurs, neuropsychologists have a silver hypothesis in the intervention of genetics (due to certain brain deficiencies). The speech therapists claim that this disorder is associated with problems of memorization and specialization, due to the lack of orientation in time and space.

Also, it may have psychological causes, it would be a question of whether "one count", of exploring reality or denying that there are immutable rules such as, for example, that in mathematics  $1+1$  will always add up, neither more nor less (Anacleto & Baussier, 2016). All of these assertions lead to the conclusion that there is no specific reason why dyscalculia disorder occurs, but it is a major problem especially affecting the safety of the sufferer. Attention deficit hyperactivity disorders; this disorder is due to serious personal factors that are often combined with inadequate responses from the environment, when this occurs the severity of the disorder increases severely (Aguilar Cárceles, 2014). The personal areas affected are several important, however, with the appropriate medical-pharmacological and psychoeducational treatment the chronicity of the problem decreases significantly.

Limit intellectual disability; It is caused by serious personal problems, which profoundly affect dominant areas and that has a chronic character, that is, that through environmental stimulation achieves remarkable advances, but hardly the total remission of the problem (Parra & Luque-Rojas, 2016). Nonverbal learning disorder; They form a group of learning disorders, unclear etiology, which encloses a neurological syndrome as a result of damage or deficit, works in the neural connections of the right hemisphere, the same that is responsible for integrating information from sensory areas and giving a global response (Fernández & González, 2016). This disorder encloses primary deficits in tactile and spatial vision perception, psychomotor coordination skills, and the processing of nonverbal information (tactile, visual, and perceptive). Figure 12 shows the neurocognitive manifestations of this disorder according to the authors.

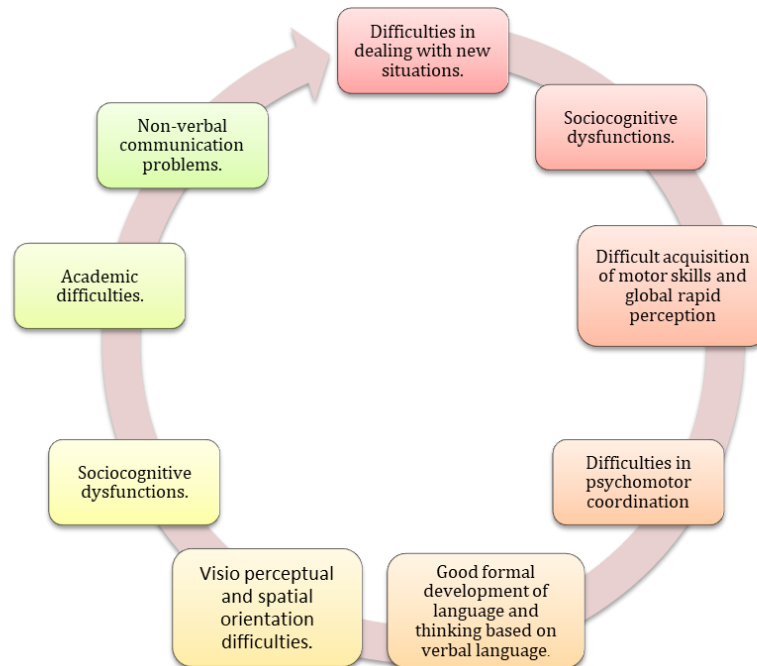


Figure 12. Neurocognitive disorders  
Source: (Fernández & González, 2016).

In many cases the differential diagnosis of restoration by deficit de attention e hiperactividad (TAVN), is difficult to establish, sharing many common characteristics such as low performance, cognitive problems, behavioral responses. Attention deficit disorder without hyperactivity; When the predominant characteristics are inattention and hyperactivity-impulsivity, the pattern of behavior is called attention deficit hyperactivity disorder (ADHD), with predominantly impulsive hyperactivity presentation in the past was called "minimal brain dysfunction", "childhood hyperkinetic reaction" or commonly "hyperactivity" (DuPaul et al., 2018). Inattention indicators may be different in the course of development. It is difficult to identify signs of inattention in the first 5 years of life, it can be evidenced in the short time of attention to one toy, the change from one toy to another, or the appreciation that he hears when told something. In middle or pre-teen childhood these children are described as confused, spaced, daydreaming, with the mind blank, manage to concentrate more on high-acting TV shows or electronic games (Bauermeister, 2014). What leads to the analysis of difficulty is more outstanding in situations that they consider boring and that require sustained mental effort.

For the authors (Anacleto & Baussier, 2016), it has different expressions depending on the age and gender of the patients. Grouping clinical alterations in inattention, impulsivity, and hyperactivity. During the first few year's children sleep poorly and start walking at an early age between 6 and 10 months. They then show hypotonia, flat feet, and fear of sleeping alone so they do not allow the light to go out. There are some subtypes within this syndrome: one in which hyperactivity predominates and another in which attention-deficit predominates (Aguilar Cárceles, 2014).

## 4 Conclusion

The multiple intelligences are contributions that in recent times refer to education and that are complemented by the knowledge updates of teachers who are constantly in preparation to offer the best as professionals and as trainers of other people. Studying multiple intelligences helps the teacher identify different disorders in children and adolescents.

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*Conflict of interest statement*

The authors declared that they have no competing interests.

*Statement of authorship*

The authors have a responsibility for the conception and design of the study. The authors have approved the final article.

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