

ISSN: 2605-5295

MLS PSYCHOLOGY RESEARCH



PSYCHOLOGY
RESEARCH

January - June, 2019

VOL. 3 NUM. 1



<https://www.mlsjournals.com/Psychology-Research-Journal>

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Editorial

The current issue of the Psychology Research journal presents a series of interesting articles on various topics starting with the difficulties related to cognitive processes and their connection with affective-emotional aspects within the scope of a business.

In this line of research, business management tries to promote support actions for its employees with the aim of increasing self-esteem through different motivational strategies. The need to address cognitive processes together with emotional and affective aspects arises to guarantee the education of an integral human being, leading to success in their workplace.

The following article tries to determine the factors that bring about a lack of discipline and its repercussion on an inadequate teaching-learning process within a university classroom. It begins with the expected motivation of university students on their studies, but who present disciplinary issues. Variables such as inappropriate habits, their values, and the use of technology in academic and non-academic activities are explored.

From another point of view, a study is presented that explores the deficiencies in the educational system of Guatemala for students with special education needs. This research analyzed the validity of the pedagogical-therapeutic model "Cetumismo" against the "Aula Recurso" program of the Ministry of Education of Guatemala. The results of the study emphasize the benefits it provides for special education needs people with disabilities.

These include specific curricular adaptations for each student, periodic and updated training for teachers, differentiated curricular itineraries and an inclusive educational process with respect to the scope of the competencies proposed for each case.

The following article analyses the repercussions that the absence of human trafficking protocols for minors has had on the fight against this phenomenon in Puerto Rico. This paper tries to prove that the negative effects of the absence of protocols in the fight against this phenomenon would diminish with the presence of human trafficking protocols for minors in Puerto Rico. It also explored whether the identification and inclusion of appropriate factors in a protocol for minors could improve case detection strategies. The study provides for the creation of a prototype plan for the prevention of juvenile human trafficking and identifies the factors that should be included in a protocol for the prevention and protection of the trafficking of minors in Puerto Rico.

The next study explores direct transcranial current stimulation as a promising and non-invasive technique to treat eating disorders.

The paper reviews the principles of transcranial DC stimulation through electrodes and how the intensity, duration, and type of application procedures influence the results.

An intervention proposal is presented based on the evidence found in the different papers reviewed to provide a more in-depth understanding of the treatment's effectiveness used in future research.

The last article of this issue presents an evaluation and intervention carried out in a case of infantile cross-lateralism. Laterality is one of the most complex neuropsychological processes to which people are subjected throughout their evolutionary cycle, affecting 30% of the world's population who show problems related to undefined laterality or cross-lateralism. This leads to problems in learning to read and write, difficulties with body schema and space-time, as well as difficulties in mental calculations.

The aim of this single case study was to analyze the components that make up part of child laterality, to identify the variables that modulate it and understand the personal, family, social, and educational consequences that affect the life of the subject from a clinical point of view.

Dr. Juan Luís Martín Ayala
Editor Jefe / Editor in chief / Editor Chefe

MLS PSYCHOLOGY RESEARCH

<https://www.mlsjournals.com/Psychology-Research-Journal>

ISSN: 2605-5295



How to cite this article:

Constantino, M. H. (2020). Knowledge and Learning Management: Cognitive and Emotional Processes in Learning - Proposed Solutions for Difficulty in Learning. *MLS Psychology Research* 3 (1), 7-20. doi: 10.33000/mlspr.v3i1.228

KNOWLEDGE AND LEARNING MANAGEMENT: COGNITIVE AND EMOTIONAL PROCESSES IN LEARNING - PROPOSED SOLUTIONS FOR DIFFICULTY IN LEARNING

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Abstract. This part of the assumption that manager have difficulties on the cognitive process that are strictly related to the emotional aspect and affective, and that to remedy these difficulties promoting actions to support and raise the self-esteem of staff through motivation. The negative factors identified involving the difficulties of learning for staff and are brought from others organization. In There are employees in companies from socioeconomic classes, different stories and experiences that must be respected in their individuality. In psychological theories proposals such as Piaget and Vygotsky the concepts relevant to the development of skills indicate the need to work the emotional and cognitive processes affective as collateral for the formation of a human being as to be totally chances of success in their cooperative performance. In this context, this work is in attempt to shape the process in a cognitive-emotional located, recognizing in it the dynamics of interactions between body and environment, adding concepts of emotions and biological assessments of these events according to an emotional and psychological perspective psychopedagogic. Presenting reflections about the teaching and learning process, we also highlight discussions about the learning difficulty that leads to social and professional failure. The aim of this study is to present strategies for overcoming difficulties in the learning process within a psycho-pedagogical perspective, within a dialectic relationship between institution, individual and family, but for the construction and appropriation of knowledge, leading to understand and transform their reality, in the quest for their autonomy.

Keywords: processes, cognitive, emotional, affective, self-esteem.

GESTÃO DO CONHECIMENTO E APRENDIZAGEM: PROCESSOS COGNITIVOS E EMOCIONAIS NA APRENDIZAGEM. PROPOSTA DE SOLUÇÕES PARA DIFICULDADE EM APRENDIZAGEM

Resumo. Este trabalho parte do pressuposto que os gestores têm dificuldades relativas ao processo cognitivo que estão estritamente ligadas ao aspecto emocional e afetivo, e que para sanar estas dificuldades promovem ações de apoio e de elevação da autoestima do colaborador através da motivação. Os fatores negativos detectados que implicam nas dificuldades de aprendizagem para os colaboradores e que são trazidos de outras organizações. Nas empresas existem funcionários de classes socioeconômicas, histórias e experiências diferentes que devem ser respeitadas em sua individualidade. Nas teorias psicológicas propostas como as de Piaget e Vygotsky os conceitos pertinentes ao desenvolvimento de competências apontam a necessidade de trabalhar os processos cognitivos emocionais e afetivos como garantias para a formação de um ser humano como ser total, com possibilidades de sucesso no seu rendimento colaborativo. Neste contexto, este trabalho se insere na tentativa de modelar o processo cognitivo-emocional numa perspectiva situada, reconhecendo nele a dinâmica de interações entre organismo e ambiente, agregando conceitos de emoções biológicas e das avaliações destas manifestações emocionais segundo uma perspectiva psicológica e psicopedagógica. Apresentando reflexões a respeito do processo de ensino e aprendizagem, destacamos também discussões sobre a dificuldade de aprendizagem que leva ao fracasso social e profissional. Pretende-se com este estudo apresentar estratégias para a superação das dificuldades no processo de aprendizagem dentro de um olhar psicopedagógico, dentro de uma relação dialética entre instituição, indivíduo e a família, mas para a construção e apropriação de um conhecimento, levando-o a compreender e transformar sua realidade, na busca de sua autonomia.

Palavras-chave: processos, cognitivos, emocionais, afetivos, autoestima.

Introduction

The subject of cognition, emotion and affectivity has been addressed by many Psychology authors who reinterpret the two main theorists discussed in this article, in several countries, including Brazil, where specialization courses in psychologists, pedagogues, educators have proliferated and managers.

In recent years, we have heard a lot about a new way on working in the pedagogical area in the light of psychology. Countless authors have gained importance in the academies with works focused on this type of approach focused on the processes of psychological and behavioral development of individuals.

Studies in the area of human development have shown how affective and cognitive problems directly influence the teaching-learning process. Among the constructivist theorists emphasized in this article, Piaget and Vygotsky are prominent in the study, among others, acting dialectically, contributing to cognitive development.

In development, imitation and teaching play an important role. They demonstrate the specifically human qualities of the brain and lead the child to new levels of development. Tomorrow, the child will do only what he can cooperatively do today. Consequently, the only correct type of pedagogy is that which advances in relation to development and guidance; it should aim not at mature functions, but at maturing functions (Vygotsky, 1979, p. 138).

With this process in mind, some questions arose, such as: What contributions did Piaget and Vygotsky make to cognitive development in the human development process? How does affectivity affect the cognitive process? How can the organization act in this psychopedagogical perspective?

To answer the questions, the theory of Piaget and Vygotsky will first be analyzed separately, taking into account the contributions to the educational field, approaching the process of cognition and affectivity from the perspective of the two academics, thus concluding the psychopedagogical perspective and the organization. Vigotsky (1991, p. 37) concludes that the world is not seen simply in color and shape, but also as a world with meaning and meaning (Morassutti, 2005, p. 49).

The objective of this work is to understand the teaching - learning process and its difficulties in general. Therefore, the object of our study in this article is to guide various theorists who scientifically support the topic (learning difficulties) and to find strategies for prevention and overcoming it.

In this sense, learning difficulties can be considered one of the causes that can lead the individual to personal, professional, and even social failure.

Development

Human development and the teaching-learning process.

The study of applied psychology in education has been intense in recent years in the light of some theorists, including Piaget and Vygotsky, who will be addressed here separately. The organization is the third group on the most important social scale in people's lives.

Today, most of them enter institutions at 16 years of age. For the manager, understanding human development in the teaching and learning processes is of fundamental importance. This knowledge enables the manager, which allows him to understand the psychological, biological and behavioral characteristics of the employee at a specific stage of his growth, allowing the recognition of possible deficiencies in the process, as well as the appropriate intervention.

The cognitive/affective and emotional aspects begin to form social interaction and the manager or organizational psychologist must be prepared to act, knowing the stages that all people go through for the teaching-learning process to take place.

Through existing educational experiences in the United States and Europe, Brazil strove to find answers to educational problems that sought to emphasize humanistic pedagogy.

The individual learning processes were only of interest insofar as they facilitated a pedagogical task that aimed to develop human potential to the fullest ...

Scoz (2004) attributes the causes of learning problems only to individual physical or psychological factors. However, we must emphasize that it is not feasible in a class-divided society, governed by broader economic, political, and social determinants.

Only from the 1980s on, Psychopedagogy managed to be structured thanks to its functionality and efficiency in facing learning difficulties, acting directly in schools around the world.

The teaching-learning process goes beyond the didactic content. It is necessary to individually know and monitor the development of each individual during the collaboration period so that each employee has a methodology that facilitates their affective, cognitive and motor development.

There were several contributions by Piaget and Vygotsky to education based on their theories of human development.

Piaget (1982) in his work shows that by carefully observing the development of individual behavior, it is possible to understand the nature of human knowledge and its evolution. His theory was formulated based on the study that knowledge evolves progressively through reasoning structures that replace each other through stages, that is, the logic and way of thinking of a child differs from that of adults.

The researcher identified four stages of cognitive development that he classified as sensorimotor, preoperative, concrete operative, and formal operative. Each of these stages is a period in which children's behavior and thinking have a peculiar form of reasoning and knowledge.

According to Jean Piaget's theory, intellectual development has two components, which are cognitive and affective. Both take place in parallel and care with the affective aspect in the teaching-learning process is of fundamental importance, since it is the dimension that represents the difficulty in becoming aware of oneself and the other.

As for Vygotsky (1988), his theory is based on human development as a result of a sociohistorical process, of greater importance for the role of language and learning, with the acquisition of knowledge through the interaction of the subject with the environment.

For him, the formation of concepts occurs between the relationships between thought and language, cultural issues in the construction of meanings, the process of internalization and the role of the organization as a transmitter of knowledge. It proposes a vision of the formation of higher psychic functions, such as culture-mediated internalization.

According to the academic, there is the Proximal Development Zone, which refers to the distance between the current level of development and the potential level of development. The idea of Mediation emphasizes the construction of knowledge as an interaction mediated by various relationships. Language represents a great importance for human evolution. It is through it that we create concepts, forms of organization of the real, the mediation between the subject and the object of knowledge. It is in Culture that human beings have symbolic systems to represent reality, which are in constant progress of recreation and will reinterpret information, concepts and meanings.

For the functioning of the psychological, the development of the internalization process that implies an external activity that must be modified to become an internal activity, is interpersonal and becomes intrapersonal. Social interaction takes place in thought, memory, perception and attention. Motivation, need, drive, emotion, and affection, starts through thought.

According to Vygotsky (1991), the domain of the instruments of mediation, including their transformation by a mental activity, is the activity of the subject, which is not only active, but interactive, since it forms and constitutes knowledge based on intra and interpersonal relationships. He believes that in the exchange with other themes, knowledge, roles and social unions are internalized, allowing the formation of knowledge

and consciousness itself. Organizations is where interactive pedagogical intervention triggers the teaching-learning process.

By focusing these theorists on the psycho-pedagogical perspective, both Piaget and Vygotsky and others contributed their theories in a meaningful and effective way to understand human development in the teaching-learning process.

Jean Piaget (1996) offers teachers, managers and psychologists a didactic theory so that they can develop cognitive and affective capacities and abilities in individuals through stimuli. It is extremely important to define the periods of intelligence development to help the manager understand the phase her subordinates are going through and establish a specific didactics for the group.

Based on Vygotsky's theory (1991), the instructor is the mediator between the subject and the object of study, interfering in the learning process, taking into account aspects of language, culture, the internalization process, mental function and next development area. The subject learns from another what the social group produces, be it in language, values or knowledge.

Wallon (2000) proposes a pedagogical theory with the "environment" as a set of circumstances in which people develop by interacting with each other. Organizations must consider themselves indissoluble in the relationship of the individual with society and maintain a balance between them, promoting the self-esteem of the individual.

In this way, the manager needs to understand the theories of human development and have an attitude of investigating employees and their practice through investigations that describe the affective relationship to compromise the formation of self-esteem and, consequently, the performance of the employee. in teaching-learning process.

Social influence on the initial formation of the self-concept.

According to Piaget, Vygotsky and Wallon, human development is based not only on cognitive aspects, but also and mainly on affective aspects. Therefore, companies can and are a great laboratory to observe and question the reasons that lead the company and employees to live together, many times, exhausted and without stimulation.

It is known that human beings have a great need to be listened to, welcomed and valued, thus contributing to a good image of themselves. In this sense, affectivity is closely linked to the construction of self-esteem. Thus, its importance in each relationship is essential for the subjects involved. Thus, the relationship between the organization and employees should be as close as possible, based on the exchange of feelings and mutual respect for different ideas.

It is worth mentioning that the task of educating should be as natural a function as breathing or walking. However, educating presents in its family and educational actions, and within the theories considered ideal, a complex task to be carried out.

Contact with different social groups allows the construction of the person's self-concept. The family and other people living with the child are part of their first social group that represents, at this time, their affective contact, which can be positive or negative, influencing the child's future. The self-concept that this child will have will be reflected in her actions and in the way she will be treated or even perceived by others.

When the child enters school and has a negative view of himself, he demonstrates a behavior different from that of other classmates, such as aggressiveness or apathy and, in most cases, he is considered lazy, inattentive, irresponsible, is say "problem student"

and automatically sent by the teacher to a professional because their school performance is compromised. However, the problem is related to numerous factors, including this student's self-concept, when she does not believe in her potential to solve challenging situations and is discouraged at the first obstacle she encounters.

Therefore, collaborative life in a company, as a segment of the social group also builds different relationships, should provide better learning conditions, select necessary activities and positions, that promote the recovery of the individual's self-esteem.

For Oliveira (1998), the affective aspect has a profound influence on intellectual development. It can speed up or slow down the rate of development and determine what content intellectual activity will focus on, and in Piaget's theory, intellectual development is considered to have two components: one cognitive and the other affective, which develop in parallel. Affection includes general feelings, interests, desires, tendencies, values, and emotions.

Affection has several dimensions, including subjective feelings (love, anger, sadness ...) and expressive aspects (smiles, screams, tears ...). For Seber (1997), within Piaget's theory, affect develops in the same sense as cognition or intelligence and is responsible for intellectual activation. With their affective and cognitive capacities expanded through continuous construction, children become capable of investing affect and having validated feelings in themselves. In this sense, self-esteem is closely related to the individual's motivation or interest in learning. Affection is the guiding principle of self-esteem.

Once the bond is developed, learning, motivation, and discipline become significant achievements for the student's self-control and professional well-being. A strong relationship is perceived between the manager and the employee, which influences the formation of self-esteem, because the manager who does not love the profession and presents different reactions to an indifferent or aggressive employee, can compromise the development of the company that loses the labor, work, time and money.

According to Bean (1995), self-esteem affects learning. Research on self-image and school performance shows the strong relationship between self-esteem and the ability to learn. High self-esteem fosters learning. The employee who enjoys high self-esteem learns with more joy and ease. Take on new learning tasks with confidence and enthusiasm. His performance tends to be a success, since reflection and feeling precede action, showing "firmness" and positive expectations, unlike one who feels incompetent, a failure.

Successful performance reinforces your good feelings. With each success achieved, he considers himself more competent. His ability to face challenges is greater and psychologically healthier than that of someone who has a negative vision of himself, because he is defeated and fears situations that can expose his thoughts and feelings.

Education theorists, educators, and authors treat affectivity as a preponderant factor for the construction of the learning self-concept. It has been addressed with more intensity, because the violence, aggressiveness and lack of respect that most people experience today can have root causes, due to the lack of appreciation of the person as a human being. In this way, inevitably, your self-concept is altered.

Oliveira (1998) addresses the ideas of Vygotsky, who has always been concerned with learning embedded in the sociohistorical development of the person as a process that presents different phases that are interconnected with each other. Regardless of the stage

in which they are, the human being lives with various groups of people who, at all times, contribute to building their self-esteem.

In an attempt to change pedagogical practices, some organizations begin to invest in manager training, looking for theoretical references that help the performance of employees in the teaching-learning process, based on affectivity as a rescue of self-esteem, seeking to mitigate difficulties. learning and interpersonal relationships found by the organization's employees.

The role of the organization in the formation of self-esteem.

The role of companies, as a relationship between the manager and the employee, is of utmost importance so that the formation of self-esteem is guided by security, the autonomy of ideas, the concepts that the employee has of himself/herself and that they contribute to school performance and your life as a whole.

The issue of affectivity and self-esteem is a worldwide concern. All segments of society have these approaches in their discourses and look for practices that can coincide with what they really believe. Affection in dealing with people is a presupposition of what the authors call the rescue of human values forgotten by us who are involved in the hustle and bustle of everyday life.

Believing this, Antunes (1996, p.56) affirms that this relationship should be based on affection and sincerity, because:

If a teacher teaches a class and thinks that it will not learn, then it is correct and this class will have enormous difficulties. If, instead, you believe in class performance, you will make a change, because the human brain is very sensitive to this expectation about performance (Antunes, 1996, p. 56).

As you can see, school, family or any other organization are integral and fundamental parts of a society, and this quest cannot ignore it. However, it appropriates the thoughts of theorists such as Wallon, Piaget and Vygotsky, to base their pedagogical actions and transform the relationships in these organizations in a richer moment in the teaching-learning process.

Such knowledge loses its validity when managers and technicians are not committed to changes in their traditional ideas or attitudes, leading to stale practices that only explore the capabilities of employees, without taking affectivity into account in the teaching-learning process.

More than a job, role, or service, people often turn to companies as a means of seeking answers that clarify their true role in society.

In this sense, emotion will be understood depending on the activation or reduction of affectivity, however, self-control is not a skill that develops "naturally" given the temporary maturation of the human being. They all need specific learning, because a relationship is something that is built day by day, in understanding oneself and the other.

Therefore, it is necessary to be careful with the words chosen for communication, taking into account the tone of voice that must be firm and not accusative, and language patterns that promote self-evaluation and self-control by the own person, making that she/he learns to love herself/himself, knowing her/his limits asking for help when necessary.

Teaching and learning is the establishment of a cause and effect relationship, it is the product of the exchange of information and personal experiences between the learner and the teacher. In this exchange, no one is unscathed and the results will be remarkable and special, insofar as the commitment, responsibility and mutual influences of those who teach learning and those who learn through education are marked and special.

In this relationship, the educator-student manager establishes an emotional bond that is a great facilitator in the teaching-learning process, because by creating a strong emotional bond, the collaborator will not feel alone, thus facilitating their learning. Certainly, the atmosphere created will be one of pleasure, welcome, joy, company, that is, the content will be presented pleasantly, difficulties will be perceived and received as part of the process, helping to overcome difficulties.

Motivation in the teaching-learning process.

In the cognitive emotional process, in addition to the formation of self-concept and the elevation of self-esteem, a greater commitment on the part of managers with motivation is necessary. This statement is based on the assumption that learning is personal, as it is the result of construction and past experiences that influence future learning by solving existing difficulties or that may arise.

In this way, learning from a cognitive perspective is like a personal construction resulting from an experimental process, internal to the person and manifested through a change in behavior.

When learning, the subject adds to the knowledge that he/she has new knowledge, making connections with those that already exist. And during your educational journey you have the possibility of acquiring a clear, stable and properly organized cognitive structure, with the advantage of being able to somehow consolidate new, complementary and related knowledge.

The main objective of education is to bring the student to a certain initial level to reach a certain final level. If you can get the student to move from one level to another, then you have registered a learning process.

It is up to educators to provide interaction situations that awaken in students the motivation to interact with the object of knowledge, with their colleagues and with the teachers themselves.

Because, even if learning takes place in the intimacy of the subject, the process of building knowledge takes place in the diversity and quality of their interactions. For this reason, the educational action of the school must provide the student with opportunities to be induced to an intentional effort, with the objective of obtaining expected and understood results.

It can be said that learning occurs through a cognitive process imbued with affectivity, relationship and motivation. Therefore, to learn it is essential to "be able" to do it, which refers to the necessary skills, knowledge, strategies and abilities, for that it is necessary to "want" to do it, to have sufficient disposition, intention and motivation.

To have good productivity results, employees must put as much disposition as skill, leading to the need to integrate cognitive and motivational aspects.

Motivation is a process that takes place within the topic, however, it is closely related to the exchange relationships that it establishes with the environment, mainly with

its managers and colleagues. In corporate situations, interest is essential for the student to have reasons to act to appropriate knowledge.

Bock (1999) points out that motivation remains a complex issue for psychology and, in particular, for theories of learning and teaching. Motivation is a factor that must be considered in the context of education, science and technology, and is of great importance in the analysis of the educational process. Motivation is presented as the dynamic aspect of the action: it is what drives the subject to act, that is, what drives him/her to initiate an action, guide him/her according to certain objectives, decide his/her search and its end.

According to the author, motivation is, therefore, the process that mobilizes the organism for action, based on an established relationship between the environment, the need and the object of satisfaction. This means that, based on motivation, there is always an organism that presents a need, a desire, an intention, an interest, a will or a predisposition to act. Motivation also includes the environment that stimulates the body and offers the object of satisfaction. And finally, motivation includes the object that appears as the possibility of satisfying the need.

One of the great virtues of motivation is to improve attention and concentration, in this perspective it can be said that motivation is the force that moves the subject to perform activities.

When motivated, the individual wants to do something and can maintain the effort necessary for the time necessary to achieve the proposed objective.

Finally, the manager must discover and model strategies, resources within the cognitive emotional and affective process so that the employee wants to learn, providing stimuli so that he feels motivated to learn.

By encouraging him, the manager always challenges him. For him, learning is also motivation, where the reasons provoke interest in what will be learned.

It is essential that the employee wants to master some competition. The desire for achievement is motivation in itself, so the manager should always provide the employee with knowledge of their progress, capturing the employee's attention and solving learning difficulties.

Methodology

The methodology used is bibliographic research, with a survey of works available in print and digital media. The approach is qualitative.

Bibliographic research is that carried out on the basis of material published in books, magazines, newspapers, electronic networks, that is, material accessible to the general public. Bibliographic research has eight phases: choice of topic; elaboration of the work plan; ID; location, compilation; archive; analysis and interpretation; and writing. Its main advantage in relation to other types of research is that it allows the researcher to cover a greater extent of phenomena than those that could be investigated directly.

In research with a qualitative approach, the existence of a dynamic relationship between the subject and the real world is considered, which cannot be expressed in number. The natural environment is the direct source for data collection and the

researcher is the key instrument. The process and its meaning are the main focus of the approach.

Psychopedagogical intervention in learning difficulties.

The educational psychologist is the professional who helps identify and solve problems in the learning process. Is trained to deal with different learning difficulties

In this sense, learning difficulties can cause social problems, which lead to marginalization and social exclusion. When learning problems are identified, a new look at school and family institutions is necessary.

The psycho-pedagogue has specific scientific knowledge derived from the articulation of various areas involved in learning processes and pathways. By intervening in learning problems, your goal is to solve them and focus on the individual and their socialization in the environment around them. Whether school, social, emotional or professional.

When the diagnosis and psychopedagogical intervention is carried out, it is an attitude that can be carried out through methods, instruments and specific techniques of Psychopedagogy, with issues related to prevention that are relevant. It is essential for the educational psychologist's work to participate in scientific research and studies related to learning problems and processes, since it is from these approaches that learning considerations can be achieved.

The educational psychologist needs to observe the individual as a whole: broad motor coordination, sensorimotor aspect, lateral dominance, rhythmic development, fine motor development, creativity, evolution of design and design, spatial and visual-motor perception, orientation and spatial-temporal relationship, acquisition and articulation of sounds, acquisition of new words, elaboration and mental organization, attention and coordination, as well as expressions, acquisition of concepts and, even, development of logical-mathematical reasoning.

Because it is through observation that you will understand the learning process according to the Vygotskian approach, based on the assumption that there are several reasons that determine the success or failure of a child in school. Within this approach, psychopedagogical practice is understood as the knowledge of learning processes in their most diverse aspects: cognitive, emotional or corporal.

Based on this assumption, psychopedagogical work is inserted in the teaching-learning process, acting mainly with professionals involved in school institutions in a preventive way, detecting moments of difficulties and anticipating problems that would be a reason for future treatment in educational life of the students, as well as interacting with the school organization chart when the learning difficulties problems are already installed, working on the diagnosis.

The specificity of psychopedagogical treatment consists in the fact that there is an objective to be achieved, the elimination of symptoms. Therefore, the psycho-pedagogue / student relationship is measured by well-defined activities aimed at solving the harmful effects of symptoms.

Starting from the idea that we are endowed with the ability to learn, the professional in the psycho-pedagogical area will have to find among the various educational theories the one that best suits each diagnosed case. One cannot speak of

learning without, therefore, considering all the relevant aspects in the life of this subject who is related and exchanged, from the creation of links.

In this sense, it is up to the education professional to provide their students with opportunities for knowledge to make life happen.

Since knowledge will never be taken for granted, the role of the educational psychologist will have a wide area of expertise, making his students discover the best way to recognize and develop their intellectual abilities.

Therefore, it is not just the role of school teaching to illustrate the mission of educating/teaching. Nor can it be seen in isolation from society, since the educational system, whether public or private, always reflects the society in which it is inserted. It is necessary to work together to facilitate educational and social exclusion.

In this way, the main focus on teaching starts from the principle of various aspects involved, such as: aptitudes, personal qualities, culture, communication, in short, the valuation of the knowledge that the student already has and, from his world view, Development of a pedagogical practice that encourages thought, creation, dialogue and active participation in the construction of new knowledge.

Discussion and Results.

Learning is an extremely complex phenomenon, involving cognitive, emotional, organic, psychosocial and cultural aspects. Learning results from the development of skills and knowledge, as well as the transfer of these to new situations.

In this perspective, all these aspects are intrinsically linked to learning. Emotional cognitive processes significantly influence the way in which humans resolve moral conflicts. The organization of thought prevails over feeling, and feeling also shapes the way of thinking.

By highlighting the autonomous moral capacity to resolve daily conflicts, we seek to think of a company/organization that works in the emotional state of all professionals in a positive way, based on trust, respect, internal satisfaction, to efficiently perform your role.

Conclusions

Businesses and governments must work together to help human beings develop all their parts, to be free to learn and create. Only respect for her total originality allows the individual to develop her own individual capacity.

It is important to note that human psychic functioning is not only made up of cognitive aspects, but feelings and emotions also shape thinking.

Finally, educating also means worrying about the construction and organization of the affective dimension of people, after all, the company, to fulfill its function, must be a place of life and, above all, of success and personal fulfillment for managers and employees. The experience between the two promotes being, reduces anxiety, facilitates

life's successes, leading them to overcome the challenges of learning difficulties with affection, motivation, self-esteem, education will achieve significant learning.

Man through memory can imagine future situations and form other images. Thus, the action of creating and imagining new situations according to Vygotsky (1989) is in the fact of the non-adaptation of the being, that is, of not being accommodated and conformed to a situation, thus seeking, through imagination and fantasy, a balance, in addition to building something new.

In this sense, according to Vygotsky (1989), the activity of creating is an exclusive manifestation of the human being, since only he has the ability to do something new from what already exists. It is under this assumption that psycho-pedagogical work is carried out by discovering in the student his abilities and skills, developing activities that help him to order and coordinate his ideas and intellectual manifestations.

It is within this Vygotskian perspective, which provides subsidies for a practice based on the construction of the individual as a person, it is essential that he insert himself in a certain cultural environment, which can be formed from his family group, as well as from school, religion, sports, folkloric manifestations, etc., because it is this group that provides instruments that will allow their intellectual maturity.

Bibliographic References

- Antunes, C. (1996). *Alfabetização Emocional*. São Paulo: Terra.
- Bean, R. (1995). *Adolescentes Seguros: Como aumentar a auto-estima dos jovens*. São Paulo: Gente.
- Bock, A. M. B. (1999). *Psicologias: uma introdução ao estudo de Psicologia*. São Paulo: Saraiva.
- Oliveira, M. & Vygotsky, L. S. (1998). *Aprendizado e desenvolvimento: Um processo sócio histórico*. São Paulo: Scipione.
- Piaget, J. (1982). *O nascimento da inteligência na criança*. Rio de Janeiro: Zahar.
- Piaget, J. (1999). *A linguagem e o pensamento da criança*. São Paulo: Martins Fontes.
- Scoz, B. (2004). *Psicopedagogia e realidade escolar: o problema escolar e de aprendizagem*. Petrópolis: Editora Vozes.
- Seber, M. G. (1997). *Piaget: O diálogo com a criança e o desenvolvimento do raciocínio*. São Paulo: Scipione.
- Vygotsky, L. S. (1991). *A Formação Social da Mente*. São Paulo: Martins Fontes.
- Vygotsky, L. S. (1988). *Linguagem, desenvolvimento e aprendizagem*. São Paulo: Ícone Editora.

Date received: 20/05/2019
Date reviewed: 12/3/2019
Date accepted: 21/03/2020

MLS PSYCHOLOGY RESEARCH

<https://www.mlsjournals.com/Psychology-Research-Journal>

ISSN: 2605-5295



How to cite this article:

Toala Ponce, S. R., Quiñónez Ortiz, E. C., & Gómez Pinillo, L. Y. (2020). Indiscipline and its Factors in Learning Teaching. *MLS Psychology Research* 3 (1), 21-38. doi: 10.33000/mlspr.v2i2.392

INDISCIPLINE AND ITS FACTORS IN LEARNING TEACHING

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INDISCIPLINE AND ITS FACTORS IN LEARNING TEACHING

Abstract. The purpose of this article was to determine the factors that induce indiscipline and that this has an impact so that good teaching-learning is not achieved within the classroom, it is assumed that university students should be motivated by the careers that they themselves have elected and are in a position to assume the responsibilities that this implies; But this is not fulfilled and there are problems of indiscipline, due to the immaturity that young people still have, they are increasingly distracted by cell phones, they want to leave the classroom frequently and have difficulty maintaining attention and not talking. Disruptions in the classroom interfere with the achievement of learning, teachers and managers must maintain discipline and, if applicable, apply the appropriate sanctions, since the rules of coexistence and respect are essential to achieve successful teaching-learning. To carry out this work, a survey was carried out on 185 students and 20 teachers of the Faculty of Pedagogy, of the Technical University "Luis Vargas Torres" of Esmeraldas, in order to have a more accurate criterion of what the factors are that induce indiscipline in the classroom. It is concluded that students have acquired inappropriate habits, little practice of values, use of technology in non-academic activities, a percentage of teachers still do not use technology in teaching-learning.

Keywords: indiscipline, interdisciplinary factors, teaching-learning.

LA INDISCIPLINA Y SUS FACTORES EN LA ENSEÑANZA APRENDIZAJE

Resumen. El presente artículo tuvo como propósito determinar los factores que inducen a la indisciplina y que esto repercute para que no se logre una buena enseñanza-aprendizaje dentro del aula de clases, se asume que los estudiantes universitarios deberían estar motivados por las carreras que ellos mismos han elegido y están en condiciones de asumir las responsabilidades que esto implica; pero esto no se cumple y se presentan problemas de indisciplina, debido a la inmadurez que aún poseen los jóvenes están cada vez más distraídos con los teléfonos celulares, quieren salir del salón de clases con frecuencia y tienen dificultades para mantener la atención y no hablar. Las interrupciones en el aula interfieren con el logro del aprendizaje, los docentes y directivos deben mantener la disciplina y de ser el caso aplicar las sanciones pertinentes, puesto que las normas de convivencia y de respeto son esenciales para lograr la enseñanza-aprendizaje con éxito. Para la realización de este trabajo se realizó una encuesta, a 185 estudiantes y 20 docentes de la facultad de la Pedagogía, de la universidad Técnica "Luis Vargas Torres" de Esmeraldas, con el fin de tener un criterio más certero de cuáles son los factores que inducen a la indisciplina en el aula de clases. Se concluye que los estudiantes han adquirido hábitos no adecuados, poca práctica de valores, uso de tecnología en actividades no académicas, un porcentaje de docentes aún no hacen uso de la tecnología en la enseñanza aprendizaje.

Palabras claves: La indisciplina, factores indisciplinarios, enseñanza, aprendizaje

Introduction

Indiscipline is a destructive behavior that does not promote peace and coexistence in society. This behavior is an acting cancer for many nations of the world, as it is a threat to the lives of young people. Many efforts have been made by various world leaders to reduce this growing notoriety, especially among schoolchildren; unfortunately, it can be seen that indiscipline has not been able to be fought due to a number of factors that do not help eradicate it.

Lack of discipline is present in the study centers of our country, so measures must be taken to intervene in these cases that are adversely affecting normal curriculum development. The bad behaviors of the students reflect a little practice of values, these reasons do not allow a good development of teaching-learning, as a consequence of arising problems.

When speaking about indiscipline on college students, young people who have already adult age seems not to agree, however, it is happening on university classrooms. This is, in many cases due to a lack of responsibility that young people is showing when they go to a study center while obtaining a university degree.

In the Faculty of Pedagogy of the Technical University "Luis Vargas Torres" in Esmeraldas, among students of the first year, indiscipline can be observed in different ways, either because students are late, the teacher allows them to enter classes. They are not up-to-date with the class and certain task, so they start asking. They do not bring tools to carry out their activities, neither. Other reasons for indiscipline are notifications from their mobile phones when trying to answer, in other cases. Sometimes, they have no intention to taking classes, so they begin interrupting classmates; so, the teacher catches their attention and the students answer inappropriately, so the teacher finds it necessary to ask them to leave the

classroom. Indiscipline among students results in situations that affects a normal development of their studies, due to their lack of maturity.

Normally, the students who do not attend classes, or have to leave a classroom for any reason; they do not worry about having the necessary information on the subjects discussed so they analyze them; they accumulate shortcomings in their learning process. At the end of the cycle, there is an impact that results in repeating or fails of the subjects. This leads to dropping out of school temporarily or permanently.

Indiscipline or undisciplined means that an individual does the opposite of what is instructed, or that an individual does not respectfully accept an order from an authority. In other words, the word indiscipline is understood as a lack of discipline, that is, the total absence of an adequate behavior that must be carried out, whether in home, an educational institution or wherever an individual is. If in any of these scenarios, the individual does not respect the rules of conduct that he/she must have, so that is considered indiscipline.

Indiscipline has a great impact on what you want to achieve, because being irresponsible, disorganized, not knowing how to control impulses, not respecting rules, are mitigating factors that obstruct a perceptible capacity to achieve goals. Being undisciplined results in harmful situations that impair a normal development of any activity, which in many cases, it can be attributed immaturity, or a lack of development in individual's social interaction.

In García's opinion (2008), indiscipline is a type of behavior that deviates from what is generally accepted by the norms, as seen in almost all facets of society; at home, in educational centers, public and religious places.

Zamudio Villafuerte (2012) states that lack of discipline in schools has become a general problem. Due to the increase in distractors, such as be part of a group, paying attention to tasks that are not related to studies, continuous usage of mobile phones during class hours, to name a few mitigating factors.

Para Goñi Grandmontagne (2009) la indisciplina hoy en día es común entre los estudiantes, además hace hincapié en que los eventos de indisciplina se observan en todos lados y que este comportamiento de indisciplina exige la aplicación de sanciones, debido a que la indisciplina en los seres humanos se valora como un acto poco ético que no corresponde con las normas y valores de la sociedad.

On the other hand, De la Mora Solís (2015) believes that indiscipline is all actions, words, attitudes and gestures of rebellion that hinder disciplinary rules established in an educational institution, or that represent an attack against integrity, authority, performance, harmony and idiosyncrasy of an institution, intolerance and disciplinary behavior cause disorder, destruction and anxiety among students. Therefore, disciplinary behaviors do not create an environment conducive to learning, instead, it leads to poor academic work.

A student has his/her own characteristics that must be taken into consideration when determining factors that produce possible causes ending in disruptive behaviors, which may be due to insecurity, inadequate adaptation, integration problem with peers, isolation,

aggressiveness, not accepting educational values, marginalization as it may also be that they have difficulty learning and obtaining good grades or they have failed subjects.

All the concepts studied are related to the fact that any behavior that affects a development of normal life in educational centers and that hinders coexistence and learning is accepted as a lack of discipline; this is due to the existence of a great diversity of terms to conceptualize such behavior. It is clear that at school is possible to establish factors that guide acts of indiscipline, to the point that necessary measures can be taken to correct and prevent these events.

In some instances, it is presented that students -for different reasons- arrive late to the study center, some do so repeatedly, others students have a justified reason such as job reasons or for some inconveniences that they might be facing, certain teachers are considerate -so that the student does not lose track of the subjects being discussed- they allow to enter the classroom, but some students do not appreciate this gesture; on the contrary, they interrupt the lecture or discussion, distract other students, impede learning and in general, they interrupt a normal class.

So, it is necessary that when starting a school year, this aspect must be taken care of so it does not continue, it will be extended for the entire cycle and the students will create habits for the subsequent cycles. Since there is a number of possible reasons why students are late to class, it is necessary considering such causes for this problem to avoid it from the beginning, so that teachers can apply appropriate measures and strategies. However, understanding the reasons does not require tolerating bad behaviors.

For Prieto Navarro (2008), the students do not perceive the level of interruption that they cause when arriving late -for their classmates and for the teacher- they cut the thread of the subject being discussed at that time; and students who are used to arriving early tend to get annoyed. The teacher should point out such an inconvenience and remind students arriving late that their behavior affects others.

On the other hand, Díaz Bordenave (1982) states that students should be explained that being late has both intellectual and social repercussions. The teacher should emphasize students that when they are late, they detract their peers from learning and disrupt teacher's normal flow of thinking. Often, it occurs at the beginning of class, when the teacher makes connections to previous materials and frames the day's content in terms of questions or key points. When students are late, not only do they lose that important framing information, but they create such a distraction that can cause their classmates to lose it, too. In addition, the social impact of the being late must be pointed out; teachers, for example, should indicate students that this action represents a lack of respect.

The number of students who are consistently late in college is concerning, as well as many who are absent sometimes all week; this leads to problems in the student's overall educational experience. Being absent a 10 percent of the school year causes many students to have learning difficulties, and if they drop subjects, they lose time that can be used to advance to the next cycles, this can be associated with an increase in failure rates and school dropout.

To correct this situation with college students -delays attending classes- students should be made aware of the harm they themselves cause and how it affects others, they teachers should allow entry into the classroom only if it is verified that the delay is due to greater reason.

In constant work with young university students, who due to their inexperience show impulsive behaviors as a tendency to act on a whim, showing behavior characterized by little or no foresight, reflection or consideration of consequences. These impulsive actions are typically ill-conceived, prematurely expressed, unduly risky, or inappropriate for any situation that often result in undesirable consequences for them, because they jeopardize long-term goals and strategies for success.

In some cases, it can be said that there are various factors for impulsiveness, which may be acceptable, because it implies an action without much foresight in appropriate situations, which may result in desirable consequences. When such actions have positive results, they tend not to be seen as signs of impulsiveness, but as indicators of boldness, speed, spontaneity, bravery.

To get a clearer idea, it can be stated that impulsivity is associated with undesirable, rather than desirable results. People who are impulsive are commonly described as reckless, impulsive, unpredictable, or unstable. They are quick to lash out at anything considered mild and often do not recognize how unreasonable or excessive these emotions are.

Linehan (2012) states that young people are often characterized as impulsive, reckless, and emotionally unstable, so this behavior was often attributed to "volatile hormones." However, recently some scientific studies have been able to explain the impulsive behavior of adolescents and young people as a result of an imbalance in brain development. According to this theory, the prefrontal cortex -the center of the brain's cognitive control system- matures more slowly than the limbic system, which governs desires and appetites, including food and sex drives. This creates an imbalance in the brain that leads to even more impulsive and risky behavior.

In psychological terms, Morris & Maisto (2001) state that impulsive behaviors are essentially inappropriate, either in terms of scale or potential risk. An impulsive person is less likely to consider potential consequences and often uses self-injury behaviors (such as binge eating or excessive drinking) as a mean of coping with their problems. However, impulsive behaviors are not -in themselves- diagnostic; only when the behavior is pervasive, disruptive and it interferes with a person's ability to function normally, it can be considered. In the same way, impulsiveness should not be confused with a compulsion, in which a person recognizes that the behavior is abnormal but cannot stop it.

It can be said that impulsive behaviors are reactions performed without thinking, from making hasty decisions to getting into fights, impulsiveness can cause harm to own person and to those around such a person. In addition, it damages relationships and overall sense of well-being, impulsive behaviors can also cause financial and legal harm if left unattended.

Teachers are often exposed to hearing inappropriate words or vocabularies used by students in the educational institution, which are expressed because they are fashionable, they

heard it somewhere, to attract attention or to make a difference in the group. Even though students are always reminded to conduct themselves appropriately when expressing their feelings, but everything has a time and a place. Teachers always must remind them that to achieve their goals, they must pay attention to their actions and thoughts, it aimed at the education/grade they want to achieve so to become professionals. Therefore, expressions with profane terms or words with unknown meaning are not allowed in the institution, because such terms may contribute more to indiscipline.

For Castañeda Carreón & Carlos (2017) the word unseemly, improper, unspeakable means not conforming to what is accepted as correct, appropriate or in good taste, because unseemly suggests a violation of accepted standards of good manners. The conduct or the use of improper words can be applied to a wider range of infractions of rules not only of social conduct but ethical practices or logical procedures in any context that it develops.

Castañeda Carreón & Carlos (2017) say: although it is important not to react defensively to the use of rude words by students, it is important that the teachers to make it clear that such terms are not allowed in the classroom, because they are unrespectful for everyone. The way in which the teacher chooses to approach such a problem will depend on the nature of the behavior occurring, as well as their individual style; letting the use of inappropriate words pass can diminish the authority of the teacher within the classroom.

On the other hand, Suárez Zozaya & Pérez (2008) state that, if rude behavior occurs or the use of inappropriate words, the teacher might choose to address a class as a whole, indicating what is and what is not acceptable, since they are students with a legal age, it is not necessary to do otherwise. It is important that the teacher respond immediately and coherently to inappropriate behaviors, the way in which teachers handle such a matter will depend to a great extent, so that this type of problem does not reappear, suggesting to students the usage of appropriate terms of expression, to have productive classes for the benefit of all.

For all the above, what the study centers and the university as a higher education institution seek is the transformation of the individual as a particular and of society in general; since universities are intended to prepare students for valuable living conditions in society and training for a professional life. Therefore, it is essential to instruct individuals comprehensively and to demonstrate that they can function within any community and contribute to the social, economic and political development of the nation; for this you must develop; abilities, values, attitudes, aptitudes and appropriate knowledge, to be able to offer your best contingent to the place where you are.

Society expects educational institutions to be preferred environments to transform citizens into productive and useful for any nation, so developing discipline among students is one of the key attributes to be effective.

The use of cell phones in classroom to conduct activities can be harmful, some students will use it correctly but as soon they are not being observed by the teacher, they will quickly switch to other sites not agreed for the task. It is a dangerous in the sense that some students will carry out their activities responsibly and others students will not.

A task in the classroom with the use of cell phones would be beneficial when the internet is provided by the educational institution, because they have limited access, they

block certain websites in which students cannot access social networks, the sites are purely academic web pages.

Smartphones and the use of electronic tablets can reduce a student's ability to think to their full potential, due to the surrounding distractions between peers who are sending different types of messages at all times and cannot resist the temptation to answer. That way students' attention is divided into two tasks: what the teacher tries to teach and what the student tries to do on the digital device. This leads to the retention of fewer elements related to both tasks because the brain system intervening or stopping movement in the body, it also interrupts cognition (Garza Gutiérrez, Carvajal A, & Avila Alpirez, 2019).

Likewise, Garza Gutiérrez, Carvajal A, & Avila Alpirez (2019) say that, if a teacher has students with smartphone addiction, they should conduct dialogs about cell phone use in the classroom, in non-academic activities affects performance and ratings. So, teachers must establish basic rules about the use of technology at the beginning of the academic year, so that students control themselves to become less tempted to take out their cell phones while the teacher is conducting classes.

The authors Villareal & Márquez P. (2014) state that currently the use of cell phones is of great help because information can be sent and received instantly, but sometimes it represents a tool that damages normal development of a class. When such devices are not being used responsibly for academic matters. The teacher has to be very aware, go through entire classroom, walk from one place to another to see if it is being used correctly to see desired result.

On the other hand, Nielsen & Webb (2011) comment that educators should not be prohibiting electronic devices in the classroom. A technology ban is not only contrary to the intuition of the world we live in, but could also harm students' development in the use of programs that would allow them to have a better participation in classes. So teachers, as well as students, need to change their practices; teachers must adapt to the reality that smartphones and other devices are here to stay, what they should do is watch and be aware of students' motives to turn on their devices while in classes to connect with non- academic activities. If happens to be that the class has become tedious to them, teachers have to change their strategy so to avoid it from happening.

Technology is a powerful tool that facilitates learning, allows concepts to come to life when correctly used, and it becomes an instrument for effective learning by correctly integrating with lessons. However, sometimes some teachers are against the use of cell phones in the classroom because they are concerned, with the distraction that it represents in the learning process while teaching (Yan, 2015).

One of the benefits provided by the use of cell phones in the classroom is blended learning, which is the combination of electronic learning with traditional classroom teaching, as indicated by Yan (2015), who also mentions that for the effective use of this technique, preparation is required; the teacher must carefully plan how to move seamlessly between traditional instruction and rich-technology activities. The teacher should also ensure that the culminating activity concludes with an assessment to determine if students have learned. If learning has not occurred, the strategies used were not effective.

Today, teachers can find various applications in the market that present concepts in a creative and attractive way. Using apps relevant to the concept being taught can provide a multi-sensorial experience that students will enjoy. However, it must always be kept in mind that it is important to evaluate if the students have learned at the end of the lesson. The evaluations do not have to be extensive tests, but they are necessary to verify the effectiveness of the teaching strategy being used (Zarra, 2017).

Another interesting thing about using technology tools is that social media can be used as a platform for students to participate in meaningful educational discussions. Teachers can create closed class groups and ask questions to which students respond. Students can also share their own thoughts and ideas, as well as upload videos they have created for classmates to evaluate them and learn. The use of this tool opens the doors for the most appropriate strategy to be used because possibilities are endless (Zarra, 2017).

Technology is considered a necessity for the teaching-learning environment, because the use of technology in the classroom not only helps to learn better, but also students acquire multitasking skills; they can learn at their own pace -which is not the case in the traditional classroom- because learning is slower and more difficult to achieve. With the integration of technology in education, students have the ability to increase speed and review lessons and concepts, more advanced students can improve their learning. Teachers find creative ways to teach their students that keeps them engaged. Technology has the ability to improve teacher-student relationships, helps make teaching and learning more meaningful and fun. Students can also collaborate with their own classmates through technology apps.

While technology has undoubtedly changed education, many educators still choose to use a more traditional, low-tech approach to learning. Some learning styles require a physical presence and interaction between the educator and the student. Additionally, some research has shown that low-tech classrooms can boost learning. For example, students who take handwritten notes have a better memory than students who do not take handwritten notes. Another drawback to technology in the classroom may be that students are deficient in spelling and writing skills. Ultimately, tailoring the learning experience to different types of students is incredibly important, and sometimes students work best with a low-tech approach.

Sometimes when teachers are starting a class some students are not paying attention, they are talking despite the fact that they are being told the class has started, sometimes they are asked to abandon the classroom if they keep talking, they get calm for a period of time, then they start talking again, so the teacher sees the need to take other measures. In order to have a good work environment in a classroom, it is necessary absolute silence so to one voice to be heard, either from the teacher who is giving instructions or explaining the class and to respect others' opinions being issued in an order. On the part of the students, the same must happen when the students have to expose their work, there must be a respect for each group exposing and the ability to listen carefully. In this way, it is possible for the student-teacher interaction to be carried out in a good manner and by hence teaching learning.

As repeated attention is drawn to certain students who want to talk about everything just when they are in the classroom and have to carry out the activities, a good strategy is to

improve the relationships of students with teachers due to the important, positive implications and lasting that this entails, for academic and social development. Through this aspect, make students aware of the gaps in knowledge that they and their classmates would have that cause continuous interruptions in classes, in this way they behave better in class and achieve higher academic levels.

Durán Ganchoza & Muñoz Suarez (2017) point out the complexity and breadth of social and school problems that can lead to student behavior during school hours. A good teacher must be able to play the role of social mediator because school programs are not the apparent cause of problematic behaviors, changes in school practices may not seem to provide a substantial solution.

For a better student-teacher interaction, it is important to know the opinions of the students, about how classroom practices could better help those with behavioral problems. It is necessary positive relationships among teachers and students, it brings beneficial results that motivate students in the learning process and promote their desire to continue studying (Durán Ganchoza & Muñoz Suarez, 2017).

Another important aspect to kept in mind is the content of materials, for it to be attractive, appropriate and that it coincides with the skills that the student wishes to develop, because a monotonous classes, the lack of didactic resources, makes it difficult for students to maintain their interest and attention, increasing difficulties for conducting teaching-learning process, since high-quality academic instruction must be designed, according to the educational levels that the students take, which it is easy to associate previous knowledge with current knowledge in an analytical, critical and reflective way (Durán Ganchoza & Muñoz Suarez, 2017).

Teaching is the most extraordinary profession in the world, although roles and functions vary from country to country, the differences between teachers are generally greater within a country than between countries. Because the nature of the activities that make up teaching depends more on the age of the people being taught than on anything else. University students -who have already gone through various educational processes on many occasions- have not reached the maturity in behavior and discipline that they must have in order to make their learning effective, which is why many teachers see the need for implementing strategies to carry out the teaching-learning process in the best possible way.

No teacher likes to deal with disciplinary problems, it is simply not fun, but since there are different situations, they must be faced it and corrected it in a timely manner. There are several factors involved in building and maintaining proper discipline in the classroom, which is essential to creating a suitable climate for achieving the common goal of teaching-learning.

To have good academic results from the beginning of the school year, it is necessary to establish how you will work during the semester, make clear the rules of the course, which consists of the explanation of the work procedures, the evaluation criteria, the basic rules of behavior, so that the performance in the classroom is not altered, in addition to insisting on

the rules of coexistence and respect, socializing the sanctions contemplated in articles 35 and 37 of the Disciplinary Regime of the Statute of the Technical University "Luis Vargas Torres" at Esmeraldas.

Teachers should pay attention to planning so to achieve their expected results while conducting classes, so they do not experience drawbacks of any kind, they must plan well how it will be developed, as Aguaded Gómez & Fonseca Mora (2007) say, which is essential to start an organized class in such a way that it can be carried out without interruptions of any kind, so techniques and methods used by the teacher must guarantee that objectives are achieved, which is the development of strategies and the acquisition of knowledge by students. Therefore, the use of teaching materials appropriate to the class -to be taught- must be considered, in this way the teaching-learning interaction is achieved in the most appropriate way. It can be supported with the use of educational technology to organize knowledge and achieve purposes, or make tools/techniques.

For, Zabalza Beraza & Zabalza Cerdeiriña (2010), the teacher should take his/her time to plan, be willing to plan the instructions well, have the tools available and be as organized as possible. The teacher should observe what elements are disturbing to the normal development of the classes, to make corrections on time. Facing problems when they occur is essential, because letting go and waiting can make the situation worse, the problems would become more acute and it would be more difficult to solve them. Something to consider is also when you have a new course and students are still not well differentiated, they may be asked to wear a name badge.

Teach the procedures well, clearly explain what is going to be done, at that moment, put into practice with a small example, correct if necessary, so that they do it well, because if the teacher does not take the time to properly teach procedures, he/she will end up frustrated throughout the cycle when students just don't seem to follow him/her because they don't understand (Biggs & Burville Biggs, 2004). A good strategy is to keep students engaged. The more students are committed to learning, the less they will cause problems. To achieve this, the teacher must demonstrate the passion they feel for teaching and that the subject they teach is interesting. When students learn their work, so there is no need to lecture all day. Engaging students in activities is a great way to make them have their own initiative to learn.

Teachers should not stay in one place while they explain the class, the most practical thing is that they move constantly in the classroom, because this allows them to observe what the students are doing. This technique not only provides some variety, but also causes students to pay more attention.

Developing a good relationship with students is important so that they have an appreciation for the subject, to get respect and to feel that teachers care about them; to do that, you have to be genuine and admit mistakes, be friendly and approachable, congratulate students on their achievements, and attend extracurricular events when possible. However, it must be clear that interactions with students must be friendly, but not familiar (Day, 2006).

The training that is intended to be achieved with the students is comprehensive, for which they must be asked to keep the classrooms clean, to organize their desks, to accustom them to having only at their desks what they need for the activity they are going to do,

everything else should be kept or put on the floor. This can help the teacher to have better control, see easily and exactly what students are doing, and there will be a better focus when carrying out certain activities.

In this rapidly changing world, education plays an important role in empowering students to participate in the challenges that come their way, because the 21st century is rapidly changing in every human dimension (economically, socially, technologically), educators and policy makers face complex problems, so teachers have to create students on the 21st century with significant skills (Martínez, Ruiz, & Valladares, 2012).

Teachers that belong to the 21st century need to employ teaching skills, mastery of content, and integration of teaching with technology, because teacher development programs are so important. The impact of good teaching is increasingly cited as an important determinant of society's economic well-being. The useful and productive teacher compensation system works as an important link to attract well-qualified and highly motivated people to the teaching profession.

The quality of teachers determines the quality of education and is linked to the development of the population. With emerging technologies, teaching-learning is transforming from a learning environment focused on the teacher who guides and the student who learns, by the maximum opportunities open to new generations, and educational trends at a global level to generate change on a large scale through creative uses of emerging technologies, which makes learning more practical, meaningful and fun (Trías & Ardans, 2004)

Method

For this investigation, the empirical method was used because it allowed an examination and analysis of the previous information to later verify, and verify which theory to use, the theoretical method for literary information based on facts, to reach a scientific understanding of them, the inductive method, which served to obtain the conclusions of the phenomenon under study, the deductive method, because it allowed simplifying results to minimum explanation and the descriptive statistical method that allowed describing facts by visualizing them, giving a summary general based on the data obtained from the study phenomenon in numerical and graphic form.

The survey technique was used, in order to have a clearer idea of the factors that affect indiscipline and how it damages the teaching-learning of the students of the first cycles of the Faculty of Pedagogy of the Technical University "Luis Vargas Torres" from the city of Esmeraldas. Since the first period of the year began in May and ended in August 2019, the observation and survey of dichotomous closed questions addressed to 20 teachers (15 women and 5 men), 185 students (140 women and 45 men), after tabulation the following results were obtained.

Table 1
Summary: student surveys

N.º	Questions	Option and percentage				Total	
		Yes	%	No	%	Survey	%
1	Do you consider being late to be a reason to talk in the classroom and cause indiscipline?	94	51%	91	49%	185	100
2	Do you think that being impulsive causes indiscipline?	144	78%	41	22%	185	100
3	Do you think that the use of improper words is one of the reasons that causes indiscipline?	112	61%	73	39%	185	100
4	Do you think that the use of cell phones contributes to the poor attention of the classes, causing indiscipline?	170	92%	15	8%	185	100
5	Do you think that a person is unruly when he is repeatedly called out for talking during school hours?	135	73%	50	27%	185	100
6	Do you consider that teachers use current strategies and techniques for teaching - learning?	94	51%	91	49%	185	100

Note: Source: survey addressed to students of the FACPED Technical University "Luis Vargas Torres" in Esmeraldas.
Prepared by: Santa Toala Ponce, M.Sc., Elsa Quiñónez Ortiz, M.Sc., Ludy Gómez Pinillo, M.Sc.

Table 2
Summary: teacher surveys

N.º	Questions	Option and percentage				Total	
		Yes	%	No	%	Survey	%
1	Do you think that when a student is late, it causes discipline in the classroom?	12	60%	8	40%	20	100
2	Do you think that when a student is impulsive it causes indiscipline?	10	50%	10	50%	20	100
3	Do you think that the use of improper words is one of the reasons that causes indiscipline?	11	55%	9	45%	20	100
4	Do you think that the use of cell phones by students contributes to the lack of attention in class, causing indiscipline?	17	85%	3	15%	20	100
5	Do you think that a person is unruly when he is repeatedly called out for talking during school hours?	13	65%	7	35%	20	100

6	Do you consider that you use current strategies and techniques for teaching - learning?	12	60%	8	40%	20	100
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Note: Source: survey directed to teachers of the FACPED Technical University "Luis Vargas Torres" of Esmeraldas
 Prepared by: Santa Toala Ponce, M.Sc., Elsa Quiñónez Ortiz, M.Sc., Ludy Gómez Pinillo, M.Sc.

Results

The results obtained from the survey of 20 teachers (15 women and 5 men), 185 students (140 women and 45 men) from the Faculty of Pedagogy of the Technical University "Luis Vargas Torres", in Esmeraldas, clearly show the factors that produce indiscipline: how can it be evidenced in questions 1, 2, 3, 4 and 5, which were carried out on students, where it is shown that more than 51% of the respondents stated that they commit mistakes such as being late, being impulsive, use non-inappropriate terms, use the cell phone for non-educational purposes, converse in the classroom, causing indiscipline that affects teaching-learning. In question 6 made to students, 51% of the respondents considered that teachers use current strategies and techniques for teaching-learning, while 49% consider that they do not.

The answers to questions 1, 2, 3, 4 and 5, which were made to teachers regarding the factors that influence the lack of discipline in the classroom, indicates that more than 50% of respondents agree that the factors indicated in questions 1, 2, 3, 4 and 5, induce indiscipline that affects the normal development of teaching-learning. Regarding the answer to question No. 6 that was made to teachers, 60% of them answered that they do use current strategies and techniques for teaching-learning, unlike the 40% that indicated that they did not.

Discussion and conclusions

According to the stated objective, which was to determine the factors that induce indiscipline and its impact on teaching-learning. The small responsibility assumed by students in their education is shown, because some students have acquired bad habits from previous teaching experiences.

The study shows that indiscipline does occur in the students of the first cycles of the Faculty of Pedagogy of the Technical University "Luis Vargas Torres, in the city of Esmeraldas. These results agree with those indicated by García (2008), Zamudio Villafuerte (2012), Goñi Grandmontagne (2009) and De la Mora Solís (2015) who mention that an individual is undisciplined when he does not respect rules, he does everything that is contrary to what it is established in a certain place, as standards of good behavior.

It was established that there is a good percentage of students who arrive at the university late for different reasons and this causes constant interruptions and disrupts normal development of educational work. This agrees with what Prieto Navarro (2008) says, that the students do not take into account that being late adversely affects everyone, and Díaz Bordenave (1982) considers that when students arrive late to classes, they have both intellectual and social effects and it is considered a lack of respect.

According to the high impulsiveness indexes, the educator as part of the comprehensive training of students is obliged to look for mechanisms that control impulsiveness, because in many occasions due to student's immaturity they do not control impulses that lead them to commit mistakes. This is very similar to what Linehan (2012) says in the event that the student demonstrates his/her impulsiveness, in that he/she wants everything fast and cannot stay in one place for a long time, strategies must be applied to keep him/her busy in that way. The way student would be controlled some, because impulsive people quickly catch sometimes the teachings and not doing things quickly and practicing fast is a stressor to them. This is also expressed by Morris & Maisto (2001); if a student demonstrates impulsivity of another type -that he/she definitely cannot control impulses of harming or attacking classmates- to observe how often the student does it; and if by bring it to attention he/her corrects such behavior, ignores it, or otherwise the student does not change such a conduct, the student should be suggested to seek professional help, before things get worse such as harming others and himself/herself.

If it is high the use of inappropriate terms, so students must be highly controlled in their use, so that they improve their way of expressing themselves towards others and have respect for the place they are in, as part of their academic training. They must internalize and use appropriate terms so that they are leaving aside the use of inappropriate words, which would harm their personality and profession as future educators. This study agrees with Castañeda B., Carreón R., & Carlos F. (2017), Suárez Zozaya & Pérez I. (2008) who state that students must adjust to what the study centers consider correct and that in the moment that the use of improper terms occurs, the teacher must make it clear that this type of situation will not be tolerated in the classroom.

The use of the cell phone should be allowed only for educational purposes within the classroom, to avoid distractions that produce indiscipline, because there are students who still cannot control the use of cell phones as an entertainment, they do not attend to the teacher when lecturing and explaining certain topics and at the time of carrying out the activity simply do not do it well, because they did not pay attention responsibly. This is very consistent with (Garza Gutiérrez, Carvajal A, & Avila Alpirez, 2019), Villareal & Márquez P. (2014) who indicate that students who use the cell phone during class for non-academic activities have an impact on their learning, in general. At the end of the cycle, the result will not be satisfactory due to the lack of attention in class, the use of the cell phone for searching topics outside the study, so students must be taught to regulate themselves when using technology in the classroom. But these results do not agree with Nielsen & Webb (2011), (Yan, 2015), (Zarra, 2017) who state that cell phone use should be allowed in the classroom because currently, it allows developing a series of skills for students, for which teachers must be trained, so that they can make use of all the programs that they can use in the classroom through the cell phone to have productive classes.

A high percentage of students like to talk in the classroom, they impair a normal development of the classes and the activities. Because the first minutes of class are usually the most important, since in this time is when the teachers are sharing information on how to go, framing the content of the conference or discussion, connecting current content with past content; for this type of attitude to be avoided, the student-teacher relationships should improve. Durán Ganchoza & Muñoz Suarez (2017) agreed that the teacher must have good

communication with the students to detect what is the cause of the interruptions and that the classes must contain all the necessary implements for a good development.

It is concluded that the university has its statute, so that students who recur with inappropriate behaviors should be subject to sanctions provided for in the university's disciplinary policy, articles 35 and 37.

Students have become accustomed to being late to the educational institution, so it is difficult for them to change such behavior, as well as comply with schedules, obey rules, complete tasks and track their materials, which may also influence the family socioeconomic situation.

The poor practice of values of the students is denoted, because they use improper phrases, they talk loudly while in class, so the teachers constantly attract their attention, the frequent use of the cell phone in non-academic activities and the disrespect for others.

In teaching-learning, a good number of teachers use strategies and the use of technology to improve and achieve student learning.

Technological advances have boosted the educational sector in recent decades; this a reason in which it is important for teachers to use different types of technologies to help students learn in the classroom.

All teachers must use technology to teach, taking advantage of what is now has become part of the lifestyle of university students, just as it is happening in working life, teachers must be trained to improve their teaching through technology and therefore education.

This article is intended to help improve teaching practice at the "Luis Vargas Torres" Technical University at Esmeraldas.

All the teachers of the Faculty of Pedagogy of the Technical University "Luis Vargas Torres, from the city of Esmeraldas - Ecuador, should be thanked for their valuable contingent to carry out this article.

References

- Aguaded Gómez, J. I., & Fonseca Mora, C. (2007). *Enseñar en la universidad: experiencias y propuestas de docencia universitaria*. España: Netbiblo.
- Biggs, J., & Burville Biggs, J. (2004). *Calidad del aprendizaje universitario*. Madrid: Narcea S.A.
- Castañeda B., S., Carreón R., J., & Carlos F., T. (2017). *Percepción de ansiedad en estudiantes universitarios*. Barcelona: Editorial académica española.
- Cegarra Sánchez, J. (2012). *Los métodos de investigación*. Madrid: Ediciones Díaz de Santos.
- Clandellas Pros, R., Clariana Muntada, M., & Badia Martín, M. (6 de junio de 2015). Indisciplina instruccional y convencional: su predicción en el rendimiento académico. *Revista Colombiana de Psicología*, 24(2), 5-6.
doi:10.15446/rcp.v24n2.44148

- Day, C. (2006). *Pasión por enseñar: La identidad personal y profesional del docente y sus valores*. Madrid: Narcea S.A.
- De la Mora Solís, C. (2015). *Disciplina en el aula*. Barcelona: Ediciones SM.
- Díaz Bordenave, J. (1982). *Estrategias de enseñanza--aprendizaje: orientaciones didácticas para la docencia universitaria*. San José: IICA.
- Durán Ganchoza, F., & Muñoz Suarez, M. (2017). *La motivación en los docentes y estudiantes universitarios*. Machala: Editorial Academica Espanola.
- Fierro Evans, C., & Carbajal Padilla, P. (2019). Convivencia escolar: Una revisión del concepto. *Psicoperspectivas*, 18(1), 3. doi: 10.5027/psicoperspectivas-vol18-issue1-fulltext-1486
- García Correa, A. (2008). *La disciplina escolar*. Murcia: EDITUM.
- Garza Gutiérrez, J., Carvajal A, E., & Avila Alpírez, H. (2019). *La Influencia del uso del celular en el rendimiento académico* . México: Editorial Academica Espanola.
- Goñi Grandmontagne, A. (2009). *Psicología de la educación sociopersonal*. Caracas: Fundamentos.
- Guzmán, J. (16 de Junio de 2011). La calidad de la enseñanza en educación superior. 33(*Especial*), 3-5. Retrieved from http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-26982011000500012
- Linehan, M. (2012). *Manual de tratamiento de los trastornos de personalidad límite*. España: Grupo Planeta.
- Martínez, R., Ruiz, R., & Valladares, L. (2012). *Innovación en la educación superior: Hacia las sociedades del conocimiento*. México: Fondo de Cultura Economica.
- Morris, C., & Maisto, A. (2001). *Introducción a la psicología*. México: Pearson Educación.
- Nielsen, L., & Webb, W. (2011). *Teaching Generation Text: Using Cell Phones to Enhance Learning*. New York: John Wiley & Sons.
- Prieto Navarro, L. (2008). *La enseñanza universitaria centrada en el aprendizaje: estrategias útiles para el profesorado*. Madrid: Octaedro.
- Sandoval Manríquez, M. (Diciembre de 2014). Convivencia y clima escolar: claves de la gestión del conocimiento. 22(41), 8-10. doi: 10.4067/S0718-22362014000200007
- Suárez Zozaya, M., & Pérez I., J. (2008). *Jóvenes universitarios en latinoamérica, hoy*. México: Universidad Nacional Autónoma de México.
- Trías, F., & Ardans, E. (2004). *Las tecnologías de la información y la comunicación en la formación docente: guía de planificación*. New York: UNESCO.
- Universidad Técnica "Luis Vargas Torres", E. (29 de Junio de 2016). Estatuto. *Estatuto Universidad Técnica "Luis Vargas Torres"*. Esmeraldas, Ecuador: Constitución de la Republica del Ecuador.
- Vázquez García, J. (2008). *La Universidad, en transformación*. España: Universidad de Cantabria.

- Villareal, J., & Márquez P., L. (2014). *Actitud ante el uso de las TIC en los docentes universitarios*. Valledupar: Editorial Academica Espanola.
- Yan, Z. (2015). *Encyclopedia of Mobile Phone Behavior*. New York: IGI Global.
- Zabalza Beraza, M., & Zabalza Cerdeiriña, M. (2010). *Planificación de la docencia en la universidad: Elaboración de las guías docentes de las materias*. Madrid: Narcea Ediciones.
- Zamudio Villafuerte, R. (2012). *Disciplina Escolar*. México: Editorial Academica Espanola.
- Zarra, E. (2017). *The Entitled Generation: Helping Teachers Teach and Reach the Minds and Hearts of Generation Z*. New York: Rowman & Littlefield.

Date received: 03/01/2020

Date reviewed: 31/01/2020

Date accepted: 05/01/2020

MLS PSYCHOLOGY RESEARCH

[https://www.mlsjournals.com/Psychology-
Research-Journal](https://www.mlsjournals.com/Psychology-Research-Journal)

ISSN: 2605-5295



How to cite this article:

Soto Genovese, E. A. (2019). Pedagogical-Therapeutic Model to Address Special Education in Guatemala. *MLS Psychology Research*, 3 (1), -. doi: 10.33000/mlspr.v2i2.458

PEDAGOGICAL-THERAPEUTIC MODEL TO ADDRESS SPECIAL EDUCATION IN GUATEMALA

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Abstract. Throughout history, the population with special educational needs has faced difficulties in social, cultural, and educational inclusion. Guatemala is not the exception for being a developing country and with great deficiencies in the attention of the educational system. Currently, there is a lack of pedagogy and didactics that solve this problem for teachers who work with students with special educational needs, just as educational centers lack training concerning special education together with therapeutic programs that provide results for people. In this investigation, the validity of the pedagogical-therapeutic model "Cetumismo" against the "Aula Recurso" program of the Ministry of Education of Guatemala was analyzed. This was done in a selected sample of teachers who work in educational centers, after answering a standardized Questionnaire to assess the quality of Special Education in educational centers through the statistical process t student according to the DSM model, where the means were compared in the two moments of evaluation, obtaining the variance. The results obtained establish that with a significance level of 0.05, the null hypothesis is rejected and the alternative hypothesis is accepted; the reason why the comparison of the means in the statistical process carried out determines that, between both programs, the program that solves the special educational needs concerning special education is the Therapeutic Pedagogical Model "Cetumismo". The teachers evaluated despite belonging to a school that uses the "Aula Recurso" program imposed by the Guatemalan Ministry of Education, consider that a pedagogical-therapeutic model such as "Cetumismo" would bring greater benefits in the special education needs of people with disability, with specific curricular adaptations for each student, constant and updated training for teachers, a differentiated curriculum, an inclusive educational process after the scope of the competencies proposed per case.

Keywords: inclusion, educational psychology, special education, classroom resource,

Introduction

The educational system in Guatemala suffers from one of the greatest deficiencies in the integral life of the country's citizens.

The General Directorate of Special Education (DIGEESP) from the Ministry of Education (2005), shows that -according to the 2002 Census XI of Population and VI of Housing of the National Statistics Institute (INE) - there are 135,482 households at least one person living with a disability. This is 6.2% of the total of Guatemalan households that make 2,200,608. On households with people with disabilities, 53.8% reside in rural areas. This data establishes the magnitude of such a problem and based on it, alternative solutions are proposed with the participation of various sectors in different fields of action.

According to CONADI in the "II National Disability Survey (ENDIS)" reports in 2006 it was established that coverage was approximately 13.660 to 15.609 special education students throughout the country and regular training for 4,988 teachers. The result shown establishes that more than 1.6 million Guatemalans suffer from some disability, statistically, that is 10.2% of the population. The information is shown in Tables 1 and 2.

Table 1

Prevalence of disability by age and sex

Age group	Prevalence			
	2-17 years n=5,469	18-49 years n=5,569	50 years onwards n=2,035	Total Ages n=13,072
Men n=6,033	4.9 (4.09-5.9)	6.9 (5.7-8.3)	21.5 (18.9-24.3)	8.3 (7.4-9.3)
Women n=7,039	5.7 (4.8-6.8)	12.1 (10.7-13.6)*	26.3 (23.4-29.4)*	11.8 (10.7-13.0)
All n=13,072	5.3% (4.5-6.1)	9.9% (8.8-11.1)	24.1% (21.9-26.5)	10.2% (9.3-11.2)

Note: retrieved from ENDIS (2016) / * significant difference in prevalence by sex ($p < 0.05$)

While analyzing such results, it was established that 5.3% of children between 2 and 17 years old are suffering from some type of disability; 9.9% of young people and adults between 18 and 49 years old suffer some type of disability and people over 50 years of age, it increases by 24.1%.

Table 2

Demographic and socioeconomic characteristics of people with or without disabilities

	People without Disabilities	People with Disabilities	OR adjusted for Age, Sex, Religion, Socioeconomic Status
Age (years)			
2-4	1,038 (9%)	31 (2%)	
5-17	4,142 (35%)	258 (19%)	2.1 (1.4-3.2)
18-49	5,017 (43%)	552 (42%)	3.6 (2.4-5.5)
+ 50 years	1,545 (13%)	490 (37%)	11.3 (7.5-17.2)
Gender			
Men	5,534 (47%)	499 (37%)	
Women	6,207 (53%)	832 (63%)	1.5 (1.3-1.7)
Region			
Central	1,856 (16%)	345 (26%)	
Northeast	2,574 (22%)	166 (13%)	0.3 (0.2-0.4)
Northwest	2,249 (19%)	394 (30%)	0.9 (0.7-1.2)
Southeast	2,685 (23%)	152 (11%)	0.3 (0.2-0.3)
Southwest	2,378 (20%)	274 (21%)	0.6 (0.4-0.7)
Location			
Rural	7,312 (62%)	727 (55%)	1.2 (0.9-1.4)
Urban	4,430 (38%)	604 (45%)	
Ethnicity			
Mayan	5,359 (46%)	628 (47%)	
Latino	5,841 (50%)	662 (49%)	1.2 (1.0-1.4)
Others	136 (1%)	12 (1%)	1.5 (0.8-2.8)
Unspecified	406 (3%)	39 (3%)	1.0 (0.6-1.5)

Socioeconomic status			
1st.	2,587 (22%)	281 (21%)	1.5 (1.2-2.0)
2nd.	2,576 (22%)	279 (21%)	1.4 (1.1-1.7)
3rd.	2,329 (20%)	273 (21%)	1.4 (1.1-1.8)
4th.	2,217 (19%)	262 (20%)	1.2 (1.0-1.6)
5th.	2,033 (17%)	236 (18%)	
Education level			
None	1,330 (20%)	381 (37%)	
Primary	2,725 (42%)	453 (44%)	0.8 (0.7-1.0)
Secondary	2,146 (33%)	179 (17%)	0.5 (0.4-0.7)
University	324 (5%)	21 (2%)	0.3 (0.2-0.5)
Literacy			
Good	3,488 (53%)	472 (45%)	0.8 (0.6-1.0)
Less	1,602 (24%)	276 (26%)	1.0 (0.8-1.2)
None	1,472 (22%)	294 (28%)	
Civil status			
Married/union	4,386 (67%)	647 (62%)	
Divorce	279 (4%)	66 (6%)	1.4 (1.0-1.8)
Widows	281 (4%)	148 (14%)	1.4 (1.0-1.7)
Lived with someone	1,615 (25%)	180 (17%)	1.3 (1.1-1.6)

Note: retrieved at the End (2016) OR: Odds Ratio

According to the National Education Law (1991), in Chapter III article 47, it defines Special Education as “the educational process that involves the application of additional or complementary programs to people who have deficiencies in the development of language, intellectual, physical and sensory and/or that give evidence of superior capacity to the normal”. However, according to López (2013), none of the schools or educational centers for people with or without disabilities in Guatemala have the necessary guidelines for the creation of such programs.

Various programs have been supported by the Ministry of Education in the General Directorate of Special Education in response to the population with special educational needs in inclusive educational centers. According to Búrbano (2005) in the investigation “Current Situation of Special Education in Guatemala” these programs are detailed in Table 3:

Table 3

Programs in response to the population with Special Educational Needs in Guatemala

Program	Assistance Percentage
Readiness	69%
Early stimulation	45%
Special education	63%
School integration	42%
Rehabilitation Physician	21%
Language therapy	39%
Lesson Resource	24%
Integrated Classroom	36%
Occupational training	33%
Labor Insertion	24%

Note: retrieved from Búrbano (2005)

The percentages of the programs that are implemented in public educational centers indicate that the most common services are: preparation, special education, and early stimulation. Each of these programs is different in each educational center.

Contradictory, the bulletin of the General Directorate of Special Education (2011), indicates that under the guidelines of the Law of Special Education for People with Special Capacities, the coverage of care that the Ministry of Education is carrying out; it is through the “Resource Classroom” program that is providing coverage for approximately 13,660 to 15,609 special education students. These students have mental disabilities, physical disabilities, hearing disabilities, visual disabilities, multiple disabilities, deaf, blindness, giftedness, learning difficulties, language difficulties, and emotional difficulties throughout the country, such as seen in figure 1:

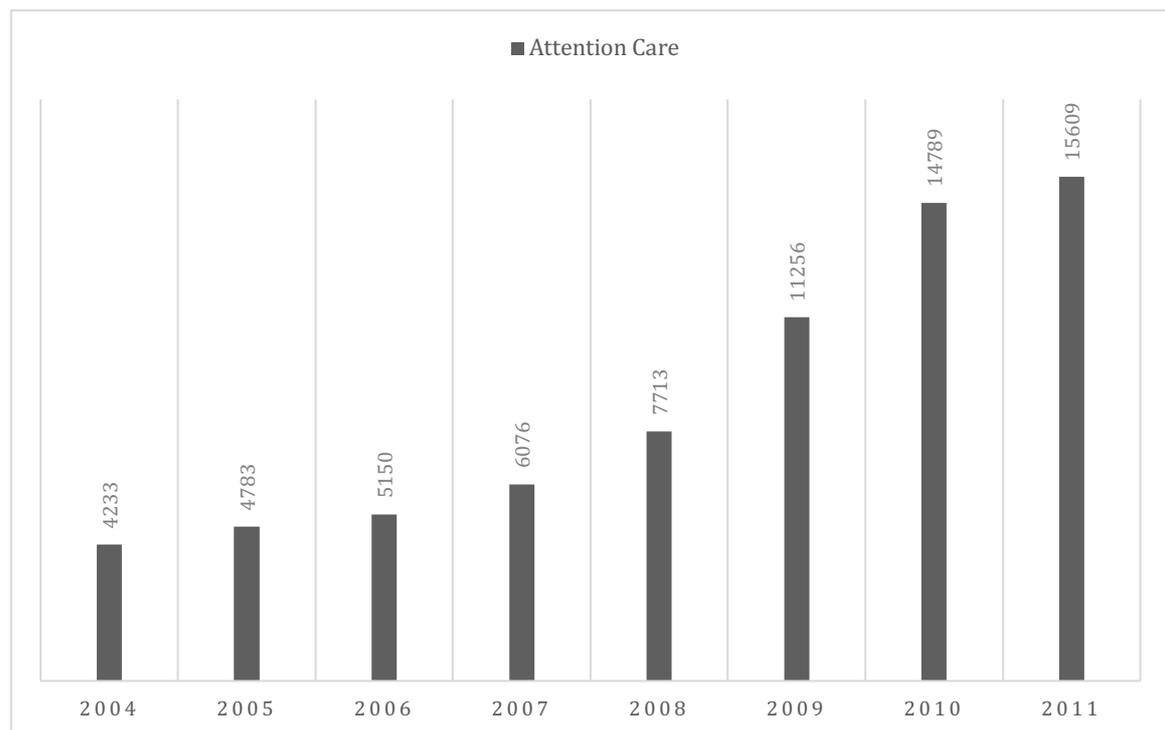


Figure 1. Population served by the Resource Classroom and Special Education Schools program in 2004-2011 (p.2). DIGEESP (2011)

According to the Ministry of Education (2017) in the SITEAL document, it indicates that of the total number of people with disabilities in the country, a 14% attends school, a 20% have attended third grade of primary school, and a 52% do not have any schooling. More than 78% of the population with disabilities receive no support and only 6% of people with disabilities know of a special education service or school.

However, according to Alvizurez (2017) in “Prensa Libre” school directors in Guatemala do not have specialized teachers and classrooms are not suitable for children with special educational needs. Currently, teachers who work with people with special needs do not have manuals or specific methodology for disability or educational need that guidelines what techniques and how to apply them as well as, strategies or pedagogical resources mentioned in the law. They only have the understanding if they have studies or a career in the area of Special Education, Psychology, or Psychopedagogy.

Currently, Guatemala has children with special educational needs, especially in public schools, so it is necessary to expand and strengthen strategies to achieve equity and equal opportunities, as a commitment to educational reform, concerning education and attention to diversity.

One of the strategies that teachers have from the Ministry of Education is the Curricular Adjustments Guide (2009) that presents curricular adjustments formats that do not recognize the special educational needs of all types of disabilities occurring in the country. They hinder school experience for all students.

In the same way, it indicates that there are 4,988 regular teachers trained in the attention of said student population. However, an educational establishment that had the “Resource Classroom” program was selected and an interview was conducted with the

Coordinator of the program. The coordinator indicated that each educational center that has implemented the Mineduc program decides what approach will be given to the cases of admitted students; and depending on the resources and knowledge of the person in charge of the program, this will be the attention that is provided to the student.

In general, the lack of attention in the education of children with disabilities is common in both the public and private sectors in Guatemala. The bulletin of the General Directorate of Special Education (2011), indicates that under the guidelines of the Law of Special Education for People with Special Capacities, the support provided by the Ministry of Education currently in the country is through the program "Resource Classroom", which in the same to "Current Situation of Special Education" report (2005) which is established as a support service that provides care for a minimum of 35 and a maximum of 45 students with special educational needs, served by short periods, in modalities of learning, language, emotional and behavioral problems.

The Ministry of Education in its supporting material for regular teachers for the care of children with special educational needs (2019) defines special educational needs as "a demand for differentiated attention and a variety of teaching-learning strategies, which are they give in the students throughout their schooling, to access learning that is determined in the curriculum corresponding to their age". So, they are an effective alternative for understanding the performance of student learning as well as the offering of educational and therapeutic services complementing the construction of diversity care.

According to the Guatemalan Ministry of Education (2017), as a diagnosis, special education in the country concludes that 89% of school buildings have architectural barriers for the population with disabilities. Also, the special educational needs most attended in the public and private sectors are learning, language, intellectual disability, and multiple disabilities. An important factor mentioned is that 66% of the teaching staff who attend special education in the public sector work with a budgeted position and 34% by annual contract.

Also, 40% of the teachers have a technical level of academic training in special education or career in order and 26% have a bachelor's level training. If the "Resource Classroom" program is a public sector program, said the study indicates that a 54% of the population with access to special education services in the private sector and a 46% the public sector, using the guides in both sectors curricula of the Ministry of Education to impart special education at the pre-primary and primary levels and to adapt them.

Our national educational curriculum is based on the Colombian models from 2005, for this study, it was considered important to include changes that Colombia has created concerning its educational system since it indirectly influences our curriculum design, which is the basis for the creation of Curricular adaptations. According to the National Administrative Department of Colombian Statistics (2005), educational inclusion requires a large number of changes in the system and in society itself. It requires a global understanding of the subject from a biopsychosocial model, in which a work of each of the citizens is proposed to build a democracy within the framework of human rights and within an open and inclusive society. To achieve this and following the ideas of Booth (2000), it is necessary to modify the culture, educational policies, and practices of educational centers and communities, institutes, universities, etc. establishing and organizing all the necessary personal, material and institutional resources in the community contexts in which they live, grow and learn.

The Declaration of Salamanca in Spain (1994), reaffirmed the total and equal right for all people within the educational system, proposing an inclusive and inclusive

perspective, as well as a rejection of educational organizations that in some way segregate and separate students either because of their cognitive conditions or because of their potential. It also established an urgent need to receive a quality education, attend regular educational centers, design and apply educational systems that ensure different characteristics and needs of the individual, and comply with the principles indicated in said declaration by international governments.

In conclusion, with Padilla (2011) teachers feel more prepared to educate students with emotional problems; however, the percentage of those who consider themselves prepared for it only reaches 45.8% and it must be taken into account that emotional problems are not considered a disability. When respondents are questioned about disabilities such as physical, mental, and sensory, less than a third of them generally feel capable of handling these students, and it is the physical disability with which they feel most familiar. When asked about students with sensory or mental disabilities, around 80% of the respondents do not feel prepared for them; and in the case of physical disability, 71.1% have the same opinion.

Therefore, didactic models must be established so that teachers can address special education. According to Mata and Arroyo (1999), through an analysis of didactic models, a global vision of the didactic process is obtained from various conceptual approaches. Specifically, in Special Education, the models derive from approaches to learning problems together with an intervention model.

When we talk about adapting teaching to children according to the Ministry of Education (2011), attending to individual differences is a topic that has always concerned professionals and teachers aware of the needs and shortcomings of the Guatemalan educational system. It is about adapting education to the individual and not the individual to education by subjecting her to a path of segregation, failure, or marginalization. What is intended is to provide the necessary conditions so that all students have a place and can receive an education that is complete and rewarding. To achieve a true adaptation of teaching, it is necessary to have all the elements that make up the subject's educational environment: the study of aptitude, attitude, motivation, social relationships, learning style and context in which the subject operates; still lack of traditional teaching methods in Guatemala.

So the objective of this study is to analyze the validity of the pedagogical-therapeutic model "Cetumismo" against the "Aula Recurso" program by teachers who work in educational centers that serve people with special educational needs in Guatemala.

Also, determine the special educational needs of the "Classroom Resource" program and the "Cetumismo" pedagogical-therapeutic model in educational centers that serve people with disabilities, identify the benefits obtained from a specialized program such as "Cetumismo" in the needs of special education for people with or without disabilities, differentiate the deficiencies of the "Classroom Resource" program that would be solved with a program like "Cetumismo".

As a hypothesis, it is established that teachers who work in educational centers that serve people with special educational needs maintain that the pedagogical-therapeutic model "Cetumismo" responds to a more explicit list of needs of people who are served by the "Resource Classroom" program".

Method

Problem

Even though Guatemala has created public special education programs and centers for the care of people with disabilities, the data obtained from the care services reflects the precarious situation in terms of care for people with or without disabilities who require special education, the question arises to create an investigation of this nature.

According to the General Directorate of Special Education in Guatemala (2008), it presents the attention provided in the programs in the following Table 4:

Table 4

Characteristics of Attention Care in Guatemala Special Education Programs

Integrated Classroom	Lesson Resource	Special education	Language therapy
1,242 students with deafness, mental retardation, and learning disabilities	4,344 students with learning, language, emotional and behavioral problems	1,460 students with intellectual, motor, multiple, and sensory disabilities	667 students with articulation, voice, and comprehension problems

Note: recovered from DIGEESP, MINEDUC (2008)

This led to the creation of the "Cetumismo" private center, which is defined as a "personalized center for integral development". This model that includes both pedagogical and therapeutic objectives seeks to centralize the processes of educational and psychological care for people with or without disabilities in Guatemala, focusing on the creation of a methodology that truly responds to the needs of students, both in the educational aspect and in the therapeutic.

Research Design

For this research, an exploratory study will be carried out, which according to Sampieri (2010) aims to increase the degree of familiarity with relatively unknown phenomena, obtain more complete information, investigate problems of human behavior considering a certain area, identify promising variables and establish research priorities.

The research design was carried out evaluating utilizing a survey designed for said research, to establish the knowledge and application of special education in Guatemala and the instrument "Questionnaire to assess the quality of Special Education schools: analysis of the current situation" to the teachers who work in educational centers that serve people with special educational needs in Guatemala, who received instruction regarding the application of the "Resource Classroom" program that responds according to the objects of study of said research.

Due to the type of study, a pedagogical-therapeutic model was designed to respond as multidisciplinary care to the special educational needs of children with

disabilities; This was delivered and explained to the teachers who work in educational centers, who responded to the two different instruments evaluating whether the model meets a more explicit list of people's needs than those that are served by the "Resource Classroom" program.

The present investigation fulfills these characteristics, concerning which the data were obtained when surveying regular teachers at the national level and the programs and methods established by the Guatemalan Ministry of Education as officers for the special education process in the country were studied.

On the other hand, in this research work, a non-experimental research design was used, so it focuses on the analysis of the pedagogical-therapeutic model "Cetumism" against the "Resource Classroom" program by teachers who work in educational centers that they serve people with special educational needs in Guatemala.

The process of said investigation will be when collecting information through the designed survey and then in two variables:

- A survey is designed and 200 teachers are evaluated to know their knowledge regarding special education care in Guatemala according to the educational center where they work.
- Variable 1: the evaluation instrument "Questionnaire to assess the quality of Special Education schools: analysis of the current situation" is delivered to the teachers of the research study, who must evaluate the 200 "Resource Classroom" program.
- Following this, a presentation of the proposal of a pedagogical-therapeutic model "Cetumism" is made to the 200 teachers of the research study.
- Variable 2: the evaluation instrument "Questionnaire to assess the quality of Special Education schools: analysis of the current situation" is delivered to the 200 teachers of the research study, who must evaluate the proposal for a pedagogical-therapeutic model "Cetumism".

Participants

In this research, we had a sample of participants, which represents the educational field concerning opinions or publications that indicate the need for an educational model focused on the special educational needs of students with disabilities who are included in their classrooms both in the public and private sectors. As inclusion criteria, educational centers were sought at the national level in the capital limits of Guatemala City, which had the "Resource Classroom" program, which enrolled students with special educational needs and who maintained close supervision by the General Directorate. of Special Education of the Ministry of Education of Guatemala.

Table 5 shows information regarding the non-probability sample that was used in the investigation:

Table 5
Population Sample

Gender	
Men	87
Women	113
Total:	200
Profession / Position	
Regular teacher	122
Teacher with studies in psychology or pedagogy	71
Rotary or practicing teachers	7
Non-teacher	0
Total:	200
Establishment where you work	
Public Educational Center	102
Private Educational Center	89
Center for Cooperative	9
Total:	200
Sector where you work	
Public	111
Private	89
Total:	200

Note: Author's creation

Variables

For the research process that was carried out, several variables were studied which are defined:

Study:

- Pedagogical-Therapeutic Model "Cetumism" (2014) is designed to work in groups of 5 students diagnosed by a specialized teacher, dividing it into three levels:
 - o Kiddies: students with a diagnosis that implies a greater challenge and have less or no independence
 - o Kido: students with a diagnosis that implies more personalized attention and less dependence of the adult on routines
 - o Kids: diagnosed students who benefit from personalized attention, but work independently
- The Classroom Resource Program (2008) is defined as a support service that serves a minimum of 35 and a maximum of 45 students who present a special educational need, served for short periods, in modalities of learning, language, emotional and language, and conduct problems.

Independents:

- Types of disabilities:

Acera (2015) defines the following types of disability:

- o Physical disability: it is the decrease or absence of motor or physical functions. The causes of physical disability are often congenital or from birth.

- Psychic disability: they are disorders that lead the person to not fully adapt to society.
- Sensory disability: are disorders in the sense organs. Includes vision, hearing, and language disorders.
- Intellectual or mental disability: It is a term used when a person cannot learn at expected levels and function normally in everyday life.
- Educational needs:

According to MINEDUC (2017), educational needs are defined as the demands for differentiated attention and a variety of teaching-learning strategies, which are given to students throughout their schooling, to access the learning that is determined in the curriculum according to their age. To compensate for these needs, curricular adjustments are required in various areas of the curriculum, according to the diagnosis issued by a professional.

Duk (2001) defines them as follows:

- Common or Basic Educational Needs: they refer to the educational needs that all students share and that are based on the basic learning for their personal development and socialization.
- Individual Educational Needs: these are linked to the different capacities, interests, levels, processes, rhythms, and learning styles of each student, which mediate their educational process, making them unique and unrepeatable in each case.
- Special Educational Needs: they refer to those individual educational needs that cannot be solved through the means and methodological resources that the teacher usually uses to respond to the individual differences of their students and that require to be attended to adjustments, resources, or pedagogical measures.
 - Teachers from educational centers currently working in both the public and private sectors. Teachers are divided into teachers of any academic level, whether pre-primary, primary, or diversified, who are qualified as special educators, graduates in clinical psychology, or careers in order.
 - The age of the students who are attended by the teachers cannot be controlled since the term “high and low functioning” is used in disability, which is also used when referring to autism, the following description of Gillberg (2011), indicates that the difference between the terms corresponds to the level of cognitive functioning, motor skills, language development, social skills and social understanding, and repetitive behavior patterns.
 - According to gender, such research will not segregate the study population. However, it is important to mention that the gender prevalence will be known since according to ENDIS (2016), the prevalence of people with disabilities between the ages of 5 to 17 years is 12% women, and 39% in men.
 - Data Collection Instruments are defined according to Fariñas, Gómez, and Rivero (2010), as any resource that the researcher uses to obtain phenomena and extract information. Through this instrument, the research is synthesized, summarizes the contributions of the theoretical framework, and delimits and defines the variables and concepts of study. For this research, the “Questionnaire to assess the quality of Special Education schools: analysis of the current situation” was used. This instrument consists of 40 segmented questions in 6 evaluation dimensions.

Dependents:

- Guatemala officially called the Republic of Guatemala, which is a sovereign state located in Central America with a wide indigenous culture, product of the Mayan heritage, and Castilian influence in colonial times. The current population for 2018 is 17,249,206 inhabitants; of which 2,200,608 suffer from a type of disability.
- The types of disabilities that are regularly attended in educational centers in Guatemala are intellectual, hearing, and visual disabilities, being of higher prevalence in the established order. However, Gómez (2008) presents the percentages of the types of disability seen in the United States and which we will use to compare with the data provided by ENDIS (2016) in Guatemala in Table 20 (annexes).
- Studies or qualifications of the Research teachers will not be controlled for the study, because according to the regulatory body for teachers is the General Directorate of Education (DIGEDUCA), it does not establish a job profile for the teaching position as a requirement to serve students with or without disabilities, leaving it to the discretion of each establishment.

Research instrument

The instrument used for this research was the questionnaire for professionals created in the research framework "Services and quality of life for people with intellectual disabilities" funded by the "Spanish Confederation of Organizations in favor of people with intellectual disabilities" (FEAPS) and in charge of the Blanquerna Faculty of Psychology and Education Sciences and Sports, at the Ramón Llull University led by a group of researchers, mainly by Giné et al. (2004) called "Questionnaire to assess the quality of Special Education schools".

The instrument was used in 2004 with the main objective of evaluating, to two educational centers in Spain, the evaluation process of the special education center according to the general model proposed in the research project, as well as the utility, relevance, and relevance of the same instruments applied for said investigation.

This instrument consists of 40 questions segmented into 6 evaluation dimensions, as shown in Table 6.

Table 6

Dimensions and Sub dimensions of the Questionnaire for professionals

Dimensions

Emotional Wellbeing

Personal Development

Self-determination

Interpersonal Relationships

Social Inclusion

Rights

Material Prosperity

Note: taken from Font, Alomar, and Mas (2004) (p.39)

According to the instrument, there is a scoring system that establishes the value to assign to each indicator and suggests Table 7:

Table 7

Scores and response indicators

If this is the case, it occurs very sporadically	1 point
Sometimes, although it is not well integrated	4 points
Consistently well implemented and integrated	7 points
Not applicable	0 points

Note: Author's creation

Therefore, said instrument was not adapted in terms of language or application since it fulfilled the objective of reflecting whether or not the quality and evaluation are given within a good service of attention to the population with disabilities that attends special education in Guatemala. The statements will be focused on evaluating how the pedagogical-therapeutic model "Cetumism" caters to these dimensions to the people who are served by the "Classroom Resource" program.

Due to the type of study, a pedagogical-therapeutic model was designed to respond as multidisciplinary care to the special educational needs of children with disabilities; This will be delivered and explained to the teachers of said educational establishment, who through the aforementioned instrument will respond if the model meets a more explicit list of the needs of the people who are served by the "Resource Classroom" program.

The Pedagogical-Therapeutic Model created and based on international systems of care for people with disabilities, such as "Self-contained classroom" applied in the United States, as well as pedagogies and approaches, such as Pestalozzi and Decroly, that respond to these special needs where teachers have a scientific, social, behavioral and educational support base that responds to the special educational needs of the Guatemalan population with or without disabilities.

This model responds to the need to provide both significant and non-significant curricular adaptations to students who have difficulty complying with the normal curriculum due to different situations that interfere with their learning.

The main areas of work in "Cetumism" are the special educational needs and significant curricular adaptations of the regular programs that students need, respecting their individuality. Likewise, support in skills and abilities according to your needs. Basic skills, academic skills, and interpersonal and intrapersonal skills are worked on.

To be accepted into the program, students must have a professional diagnosis related to special educational needs. This is essential since it provides an initial structure

that allows identifying the special needs that it requires to understand the capacities and dysfunctions to carry out the entry and exit profile appropriate to their potential.

Data Analysis

For this investigation, according to the study variables, and the object of study, the statistical method of student T (t-test) was chosen. Therefore, the student T-test was determined by having two mismatched or independent samples, where the variance was unequal.

For the research, the first sample was the 200 teachers who evaluated the "Classroom Resource" program, and the second sample was the same 200 teachers who evaluated the pedagogical-therapeutic model "Cetumism". It was considered of unequal variance since it is assumed that the two population variances are different, although the sample sizes are the same, so it is estimated separately.

This was graphed utilizing a two-tailed Gauss bell, wherewith a mean t Alpha mean the null hypothesis can be rejected: teachers who work in educational centers that serve people with special educational needs establish that the pedagogical model-Therapeutic "Cetumism" does not respond to a more explicit list of needs of people who are served by the "Resource Classroom" program; and accept the alternative hypothesis: teachers who work in educational centers that serve people with special educational needs establish that the pedagogical-therapeutic model "Cetumism" responds to a more explicit list of needs of the people who are served by the "Classroom" program. Resource".

Therefore, in said investigation, the procedure is as follows:

- The "Questionnaire to assess the quality of Special Education schools is reproduced: analysis of the current situation"
- They are rated and weighted according to the protocol for variable 1 and variable 2.
- The means are obtained due to data from two samples made by the same population.
- Two standard deviations are obtained, one for each mean.
- A hypothesis test is carried out to establish the final result.

Results

According to the results obtained, we will segment them to the two evaluation moments. We will see the results of "Classroom Resource" and "Cetumism" by dimensions in which the questions are divided. If a comparison is made by dimension of the questionnaire, according to the positive responses obtained when evaluating the two programs, we obtain the following graphs of results:

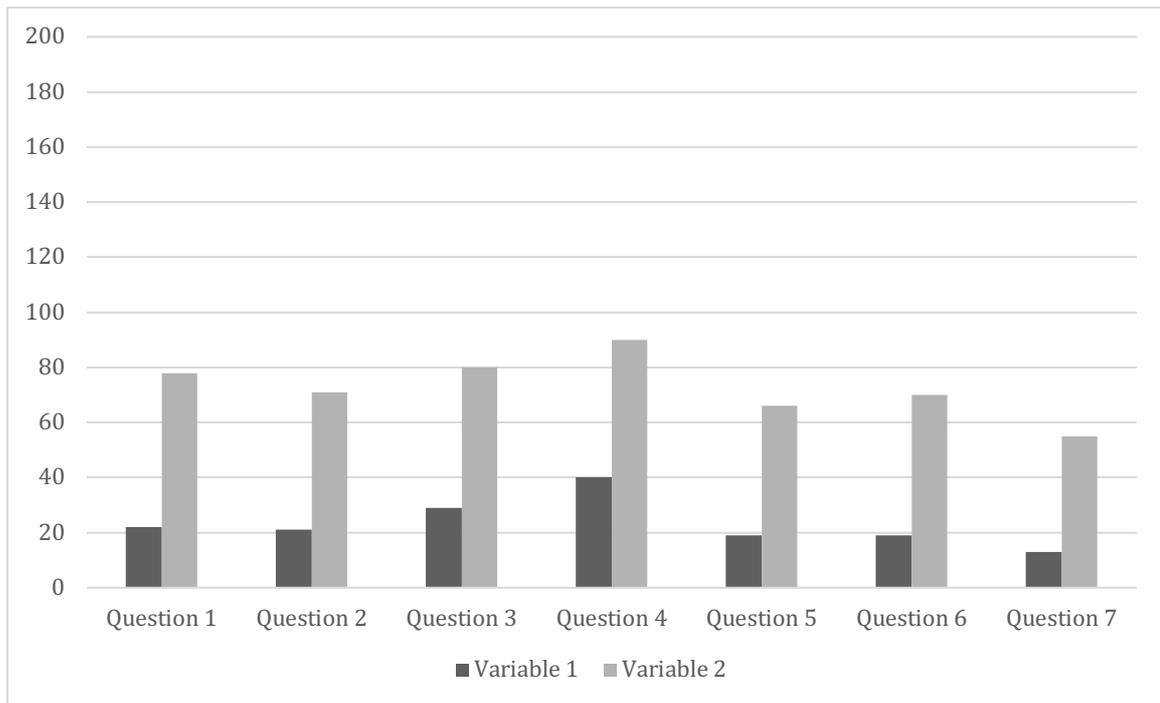


Figure 2. Emotional Wellbeing, variable 1 and variable 2

According to the answers obtained, the question with the greatest number of positive responses was question 4 in "Classroom Resource": Students follow an established and stable daily schedule or program of activities, and they are conveniently informed about it either through oral language or through alternative systems, representing 20%. And the same question for "Cetumism", representing 45%.

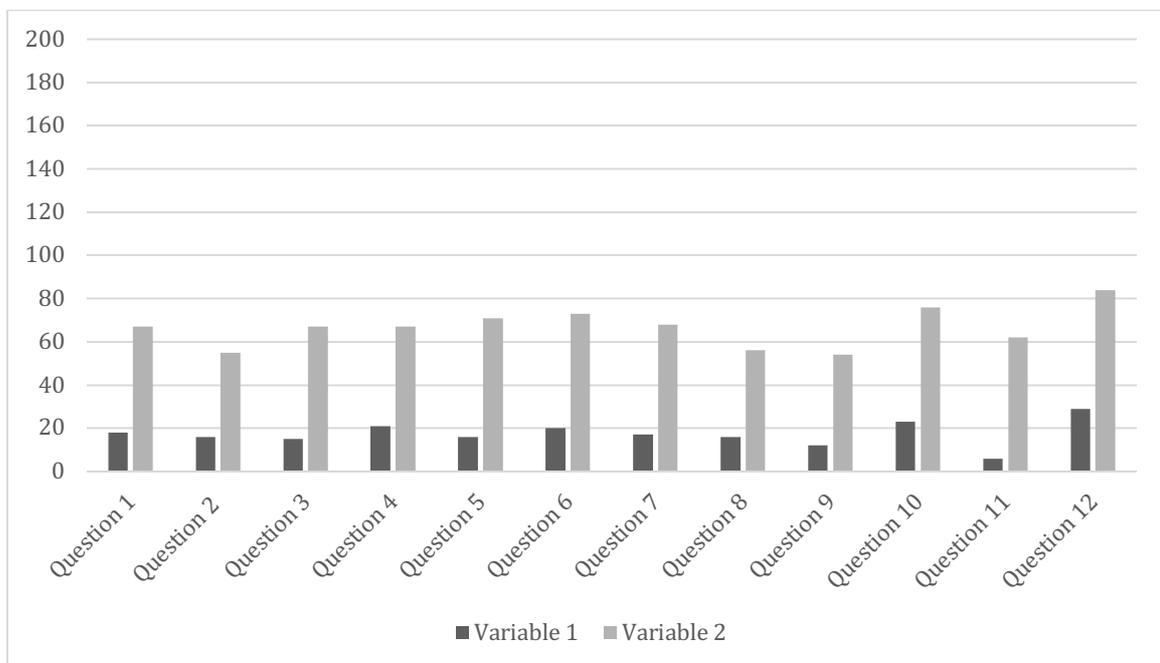


Figure 3. Personal development, variable 1 and variable 2

According to the results, the question that had the greatest number of positive responses was question 12 in "Classroom Resource": The center has clearly established

communication channels with parents to give as well as to request information or help or to present any complaint, representing 14.5%. And, the same question for "Cetumism", representing 42%.

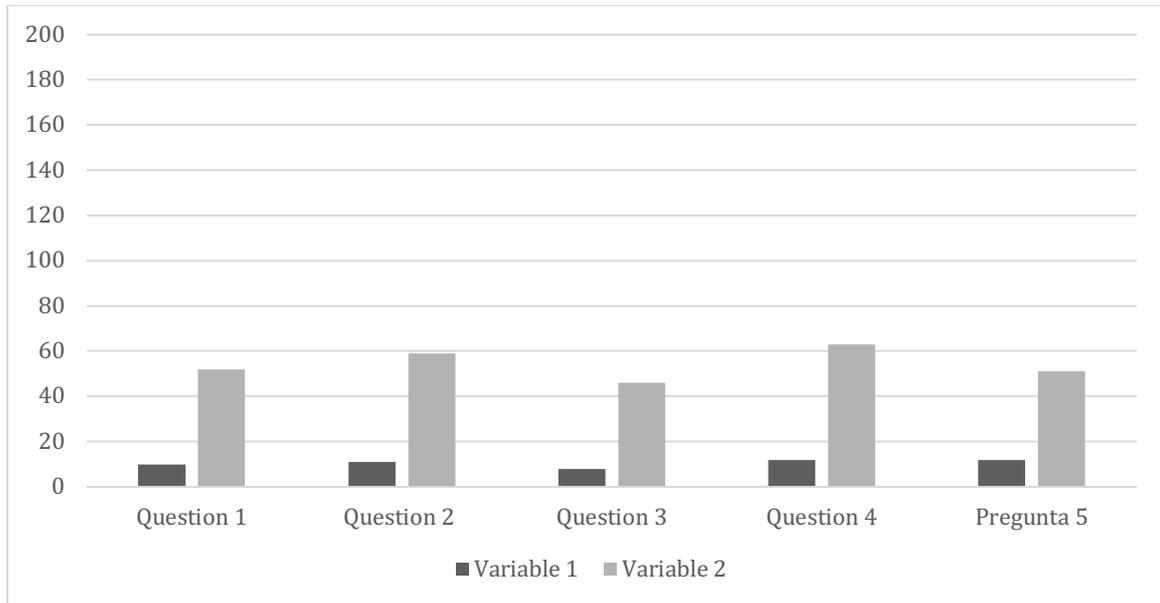


Figure 4. Self-determination, variable 1 and variable 2

According to the results, the question that obtained the most positive responses was question 4 in “Classroom Resource”: It teaches and provides opportunities for students to make decisions, solve problems and set goals related to school activities and routines. representing 6%. This is the same question for "Cetumism", representing 31.5%.

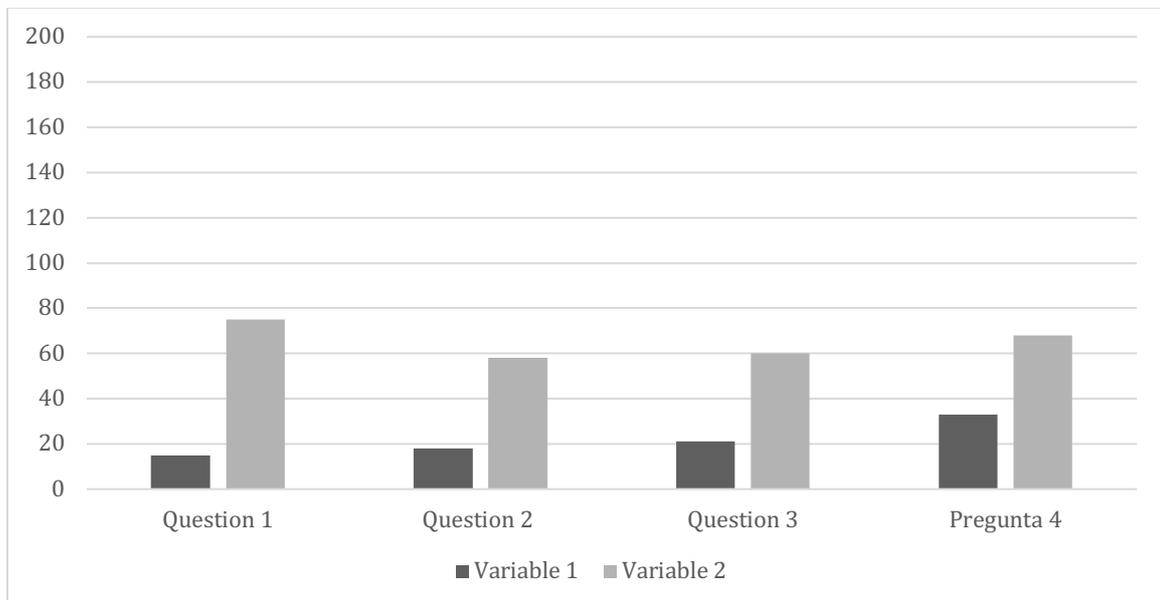


Figure 5. Interpersonal relationships, variable 1 and variable 2

According to the results, the question that obtained the most positive responses was question 4 in “Classroom Resource”: Opportunities are provided for students to interact with peers of their age in their usual environments, representing 16.5%, but

according to the results of "Cetumism", the question that obtained the most positive responses was question 1: The center organizes its school hours and the different activities so that students can relate to very diverse people, that is, different professionals, teachers, support staff, students, etc., representing 37.5%.

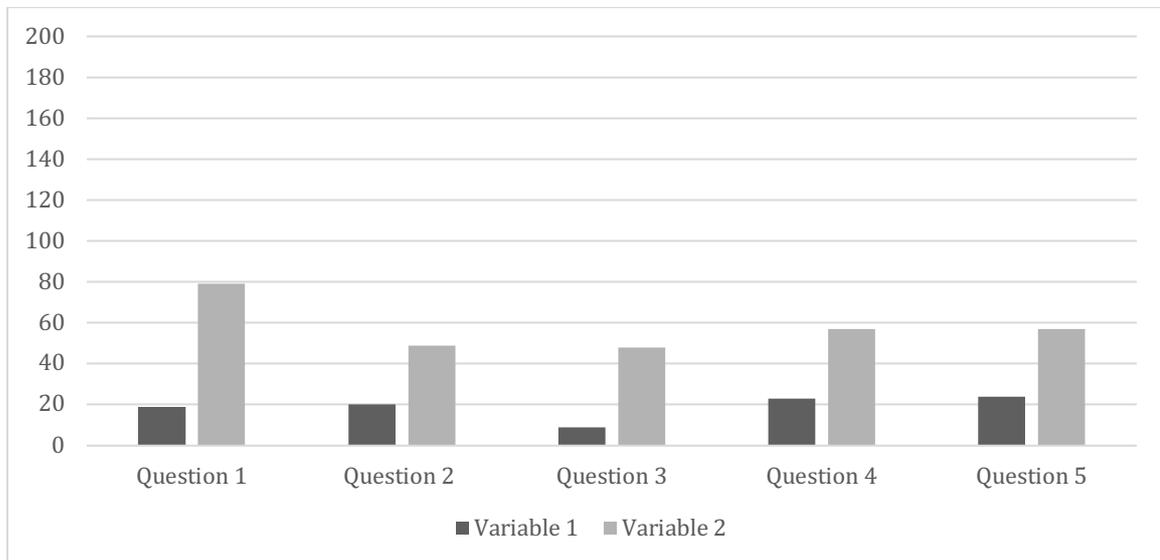


Figure 6. Social inclusion, variable 1 and variable 2

According to the answers, the question that obtained the most positive responses was question 5 in "Classroom Resource": The center promotes the participation of students in extracurricular, leisure, and free-time activities that are organized in their town, neighborhood, or city, representing 12%. And, the same question for "Cetumismo", representing 39.5%.

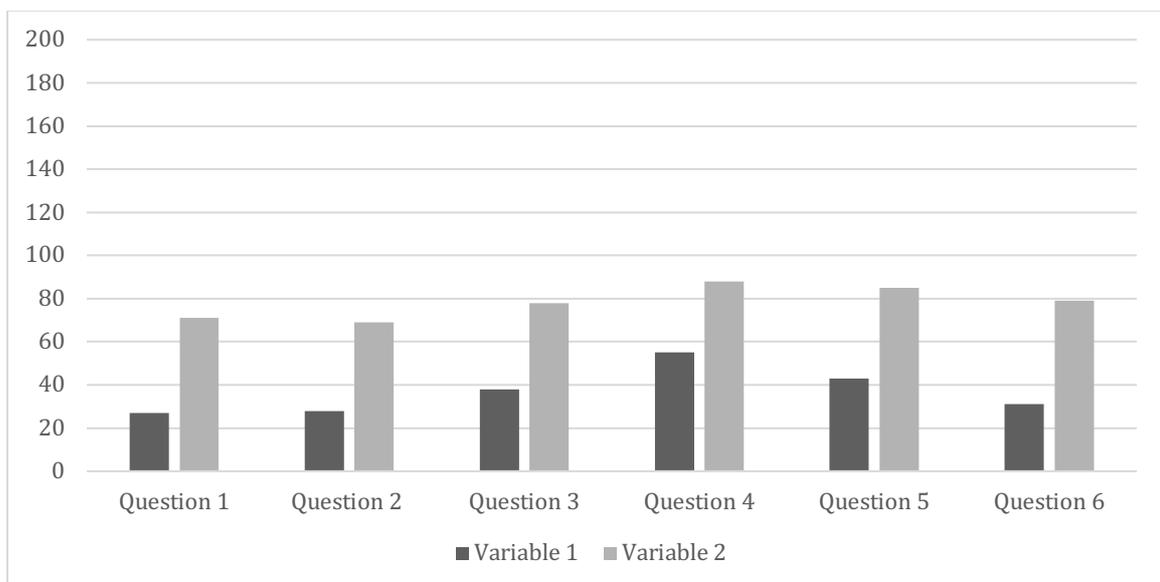


Figure .: Rights, variable 1

According to the results, the question that obtained the most positive responses was question 4 in "Classroom Resource": The school respects personal data protection

and always requests the permission of the parents and the student for the treatment of information or development. of any action that may compromise your privacy, representing 27.5%. And the same question for "Cetumismo", representing 44%.

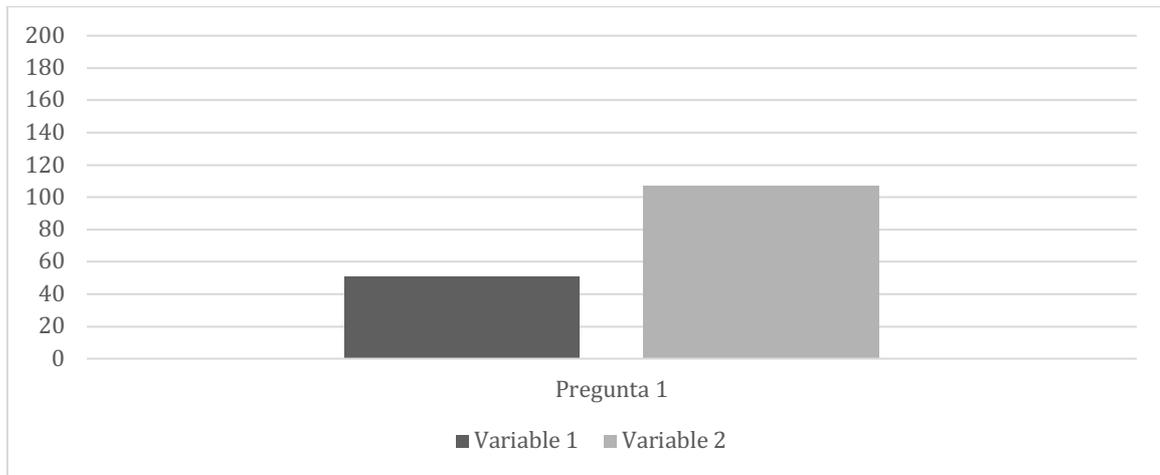


Figure 8. Material Prosperity, variable 1 and variable 2

According to the results, the question obtained 25.5% of results similar to the expected positive answer. And the same question for "Cetumismo", representing 53.5%. When making a comparison by the dimensions evaluated in the instrument for the "Resource Classroom" program and the "Cetumismo" model, the following is evident:

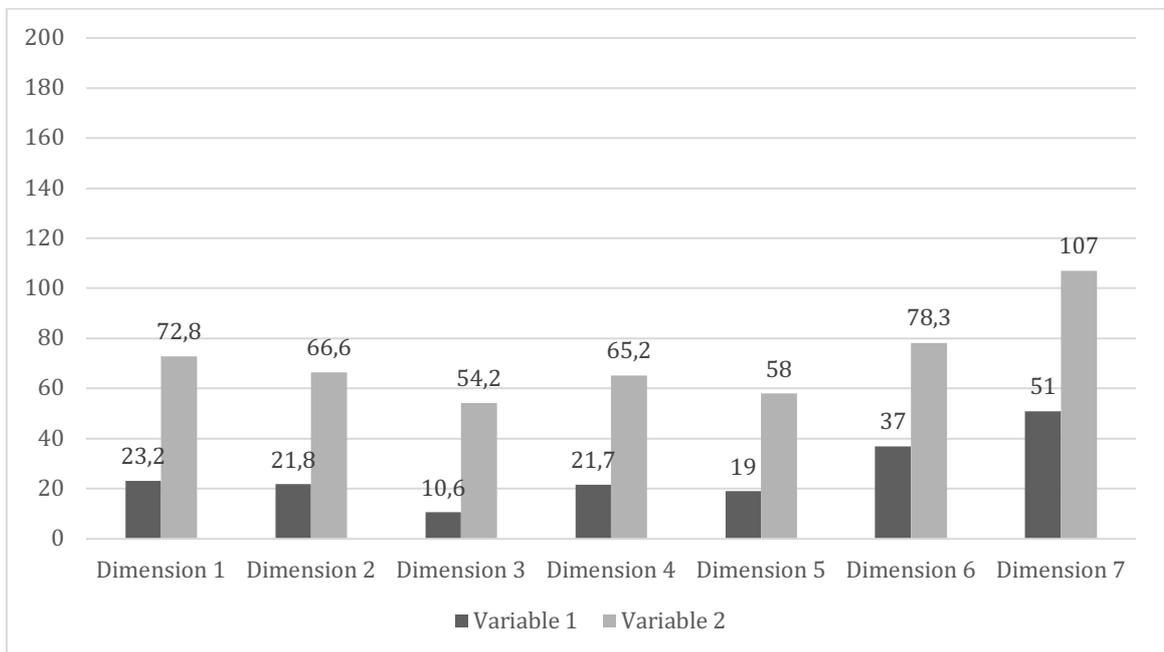


Figure 9. Comparison of dimension, variable 1 and variable 2

Analysis of Student's t-test

We can see globally the results obtained in both programs segmented by the sections in which the questions are grouped:

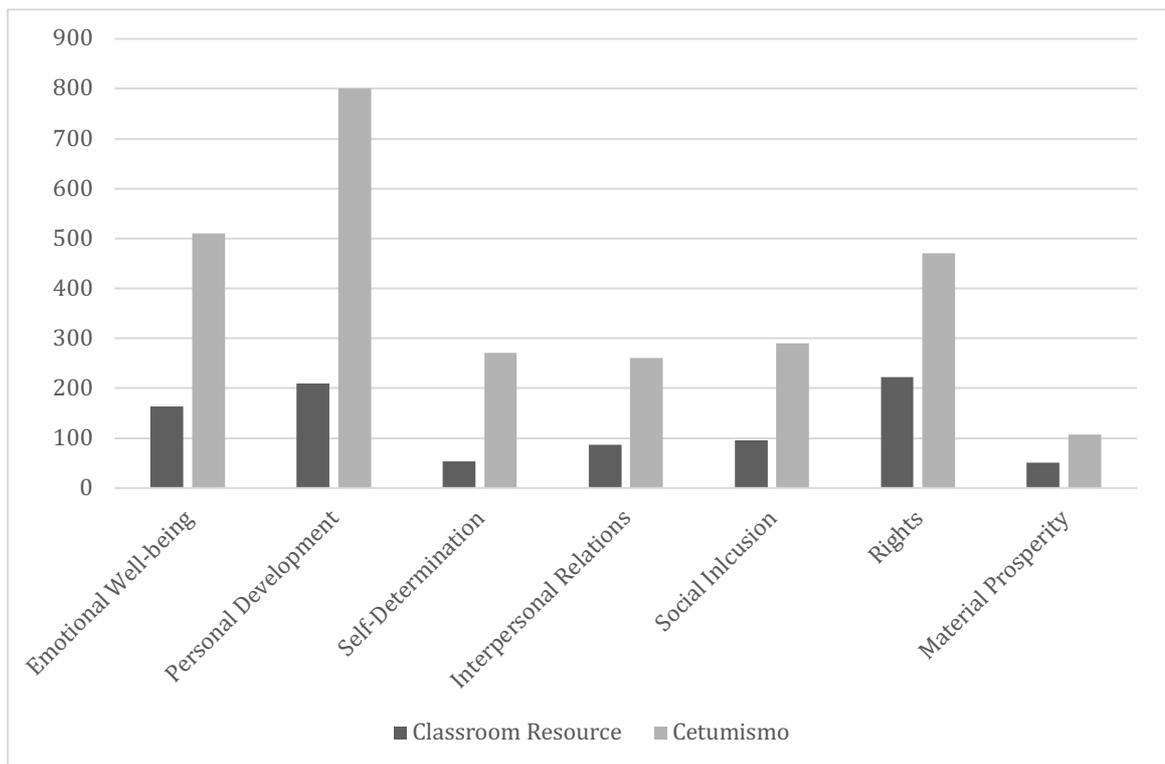


Figure 10. Overall results between both programs

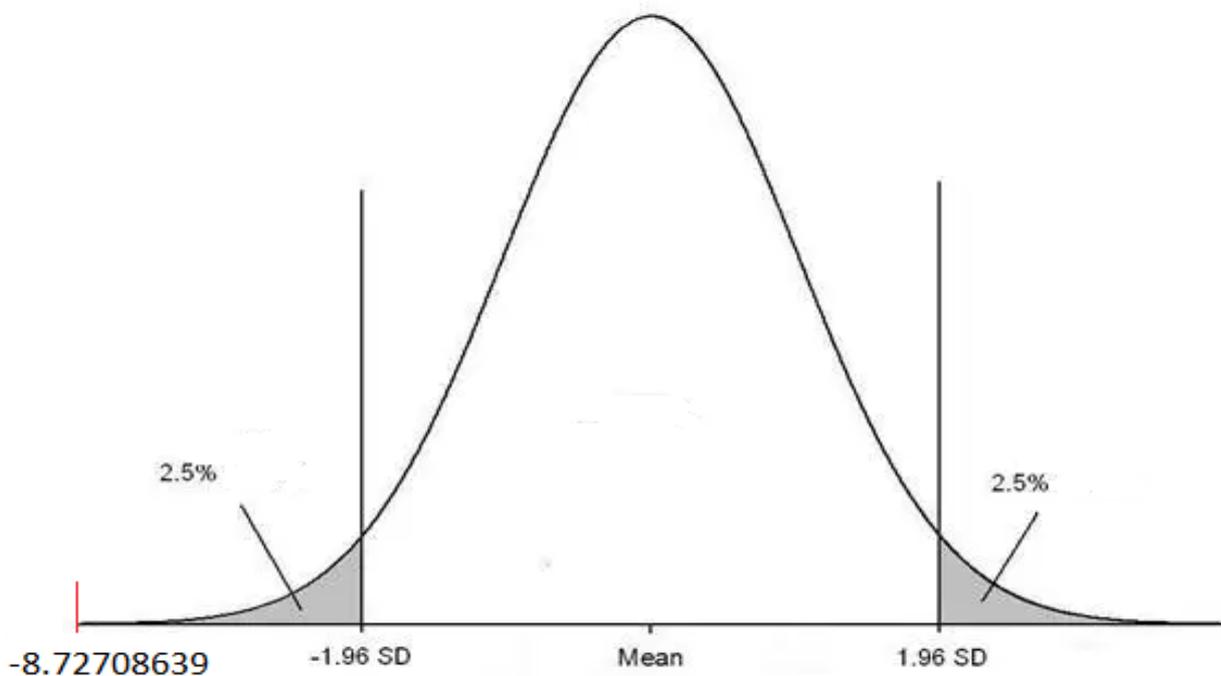
Therefore, if we perform the student's t-test, where we compare the means obtained in the two evaluation moments, we will obtain the variance, from the data in the following table 10:

Table 10
Student's t-test for two samples of unequal variances

	Variable 1	Variable 2
Average	4.4	13.53
Variable	64.1809045	154.712663
Observations	200	200
Hypothetical difference of the means	0	
Degrees of freedom	340	
Statistical t	-8.72708639	
P(T<=t) a queue	5.9555E-17	
Critical value of t (one queue)	1.64934761	
P(T<=t) two queue	1.1911E-16	
Critical value of t (two queues)	1.96696573	

Note: Author's creation

Therefore, since the critical value at two tails is 1.9669 and a t-statistic of -8.7270, it can be established that with a mean t Alpha significance level of 0.05, the null hypothesis is rejected and the alternative hypothesis is accepted in said investigation.



So, according to the results obtained in the comparison of the means in the statistical process carried out, it can be determined that, between both programs, “Aula Recurso” and “Cetumismo”, the program that solves special educational needs concerning education special is Therapeutic Pedagogical Model "Cetumismo”.

Discussion and Conclusions

1. The general objective of this research has been to analyze the validity of the pedagogical-therapeutic model "Cetumismo" against the "Aula Recurso" program by teachers who work in educational centers that serve people with special educational needs in Guatemala.
2. With what, according to the data obtained and the selected statistical process, t student, we can indicate that the pedagogical-therapeutic model "Cetumismo" is valid against the "Aula Recurso" program of the Ministry of Education of Guatemala. These results were obtained by evaluating in two moments the teachers who work in educational centers that serve people with special educational needs in Guatemala.
3. Part of the research was to determine what special educational needs the “Resource Classroom” program responds to in educational centers that serve people with disabilities in Guatemala and what special educational needs the pedagogical-therapeutic model “Cetumism” responds to when it is designed to serve people with disabilities. disability in Guatemala.

4. Due to the questions and the segmentation by sections of the applied instrument, both programs can evaluate what special educational needs are necessary to attend according to the research variables of the applied instrument. Establishing according to the results that both programs respond to solve the educational needs in question to the Rights and Material Well-being necessary for special education in our country.

5. When establishing that both programs respond to the rights and materials for the educational process of people with disabilities, it was important to identify the benefits obtained from a specialized program such as "Cetumismo" in the special education needs of people with disabilities. According to the results, utilizing a pedagogical-therapeutic model such as "Cetumismo" the scope of care, quality of service, variety of diagnoses attended, and professionals responsible for the process would allow for a diverse and complete program of care in any educational center. Unlike the "Classroom Resource" program.

6. This led to analyze and establish the deficiencies of the "Resource Classroom" program that would be solved with a model like "Cetumism". According to the responses by section of the instrument, it can be seen from the results that the "Resource Classroom" program needs to improve in the "self-determination", "interpersonal relations" sections.

7. Compared to the information provided by the Guatemalan Ministry of Education, it is understood that the lack of methodologies and professional teachers in special education is a latent deficiency in the Guatemalan educational system. It can be considered that the infrastructural failures, lack of furniture, and absence of didactic material add to the deficiency of knowledge and updating of the General Directorate of Special Education in seeking new care strategies for the population with disabilities.

8. The "Cetumism" model, on the other hand, needs better in "Interpersonal Relations". This echoes the attitude and prejudices that the population manifests towards disability in Guatemala. The "Cetumism" model provides a quality special education, with trained and updated teachers, but the manifest difficulty is with parents who have experienced discriminatory situations and rejection of a non-cultural society.

9. As poverty and economic difficulties are one of the main factors why families do not enroll their children with disabilities in educational programs, it was necessary to identify what it implied to implement a pedagogical-therapeutic model such as "Cetumism" in centers where specific care is provided. for students with disabilities in Guatemala.

10. However, the methodology used in the design of the pedagogical-therapeutic model "Cetumismo" is based on methodologies of countries with high educational indexes and with a high level of attention to diversity. Some of them are the "Self-Contained Classroom" that defines the specialized attention service in pedagogical and therapeutic processes for groups of 5 students with special educational needs for each specialized teacher; being a marked difference with the current attention of the "Resource Classroom" program.

11. Due to the type of research study, the personal proposal is a pedagogical-therapeutic model that centralizes the processes of educational care. This model was designed to respond as multidisciplinary care to the special educational needs of

children with disabilities; This allows the contribution of adapting the multidisciplinary care of people with disabilities in Guatemala based on a pedagogical-therapeutic model based on special educational needs.

12. Therefore, for this research, the hypothesis that is fulfilled is the alternative hypothesis, since due to the results obtained, the teachers evaluated despite currently belonging to a school that uses the “Resource Classroom” program implemented by the Ministry of Education of In Guatemala, they consider that a pedagogical-therapeutic model such as “Cetumism” would bring greater benefits in the special education needs of people with disabilities, such as specific curricular adaptations for each student with a diagnosis, constant and updated training for teachers, a differentiated curriculum, process thinking about inclusion after reaching the competencies proposed per case.

13. A special education correctly implemented by the State must work with the different dimensions of students, with or without disabilities, to achieve learning. This type of learning is achieved by innovative strategies such as the “Cetumism” model, in terms of forming special curricular options that aim at adapting the National Base Curriculum as modifiable and differentiating, non-static teaching.

The Pedagogical-Therapeutic Model "Cetumism" is not only a model that responds to the care of people with disabilities and their special educational needs but also as a model of integration and social inclusion of students and the rest of society. In the recognition of diversity is the key to our Guatemalan society to improve and not segregate or classify despite our differences. We are a multilingual and multi-ethnic country that must foster cooperation and understanding, including over our shortcomings as a country.

References

- Acera, M. (2015). *¿Cuáles son los tipos de discapacidad?* [Mensaje en un blog] 10/11/2016, Deusto Salud. Recuperado de <http://www.deustosalud.com/blog/teleasistencia-dependencia/cuales-son-tipos-discapacidad-mas-comunes>
- Alvizurez, Y., (10 de Mayo 2017). Niños especiales enfrentan falta de atención educativa. *Prensa Libre*. Guatemala. Recuperado de <https://www.prensalibre.com/ciudades/nios-especiales-se-enfrenta-a-la-falta-de-atencion-educativa/>
- Booth, T. (2000). *Progreso en la educación inclusiva: estudio temático para la evaluación de educación para todos*. París: UNESCO.
- Búrbano de, G. (2005). *Situación Actual de la Educación Especial en Guatemala*. Ministerio ACIDI-SODEF. Recuperado de <https://www.mineduc.gob.gt/DIGEESP/documents/EducacionEspecial.pdf>
- Cárdenas, C.; Cerpa, Y.; Fontalvo, Y. y Valbuena, S. (2016). *Rol del docente de matemáticas en el proceso de inclusión de estudiantes de básica primaria con discapacidad cognitiva*. (Tesis de graduación, Universidad del Atlántico, Colombia) Recuperado de <http://funes.uniandes.edu.co/10511/1/Ca%CC%81rdenas2016Rol.pdf>
- Congreso de la República de Guatemala. (1991). Decreto 12-91. Ley de Educación Nacional. Publicada en *Diario Centroamérica*. Del 12 de enero 1991. Guatemala.

- Consejo Nacional de Discapacidad. (2016a). *II Encuesta Nacional de Discapacidad en Guatemala (ENDIS)*. 9/07/2018, Recuperado de <https://www.unicef.org/guatemala/media/461/file/ENDIS%202016.pdf>
- Departamento Administrativo Nacional de Estadística Colombiana. (2005). *Dirección de censos y demografía*. Colombia. Recuperado de <https://www.dane.gov.co/files/censos/boletines/discapacidad.pdf>
- Dirección General de Educación Especial. (2005). *Programa nacional de educación cívica y valores*, Guatemala: Ministerio de educación de Guatemala.
- Dirección General de Educación Especial. (2009). *Guía de Adecuaciones Curriculares*. Guatemala: Ministerio de Educación de Guatemala Recuperado de https://www.mineduc.gob.gt/DIGEESP/documents/Manual_de_Adecuaciones_Curriculares.pdf
- Dirección General de Educación Especial. (2011). *Manual de Atención a las Necesidades Educativas Especiales en el Aula.*, Ministerio de Educación de Guatemala: Autor. Recuperado de <https://www.mineduc.gob.gt/DIGEESP/documents/manual%202011.pdf>
- Duk, C. (2001). *Necesidades Educativas Especiales*. Santiago: Inclusión educativa.
- Fariñas, A.; Gómez, M.; Ramos, Y. y Rivero, Y. (2010). *Técnicas e Instrumentos de Recolección de Datos*. Recuperado de <https://bloquemetodologicodelainvestigacionudo2010.wordpress.com/tecnicas-e-instrumentos-de-recoleccion-de-datos/>
- Gillberg, E. (2011). *¿Cuál es la diferencia entre Autismo de Alto Funcionamiento y el Síndrome Asperger?*, Autismo Diario. <https://autismodiario.org/2011/02/15/cual-es-la-diferencia-entre-autismo-de-alto-funcionamiento-y-el-sindrome-asperger/>
- Giné, C., Kurz, E.A, Martín, P.C, Font, J, García, M., Beltrán, F., Vidal, X. Mas, G., Borrás, E., González, M., Carbó, M. y Balcells, A. (2004). *Cuestionario De Indicadores De Calidad Para La Evaluación De Los Centros De Educación Especial*. España: Facultat de Psicologia i Ciències de l'Educació i de l'Esport Blanquerna, de la Universitat Ramon Llull: Autor.
- Gómez, R. (2008). *Discapacidades en la Infancia*. Hospital Universitario Clínico de San Carlos. Recuperado de http://www.sld.cu/galerias/pdf/sitios/rehabilitacion-logo/discapacidades_en_la_infancia.pdf
- Instituto Nacional de Estadística de Guatemala. (2002) *XI Censo Nacional de Población y VI de Habitación*. Guatemala: Ministerio de Educación de Guatemala. Recuperado de <https://www.ine.gob.gt/index.php/encuestas-de-hogares-y-personas/discapacidad>
- López, H. (2013). *Programa de inclusión dirigido a docentes del nivel de educación primaria que atienden a estudiantes, con necesidades educativas especiales físicas y/o sensoriales en las aulas*. (Tesis de graduación). Universidad de San Carlos de Guatemala, Guatemala.
- Mata, S. (1999). *Didáctica de la educación especial*. Archidona, Málaga: Aljibe.
- Ministerio de Educación de Guatemala. (2011). *El Modelo Conceptual de Calidad Educativa*. Guatemala: Autor.
- Ministerio de Educación de Guatemala. (2017). *Políticas de educación inclusiva para la población con necesidades educativas especiales con y sin discapacidad*. Guatemala. SITEAL. https://www.siteal.iiep.unesco.org/sites/default/files/sit_accion_files/siteal_guatemala_6014.pdf

- OCDE (1994). *Declaración de Salamanca y Marco de Acción para Necesidades Educativas Especiales*. Recuperado de https://unesdoc.unesco.org/ark:/48223/pf0000098427_spa
- Padilla, A. (2011). Inclusión educativa de personas con discapacidad. *Revista Colombiana de Psiquiatría*, 40(4) , 670-699. Recuperado de <https://www.elsevier.es/es-revista-revista-colombiana-psiquiatria-379-avance-resumen-inclusion-educativa-personas-con-discapacidad-S0034745014601578>
- Sampieri, R. (2010). *Metodología de la Investigación*. México: McGraw Hill.

Date received: 25/04/2020

Date reviewed: 6/05/2020

Date accepted: 28/05/2020

MLS PSYCHOLOGY RESEARCH

[https://www.mlsjournals.com/Psychology-
Research-Journal](https://www.mlsjournals.com/Psychology-Research-Journal)

ISSN: 2605-5295



How to cite this article:

Álvarez, N. (2020). . Absence of Protocols for the Prevention of Human Trafficking of Minors in Puerto Rico. *MLS Psychology Research* 3 (1), 65-78. doi: 10.33000/mlspr.v2i2.463

ABSENCE OF PROTOCOLS FOR THE PREVENTION OF HUMAN TRAFFICKING OF MINORS IN PUERTO RICO

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Summary: Human trafficking is a phenomenon that grows in the bowels of many countries around the world. Puerto Rico is no exception. The investigation presented in this article will analyze the repercussions that the absence of protocols for the human trafficking of minors have wrought in the fight against this exploratory phenomenon in Puerto Rico. To achieve this purpose, an investigation was realized with a mixed focus and an exploratory design. The hypothesis of this study attempts to prove the negative effects of the lack of protocols in the fight against this phenomenon will be reduced with the presence of protocols against the human trafficking of minors in Puerto Rico. It was also auscultated if the identification and inclusion of the correct factors in a protocol for minors could improve the detection strategies in these cases. For this study, the knowledge of experts that offer services to minors in public agencies in Puerto Rico, as well as non-government agencies (NGO) was used. The selected sample was not randomly selected by availability. The technique utilized to obtain this information was the interview in the middle of a questionnaire. This questionnaire was redacted utilizing the Likert scale, alongside open questions. The main objectives to create a prototype plan of youth prevention for human trafficking and to identify the factors that a prevention and protection protocol for the human trafficking of minors must include in order to be effective were met.

Key words: human trafficking, human rights, minors, slavery and exploitation

AUSENCIA DE PROTOCOLOS DE PREVENCIÓN DE TRATA HUMANA PARA MENORES DE EDAD EN PUERTO RICO

Resumen: La trata humana, es un fenómeno que crece en las entrañas de muchos países del mundo. Puerto Rico, no es la excepción a esta situación. En la investigación que se presenta en este artículo, se analizan las repercusiones que ha tenido la ausencia de protocolos de trata humana para menores de edad, en la lucha contra este fenómeno en Puerto Rico. Para lograr ese propósito, se realizó una investigación de enfoque mixto y diseño exploratorio. Respecto a las hipótesis del estudio, a través de estas, se intentó probar que los efectos negativos que acarrea la ausencia de protocolos, en la lucha contra este fenómeno, disminuirían con la presencia de protocolos de trata humana para menores en Puerto Rico. También, se auscultó si la identificación e inclusión de los factores correctos, en un protocolo para menores, podría mejorar las estrategias de detección de casos. Se utilizó la percepción y conocimiento de expertos que ofrecen servicios a la población de menores, en algunas agencias públicas de Puerto Rico y en algunas organizaciones no gubernamentales (ONG). La muestra seleccionada, fue no aleatoria y por disponibilidad. La técnica utilizada para obtener la información, fue la entrevista por medio de un cuestionario. El cuestionario, se redactó utilizando una escala Likert, además, se realizaron preguntas abiertas. Se cumplió con los objetivos principales de crear un prototipo de plan de prevención juvenil de trata humana e identificar los factores que debe incluir un protocolo de prevención y protección de la trata para menores en Puerto Rico.

Palabras clave: trata humana, derechos humanos, menores, esclavitud y explotación.

Introduction

In all the countries of the world there are diverse social problems. Many of these problems depend on different factors such as: poverty, culture, economy, customs, traditions, political, social conditions, geographic location, and many others. In modern times, with globalization many of these problems pass more easily from one country to another (Rey and Hernández, 2010). Unfortunately, the problem of human trafficking is not the exception to that reality. Human trafficking, also known as human trafficking or modern slavery, is a social problem that can transcend borders. Trafficking can grow profoundly in each country and it violates the most basic human rights. In Puerto Rico, the problem of trafficking is poorly understood and it is difficult for both the government and the society to accept its existence (Rey and Hernández, 2010).

Human trafficking was classified as a crime in the Penal Code of Puerto Rico in 2012 (Law No. 146, 2012). The absence of trafficking protocols, aimed at the prevention and protection of minors, together with the scarcity of statistics and relevant information related to the subject and the limited research that exists in the country, aroused the researcher's interest in relation to this topic. From that concern, the research presented in this article emerged.

Human trafficking is currently considered the second most lucrative crime in the world, after drug trafficking (Fundación Ricky Martín, 2020). It is estimated that it is a business that generates approximately one hundred and fifty (\$150) billion dollars in annual profits in the world (Fundación Ricky Martín, 2020). Information published in *Global Estimates of Modern Slavery* (2017), from the International Labor Organization (ILO), estimated that in 2016, there were 40.3 million victims of modern slavery worldwide (ILO, 2017). Out of such an impressive figure, a 5.5 million are believed to be minors (Fundación Ricky Martín, 2020). As of (2018), there were not statistics for such a crime in Puerto Rico (Senate of Puerto Rico, 2018). Likewise, according to the

Puerto Rico Police Statistics Center (2020), as of July 31, 2019, only one case of human trafficking was registered (Puerto Rico Police, 2020).

On the other hand, this phenomenon has been studied from different theories, among them, the multifactorial theory. According to it, the causes of human trafficking stem from different factors (Rey Hernández, 2010). Many of the defenders of this theory understand that criminal behavior can respond to a combination of factors and circumstances, both of the subject and of the environment that surrounds the person (Rey and Hernández, 2010). Another theory known as the theory of globalization has become relevant in the modern world and is being used in various investigations related to this topic. Although it was initially understood to be an economic movement, this ease of rapprochement between nations has brought consequences in the social, political, cultural, technological and many other aspects. (Irwin N., 2016). These two theories were the cornerstone of the investigation.

On the other hand, although there is a shortage of research in Puerto Rico related to the subject of human trafficking, and it is little known, in recent years the presence of this phenomenon has begun to be recognized. This has happened thanks to research led by the Ricky Martín Foundation, in collaboration with the University of Puerto Rico and the Protection Project at the Johns Hopkins University Advanced School of International Studies. From this foundation, three important investigations related to this topic have emerged. At present, these are the most important works conducted on said subject in Puerto Rico. It was with the first investigation that the existence of the trafficking problem in Puerto Rico practically came to light. The first investigation identified the first types of trafficking on the island. That first investigation is entitled: *La trata de personas en Puerto Rico un reto a la invisibilidad* (2010) [Human trafficking in Puerto Rico a challenge to invisibility (2010)]. The three investigations were carried out by two prestigious professors from the University of Puerto Rico, Dr. César Rey and Dr. Luisa Hernández. The first investigation reveals, at the national level, the existence of the trafficking problem and the possible magnitude of this phenomenon in Puerto Rico. In the second investigation, entitled: *La trata de personas: Una forma Moderna de esclavitud en Puerto Rico* (2014) [Human Trafficking: A Modern Form of Slavery in Puerto Rico (2014)], the researchers discovered new types of trafficking present in Puerto Rico. In addition, they had the opportunity to interview some victims of this crime. The third investigation titled *Violencia género y trata* (2017) [Gender Violence and Trafficking (2017)] was led by Dr. Luisa Hernández. In it, the relationship between victims of gender violence and human trafficking was ausculted. It should be noted that the investigations carried out by the Ricky Martín Foundation and the University of Puerto Rico have been essential while conducting the research work presented in this article.

In order to have a better perspective of the problem of trafficking, it is important to discuss a little more broadly some of the research carried out in Puerto Rico. Before elaborating on these investigations, the definition of some terms that are often confused is pertinent, those terms are:

Human trafficking

According to the definition of the United Nations (UN), human trafficking refers to:

Smuggling of migrants means the facilitation of the illegal entry of a person into a State of which said person is not a national or permanent resident in order to

obtain, directly or indirectly, a financial benefit or other material benefit (UN, 2000, p.57).

Human trafficking

According to the United Nations (UN), the definition of human trafficking is:

The recruitment, transportation, reception or reception of people, resorting to the threat or use of force or other forms of coercion, kidnapping, fraud, deception, abuse of power or a situation of vulnerability or granting or receiving payments or benefits to obtain the consent of a person who has authority over another for the purpose of exploitation. Such exploitation includes, at a minimum, the exploitation of the prostitution of others or other forms of sexual exploitation, forced labor or services, slavery or the analogous practices of slavery, servitude or the removal of organs ”(UN, 2000, p. 44 and 45).

Despite the paucity of research on the subject in Puerto Rico, it cannot be denied that studies have been carried out from which relevant information has been obtained. One of these investigations is titled: *Migración Clandestina: Informe preliminar sobre la Trata de Personas desde República Dominicana hacia Puerto Rico* [Clandestine Migración: Preliminary Report on Trafficking in Persons from the Dominican Republic to Puerto Rico], carried out by the Organization of American States (OAS), in 2006. This investigation consists of more than ten years of realization. However, it is vitally important since it appears to be the first carried out by a prestigious international organization that identifies the existence of the problem of trafficking in Puerto Rico. Subsequently, Puerto Rico was also included in the report, *Congressional Research Services (CRS) Report for Congress* (2013). Apparently it is in the report of that year that for the first time Puerto Rico is identified as a country of origin, transit and destination for human trafficking (United States Department of State, 2013). As for the study carried out by the OAS, an attempt is made to analyze and understand the possibility of the existence of human trafficking in Puerto Rico (OEA, 2006). In the report, the existence of a high volume of Dominican immigrants entering Puerto Rico was exposed. This could raise suspicions that the island would function as a transit and destination country for victims of trafficking (OAS, 2006).

Similarly, another important investigation that studies this topic is entitled: *Trata de personas; una forma moderna de esclavitud en Puerto Rico*, [Trafficking in persons; a modern form of slavery in Puerto Rico], (Rey and Hernández, 2014). In this investigation, the authors had the opportunity to interview some victims of trafficking in Puerto Rico. One of the most shocking stories that emerged from these interviews was that of a minor, who assured that her mother prostituted her since she was five years old. According to the minor's account, the mother locked her in a room with her sister, tied her to the bed and collected the amount of one hundred dollars (\$ 100.00) for men to have sexual relations with them (Rey Hernández, 2014). Some substitute homes (understood by these, homes under the supervision of the Puerto Rico Department of Families, where minors removed from their homes due to mistreatment or other actions that may put them at risk), are also foci of this phenomenon (Rey and Hernández, 2014). In some of these homes, minors are victims of sexual abuse (Rey and Hernández, 2014). According to the authors, the vulnerability of children makes them easy prey for other predators (Rey and Hernández, 2014).

On the other hand, in the *Trata de Personas CRS Report for Congress* (2013) [Human Trafficking CRS Report for Congress (2013)], it is established that Puerto Rico is used as a place of origin, transit and destination, for the crime of trafficking (United States Department of State, 2013). Different scholars on the subject agree with this

assertion, such as: María Salado (2014), Dr. César Rey and Dr. Luisa Hernández (2010), among others. Likewise, in the study *Migración Clandestina: Informe preliminar sobre la Trata de Personas desde República Dominicana hacia Puerto Rico* (2006) [Clandestine Migration: Preliminary Report on Trafficking in Persons from the Dominican Republic to Puerto Rico (2006)], one of the most important indications, was in the sense that both the authorities of the United States and those of Puerto Rico, lacked understanding on this matter (OAS, 2006). What is striking is that, according to subsequent research, such as *Trata de Personas en Puerto Rico: un reto a la Invisibilidad (2014)* [Human Trafficking in Puerto Rico: a challenge to Invisibility (2014)], it is argued, that there is still this lack of understanding of the problem of human trafficking in Puerto Rico. (Rey and Hernández, 2014).

Another important investigation, on the subject of trafficking in Puerto Rico, is the most recent carried out by the Ricky Martín Foundation, also led by professors Luisa Hernández and César Rey. This investigation is titled: *Violencia: género y trata* (2017) [Violence: gender and trafficking (2017)]. In this investigation, the possibility is found that within the group of women who suffer gender violence, there are also women victims of human trafficking. Said study was exploratory and was carried out through a documentary review of the files of women who have sought help from the Office of the Women's Attorney (OPM) of the Commonwealth of Puerto Rico. One of the most important findings of the investigation was to discover that the Office of the Women's Attorney, is a good place to identify victims of human trafficking in Puerto Rico. According to the researchers, it would be important to train the personnel of said attorney general's office for this purpose, particularly those who carry out an initial interview (Hernández and Rey, 2017).

According to the study, it is estimated that in Puerto Rico forty-six points two percent (46.2%) of people, live below poverty levels. Sixty-two percent (62%) of women live in an even worse situation, as do sixty-eight percent (68%) of their children. (Pairs Maga, 2016, cited by Rey and Hernández, 2017). It is understood that one of the most vulnerable sectors is households where women are the heads of the family. (Rey and Hernández, 2017). Within that group, migrant women who come to the OPM to seek help are also identified. It should be noted that vulnerability is one of the characteristics of victims of human trafficking. According to the researchers, many of the migrant women worked as caretakers and domestic workers. This situation could undoubtedly place them in a vulnerable position to become potential victims of human trafficking and exploitation. Achieving confirmation that victims of gender-based violence are highly vulnerable to trafficking and trafficking was one of the most outstanding findings and related to the purpose of the investigation (Hernández and Rey, 2017).

On the other hand, one cannot speak about the issue of trafficking without studying the international and national legislation, treaties and protocols related to this issue. Here are some of them:

Regarding legislation and protocols, the *Protocolo para prevenir, reprimir y sancionar la trata de personas especialmente mujeres y niños, que complementa la Convención de las Naciones Unidas contra la Delincuencia Organizada Transnacional, mejor conocido como Protocolo de Palermo* (2000) [Protocol to prevent, suppress and punish trafficking in persons, especially women and children, complements the *United*

Nations Convention against Transnational Organized Crime, better known as the Palermo Protocol (2000)] is currently considered the most important international instrument in the fight against human trafficking. It was signed by the States in the year 2000 (understood by States, the countries that have ratified some of the protocols of the United Nations Organization). It entered into force in 2003 and it was ratified by 124 countries in 2009. It is practically the guide used by all signatory states to the Palermo protocol, to draft and map their strategies to combat this phenomenon. Also, there is the Model Law Against Trafficking in Persons (2010), it was created by the United Nations Office on Drugs and Crime (UNODC). This model of law is created with the purpose of systematizing the provision of legislative assistance by UNODC and facilitating the legislation of the States that sign the Palermo Protocol. It is designed to adapt to the legislation of any of the States, regardless of legal tradition and its social, economic, cultural and geographic conditions (UNODC, 2010). The so-called Model Law is a guide so that the signatory States of the Palermo Protocol can adapt it to their cultures and needs. In such a way, that uniformity between these legislation is maintained, with what has been agreed and signed in the Palermo Protocol (UNODC, 2010).

There have been many protocols and guides that have been developed around the world to combat this phenomenon. Apart from the Palermo Protocol, there are also the *Protocolo Facultativo de la Convención sobre los Derechos del Niño relativo a la venta de niños, la prostitución infantil y la utilización de niños en la pornografía* (2000) [The Optional Protocol to the Convention on the Rights of the Child on the sale of children, child prostitution and the use of children in pornography (2000)]. Similarly, the *El Protocolo facultativo de la Convención sobre los Derechos del Niño relativo a la participación de niños en los conflictos armados* (2000) [The Optional Protocol to the Convention on the Rights of the Child on the participation of children in armed conflicts (2000)] and many others was created.

Human trafficking has been legislated and criminalized in some countries. Some of these laws are mentioned below: *ley 26842 trata de personas y asistencia a sus víctimas. Prevención y Sanción. Código Procesal Penal, modificado el 19 de diciembre de 2012* [Law 26842 deals with people and assists their victims. Prevention and Sanction. Criminal Procedure Code, amended on December 19, 2012], in Argentina, *ley 896 Ley Contra la Trata de Personas, aprobada el 28 de enero de 2015* [Law 896, Law Against Trafficking in Persons, approved on January 28, 2015] in Nicaragua, *ley DOF 19-03-2014, ley General Para Prevenir, Sancionar y Erradicar los Delitos en Materia de Trata de Personas y para la Protección y Asistencia a las Víctimas de Estos Delitos*, [DOF Law, 03-19-2014, General Law to Prevent, Punish and Eradicate Crimes in the Area of Trafficking in Persons and for the Protection and Assistance to the Victims of These Crimes], United Mexican States, *ley 9095 Ley Contra la Trata de Personas, publicada el 8 de febrero 2013* [Law 9095 Law Against Trafficking in Persons, published on February 8, 2013], in Costa Rica, among many others.

Legislation to combat trafficking has also been passed in the United States and Puerto Rico. Among the laws passed by the United States are: *Ley Pública 106-386 Ley de Protección a Víctimas de Trata de Personas - octubre* (2000) ([Public Law 106-386 Protection of Victims of Trafficking in Persons Act - October (2000)] (TVPA). This law was created with the purpose of ensuring fair and effective punishment for traffickers and for the protection of victims. It is the first federal law in the United States that covers three important areas such as: prevention (prevention), protection (protection) and prosecution (prosecution), better known as the three (3) P. The TVPA established various methods aimed at prosecuting traffickers, preventing human trafficking and

offering protection to victims. It classifies human trafficking as federal crimes and it imposes severe penalties on traffickers. In addition, it creates the Office for Monitoring and Combating Trafficking in Persons, as a way to prevent trafficking. Said office must monitor the work that different countries are doing to comply with the minimum standards established by the TVPA (2000). This assignment will be carried out through the publication of a Trafficking in Persons Report (TIP). This report evaluates and describes the efforts of the countries to combat human trafficking (TVPA, 2000). In addition, the law (TVPA) established the Inter-Agency Task Force to Monitor and Combat trafficking and the implementation of the law. In addition, the law protects victims and survivors of trafficking by establishing what is known as the T Visa. That visa allows victims of trafficking and their close relatives to remain in the United States as temporary residents and offers them the option of becoming permanent residents after three (3) years (TVPA, 2000). In addition, they have *Ley de Reautorización de la Protección de Víctimas de la Trata* [Reauthorization Law for the Protection of Victims of Trafficking] (TVPRA, 2003). This law established a federal and civil right of action for victims of trafficking to sue traffickers (TVPA, 2003, Sec. 1595). In addition, it included the crime of trafficking in crimes that can be considered under the statute of Corruption Organizations Influenced by the Crime of Corruption (RICO). In addition to these measures, it included protective measures for victims and their families in relation to deportation and also included a requirement, in relation to which the Attorney General must prepare an annual report on the efforts made by countries to combat trafficking. That report must be presented to Congress. (TVPRA, 2003) In addition, they have *Ley de Reautorización de la Protección de Víctimas de la Trata* [Reauthorization Law for the Protection of Victims of Trafficking] (TVPRA, 2013), which was approved as an amendment to the Law against Violence against Women. This law reinforces programs that guarantee that citizens do not consume products manufactured by victims of trafficking and to prevent marriages. It also includes emergency responses in the State Department so that there is a quick response, when cases of natural disasters arise. Situation that increases the vulnerability of people to be victims of trafficking. Also, it reinforces the collaboration with local and state law and order forces to facilitate and expedite the prosecution of traffickers (TVPRA, 2013), among many other approved laws.

There is federal legislation of the United States of America, which is applicable to Puerto Rico. This is due to the political relationship that exists between both countries. However, the two cultures have great differences, inasmuch as the people of Puerto Rico see the need to present legislation tempered to their idiosyncrasy and reality as a people. Addressing the needs of the Puerto Rican people, human trafficking is criminalized in article one hundred sixty (160) of the new Penal Code (2012). Trafficking was located as part of crimes against the civil rights of Puerto Rican citizens. In the new Penal Code of Puerto Rico, trafficking was defined and classified as criminal conduct as follows:

The one that a person through the recruitment, transport, transfer, reception or reception of people, and that resorting to the use of force, threat, coercion, kidnapping, fraud, deception, abuse of power, or other situations of vulnerability, offers or receives the concession or receipt of payments or benefits in order to obtain the consent of a person who has authority over another to beg, any kind of sexual exploitation, pornography, forced labor or service, debt bondage, servile marriage, irregular adoption, slavery or its analogous practices, servitude or removal of organs, even with the consent of the victim (Law No. 146-2012, p.78).

In the aforementioned article, attention is also drawn to different forms of exploitation. Specifically, sexual exploitation, forced labor, debt bondage, servile marriage, irregular adoption, slavery, servitude and the removal of organs. Involuntary servitude was defined in another article of the Penal Code, although it is also included in article 160 of human trafficking (Law 146-2012). Furthermore, under Article 300 of the same Penal Code (2012), under crimes against humanity, human trafficking is included, as defined in Article 160 of the Puerto Rico Penal Code (Act 146-2012).

Likewise, other laws were amended to include trafficking as a crime, this was the case of the juvenile law, *Act No. 225 of 2014, to amend articles 2, 3, 5, 7, 8, 11 and 58 of the Law No. 246, Law for the Safety, Welfare and Protection of Minors (2014)*, which includes human trafficking as one of the forms of abuse. Likewise, *Act No. 87 of 2015 was approved, in which the month of February is declared as Orientation and Prevention Month against Human Trafficking in Puerto Rico*, including the celebration of the Day of Orientation and Prevention Against Human Trafficking, on the 3rd Monday of February of each year, in order to raise awareness among the inhabitants of Puerto Rico about its existence, effects and ways of contributing to its eradication; and for other purposes (Law No. 87-2015 p.1).

Method

With the purpose of studying the consequences of the absence of protocols for the prevention and protection of human trafficking in minors, and the possible effect that this has caused in the fight against this phenomenon in Puerto Rico, this research emerged. The study was carried out using a methodology with a mixed approach, which involves a process of data collection, analysis and linking of both methodologies, quantitative and qualitative (Hernández, Sampieri et al., 2014). This offers research more complete results and a broader way of studying such a complex and unknown problem in Puerto Rico. According to Hernández Sampieri (2014), mixed investigations generate qualitative and quantitative inferences, which is known as meta-inferences. In addition, it mentions as some of its benefits, those mentioned below: broader and deeper perspective, richer and more varied data, greater strength and rigor and others (Hernández Sampieri, 2014). Ugalde and Balbastre (2013) agree with this position, who are the authors of the article *Quantitative Research and Qualitative Research: Searching for the Advantages of Research Methodological Differences (2013)*. These authors state that mixed research offers results with greater reliability, validity and understanding.

Both approaches (quantitative and qualitative) are integrated in mixed research. This integration offers the opportunity for more complete results (Ugalde and Balbastre, 2013). Obtaining results with greater force and counteracting the disadvantages of qualitative and quantitative methodologies (when used individually), are other advantages of using such an approach (Ugalde & Balbastre, 2013). This approach offered the opportunity to conduct research with a broader point of view.

Likewise, using this research method provided an opportunity to obtain a broader and more complete vision of the phenomenon of human trafficking in Puerto Rico. With the use of this method, the aim was to make use of the best of each of the approaches, understood qualitatively and quantitatively. With this, an attempt was made to reduce the

possible weaknesses that each of the approaches might have. Using this method offered the convenience of investigating the subject in question in a more comprehensive way.

As for the design, the exploratory design was used in the research. As previously stated, in Puerto Rico, human trafficking is a relatively new topic and there is a paucity of research related to it. (Rey and Hernández, 2014). It cannot be lost from perspective that research with exploratory design is used to increase the degree of knowledge of the subject to be studied (López, 2014). In addition, it gave the research an innovative perspective. The use of this design offers the opportunity for new research interest to emerge from the results of the research (López, 2014). What made this design, the ideal for the investigation of the topic of trafficking in Puerto Rico.

Likewise, the most important objectives outlined for the study were: to identify the factors that should include a prototype of a human trafficking protocol for minors, to develop a prototype of a youth prevention plan for human trafficking, adapted to the Puerto Rican reality and others. The factors were identified by the study participants.

Regarding the hypotheses, they sought to establish that there is indeed a relationship between the presence of protocols for the prevention of trafficking in minors, and the possible reduction in the effects that their absence has had in the fight against this phenomenon in Puerto Rico. Furthermore, the possibility that by identifying the correct factors that should be included in a protocol for the prevention of human trafficking for minors, the detection of cases in Puerto Rico could be improved.

To carry out the investigation, a non-random and dispositional sample was used. The sample was obtained from agencies belonging to the criminal justice system, the agency in charge of ensuring the best welfare of minors in Puerto Rico, known as the Department of the Family, and two NGOs. The agencies invited to participate were:

1. Department of the Family (Administration of Families and Children),
2. Youth institutions of the Department of Correction and Rehabilitation
3. The Puerto Rico Police
4. The Judicial Branch
5. The Department of Justice
6. NGO, there was the collaboration of personnel from the CREA Homes and Teen Challenge, since these organizations offer services to young minors.

On the other hand, the construction of the instrument was aimed at auscultating the knowledge and perception of the subjects, on the subject in question. The validation of the instrument was carried out by three professor judges with a doctoral degree from a major university in Puerto Rico, who, in turn, are knowledgeable of the research methodology. It is expected that the information gathered through the research instrument will provide to the government agencies and NGOs participating in the study with relevant information regarding the issue of trafficking in Puerto Rico.

Likewise, the instrument fulfilled its purpose of obtaining the necessary information to carry out the investigation. The sample was obtained non-randomly and by arrangement. The results obtained from the research are expected to make the study a contribution to future research. As has been established, in Puerto Rico there is a shortage of research on the subject in question.

Regarding the limitations of the study, the most important were: the scarcity of research and information related to the subject in Puerto Rico, the fear of some

government officials to answer questions that they understood were evaluating the system for which they work, the requirements for offer permission to carry out research in some agencies, the passage of Hurricane Maria, the scarcity of information regarding the issue of human trafficking in Puerto Rico, and others. It is important to note that the authorization to carry out the study was not officially obtained in one of the agencies, since they had demands that would delay the conduct of the investigation. Similarly, it was possible to interview representatives of the agency who consented without any problem to participate in the investigation. In another of the agencies, although authorization was obtained, communication to coordinate the interviews was impossible, however, some employees who agreed to participate in the investigation were contacted. This research is an additional contribution to the studies that already exist on the subject of trafficking in Puerto Rico, which may benefit future researchers on this matter. From the research, additional questions may arise that open the space for further study.

Regarding the research findings, one of the most significant was to find that a significant number of the participating government agencies that offer services to minors in Puerto Rico, are not properly prepared to detect and offer services to minors who are victims of human trafficking. Therefore, victims may be ignored by the state or doubly victimized, firstly by their captors and secondly by the state. Furthermore, it was found that many of the employees expressed that they did not feel prepared to detect or offer services to minor victims or possible victims of this phenomenon. Most of the interviewees demonstrated that they have at least a basic knowledge of what trafficking is and of its existence in Puerto Rico. However, it cannot be forgotten that these are the people called to offer services to this vulnerable population. Another important finding was the absence or scarce statistics on the crime of trafficking in Puerto Rico, even though since 2012, trafficking was classified as a crime in the Penal Code of Puerto Rico. Furthermore, a significant group of those interviewed indicated that they did not know either the Palermo Protocol or some of the laws related to human trafficking that are applicable in Puerto Rico. Another significant finding that emerged from the investigation was that both the Department of the Family and the Police of Puerto Rico have intervention protocols for human trafficking cases. However, the investigation did not find evidence of the existence of national protocols for the prevention of human trafficking for minors. These findings and many others, arising from the research, demonstrate the need for constant training and guidance for front-line employees in offering services to minors. It cannot be ignored that human trafficking, even to the present, is a subject that is little known and studied in Puerto Rico.

Results

Among the most significant results of the research, it can be mentioned that the interviewees identified the factors that a prototype of a youth prevention plan should include. With the information offered by the interviewees, the main objective of the study was fulfilled, which consisted of creating a prototype of a plan for youth prevention of human trafficking. Furthermore, the interviewees identified the factors that should be included in a prototype protocol for the prevention and protection of human trafficking for Puerto Rican minors. Also, it was verified the insecurity of some of the employees to handle human trafficking cases. It was possible to identify the genuine desire of many of the participants, in terms of being able to identify, attend to and prevent this type of situation.

The investigation revealed the need for state-of-the-art protocols for the prevention and protection of human trafficking for minors. Likewise, the importance and need for training, orientation, awareness and responsibility in relation to this phenomenon was evident. The interviewees were emphatic about the importance of prioritizing these issues. Participants suggested that protocols be created that are accompanied by clear guidelines to help employees identify potential trafficking cases, as some expressed that they did not feel empowered to do so. Furthermore, implicit was the lack of communication between the relevant agencies, the lack of definition of procedures and the need for a clearer and more understandable definition of the meaning of trafficking. This reveals the need for a national protocol for the prevention and protection of human trafficking for minors. This protocol must be accompanied by a guide that contains specific and clear guidelines for the detection of trafficking cases. Likewise, the urgency was expressed to define the responsibilities of each relevant agency in this matter. The protocol should be seen as an additional tool that helps in the fight against this phenomenon in Puerto Rico. Said protocol should serve as a guide for employees of public agencies and NGOs in Puerto Rico.

Likewise, the study participants identified some of the effects that the absence of protocols has had in the fight against this phenomenon in Puerto Rico. According to the knowledge and perception of the interviewees, some of these effects are: delays in criminal proceedings in the agencies of the Criminal Justice System, inability of some officials to identify acts of human trafficking, greater vulnerability for minors to suffer acts violence, greater exposure to the violation of the human rights of potential victims, absence of tools for intervention by officials, a delay in filing cases and others.

On the other hand, another important result identified through the investigation was the need to establish indicators to guide possible cases of trafficking, the need for training for officials who offer services to this population, definition of the obligations of each agency and specific guidelines for each one, as to how to proceed in detecting trafficking cases. Also, the importance of promoting good communication between agencies was identified in order to achieve good teamwork, good communication, coordination and streamlining of the services to be offered, which should be beneficial to minors.

Discussion and Conclusion

According to the results of the investigation, it is imminent to have a state protocol for the prevention and protection of human trafficking for minors in Puerto Rico. Furthermore, it is essential to educate and train public officials, NGO officials and the community in general on this subject and its magnitude. A massive and constant disclosure of the reality of the existence of this phenomenon on the island is imperative. According to the results of the study, it is necessary to create public-private alliances to effectively combat this problem. It is also clear the need for alliances with other countries, especially Latin American countries also affected by this issue. To work together and coordinate in the fight against is a phenomenon.

Despite the fact that Puerto Rico has been recognized as a country of origin, transit and destination of cases of human trafficking, still to the present, there is much ignorance on this subject. However, the interviewees showed great interest and concern in being able to identify and offer adequate services to victims of this crime. Some officials could perceive a tone of frustration and concern regarding this matter.

It cannot be denied that the government of Puerto Rico has made progress in terms of national legislation. However, the need to work with the prevention and protection of minors has become clear. The problem of trafficking is not yet fully visible in the Puerto Rican community. Obviously, there is still a long way to go when it comes to this matter. Adequate management of this phenomenon is urgent.

It is essential to involve the community as an integral part of the fight against this problem. Education, at all levels, is an indisputable tool to confront this monster. This phenomenon threatens the safety and well-being, not only of Puerto Rican children, but also of children around the world. You cannot skimp on efforts when it comes to the best welfare of minors. Sometimes, it seems that they forget that minors are the future of peoples.

It is up to the members of the legislative branch, the executive branch and the Judicial Branch of Puerto Rico to pay the attention that this matter deserves. The responsibility of providing the necessary tools to minimize the effects caused by the absence of human trafficking protocols for minors falls on their shoulders in the fight against this phenomenon. Furthermore, they are responsible for ensuring the best interests of Puerto Rican minors.

References

- Binda, N. U., & Balbastre-Benavent, F. (2013). Investigación cuantitativa e investigación cualitativa: buscando las ventajas de las diferentes metodologías de investigación. *Revista de Ciencias económicas*, 31(2), 179-187.
- Hernández L., Rey C. (2017), *Violencia: género y trata*. Puerto Rico: UPR
- Hernández Sampieri R.; Fernández-Collado, C. & Baptista Lucio, P. (1997 y 2010), *Metodología de la investigación*. México: McGRAW-HILL
- (ILO), I. L. (2017). Global Estimates of Modern Slavery. Geneva Retrieved from https://www.ilo.org/global/publications/books/WCMS_575479/lang--en/index.htm
- Irwin N, (2016) How Brexit Will Affect the Global Economy, Now and Later, New York Times. Retrieved from http://www.nytimes.com/2016/06/25/upshot/how-brexit-will-affect-the-global-economy-now-and-later.html?_r=0
- Law 106-386. (2000). *Victims of Trafficking and Violence Protection Act of 2000*. E.U. Retrieved from <https://www.govinfo.gov/app/details/PLAW-106publ386>
- Ley 225, Ley para enmendar los artículos 2,3,7,8,11 y 58 de la Ley Núm.246, Ley Para la Seguridad, Bienestar y Protección de Menores. (2014). Puerto Rico.
- Ley 26842 de Asistencia a sus víctimas, prevención y sanción Código procesal penal Victims of Modificación.(2012).Argentina. Retrieved from <https://www.argentina.gob.ar/normativa/nacional/ley-26842-206554>
- Ley 87, Ley de Asistencia a Inmigrantes Víctimas de Trata Humana. (2015). Puerto Rico.
- Ley 896, Ley contra la trata de personas. (2015, January 28). Nicaraguas. Retrieved from https://oig.cepal.org/sites/default/files/2015_nic_ley896.pdf

- Ley 9095, Ley contra la trata de personas. (2013). *Ley contra la trata de personas*. Costa Rica. Retrieved from https://oig.cepal.org/sites/default/files/2012_cri_ley9095_0.pdf
- Ley general para prevenir, sancionar y erradicar los delitos en materia de trata de personas y para la protección y asistencia a las víctimas de estos delitos (DOF). (2014, March 18). Estados Unidos Mexicanos. Retrieved from http://www.diputados.gob.mx/LeyesBiblio/pdf/LGPSEDMTP_190118.pdf
- Ley Núm. (2012).146, Código Penal de Puerto Rico.
- López W. (2014). Ocho pasos para el desarrollo de una investigación. Puerto Rico: UPR
- Apa, N. (2017). Normas Apa. Retrieved from Normas Apa: <http://normasapa.net/2017-edicion-6>.
- (ONU), O. d. (2000). *Protocolo para prevenir reprimir y sancionar la trata de personas, especialmente mujeres y niños, que complementa la Convención de las Naciones Unidas contra la Delincuencia Organizada Transnacional*.
- Rey C. y Hernández L. (2014). La trata de personas: Una forma moderna de esclavitud en Puerto Rico. San Juan, Puerto Rico: UPR
- Rey C., Hernández. L. (2010). *La trata humana en Puerto Rico; Un reto a la invisibilidad*. San Juan, Perto Rico: UPR.
- Salado, María (2014). *La Trata de niños y niñas en Puerto Rico*. Retrieved from https://prezi.com/asn0h_zlh-fs/la-trata-de-ninos-y-ninas-en-puerto-rico/
- TVPRA, L. (2003). Ley de Reautorización de la Protección de Víctimas de la Trata de Personas. Estados Unidos (E.U).
- TVPRA, L. (2005). Ley de Reautorización de Protección de Víctimas de la Trata de Personas. Estados Unidos (E.U).
- TVPRA, L. (2008). Ley de Reautorización de Protección de Víctimas de la Trata de Personas. Estados Unidos (E.U).
- TVPRA, L. (2013). Ley de Reautorización de la Protección de Víctimas de la Trata Estados Unidos (E.U).

Date received: 05/05/2020
Date reviewed: 20/05/2020
Date accepted: 22/06/2020

How to cite this article:

Pellón Mendoza, A. R. & Castaño Castaño, S. (2020). Application of Direct Transcranial Current as Non-Invasive Therapy in Eating Disorders: An Intervention Proposal. *MLS Psychology Research* 3 (1), -79-98. doi: 10.33000/mlspr.v3i1.468

**APPLICATION OF DIRECT TRANSCRANIAL CURRENT AS
NON-INVASIVE THERAPY IN EATING DISORDERS: AN
INTERVENTION PROPOSAL**

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Abstract. Transcranial direct current stimulation constitutes a promising technique for the treatment of psychiatric disorders such as nervous anorexia. The way of acting is through the regulation of brain activity applied mainly in the area of the dorsolateral prefrontal cortex. This paper reviews the principles of transcranial direct current stimulation through the electrodes and how the intensity, duration and type of application procedures influence the results; the pathogenesis of anorexia nervosa, the different areas that are altered in terms of its operation, as well as the studies carried out in the dorsolateral prefrontal cortex and the different experimental studies of treatment in this typology of patients using this technique in recent years. A possible intervention proposal is also exposed based on the evidence found in the different works reviewed, introducing some improvements, with the aim of making the effectiveness of treatment with tDCS more widely known in future research.

Keywords: transcranial direct current stimulation (tDCS), nervous anorexia, dorsolateral prefrontal cortex, treatment, pathogenesis.

APLICACIÓN DE CORRIENTE TRANSCRANEAL DIRECTA COMO TERAPIA NO INVASIVA EN TRASTORNOS DE LA CONDUCTA ALIMENTARIA: UNA PROPUESTA DE INTERVENCIÓN

Resumen. La estimulación transcranial de corriente directa constituye una técnica prometedora para el tratamiento de trastornos psiquiátricos como puede ser la anorexia nerviosa. La forma de actuación es a través de la regulación de la actividad cerebral aplicada principalmente en la zona de la corteza prefrontal dorsolateral. En el presente trabajo se revisan los principios de la estimulación transcranial de corriente directa a través de los electrodos y cómo influye la intensidad, la duración y el tipo de procedimientos de aplicación en los resultados; la patogenia de la anorexia nerviosa, las diferentes áreas que se encuentran alteradas en cuanto a su funcionamiento, así como los estudios llevados a cabo en la corteza prefrontal dorsolateral y los diferentes estudios experimentales de tratamiento en esta tipología de pacientes mediante esta técnica en los últimos años. Se expone también una posible propuesta de intervención basándonos en las evidencias encontradas en los diferentes trabajos revisados introduciendo algunas mejoras, con lo que se pretende dar a conocer con mayor profundidad la efectividad del tratamiento mediante tDCS en futuras investigaciones.

Introduction

Eating disorders are characterized by abnormal and harmful habits in the diet that often present comorbidity with important medical and psychiatric disorders, leading to a loss of quality of life and being able to reduce the duration of the same.

Within the category of eating disorders we can find different types of disorders related to eating habits, but with particular characteristics and specific in each of them, such as morbid obesity; diagnosed in people whose body mass index (BMI) is greater than 40 kg/m² and anorexia nervosa (AN) which is defined by an extremely low BMI (<18.5 kg/m²) which presents morbid concerns related to weight and body image according to the DSM-IV (American Psychiatric Association, 1994). This latter eating behavior disorder is characterized by weight loss or failure in weight gain that leads to wasting. Both diseases have a significant impact on people's lives, albeit in different ways. Morbid obesity is a chronic and progressive disease with a prevalence of approximately 14%, which has comorbidity with cardiovascular disease, type 2 diabetes mellitus, osteoarthritis and various types of cancer. By contrast, 0.7–3% of the population (predominantly 10:1 in the female population) suffers from AN, this disorder is also associated with critical metabolism, endocrine and electrolyte imbalances, psychiatric comorbidities and an even higher risk of mortality due to the high suicide rate in this type of disorder and the complexity of complications that may occur. In addition to these disorders is also Bulimia Nervosa (BN), characterized by recurrent episodes of binge

eating and inappropriate compensatory behaviors. A binge consists of ingesting large amounts of food over a short period of time, experiencing a feeling of loss of control over your intake. Another feature of the BN refers to excessive concern for weight and figure; personal worth is judged almost exclusively on the basis of weight and figure (American Psychiatric Association, 1994). It is estimated to have an overall prevalence of 0.3% and can afflict up to 1% of women, presenting psychiatric comorbidities such as anxiety and depression. Another of the eating behavior disorders with a high prevalence is binge eating disorder. (Lee, 2018). This disorder is defined as a lack of control over intake that manifests itself by eating large amounts of food over a discrete period of time. Bingeing causes great discomfort in the subject; these are not followed by compensatory behavior and must occur at least twice a week for at least 6 months. This disorder is more common among people with obesity than in people with normo weight, according to the DSM-IV (American Psychiatric Association, 1994).

A wide variety of treatments have been applied for eating disorders among the most used today; from conservative measures (diet, exercise, cognitive behavioral therapy) to medications (e.g. benzphetamine, orlistat, rimonabant) and bariatric surgery (Roux-in-Y gastric bypass, adjustable gastric laparoscopic band, sleeve gastrectomy, vertical band gastroplasty) in the case of obesity. Of these options, bariatric surgery is the most effective treatment for rapid weight loss but it is still associated with approximately a 10–27% failure rate. Currently, for the treatment of AN the most commonly used are cognitive behavioral therapy (CBT), selective serotonin reuptake inhibitors (SSRIs) and neuroleptics. According to the data, the treatments available for AN are only likely to be effective. Pharmacological treatment plays a limited role as the primary treatment, but with rather poor efficacy, in addition 30% of patients with AN prove to be medically intractable. Psychological therapies, such as CBT and family psychotherapy, are widely considered the treatment of choice. However, no individual psychological intervention showed a clear superiority in the treatment of adults with AN, while in adolescents with AN, the evidence base is stronger for the use of family psychotherapy on the individual than individual psychotherapies (Constanzo et al., 2018). In particular, the application of an integrated multifocal treatment, based on family and individualized psychotherapy, nutritional and pharmacological interventions, showed improvement in bedtime behaviors and psychopathology in adolescents with AN (Laghi et al., 2017). However, there is a need to continue efforts to develop novel interventions (Bodell and Keel, 2010). The situation is similar for BN; patients are typically treated with CBT and/or antidepressants (SSRIs) as pharmacotherapy, but most patients say they remain symptomatic after treatment.(Lee, 2018). As for treatment for binge eating disorder, it doesn't differ much from those listed above.

As we have mentioned, there are currently a wide variety of treatments for different disorders of eating behavior, but none of them have a high effectiveness, due to the high incidence of this type of disorder and the low percentage of recovery, different complementary treatments to those already existing are currently being studied. It is

worth noting the low percentage of recovery and the high level of relapse that occurs in patients with ER, this accompanied by the large number of complications that come with an ER. In recent times are studying a variety of treatments that can help in the aspects discussed, among the procedures being investigated are techniques that can be used to stimulate or inhibit neuronal activity, this type of technique has been postulated as a potential treatment (McClelland et al., 2013; Lee et al., 2018).

The objective of this study is to analyze the different applications that have been carried out to date of neuromodulation techniques, in particular transcranial stimulation with direct current (tDCS), in patients with anorexia nervosa and to make a proposal for intervention.

Neuromodulation and pathogeny of eating disorders

Neuromodulation, is one of these potentially beneficial techniques, involves modifying the specific activity of the neural circuit without causing damage to nerve tissue, which involves the recovery of the previous functional state after discontinuation of the stimulus. This technique aims to activate or deactivate neural networks by applying a controllable electrical current with respect to frequency, amplitude and pulse width. It has been proposed as an alternative to the surgical procedures that were being applied in different pathologies. Experimental models have shown that high-frequency electrical stimulation affects the entire neural system, altering its metabolism and modifying neurotransmitter production and even protein synthesis. (Jáuregui-Lobera, 2018).

Among the different types of neuromodulation is noninvasive brain stimulation (NIBS) that involves transcranial cortical stimulation of neural targets in a non-surgical way. There are different types of stimulation; repetitive transcranial magnetic (rTMS) and transcranial direct current stimulation (tDCS) that are the most popular and frequently studied. These are non-invasive, focal, painless and safe brain stimulation techniques, the therapeutic potential of which underlies the ability to induce transient changes in cortical excitability status, in the case of rTMS; neuromodulation and brain plasticity, in the case of tDCS.

Each differs in terms of its stimulation mechanism; RTMS passes brief pulses of current through a coil over the scalp generating an electromagnetic field that inhibits (low frequency, <5 Hz rTMS) or active (high frequency, > 5 Hz rTMS) target neurons, while tDCS consists of stimulating with weak current electricity certain regions of the brain through electrodes placed on the scalp to depolarize (anodic tDCS) or hyperpolarize (cathode tDCS) resident neurons.

Both rTMS and tDCS have been explored with different successes for a multitude of disorders, including OCD, depression, anxiety, chronic pain, stroke rehabilitation, addictions and have also been applied to eating disorders (Jáuregui-Lobera, 2018).

The appeal of tDCS as a therapeutic intervention is multifactorial: it is safe and tolerable, non-invasive, producing mild side effects, such as paresthesia and erythema located at the stimulation site. The application of tDCS involves the placement of two patch electrodes on the scalp soaked in saline to promote electrical conduction. Low-intensity dc current (between 1-2.5 mA) is administered for a variable period between 10 and 30 minutes. This electric current produces a stimulation that results in partial depolarization of neural cell membranes in regions close to the anode and hyperpolarization near the cathode, causing a change in the spontaneous rate of neural triggering, thus modulating cortical excitability.

Anodic stimulation reduces the trigger threshold for the spread of action potentials, facilitating activity, while cathodic stimulation inhibits activity. Interestingly, the effect of tDCS depends on the direction of the current flow (i.e. parallel or perpendicular to the orientation of the underlying pyramid neurons). Due to the folding of the neocortex, the dominant current flow is perpendicular to the neural columns, so the mechanism of action of tDCS is mainly due to the polarization of synaptic terminals. The influence of the current direction and the importance of the polarity of the electrode with respect to the facilitation or inhibition of cortical activity reflects the relevance of the placement of the same to achieve the desired results of tDCS. (Dalton, 2018; Moffa, 2018).

To know where this type of treatment may be most beneficial it is necessary to know the pathogeny of ER, it is known that there are a number of brain regions involved in the regulation of homeostatic and hedical aspects of food behavior. Hypothalamic nuclei are essential for maintaining energy homeostasis, while limbic and cortical structures are involved in the non-homeostatic search for food in areas of reward and pleasure (Michaud, 2017). Irregularities in neural activity within homeostatic circuits may play an important role in the food deregulation of the eating disorders discussed above. There is evidence that certain forms of addiction and food cravings that are present in obesity share similar underlying mechanisms, such as deregulation of dopaminergic activity in the Mesolimbic pathways (Michaud, 2017; Monteleone, 2018). Research on the pathogenesis of AN and BN has also pointed to the deregulation of non-homeostatic reward pathways as a causal factor in the mechanism of development of ACT (Dalton, 2018; Jáuregui-Lobera, 2018; Surowka, 2018). The dorsolateral prefrontal cortex (dlPFC) has been identified as a key brain region involved in the regulation of food and behaviors in all eating behavior disorders, playing a critical role in both executive function, inhibitory control, integration of reward signals, and planning and execution of targeted behaviors (Costanzo , 2018; Ehrlich et al., 2015; Gordon, 2019; Hestad et al., 2016; Kekic, 2017; Lowe, 2017; Macedo, 2016; Ray, 2019). Associations between obesity and decreased functional activity in the lateral regions of the prefrontal cortex have also been observed after a meal by elucidating a potential mechanism that contributes to the development of obesity. This executive dysfunction can also worsen as a result of obesity,

creating a negative feedback cycle that can make it difficult for obese people to change their eating behaviors. (Volkow ND, 2013).

One of the annotated characteristics of AN is comorbidity with affective disorders such as depression or bipolar disorder. Previous imaging studies suggest that AN involves dysfunction within several neural pathways, including circuits related to self-awareness (parietal cortex, insula), visual and taste sensation (occipital cortex and insula) and reward (ventral striated body, anterior and subcallosal cingulated body), dorsolateral PFC and ventromedial PFC. (Ellison et al., 1998; Val-Laillet et al., 2015; Zhang et al., 2013). Insula, which preserves interoception (an individual's self-observation of the body's internal homeostasis), is involved in many of these circuits and can be particularly related to distorted perceptions in AN.

A theory of the pathogenesis of AN suggests that there is an imbalance in the serotonergic signaling within the ventral striatum, perhaps related to the aversion aspect of the disorder (Taghva, Corrigan and Rezaei, 2012). Another theory is the existence of disturbances in the reward pathways (Kaye and Bailer, 2011; Kaye, Fudge and Paulus, 2009; Kaye et al., 2013). Disruption of the dopamine system is known to affect reward circuits, leading to a dysphoric mood and anxiety (Kaye et al., 2013). There is evidence of a dopamine imbalance in the ventral striatum in patients with AN showing a decrease in activity as well as hyperactivity in the caudate (Wagner et al., 2007). In addition, the reward pathways of ED patients are triggered by disease-related stimuli, but are not necessarily activated with typical rewarding stimuli. For example, there is an overactivation of the ventral striatum in response to low weight stimuli (Fladung, Grang and Grammer, 2010).

Anorexia is associated with fronto-temporal hyperactivity of the right hemisphere (RH). Electroencephalography (EEG) measurements of people with anorexia showed an RH overactivation (Grunwald et al., 2004). Similarly, when performing a positron emission tomography (PET) scan to people with this eating behavior disorder, aimed at mapping serotonin activity around 5-HT_{1A} receptors, larger groups of serotonergic junctions were found, predominantly in fronto-temporal regions of HR (Galusca et al., 2008). A review of anatomical and metabolic alterations of anorexia described the pathological profile as most often a posterior right hypometabolism, followed by a right anterior hypermetabolism, both associated with an abnormal electroencephalogram (EEG) peak of (RH Braun et al., 1992). In the same vein, patients with anorexia described drawings of healthy female body shapes, in different weight categories, as more aversive than the subject control group, and anorexic aversion ratings correlated positively with the activity of the right prefrontal cortex (Uher et al., 2004). In another study, they saw their own distorted images of the body and activated the right amygdala, the right fusiform turn, and the brainstem region, as if a "scarf" had been activated (Seeger et al., 2002).

Interest in the development of treatments targeting brain regions associated with appetite behaviors such as lateral prefrontal and subcortical regions, such as tDCS treatment, has increased in recent years. In general, the results support this treatment as a useful tool to potentially modify prefrontal cortex activity, food intake and weight intake and decreased anxiety. Brain stimulation techniques offer promising results in modulating food intake and eating behaviors. It has also been instrumental in helping to elucidate the underlying neuropathology and cognitive mechanisms that regulate appetitive behaviors.

Safety and efficacy of tDCS in anorexia treatments

Treatment with tDCS does not evoke action potentials, but induces a change in membrane potential, i.e. anodic stimulation causes depolarization of the membrane and increases the propensity for neuronal firing, while cathodic stimulation affects the probability of neuronal activity. (Phillipou et al., 2019). Consider a flexible treatment in terms of protocols and electrical dose, it is not easy to decide the most effective design for a given experiment. This is due in part to the current lack of comparable research available: there is great variability in protocol and configuration between published studies, and many of them are often underpowered due to small sample sizes (Berryhill et al. , 2014; Li et al., 2015).

The experiments carried out so far with tDCS in AN patients leave us with a variety of results.

In the first published study using this neuromodulation technique in patients with AN carried out by, Khedr, Elfetoh, Ali and Noamany (2014) stimulated the dorsolateral prefrontal cortex (DLPFC) with anodic tDCS in seven patients resistant to treatment with AN. Five patients showed improvement in eating disorder and depressive symptoms immediately after application for 10 days of tDCS, two of these patients maintained improvement at 1 month follow-up. Costanzo et al., (2018) also stimulated the left DLPFC with tDCS in a group of 11 participants (three sessions a week, for 6 weeks), also included a comparison group of 12 AN patients who received family therapy (FBT) in an open study. Although no group differences in eating disorder symptoms were reported, BMI was reported to increase significantly in the tDCS group, but not in the FBT group.

Results were obtained that were interpreted as a possible direct / indirect effect of tDCS in some pathophysiological mechanisms of AN, involving mesocortical dopaminergic pathways and increased food intake. This study first demonstrated a specific effect of a tDCS treatment on stable weight gain and superiority compared to an active control treatment for adolescents with AN. In the experimental group, tDCS was applied to the dLPFC and, more specifically, the anode electrode was placed on the left and the cathode electrode on the right area. According to the literature, this configuration, with concurrent left and right excitatory inhibitory stimulation, was applied to rebalance the right frontal hyperactivity reported in the AN (Bär et al., 2013; Brooks et al., 2011; Grunwald et al., 2004; Phillipou et al., 2015). Furthermore, all participants received nutritional and psychiatric follow-up, as well as psychological support. It is important to

note that the two groups received a similar concurrent nutritional, psychoeducational and pharmacological treatment (the usual “as usual” AU treatment), which could have a major role in eating behavior and weight gain, while they differed for the specific complementary treatment (that is, the experimental tDCS or the treatment of choice FBT). This means that the results obtained can be explained by the complementary treatment or by the interaction between each complementary treatment and the AU treatment.

It is possible to speculate that treatment with tDCS may have a direct/indirect action on one of the aetiopathogenic mechanisms of AN and may represent a more specific treatment in perspective for AN, especially in adolescence. In fact, tDCS has the potential to timely detect brain abnormalities through brain plasticity mechanisms, essential in development. In reality, although "malleable" during the early stages, once established, AN patients are remarkably persistent (Constanzo, 2018; Walsh, 2013), therefore it is essential to treat the disorder early.

Very recently, the first human evidence has been published (Fonteneau et al., 2018) in which bifrontal tDCS induces the release of neurotransmitters in subcortical areas. Specifically, left/right cathodic-anodic tDCS, which induced a significant increase in extracellular dopamine in a part of the striatum involved in the reward-motivation network. Mesolimbic dopaminergic projections on the striatum are supposed to play a key role in governing eating behavior by modulating appetitive motivational processes. It has been hypothesized that disturbances in the dopaminergic reward (DA) pathways play a role in the pathogenesis of AN (Alcaro et al., 2007; Casper, 2006).

Therefore, one of the hypotheses is, although only speculatively, that the treatment used with left/right cathodic-anodic tDCS, aimed at rebalancing the hyperactivity of the right DLPC, can help to restore the cortical glutamatergic system that regulates the tonic DA in the striatum, acting in turn in the rebalancing of the dopaminergic alterations observed in the reward brain network in AN, crucial to regulate the behavior of food intake. (Constanza et al., 2018).

It is plausible that the positive effects found both in BMI and in psychopathological symptoms may arise from a synergistic action between cortical stimulation and medical stimulation in regulating the imbalance between the tonic and phasic component of DA in AN.

The application of tDCS in the right hemisphere is justified in the different studies based on the hyperactivation of said hemisphere. However, in the left hemisphere, DLPFC stimulation is largely justified based on studies in patients with major depression disorder, which generally stimulates this area, showing improvements, due to the great comorbidity that exists between this disorder of the mood and eating disorder. However, in healthy individuals, Vierheilig et al. (2016) with the aim of investigating the effects of bilateral tDCS with different electrode assemblies on the interaction of attention and emotion processes, they found that only left cathodic/right anode tDCS leads to increased

visual attention, but neither left cathodic/right anode nor left anode/right cathode influenced emotional processing.

One of the latest studies by the Phillipou et al., (2019), concludes that anorexia is associated with abnormal HR. An adjunctive tDCS has good potential to facilitate recovery of patients with this condition, balancing the interhemispheric activity. As for the arrangement of the electrodes, an anode left and a cathode right onto the prefrontal is recommended for patients medicated with SSRIs, and DLPFC anode and a shoulder cathode contralateral (or other location noncephalic) it would be more appropriate for medicated patients with SSRIs. Along with nutritional supplements, psychotherapy and other treatments available.

In the different studies carried out, none of the subjects experienced significant side effects neither during the application nor afterwards. In one of the studies where tDCS side effects were most evaluated was in the study by Constanza et al., 2018, they were evaluated using a standard questionnaire (Brunoni et al., 2011) that participants completed after each stimulation session. The questionnaire lists adverse effects such as headache, neck pain, scalp pain, tingling, itching, burning sensation, skin redness, drowsiness, difficulty concentrating, and acute mood swings. Participants quantify the intensity of tDCS-related symptoms or side effects (1, absent; 2, mild; 3, moderate; 4, severe)

Regarding safety and tolerability, no participant requested to stop the study or reported significant discomfort at the electrode sites. The participants tolerated the application of tDCS well. The most frequent adverse effects were itching sensation, burning sensation (reported by 9 participants), especially in the first seconds of stimulation, which decreased rapidly with the addition of water under the sponge and local redness (report of 8 participants). Other effects were mild headache (reported by 5 participants), tingling (reported by 5 participants). This confirms a high tolerability and viability of a treatment with tDCS.

Current pilot studies

Currently, in the different databases consulted, two pilot studies carried out in the past year have been found, in which tDCS is used as a technique for the treatment of patients with AN.

One of the pilot studies is the one carried out by Phillipou et al., 2019 in Australia. Aiming to non-invasively stimulate the left lower parietal lobe (IPL) with HD-tDCS in individuals with AN, this pilot research provides preliminary evidence to determine the feasibility and acceptability of this type of treatment. One of the main differences with conventional tDCS is the application by means of high definition gel electrodes with large sponges.

In addition to presenting minimal physical risks, the duration of treatment with HD-tDCS has the potential to be significantly shorter than that required for psychological therapies in AN, such as CBT (i.e. 20 sessions for an estimated 20 weeks) (Phillipou et al. 2019).

For this study, 20 participants, women, diagnosed with AN, over 18 years of age and with a BMI ($<18 \text{ km} / \text{m}^2$), are selected, they must have been on stable pharmacological treatment for more than 1 month and the clinical situation at the moment it must be stable. Continuous medical assistance is required during the course of the intervention. Daily HD-tDCS (or simulated HD-tDCS) sessions were administered over 10 days (weekdays only) consisting of anodic HD-tDCS applied to the left IPL for 20 minutes at 2 mA (plus 30-second increase and 30-minute ramp down). seconds). The other mock HD-tDCS group was administered in the same manner, but the voltage decreased after the initial ramp from 30 seconds to 0. Similarly, it will rise and fall at the end of the 20 minute mock stimulation to replicate. ramp periods. While students are receiving HD-tDCS or HD-tDCS simulation, they will see visual distractors on a computer monitor.

The venue was the Melbourne Clinic (TMC) within the intensive day-to-day patient program for Body Image and Eating Disorders and Recovery Service (BETRS) at St. Vincent Hospital , Melbourne.

Efficacy assessment was performed using various assessment instruments, the eating disorder questionnaire (EDE-Q; short form), total scores, AN symptom scale scores (adapted from McClelland et al., 2016; Likert scale classifications that include impulse to eat, impulse to exercise, urge to restrict, feeling of fatness, feeling of fullness, mood and anxiety), and the rate of SWJ during a fixation task . Additionally, physical measurements (including BMI) and functional connectivity in the resting state of the left IPL were evaluated from the start to the end point of the treatment, as well as evaluations that have been previously reported in the literature as characteristics of AN that includes a battery of eye movement tasks (Phillipou et al., 2015; Phillipou, Rossell, Gurvich, Castle and Abel, 2016; Phillipou et al 2016; Phillipou, Rossell, Gurvich, Hughes, et al., 2016) Overall (ie, the Wisconsin Card Sorting Test). (Steinglass, Walsh and Stern, 2006). The evaluations were carried out both pretreatment with HD-tCDS and posttreatment, as well as a follow-up of 4 and 12 weeks.

The other pilot study is the one carried out by Strumila et al., 2019 in France, in which it was decided to carry out a pilot study using a method with a different design, varying the number of sessions. The primary objective of the study was safety and tolerability, and the secondary outcomes were efficacy and persistence.

The objective research subjects were ten female patients diagnosed with AN according to DSM-5, in serious condition, (that is, at least 3 years of progression with the failure of at least one of the outpatient treatments and a previous hospital treatment well

performed by a specialized team) These patients were recruited at the eating disorders center of CHU Montpellier, France, being treated in a hospital setting, receiving the usual care, with pharmacological treatment of various kinds to manage the symptoms eaten. Subjects received 20 sessions of 2 mA andal stimulation for a period of two weeks (twice a day for 25 minutes, 10 days) in order to carry out a study differentiated from those that have been carried out until moment, incorporating an increase in the number of sessions that patients received (Strumila et al., 2019). The node was placed to the left of the DLPFC and the whole was placed to the right of the DLPFC in accordance with the international electrode placement system 10e20. The application of tDCS was combined with the usual multidisciplinary treatment of patients. During the two weeks of stimulation, none of the participants underwent a specific feedback protocol (i.e., nasogstric feedback), nutritional intervention, or assistance to a specialist psychological intervention group. In conclusion, nine out of ten patients with severe AN, completed the treatment protocol, without interruption in execution. The only patient who did not complete the protocol was for reasons other than stimulation.

There were no serious side effects, and some minor side effects in the andal stimulation zone disappeared quickly after the procedure. In terms of efficacy, significant improvements were observed in AN symptoms and improvements in compressed depression after the intervention and at one month of follow-up.

Propuesta de intervención

One of the essential conclusions of the studies is that given the lack of therapeutic options available in AN and the low cost of tDCS therapies, they could be performed safely in outpatient settings. Although it is true that these results require exhaustive research, they are necessary for the future and in a controlled and random way to confirm whether the application of tDCS could be a safe and effective complementary treatment option in patients suffering from AN.

Objective

Learning the effectiveness of the intervention with tDCS in patients with AN, diagnosed and with stable treatment. Subjects were divided into two groups: group 1 was given tDCS (treatment group) and group 2 was applied the electrodes and the same sessions as if they were receiving tDCS but without receiving it (sham or sham group). None of the subjects will be aware of whether they receive tDCS or simulated sessions previously. The evaluation of the results will be double-blind in such a way that the person in charge of analyzing the data will not previously know which subjects have received tDCS and which have not, since these are coded. The intervention with tDCS in group 1 patients will act as a complementary treatment to their usual treatment, both pharmacological and psychological.

HD-tDCS will be used for its greater precision and to facilitate the analysis of the data using fMRI (Esmailpour et al., 2019), placing the electrodes in the areas that have shown greater effectiveness; in the left dlPFC the node (excitatory) and in the right dlPFC the whole (inhibitory), the intensity will be 2mA, with a duration of 25 minutes, 15 sessions from Monday to Friday, alternate days, a total duration 5 weeks.

Evaluation

We propose to carry out this evaluation both in the pretreatment with tDCS and at the end of it in the following periods: one month, the third month, the sixth month and after one year. Various assessment instruments will be used, the eating disorder questionnaire (EDE-Q; short form), total scores, AN symptom scale scores (adapted from McClelland et al., 2016; Likert scale classifications that include the urge to eat, urge to exercise, urge to restrict, feeling of fatness, feeling of fullness, mood and anxiety). Additionally, physical measurements (including BMI) were evaluated.

In order to carry out a metabolic analysis of activity in the brain areas where tDCS is applied and to assess the changes and differences between the two groups and before and after the application of tDCS, an evaluation will be performed Randomized 6 of the participants in each group of brain activity using functional magnetic resonance imaging (fMRI). The fMRI data will be obtained before and after completing the stimulation session and always from the same subjects.

This evaluation will help us to correlate the effect of tDCS and the best of the subjects in the AN assessment tests, thus demonstrating that this improvement is an effect of tDCS in combination with classical treatment. The fMRI supports noninvasive images of brain function as the name implies, allowing the study of dynamic physiological changes (Symms, et al., 2006). Therefore, it allows us to study not only how stimulation modulates specific brain regions, but also how tDCS modulates activity throughout the brain in the context of anatomical and functional connectivity. In addition, this integration can also provide a critical insight into how, where and when stimulation is likely to be most effective, useful for optimization purposes.

In a methodological review carried out by Esmailpour et al, in 2019, 118 articles were analyzed where tDCS and fMRI were applied simultaneously in various cases, in order to explore the methodological parameters of integration n of tDCS with fMRI. The conclusion of this review about the use of the fMRI as a means of evaluation is positive, although it indicates that the way to do it must be very exhaustive and with a correct application to avoid the risk of induction of currents for sitas. These additional considerations will be taken into account for the correct evaluation of the data and as indicated to avoid risks.

Conclusions

Current AN treatments are expensive, many patients receive treatment for many years, and a large proportion do not achieve long-term recovery. Brain-stimulating techniques such as HD-tDCS, which are noninvasive and with negligible secondary risks, provide a promising potential therapeutic tool for the treatment of AN if they are effective as preliminary studies indicate.

The lack of exhaustive controlled and randomized research in addition to the reduced volume of these investigations means that this resource is not currently being used as part of the treatment in patients with AN (Berryhill et al., 2014; Li et al. , 2015). The easy accessibility and application of the intervention means that we must further study what is related to perfecting the application protocol in order to access this type of non-invasive neuromodulation treatment in an easier way in the future. It has been verified that the effects are always positive, and the secondary ones are hardly noticeable and of a very short duration.

It will only be through proposed interventions such as the one exposed in our article and future research after its application how we will be able to elucidate whether this type of treatment has real therapeutic value, as has been verified in other psychiatric disorders.

References

- Alcaro, A., Huber, R., and Panksepp, J. (2007). Behavioral functions of the mesolimbic dopaminergic system: an affective neuroethological perspective. *Brain Res. Rev.* 56, 283–321. doi: 10.1016/j.brainresrev.2007.07.014
- American Psychiatric Association (1994). Diagnostic and statistical manual of mental disorders (4a. ed).
- Bär, K. J., Berger, S., Schwier, C., Wutzler, U., and Beissner, F. (2013). Insular dysfunction and descending pain inhibition in anorexia nervosa. *Acta Psychiatr. Scand.* 127, 269–278. doi: 10.1111/j.1600-0447.2012.01896.x
- Berryhill, M. E., Peterson, D. J., Jones, K. T., & Stephens, J. A. (2014). Hits and misses: leveraging tDCS to advance cognitive research. *Frontiers in psychology*, 5, 800. doi: 10.3389/fpsyg.2014.00800
- Bodell. (2010). Current treatment for anorexia nervosa: Efficacy, safety, and adherence. *Psychology Research and Behavior Management*, 91. doi: 10.2147/PRBM.S13814

- Braun, C.M., Chouinard, M.J. (1992). Is anorexia nervosa a neuropsychological disease? *Neuropsychology*, 3, 171–212. doi: 10.1007/bf01108842
- Brooks, S. J., O'Daly, O.G., Uher, R., Friederich, H. C., Giampietro, V., Brammer, M., et al. (2011). Differential neural responses to food images in women with bulimia versus anorexia nervosa. *PLoS ONE* 6, 22259. doi: 10.1371/journal.pone.0022259
- Brunoni, A. R., Amadera, J., Berbel, B., Volz, M. S., Rizzerio, B. G., and Fregni, F. (2011). A systematic review on reporting and assessment of adverse effects associated with transcranial direct current stimulation. *Int. J. Neuropsychopharmacol.* 14, 1133–1145. doi: 10.1017/S1461145710001690
- Casper, R. C. (2006). The “drive for activity” and “restlessness” in anorexia nervosa: potential pathways. *J. Affect. Disord.* 92, 99–107. doi: 10.1016/j.jad.2005.12.039
- Costanzo, F., Menghini, D., Maritato, A., Castiglioni, M. C., Mereu, A., Varuzza, C., Zanna, V., & Vicari, S. (2018). New Treatment Perspectives in Adolescents With Anorexia Nervosa: The Efficacy of Non-invasive Brain-Directed Treatment. *Frontiers in Behavioral Neuroscience*, 12, 133. doi: 10.3389/fnbeh.2018.00133
- Dalton, B., Bartholdy, S., Campbell, I. C., & Schmidt, U. (2018). Neurostimulation in Clinical and Sub-clinical Eating Disorders: A Systematic Update of the Literature. *Current Neuropharmacology*, 16(8), 1174-1192. doi: 10.2174/1570159X16666180108111532
- Ehrlich, S., Geisler, D., Ritschel, F., King, J., Seidel, M., Boehm, I., Breier, M., Clas, S., Weiss, J., Marxen, M., Smolka, M., Roessner, V., & Kroemer, N. (2015). Elevated cognitive control over reward processing in recovered female patients with anorexia nervosa. *Journal of Psychiatry & Neuroscience*, 40(5), 307-315. doi:10.1503/jpn.140249
- Ellison, Z., Foong, J., Howard, R., Bullmore, E., Williams, S., & Treasure, J. (1998). Functional anatomy of calorie fear in anorexia nervosa. *The Lancet*, 352(9135), 1192. doi: 10.1016/S0140-6736(05)60529-6
- Esmailpour, Z., Shereen, A. D., Ghobadi-Azbari, P., Datta, A., Woods, A. J., Ironside, M., & Ekhtiari, H. (2019). Methodology for tDCS integration with fMRI. *Human Brain Mapping*. doi: 10.1002/hbm.24908
- Fladung, A. K., Grön, G., Grammer, K., Herrnberger, B., Schilly, E., Grasteit, S., ... & von Wietersheim, J. (2010). A neural signature of anorexia nervosa in the ventral striatal reward system. *American Journal of Psychiatry*, 167(2), 206-212. doi: 10.1176/appi.ajp.2009.09010071

- Fonteneau, C., Redoute, J., Haesebaert, F., Le Bars, D., Costes, N., Suaud-Chagny, M. F., et al. (2018). Frontal transcranial direct current stimulation induces dopamine release in the ventral striatum in human. *Cereb. Cortex* 28, 2636–2646. doi: 10.1093/cercor/bhy093
- Galusca, B., Costes, N., Zito, N. G., Peyron, R., Bossu, C., Lang, F., & Estour, B. (2008). Organic background of restrictive-type anorexia nervosa suggested by increased serotonin_{1A} receptor binding in right frontotemporal cortex of both lean and recovered patients:[^{18F}] MPPF PET scan study. *Biological psychiatry*, 64(11), 1009-1013. doi: 10.1016/j.biopsych.2008.06.006.
- Gordon, G., Brockmeyer, T., Schmidt, U., & Campbell, I. C. (2019). Combining cognitive bias modification training (CBM) and transcranial direct current stimulation (tDCS) to treat binge eating disorder: Study protocol of a randomised controlled feasibility trial. *BMJ Open*, 9(10), e030023. doi:10.1136/bmjopen-2019-030023
- Grunwald, M., Weiss, T., Assmann, B., and Ettrich, C. (2004). Stable asymmetric interhemispheric theta power in patients with anorexia nervosa during haptic perception even after weight gain: a longitudinal study. *J. Clin. Exp. Neuropsychol.* 26, 608–620. doi: 10.1080/13803390409609785
- Hestad, K., Weider, S., Nilsen, K. B., Indredavik, M. S., & Sand, T. (2016). Increased frontal electroencephalogram theta amplitude in patients with anorexia nervosa compared to healthy controls. *Neuropsychiatric Disease and Treatment, Volume 12*, 2419-2423. doi:10.2147/NDT.S113586
- Jáuregui-Lobera, I., & Martínez-Quiñones, J. V. (2018). Neuromodulation in eating disorders and obesity: A promising way of treatment? *Neuropsychiatric Disease and Treatment, Volume 14*, 2817-2835. doi:10.2147/NDT.S180231
- Kaye, W. H., & Bailer, U. F. (2011). Understanding the neural circuitry of appetitive regulation in eating disorders. *Biological psychiatry*, 70(8), 704. doi: 10.1016/j.biopsych.2011.08.018
- Kaye, W. H., Fudge, J. L., & Paulus, M. (2009). New insights into symptoms and neurocircuit function of anorexia nervosa. *Nature Reviews Neuroscience*, 10(8), 573. doi: 10.1038/nrn2682.
- Kaye, W. H., Wierenga, C. E., Bailer, U. F., Simmons, A. N., Wagner, A., & Bischoff-Grethe, A. (2013). Does a shared neurobiology for foods and drugs of abuse contribute to extremes of food ingestion in anorexia and bulimia nervosa?. *Biological psychiatry*, 73(9), 836-842. doi: 10.1016/j.biopsych.2013.01.002

- Khedr, E. M., Elfetoh, N. A., Ali, A. M., & Noamany, M. (2014). Anodal transcranial direct current stimulation over the dorsolateral prefrontal cortex improves anorexia nervosa: A pilot study. *Restorative neurology and neuroscience*, 32(6), 789-797. doi: 10.3233/RNN-140392
- Kekic, M., McClelland, J., Bartholdy, S., Boysen, E., Musiat, P., Dalton, B., Tiza, M., David, A. S., Campbell, I. C., & Schmidt, U. (2017). Single-Session Transcranial Direct Current Stimulation Temporarily Improves Symptoms, Mood, and Self-Regulatory Control in Bulimia Nervosa: A Randomised Controlled Trial. *PLOS ONE*, 12(1), e0167606. doi:10.1371/journal.pone.0167606
- Laghi, F., Pompili, S., Zanna, V., Castiglioni, M. C., Criscuolo, M., Chianello, I., Mazzoni, S., & Baiocco, R. (2017). How adolescents with anorexia nervosa and their parents perceive family functioning? *Journal of Health Psychology*, 22(2), 197-207. doi: 10.1177/1359105315597055
- Lee, D. J., Elias, G. J. B., & Lozano, A. M. (2018). Neuromodulation for the treatment of eating disorders and obesity. *Therapeutic Advances in Psychopharmacology*, 8(2), 73-92. doi: 10.1177/2045125317743435
- Li, L. M., Uehara, K., & Hanakawa, T. (2015). The contribution of interindividual factors to variability of response in transcranial direct current stimulation studies. *Frontiers in cellular neuroscience*, 9, 181. doi: 10.3389/fncel.2015.00181
- Lowe, C. J., Vincent, C., & Hall, P. A. (2017). Effects of Noninvasive Brain Stimulation on Food Cravings and Consumption: A Meta-Analytic Review. *Psychosomatic Medicine*, 79(1), 2-13. doi: 10.1097/PSY.0000000000000368
- Macedo, I. C., de Oliveira, C., Vercelino, R., Souza, A., Laste, G., Medeiros, L. F., Scarabelot, V. L., Nunes, E. A., Kuo, J., Fregni, F., Caumo, W., & Torres, I. L. S. (2016). Repeated transcranial direct current stimulation reduces food craving in Wistar rats. *Appetite*, 103, 29-37. doi: 10.1016/j.appet.2016.03.014
- McClelland, J., Bozhilova, N., Campbell, I., & Schmidt, U. (2013). A Systematic Review of the Effects of Neuromodulation on Eating and Body Weight: Evidence from Human and Animal Studies: The Effects of Neuromodulation on Eating and Body Weight. *European Eating Disorders Review*, 21(6), 436-455. doi: 10.1002/erv.2256
- McClelland, J., Kekic, M., Bozhilova, N., Nestler, S., Dew, T., Van den Eynde, F., ... Schmidt, U. (2016). A randomised controlled trial of neuronavigated repetitive transcranial magnetic stimulation (rTMS) in anorexia nervosa. *PLoS One*, 11(3). doi: 10.1371/journal.pone.0148606

- Michaud, A., Vainik, U., Garcia-Garcia, I., & Dagher, A. (2017). Overlapping Neural Endophenotypes in Addiction and Obesity. *Frontiers in Endocrinology*, 8, 127. <https://doi.org/10.3389/fendo.2017.00127>
- Moffa, A. H., Brunoni, A. R., Nikolin, S., & Loo, C. K. (2018). Transcranial Direct Current Stimulation in Psychiatric Disorders. *Psychiatric Clinics of North America*, 41(3), 447-463. doi: 10.1016/j.psc.2018.05.002
- Monteleone, A. M., Castellini, G., Volpe, U., Ricca, V., Lelli, L., Monteleone, P., & Maj, M. (2018). Neuroendocrinology and brain imaging of reward in eating disorders: A possible key to the treatment of anorexia nervosa and bulimia nervosa. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 80, 132-142. doi: 10.1016/j.pnpbp.2017.02.020
- Phillipou, A., Abel, L. A., Castle, D. J., Hughes, M. E., Gurvich, C., Nibbs, R. G., & Rossell, S. L. (2015). Self perception and facial emotion perception of others in anorexia nervosa. *Frontiers in psychology*, 6, 1181. doi: 10.3389/fpsyg.2015.01181
- Phillipou, A., Gurvich, C., Castle, D. J., Abel, L. A., and Rossell, S. L. (2015). Comprehensive neurocognitive assessment of patients with anorexia nervosa. *World J. Psychiatry* 22, 404–411. doi: 10.5498/wjp.v5.i4.404
- Phillipou, A., Kirkovski, M., Castle, D. J., Gurvich, C., Abel, L. A., Miles, S., & Rossell, S. L. (2019). High-definition transcranial direct current stimulation in anorexia nervosa: A pilot study. *International Journal of Eating Disorders*, 52(11), 1274-1280. doi: 10.1002/eat.23146
- Phillipou, A., Rossell, S. L., Gurvich, C., Castle, D. J., & Abel, L. A. (2016). The eyes have it: Eye movements and anorexia nervosa. *Australian and New Zealand Journal of Psychiatry*, 50(8), 806-807. doi:10.1177/0004867416656260
- Phillipou, A., Rossell, S. L., Gurvich, C., Castle, D. J., Troje, N. F., & Abel, L. A. (2016). Body image in anorexia nervosa: Body size estimation utilising a biological motion task and eyetracking. *European Eating Disorders Review*, 24(2), 131-138. doi: 10.1002/erv.2423
- Phillipou, A., Rossell, S. L., Gurvich, C., Hughes, M. E., Castle, D. J., Nibbs, R. G., & Abel, L. A. (2016). Saccadic eye movements in anorexia nervosa. *PLoS One*, 11(3). doi: 10.1371/journal.pone.0152338
- Ray, M. K., Sylvester, M. D., Helton, A., Pittman, B. R., Wagstaff, L. E., McRae, T. R., Turan, B., Fontaine, K. R., Amthor, F. R., & Boggiano, M. M. (2019). The effect of expectation on transcranial direct current stimulation (tDCS) to suppress food

- craving and eating in individuals with overweight and obesity. *Appetite*, 136, 1-7. doi: 10.1016/j.appet.2018.12.044
- Seeger, G., Braus, D. F., Ruf, M., Goldberger, U., & Schmidt, M. H. (2002). Body image distortion reveals amygdala activation in patients with anorexia nervosa—a functional magnetic resonance imaging study. *Neuroscience Letters*, 326(1), 25-28. doi: 10.1016/S0304-3940(02)00312-9.
- Steinglass, J. E., Walsh, B. T., & Stern, Y. (2006). Set shifting deficit in anorexia nervosa. *Journal of the International Neuropsychological Society*, 12(3), 431-435. doi: 10.1017/S1355617706060528
- Strumila, R., Thiebaut, S., Jaussent, I., Seneque, M., Attal, J., Courtet, P., & Guillaume, S. (2019). Safety and efficacy of transcranial direct current stimulation (tDCS) in the treatment of Anorexia Nervosa. The open-label STAR study. *Brain Stimulation*, 12(5), 1325-1327. doi: 10.1016/j.brs.2019.06.017
- Surowka, A. D., Ziomber, A., Czyzycki, M., Migliori, A., Kasper, K., & Szczerbowska-Boruchowska, M. (2018). Molecular and elemental effects underlying the biochemical action of transcranial direct current stimulation (tDCS) in appetite control. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 195, 199-209. doi:10.1016/j.saa.2018.01.061
- Symms, M., Jäger, H., Schmierer, K., & Yousry, T. (2006). A review of structural magnetic resonance neuroimaging. In *Neuroscience For Neurologists* (pp. 343– 375). UK: World Scientific. doi: 10.1136/jnnp.2003.032714
- Taghva, A., Corrigan, J. D., & Rezai, A. R. (2012). Obesity and brain addiction circuitry: implications for deep brain stimulation. *Neurosurgery*, 71(2), 224-238. doi: [10.1227/NEU.0b013e31825972ab](https://doi.org/10.1227/NEU.0b013e31825972ab)
- Uher, R., Murphy, T., Brammer, M. J., Dalgleish, T., Phillips, M. L., Ng, V. W., ... & Treasure, J. (2004). Medial prefrontal cortex activity associated with symptom provocation in eating disorders. *American Journal of Psychiatry*, 161(7), 1238-1246. doi:10.1176/appi.ajp.161.7.1238.
- Val-Laillet, D, Aarts, E, Weber, B. (2015). Neuroimaging and neuromodulation approaches to study eating behavior and prevent and treat eating disorders and obesity. *Neuroimage*; 8, 1–31. doi: 10.1016/j.nicl.2015.03.016.
- Vierheilig, N., Mühlberger, A., Polak, T., & Herrmann, M. J. (2016). Transcranial direct current stimulation of the prefrontal cortex increases attention to visual target stimuli. *Journal of Neural Transmission*, 123(10), 1195-1203. doi: 10.1007/s00702-016-1542-5.

- Volkow, N. D., Wang, G.-J., Tomasi, D., & Baler, R. D. (2013). Obesity and addiction: Neurobiological overlaps: Overlaps between drug and food addiction. *Obesity Reviews*, *14*(1), 2-18. doi:10.1111/j.1467-789X.2012.01031.x
- Wagner, A., Aizenstein, H., Venkatraman, V. K., Fudge, J., May, J. C., Mazurkewicz, L., ... & Carter, C. (2007). Altered reward processing in women recovered from anorexia nervosa. *American Journal of Psychiatry*, *164*(12), 1842-1849. doi: 10.1176/appi.ajp.2007.07040575
- Walsh, B. T. (2013). The enigmatic persistence of anorexia nervosa. *Am. J. Psychiatry* *170*, 477–484. doi: 10.1176/appi.ajp.2012.12081074
- Zhang, H. W., Li, D. Y., Zhao, J., Guan, Y. H., Sun, B. M., & Zuo, C. T. (2013). Metabolic imaging of deep brain stimulation in anorexia nervosa: a 18F-FDG PET/CT study. *Clinical nuclear medicine*, *38*(12), 943-948. doi: 10.1097/RLU.0000000000000261.

Date received: 16/05/2020

Date reviewed: 24/05/2020

Date accepted: 22/06/2020

How to cite this article:

Medina Amate, I. M. (2020). Evaluation and Intervention in the Event of a Cross Child Laterality Case. Only Case. *MLS Psychology Research* 3 (1), 99-138. doi: 10.33000/mlspr.v3i1.453

**EVALUATION AND INTERVENTION IN THE EVENT OF A CROSS
CHILD LATERALITY CASE. ONLY CASE**

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Abstract. Laterality is one of the most complex neuropsychological processes to which human beings are subjected throughout their life cycle. Although this process can be developed correctly in most of the cases, it does not happen in all of them. 30% of the world population shows problems related to undefined laterality or cross dominance and therefore, they may present problems in learning to read and write, troubles with their body image, spatial and temporal awareness difficulties and problems with mental calculation. Thus, the aim of this single-case study is to analyse which are the components, that form laterality in children, identify which are the variables that modulate it and find out about the personal, family, social and educational consequences which have an effect on the subject's life from a clinical point of view.

Key words: Laterality, learning, cross laterality.

**EVALUACIÓN E INTERVENCIÓN ANTE UN CASO DE
LATERALIDAD CRUZADA INFANTIL. CASO ÚNICO**

Resumen. La lateralidad es uno de los procesos neuropsicológicos más complejos a los que está sometido el ser humano a lo largo de su ciclo evolutivo. Este proceso se llega a desarrollar correctamente en la mayoría de los casos, pero no en todos. El 30% de la población mundial muestra problemas relacionados con la lateralidad no definida o lateralidad cruzada, presentando problemas en el aprendizaje de la lectura y escritura, dificultades con el esquema corporal y espacio-tiempo, así como en dificultades para el cálculo mental. Por tanto, el objetivo de este estudio de caso único es analizar cuáles son los componentes que forman parte de la lateralidad infantil,

identificar cuáles son las variables que la modulan y conocer en profundidad las consecuencias personales, familiares, sociales y educativas que repercuten en la vida del sujeto desde un punto de vista clínico.

Palabras clave: lateralidad, aprendizaje, lateralidad cruzada.

Introduction

The brain, like any of our organs, is formed throughout life development (Blakemore & Frith, 2007). During this period, it undergoes constant changes both quantitatively and qualitatively. At a quantitative level, the brain modulates its shape, as well as its volume, to accommodate the neural connections that are forged throughout development (Ferré, Catalán, Casaprima and Mombiela, 2004). These neural connections imply that it undergoes waves of brain reorganization (qualitative changes), where the function and organization of all brain structures is modified, from the most primitive to the most complex (Blakemore and Frith, 2007).

All these complex structures need a good organization that allows the brain to be able to act in a way adapted to the environment. Therefore, it (as well as our entire body) is organized in a binary way, in which all structures have their function based on their location (Ferré, Catalán, Casaprima, Mombiela, 2016): left hemisphere and right hemisphere.

Thus, each of the hemispheres is specialized in specific functions. In general, the left hemisphere is in charge of language (Gazzaniga, 2000) and information processing (Ferré et al, 2004), as well as the hemisphere in charge of writing, reading or numerical reasoning (Cumandá, 2012) and whose processing is sequential, that is, the one that analyzes the details step by step (Rivera, 2010). The right hemisphere would then be in charge of the most spatial part, with functions intended to process corporo-spatial information (Ferré et al, 2004), as well as the fact of being able to orient itself in space and prepare conceptual maps (Cumandá, 2012), being its most holistic and global processing (Rivera, 2010). This statement would lead us to think about the fact that each of the hemispheres has a specific functionality and that, therefore, depending on the task, one hemisphere will prevail over the other, thus marking a dominant and a sub-dominant hemisphere (Ostrosky, 1986).

Thus, it has been considered from the first theories that the left hemisphere is the dominant hemisphere, due to the linguistic function it is in charge of, in addition to being the hemisphere in charge of the dextrality of more than 90% of the world population (Romero, 2010).

However, although it is true that each of the hemispheres is preferably assigned to specific functions, it should be noted that neither of these acts “alone”, since it requires that both hemispheres participate in all the activities or tasks carried out for the correct development of the same (Ferré et al, 2004). Therefore, the concept of the dominant/non-dominant hemisphere is replaced by other more specific terminologies, in which the term cerebral reference is called in reference to the greater participation of one or the other in certain tasks or functions (Repila, 2014) or depending on the novelty of the task (Tirapu, 2018), but always bearing in mind that both participate as a globality not subject to dissociations (Ferré and Irabua, 2002).

This interhemispheric connection is produced by the corpus callosum. In the words of Quintero, Manaut, Rodríguez, Pérez and Gómez (2003), "the corpus callosum is the largest interhemispheric commissure and is in charge of connecting both hemispheres transversely", which is made up of more than 200 million fibers nervous (Romero 2010, Quintero et al, 2003). In other words, the corpus callosum is responsible for establishing relationships between the highest functions of the Nervous System, and thus being able to get the right side of the brain to know what the left does (Ferré et al, 2016).

However, at the moment when the hierarchical organization of functions fails and the cerebral hemispheres do not communicate through the corpus callosum in a successful way, the circuits designed to elaborate a response are not capable of carrying out the tasks that correspond, entering the bark scene. The cortex, which is in charge of higher functions, carries out the "resolution" of lower-level tasks, causing a blockage and saturation when it comes to performing its own tasks, such as planning, directing, or raising awareness (Ferré et al, 2004). This process causes subjects with learning problems linked to laterality to appear, presenting difficulties in developing correct learning adapted to the needs of the environment (Casado, Llamas & López, 2015).

Laterality has been a very studied aspect by different authors, and there is controversy regarding its etiology (Bilbao and Oña, 2000). According to several authors (Galín and Ornstein, 1972; Hicks and Kinsbourne, 1978 and Milner, 1964), laterality is considered an aspect linked to genetics, it being an intrinsic factor in the nature of the human being, and difficult to change. However, authors such as Dawson (1972) or Oña (1999), establish that lateral predominance is the result of learning and that it can be modulated.

As of today and taking into account the latest studies, it can be concluded that the functional distribution between the two hemispheres is predetermined by genetic information, but that it is the environment and learning that causes their modulation and subsequent development. In the words of Ferré et al (2004): "Genetics provides the basic design, but interaction with the environment is essential for synapses to be activated and circuits and connections to be built."

Laterality is defined as "the functional predominance of one side of the body over another, and is manifested in the preferential use of the hand, foot, eye and ear" (Portellano, 2008). It is what allows us to orient ourselves at a time-spatial level, which helps us to differentiate what is left and right (Rivera, 2010), showing a right or left-handed ability at the eye, foot, hand and ear level (Squadrone et al., nineteen ninety five). Thus, laterality is the fruit of the ordered distribution of functions between the two hemispheres, but without coming to suppose an absolute dominance of one hemisphere over another, but rather as a relative dominance depending on the task or activity (Repila, 2014; Tirapu, 2018).

Therefore, laterality is understood as a complex process that runs through the neuro-sensory-motor aspects throughout the entire cycle (Cumandá, 2012), and as such, goes through several phases. The first phase of the development of laterality is the prelateral stage, comprised between the zero and four years of the child. In this phase, what is intended to be achieved is that the subject has a proper domain of the sensory organs and the body itself, guarantee good contralateral automatic coordination and three-dimensional sensory function, as well as correct activation of the corpus callosum (Ferré et al, 2016).

This phase in turn is divided into three large blocks, in which aspects related to the development of sensory organization stand out, as well as the characteristic responses of the child after its achievement (Table 1, Ferré et al, 2016).

Table 1

Evolutionary sequence of laterality

	Postural Organization	Sensory Organization	Answers Characteristics that the baby should organize (identifiable)
Homolatera phase	Alternating single-sided	Monocular, monaural, monotactile alternating perception.	Asymmetric and symmetric cervical tonic reflex Face-up domain. Body Extension I turn on the ground. Face down domain. Circular crawling.
	Bilateral	Ocular, auditory, tactile duosensory perception.	Inexperienced and homolateral linear crawling.
Contralateral phase	Contralateral	Ocular, auditory, tactile bisensory perception.	Linear expert Sitting Crawl Mastery of double-density Ambulation Contralateral ambulation
Laterality	Laterality	Auditory, tactile, visual dominance	Single stand Lateralization

Note: Adapted from Ferré et al, 2016.

During these phases, and since laterality is a complex process that takes place throughout the evolutionary process and where factors such as genetics, environment and stimulation interact, difficulties may arise when defining lateralization or delays in same.

The laterality, therefore, can be of different types (Brusasca, Labiano and Portellano, 2011; Ferré et al, 2016; Repila, 2014):

- Defined laterality. Defined laterality is that by which the subject predominantly uses one side of his body in both hands, feet, ears and eyes. Thus, the one who predominantly uses his right part will be right-handed and the one who uses his left part will be left-handed.
- Disgruntled laterality. It is one that has been produced by changing the primarily manual preference due to social and educational influences. It can cause neuropsychological disorders such as dysfunction, obstruction or inhibition of brain function.
- Ambidextrism. It occurs when both sides of the body are used without preference. This phenomenon is rare in population incidence. It indicates poor neurological organization and interhemispheric functional organization
- Crossed laterality. It refers to a non-homogeneous lateral predominance, that is, the fact that the right side prevails in one limb and the left side in another limb. This usually occurs when there is a reason for crossing the eye and ear, the most frequent being that expressed with right-handed predominance of the hand and foot together with left-eye predominance.

Although it is true that the majority of the population develops their laterality successfully, there is a significant percentage of children who do not adequately develop it. Approximately a 30% of the population suffers from cross laterality, especially women due to their cerebral symmetry (Brusasca et al, 2011). In the words of Bernabéu (2014), "the development of laterality has repercussions on different facets of the evolutionary development of the child, such as motor development, motor coordination, capacity for orientation and spatial-temporal perception, as well as knowledge of body schema". Specifically, the fact of having crossed laterality leads directly to presenting problems when it comes to rotating figures, confusing the spatial representation of letters or numbers or to presenting difficulties related to the body schema itself, as well as motor and time relationship-space.

In short, learning-related processes such as language, literacy or mathematics would be directly affected by the lack of lateral predominance, since it is necessary to have a dominant segment that has greater strength, precision, proprioceptive quality, balance and coordination to carry out this type of learning (Mayolas, 2010). According to Bernabéu (2014), children with a defined laterality dominance have advantages when it comes to learning to read, write and do mathematical calculations with respect to those who have difficulties in predefining their laterality. For example, authors such as Mesonero (1994) mention that the difficulties that may appear during the learning process of reading can be caused to a great extent by the difficulty of discrimination between right and left, delayed nerve maturation and alterations in cross

laterality. Like reading, there are also dysgraphia and dysortography problems, as well as calculus problems. In addition, this author relates the problems of reading and writing due to alterations in psychomotricity, body schema and spatial structuring.

Although it must be borne in mind that the laterality process is evolutionary and whose predominance does not begin to be established around 4-6 years with the learning of codes (Ferré et al, 2016), it is true that these problems must be detected from the as efficiently and quickly as possible, in order to supply all those deficits in the shortest possible time. For this, manifestations such as the following must be taken into account (Bernabéu, 2014; Ferré et al, 2016):

- Difficulties in the automation of reading, writing and calculation.
- Organization problems in space and time.
- Personal and emotional instability.
- Disorder of body landmarks.
- Difficulty getting to the right and left of the body midline.
- Marked slowness of reflections.
- Graphic and/or reading investments.
- Slow reading speed and lack of reading comprehension.
- Loss of attention.
- Problems in relationships with peers.

Therefore, a complete and global exploration of the different aspects related to the laterality of the subject is essential, with the emphasis on exploring the contralateral base development, the symmetry of the body and functional architecture, the automation of the previously reached levels of organization and the type of hand-eye-foot-ear laterality. The objective of this more exhaustive exploration is none other than being able to detect the lateral predominance of the subject and see in which phases or aspects the underlying problem may exist, in order to make a good approach and to design a manual preference acquisition strategy that improves the quality of life of the child (Ferré et al, 2004, Mayolas Pi, 2010).

In short, this study aims to contribute to the updating of laterality disorders research and to know in depth what are the factors and components that affect its correct development. For this, a single case study is carried out in which all relevant data that may be clarifying in the controversy surrounding laterality can be collected, and thus be able to ensure the existence of

a literature together with the entire scientific community truthful and rigorous that can be applied and taught in educational centers, psychology centers and training centers.

Objectives and hypotheses

The general objective of this study is to analyze which are the components and variables that are part of child laterality from the perspective of a single case study. The specific objectives are:

- Evaluate the main causes of laterality from a clinical perspective.
- Know the different tests and evaluations related to laterality.
- To analyze techniques for treating laterality disorders.
- Carry out a complete treatment plan for the improvement of the subject.
- Explore in depth what consequences it entails on a personal, family, social and educational level.

Once the research objectives have been established, the following hypotheses will be established:

1. Crossed laterality will be positively associated with learning-related problems.
2. Having a correctly defined laterality will be associated with an improvement in reading ability, as well as in the writing of the subject.
3. A correct defined laterality will be positively related to an adequate psychomotor development.
4. An individualized and personalized treatment in the patient will be positively related to a greater probability of improvement in their academic results.

Method

Participants

Being a single case study, the sample used to achieve it was from a single subject. Said subject (hereafter J.S.C) is a male, 10 years old. He is currently in the 4th grade of elementary school, he has repeated a year on one occasion. J.S.C is the youngest son of three brothers, with parents separated since he was four years old, with the mother having custody. He has two older brothers, aged fifteen and seventeen. The family has a medium socioeconomic and

educational level. J.S.C does not present any relevant disease or apparent neurological problems, as well as any psychological diagnosis detected to date. There is no family history.

The therapeutic demand comes from the parents of J.S.C, who express concern about its academic problems. They refer to the lack of motivation and the slowness of the subject to carry out academic tasks, since it presents problems when writing (both in form and in time) and also when reading. In relation to his psychomotricity, he presents slowness in alternating movements and movements that need more concrete and fine skills. It also presents difficulties to discriminate right-left. On an emotional and social level, he is a child with great concerns and curiosities, a lover of music and rock culture. Socially, he is an extroverted and amusing boy, reason why he does not present apparent problems in the relation with his equals.

Instruments

For the present study, different sources of evaluation have been used to determine what is the real problem underlying the reason for consultation. It should be noted that the specific evaluation for this single case study has been in the form of a funnel, that is, it has started with more general techniques and has ended with more specific tests and questionnaires depending on the results obtained.

Firstly, an interview was carried out both with the subject and with the parents, with the aim of obtaining all the relevant information that may be useful for therapeutic follow-up. Specifically, the interview used has been based on Silva (1998), where it is postulated that the semi-structured interview should be understood as a Gestalt, in which all aspects, situations and participants interact with each other, considering themselves as a whole. This interview has specific objectives and on which the interview was based (Silva, 1998):

- Perceive the complete behavior of the patient and their parents.
- Listen, experience, observe.
- Stimulate verbal expression.
- Operational definition of the problem.
- Identify antecedents and consequences thereof.
- Know solution attempts.
- Develop hypotheses.
- Plan the diagnostic process.
- Develop an integrative concept map.

When conducting the interview with the minor, it is necessary to emphasize that the process of the same changes, emphasizing other aspects that can provide more information, such as their verbal and non-verbal behavior, the forms of interaction with the therapist himself, verbalizations about the problem or the evolutionary variables themselves such as age. That is why the therapist must have deep knowledge about how to conduct interviews with children and adolescents, as well as have knowledge of child or evolutionary psychology (Maganto, 1998).

Once all the data has been collected (mainly by the parents), the case is recorded. The anamnesis at this time would act as a summary of all the relevant data mentioned so far, from a passive perspective, where they will be organized by aspects or dimensions of the subject: family, school, friends, etc. (Pujol, 1982).

In summary, the purpose of the anamnesis is to collect information on the subject from the prenatal, perinatal and postnatal moments up to the present time, taking into account those relevant factors that explain the reason for the consultation, in an objective and dynamic way. However, the purpose of the interview is to study and understand the behavior of the subject at a global level, with the information provided being more subjective and profound (Bleger, 1964).

Specifically, during the interview, special emphasis has been placed on knowing all those data related to the laterality process in the J.S.C family, as well as in the subject himself from his birth to the present day. In this way, the data on the lateral dominance of the family, possible functional or sensory alterations and possible associated pathologies have been studied in depth (Ferré et al, 2016), since, although the etiology of manual laterality is unknown, they have been attributed genetic influences among others (Galán and Del Río, 2012).

Secondly, it is necessary to emphasize that a good evaluation process cannot be achieved without a good observation process (Fernández Ballesteros, 1992a). That is why observation has been used throughout the therapeutic process, since it provides information from the first interviews to the end of the intervention with the subject. In the words of this author, three main factors related to observation must be taken into account:

- Observing subject, since it can be an external observer (therapist or co-therapist, family) or internal observer, that is, through self-observation.
- Observation site, which can be natural (in its own context) or artificial (in consultation).

- Time in which the observation is made, current or past.

Be that as it may, observation allows determining the patterns or behaviors that the subject develops in different environments or contexts, with different people or at different times, thus causing the therapist to carry out a much more detailed analysis of what the therapeutic objectives should be to work (Fernández Ballesteros, 2014). Specifically, the observation of the laterality process can be done easily both at home and in therapy, taking into account what are the main tendencies of the child when it comes to moving, taking things with the most common hand, looking through a hole, etc. However, it must be borne in mind that these types of movements and actions must come out spontaneously and automatically in the child so that the information is as truthful as possible (Ferré et al, 2016).

Regarding more specific scales, a search was carried out for all those tests relevant to the case at hand, trying to evaluate all those areas of the subject that can provide relevant information for the future diagnosis. Firstly, the Weschler intelligence scale for children has been used (WISC-V, Flanagan & Alfonso, 2017).

This test assesses overall intellectual performance in children ages six through sixteen. It is made up of fifteen specific tests grouped into two major indices, primary (verbal comprehension, visuo-spatial dimension, fluid reasoning, working memory and processing speed) and secondary (quantitative reasoning and auditory working memory). It is a standardized test for individual use with a completion time of about fifty minutes (Huguet, 2018). The reliability of this test is divided into two halves. The reliability of the primary indices ranges from 0.88 to 0.93 and the reliability of the secondary indices ranges from 0.92 to 0.95. The reliability of Total IQ or CIT is 0.95. Furthermore, the scale shows high internal validity (Amador and Forns, 2019).

On the other hand, the CREA Test has also been used, a test that evaluates the creative capacities of all those subjects from six years of age until adulthood. From a statistical point of view, the CREA test presents high reliability (0.8756), as well as significant validity (Martínez Zaragoza, 2003). It is a quick and objective test that consists of writing all those possible questions that are generated from the visualization of an image. In addition, evaluating creativity in such an objective way offers the therapist the possibility of knowing more in depth aspects to take into account of the subject and her future intervention (Corbalán & Limiñana, 2010).

Another of the batteries used is the PROESC writing process battery that evaluates the processes involved in writing and error detection (Cuetos, Ramos & Ruano, 2002). The battery has a high internal validity both at the factorial level and at the criterion level, as well as a reliability of 0.82 (Cayhualla and Mendoza, 2012). It is a battery that can be administered individually or collectively, with ages between eight and fifteen years of age. It consists of five subtests, of which only two have been used to evaluate the writing of J.S.C: dictation of words and dictation of sentences.

In addition and closely linked to said battery, the battery for the PROLEC-R reading processes has been made (Cuetos et al, 2014), a battery that analyzes the reading processes and all the possible cognitive processes involved in it. This battery is made up of nine tests divided into four processes in which the following stand out: letter identification processes, through the letter name or sounds test and the same-different test; lexical processes or visual recognition of words, through the test of reading words and pseudowords; syntactic processes through grammatical structures and punctuation marks, and finally semantic processes through the understanding of sentences, texts and orally. The test shows a significant content validity, as well as a reliability of 0.687 (Salvador-Cruz, Cuetos and Aguillón, 2016).

Regarding the emotional aspect, a cross-sectional evaluation has been carried out, that is, throughout the sessions (both evaluation and intervention) emotional aspects of the subject have been analyzed through open questions about their interests, thoughts about the “problem”, concerns and other aspects for the correct interpretation of it. However, standardized tests have also been used to complete the information.

The test chosen for this purpose has been the list of adjectives for the evaluation of the self-concept or LAEA. This test evaluates a series of aspects related to the physical, social, emotional and intellectual self-concept (Garaigordobil, 2011). This presents an adequate factor validity above 0.90 and a reliability that shows the stability of the LAEA test.

Finally, an evaluation focused on spatial orientation, psychomotor aspects and corporality in the subject was carried out. Thus, an exhaustive analysis of spatial orientation has been made, evaluating, as Gonzato, Fernández Blanco and Díaz Godino (2011) cite “the description of the subject's situation with the near space, the displacement in relation to himself and the use of the concepts of left-right, front-back, up-down, near-far and near-far”. Therefore, and as the authors themselves indicate, "this criterion aims to evaluate the orientation and

spatial representation capabilities, taking into account both the language used in the description and the representation in the plane of objects and situations."

On the other hand, the Harris Test was used to assess the lateral predominance of the subject ((Harris, 1977). This test consists of evaluating the lateral predominance of each body segment of the subject using twenty-six tests that evaluate the lateral mastery of the hand, foot, ear and eye (Ferradas, 2015).

Furthermore, following the Harris Test line (Harris, 1977), each of the body lines involved in laterality (hand, foot, eye, ear) has been evaluated in a more comprehensive and concrete way. In this way, the entire evaluation has been carried out through different activities and procedures that can analyze in depth the different lateral predominance of the subject.

Procedure

This work has been carried out through the ITIPA practice center, a center dedicated to comprehensive psychology and trauma therapy, where patients with all kinds of problems are received. In this way, the case of J.S.C was evaluated by the internship tutors and subsequently assigned to carry out the final master's work, previously accepted by the ethics committee of the European University of the Atlantic in Santander (Spain).

Once the case was assigned, a meeting was held with the family in which they explained the purpose of the project, what the objectives were and what the procedure to be followed would be, as well as the aspects of confidentiality and ethics. In this way, and with all the data from the study on paper, the informed consent was signed (Annex 1) by the family for their minor parent to participate in the study.

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The way of working with J.S.C has been through fifty-minute sessions, established weekly within the ITIPA center and taught by the internship student. Each session had the objective of something different and essential depending on the times of therapy (see Table 2), although in all of them there has always been a common objective and that of establishing good

rapport with the patient, emphasizing establish a game dynamic that should occur in all cases in which an infant is involved.

Being a unique case, the sessions will focus first on the correct evaluation and consequent possible diagnosis, followed by the subject's intervention and treatment plan. Being younger, the treatment will also be focused on the family and, if possible, on school.

Table 2

Procedure of sessions

Nº of sessions	Procedure	Phases
1st session	First contact. Interview with J.S.C and parents. Reason for consultation.	Establish good rapport. Data collection. Case history.
2nd session	WISC-V + TEST CREA.	Evaluation J.S.C.
3rd session	PROLEC and PROESC.	Evaluation J.S.C.
4th session	LAEA and Test Harris.	Evaluation J.S.C.
5th session	Laterality Assessment.	Evaluation J.S.C.
6th session	Return of information to parents and school. Preparation of reports.	Diagnosis and intervention objectives.
7th session	Improve body schema and body dominance.	Intervention J.S.C.
8th session	Activities and games Consolidation of manual and foot preference.	Intervention J.S.C.
9th session	Manual preferential consolidation. I work in writing. Return advances to the family.	Intervention J.S.C. Information to parents and school.
10th session	I work in writing. Visual and auditory consolidation.	Intervention J.S.C.
11th session	Consolidation of visual preference. I work in writing. Return advances to the family.	Intervention J.S.C. Information to parents and school.
12th session	Spatial and temporal organization.	Intervention J.S.C

13th session	Eye-hand-foot-ear integration. Gymkana. treatment.	laterality End of	Intervention J.S.C. of treatment.
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Note: Author's creation.

Results

Once the resolution of all those pertinent tests has been carried out and the evaluation of the subject has been completed, all relevant results that may clarify the case in question must be revealed. Being such a complex and exhaustive evaluation, the results of each test will be specified in the same order that they have been presented in the Method section.

The results obtained on the Weschler Intelligence Scale for children WISC-V show significant results. As can be seen in Table 3, the scalar scores and the equivalent age of the tests performed show that subtests such as matrices, digits, keys, drawing span and symbol search are below the standardized mean for the subject's age. Specifically, the Matrices score (with an age equivalent to 6 years 10 months), shows possible alterations in the subject's ability to reason abstractly, as well as to process visual information. As for the Digits subscale (with an equivalent age below 6 years), it shows that the subject presents possible deficits in immediate auditory memory, as well as in working and attention memory. On the Claves scale (with an equivalent age below 8 years) the results show possible difficulties in the subject's speed and visuomotor skills, as well as problems in associative learning and pencil and paper handling. Regarding the Span scale of Drawings (with an equivalent age below 6 years), the results show that the subject has possible problems with the ability to memorize visually, as well as in working memory. Finally, the results in the Symbol Search subscale (with an equivalent age below 8 years), show that the subject has serious difficulties with perceptual precision and speed, as well as speed difficulties in processing simple visual information.

Table 3

WISC-V scale result

TEST	Direct scoring	Scalar Score	Equivalent age
Cubes	30	11	10 years and 10 months
Similarities	33	13	12 years and 10 months
Arrays	13	7	6 years and 10 months
Digits	14	4	< 6 years and 2 months
Keys	24	5	< 8 years and 2 months
Vocabulary	27	9	9 years and 10 months
Balances	18	9	9 years and 2 months
Visual Puzzles	20	14	> 16 years and 10 months
Spam Drawings	13	4	< 6 years and 2 months
Search symbols	17	7	< 8 years and 2 months
Arithmetic	18	9	9 years and 2 months

Note: Adaptation of Weschler's version, 2015

In addition, as can be seen in Table 4 (primary indices), the results show conclusive results, with the most affected indices being working memory and processing speed. The 1st percentile in working memory seems to indicate that the subject has serious difficulties in temporarily retaining auditory and visual information for a certain time.

Lastly, the 9th percentile in processing speed seems to indicate alterations in the subject's ability to explore, order and discriminate simple visual information quickly. These first results already show encouraging and relevant data to understand what the subject's functioning is and in which aspects there are deficits.

Table 4

Primary indices

Indice	Sum scores	scalar	Composite score	Percentage	95% Confidence interval
Verbal understanding	22		ICV 106	66	97-119
Visospatial	25		IVE 114	82	104-121
Fluid reasoning	16		IRF 88	21	82-96
Work memory	8		IMT 67	1	62
Processing speed	13		IVP 80	9	73-91
CI TOTAL	58		CIT 87	19	81-94

Note: Adapted from the Weschler version, 2015

Regarding the results from the CREA version C Test, a direct score of 13 has been obtained. This corresponds to an 80th percentile, so we can affirm that J.S.C has high creativity. It is relevant to note that, due to the slow writing, JS.C completes the questionnaire orally instead of writing the questions himself.

In tune with the previous test, the Battery for Writing Processes (PROESC-R) has been carried out, specifically the test dictated by a newsroom. In dictation it is observed that J.S.C has a very slow writing speed, taking five minutes to complete 32 words. Furthermore, it states that the dictation is very long. The letter is large and has an irregular line. There are errors in the letters that imply curvature and union of words, with little clarity being observed in the b, l, j and q. There are also misspellings such as the little use of capital letters in proper names (Parakeet) and beginning of sentences after periods, lack of accentuation (birds) and confusion between b / v (liked). (Appendix 2)

Regarding the writing process, the results obtained in the Battery for the PROLEC-R Reading Processes are as follows (Table 5):

Table 5
Results of the PROLEC-R scales

Scales	Direct scoring	Precision	Speed	Reading Skill
Reading letters	20	Normal	Normal	Average
Same-Different	20	Normal	Normal	Average
Word reading	39	Normal	Very slow	Low
Pseudoword reading	38	Normal	Very slow	Low
Gramatical structures	13	-	Normal	Average
Punctuation marks	12	Normal	-	Average
Understanding sentences	15	Doubts	-	Average
Text comprehension	c 13	-	-	Average
Oral comprehension	5	-	-	Average

Note: Adapted from the PROLEC-R scale

The PROLEC-R Battery is organized through processes. The first process is the initial process of letter identification, evaluated through the subscript "letter name" and "equal-different". The results obtained in this process have been normal both in precision and speed, as well as in reading ability, showing that J.S.C knows how to identify letters and discriminate them, an essential aspect to read correctly.

However, in the second process called "lexical process", the scores show problems both in the "word list" and "pseudoword list" subscale, showing problems mainly in the speed to read them. Specifically, presenting problems in this process may be for reasons related to the non-preference of the recovery path of the reading processes (lexical or sub-lexical), but also with other problems derived from the difficulty of integrating information. The third process studies the grammatical aspect, through the subscales "grammatical structures" and "punctuation marks", showing adequate and standard results. Finally there is the semantic process, formed by the understanding of sentences, texts and oral comprehension. The results

show doubts in the precision in the level of sentences, as well as a very low direct score in oral comprehension. This shows the possible difficulties of the child to extract the meaning of the sentences, as well as difficulties in the correct information of the information.

When evaluating J.S.C, the emotional aspect has also been taken into account, evaluated through the different interviews but also through the List of Adjectives for Self-Concept (LAEA). The percentile obtained through the direct score has been 90, so it is concluded that J.S.C has a good emotional, physical, social and intellectual self-concept.

On the other hand, the results obtained in the evaluation in spatial orientation have been decisive in determining the deficit in the subject. J.S.C shows orientation problems, showing difficulties to differentiate left, right, up, down, front, behind. Thus, in activities such as pointing to objects with different hands, saying what position these objects are in relation to others, or placing himself in a certain specific position, the difficulties were obvious. It also presents difficulties in the speed to carry out simple exercises, since it takes a lot of time to think about what is indicated, showing deficits in the automation of these processes.

Regarding the Harris Test, the results show that the subject apparently presents a crossed laterality (in acronyms of the DIDI questionnaire), since he shows dextral preferences in hand, foot and ear (although with slow actions) and dextral or sinistral lateral alternation in the eye domain. This issue has been evaluated in more detail through the detailed evaluation of each of the lateral domains: manual, foot, visual and auditory laterality. The results show similar results to those already mentioned in the Harris Test, showing preferences in the right hand, foot and ear, but finding doubts in the ocular preference.

Diagnostics

In conclusion, once all the results obtained throughout the evaluation have been analyzed, it can be concluded that J.S.C presents learning problems derived from difficulties in written expression. This could be due to a base problem related to a possible cross laterality with visual crossing. This causes difficulties in one's own corporeality and body schema, difficulties in writing and reading, as well as in spatial and temporal organization. Therefore, the intervention will be focused on improving all these aspects in particular, and on improving its quality of life.

Intervention

Once the diagnosis is made, the intervention and treatment plan is carried out. The treatment chosen for this case has been mainly therapeutic and individually. It is important to note that although the treatment of cross laterality has common guidelines and objectives, there are no equal cases. This is because each person presents different aspects, characteristics and pathological situations, so the treatment should be focused only on the subject in question with whom they are going to work, adjusting the intervention objectives to their needs (Ferré et al, 2016). In addition, it should be noted that this study has been integrated into the multidisciplinary approach of the center, making game dynamics the central axis of the therapy and also, taking into account the systemic therapy of the center in which the family and educational environment count as main factor for the development of the subject and its problems.

In this way, once all those individual variables of the subject and the problem in question have been taken into account, the conclusion is reached that a neuro-psycho-educational intervention will be the most appropriate choice for the case and the context. This is because the problem of cross laterality may have a neurological origin, but also at a psychological level or due to contextual and educational experiences. Thus, taking into account the aforementioned and based on the book by Ferré et al (2016), the specific treatment objectives for J.S.C have been:

- Improve the corporality and the corporal scheme.
- Consolidate laterality at manual, foot, visual and auditory levels.
- Train graphomotor skills to improve writing.
- Improve spatial and temporal organizational.

Corporeality and body scheme

The development of the body schema must be considered as a necessary objective within the intervention for the correct achievement of the overall development of the subject, in order to ensure that the subject is aware of their own perception and that of their environment (Fontana, Pereira and Rojas, 2006). In this way, the training of the corporeality of the subject and the enhancement of knowledge in the body schema itself has been carried out through different activities:

- Middle line. Exercises related to the body midline consist of drawing the midline on the body, in drawings or in front of a mirror. Then parts of the body that are in the midline are named (Annex 3).
- Point out, recognize and name body parts.
- “Sí, mi capitán” (“Yes my captain”). This game consists of giving an order to the partner (in this case patient-therapist) to carry out a series of instructions related to the body (Annex 3)
- Integration exercises of the two hemibodies. Dividing the body through the midline causes us to have "two halves of the body." This means that the child must first know how to differentiate what is her right and left, and then how to integrate both. To achieve this integration, a color is assigned to each part of the body (blue-right / yellow-left). Once assigned, a series of exercises related to color and body part are requested. Once this objective has been achieved, the midline is “crossed” and exercises will be carried out focused on achieving the integration of the two half-bodies.

These exercises stimulate the child's proprioception and give him the opportunity to get to know those parts of his body necessary to perform certain tasks of a bodily nature, providing the overall development of the subject in the environment around him.

Consolidation of laterality at manual, foot, visual and auditory levels

Although it is true that laterality is considered a superior process at a global level, it should not be forgotten that a good lateral eye-hand-leg-ear organization is necessary for good subsequent development (Ferré et al, 2004). For this reason, one of the primary objectives of the intervention has been to consolidate laterality at each of these levels, emphasizing visual dominance, since it is the most affected aspect.

Manual laterality

Taking into account the results obtained in the evaluation of the subject, right-handed manual dominance was consolidated, although both gross and fine psychomotor processes were affected in terms of procedure and execution time. For this reason, the proposed activities have aimed to improve dominant manual integration as well as facilitate general and bodily harmonization (Cumandá, 2012; Ferré et al, 2004).

- "Hot Potato". The game consists of throwing and catching objects between the therapist and the subject with the desired hand for a timed time. Whoever has the object in hand loses. The goal of this game is global body timing.
- Shoot a target. The game consists of making balls in a bucket with the dominant hand and then changing to the non-dominant hand.
- Make small constructions (Lego type).
- Hold object in balance in one hand while performing another action.
- Slap a balloon with the desired hand. The exercise consists of keeping the balloon inserting which hand to use (once right, next left).

All these exercises have the common objective of stimulating the dominant hand, integrating manual laterality as an automatic and effective process, coordinating the hand with other parts of the body (eg, hand-eye), as well as stimulating other higher processes such as working memory. , inhibition processes, etc.

Foot laterality

In the words of Repila (2014), the predominant foot laterality does not form part of one of the main objectives in terms of diagnostic criteria and lateral intervention, since this has the function of supporting and balancing higher functions. However, it is important to note that the correct functionality of the same interferes with the consequent laterality of sensory and manual dominance. Therefore, the exercises chosen for this purpose have been:

- "To the lame leg". Keep the balance to the lame leg making a circuit.
- Kick a ball by inserting the feet.
- Jumps triggered with a hopscotch.
- Lame, lame I am. Go to the wrong leg for a while while doing activities. Thus, foot dominance and working memory are stimulated.

Visual laterality

The results obtained from the evaluation show a poorly defined laterality at a visual level in J.S.C. Therefore, it is important to delve into this aspect, since a poorly defined laterality in the visual field can cause interferences in the overall processing and, therefore, a longer task completion time. The objective of intervention in visual laterality is therefore to enhance the interhemispheric relationship of the passage of information from one hemisphere

to another through the corpus callosum (Tirapu, 2018), since it is one of the structures with the highest number of nerve fibers in the brain (Van, Mori, Wakana, Nagee, 2005)

Thus, during the intervention at J.S.C, a series of activities and exercises based on visual interhemispheric empowerment have been carried out. Specifically, the activities chosen are based on the aforementioned book by Ferré et al (2004), they are as follows:

- Activities with separator. This activity consists of dividing the two visual fields through a cardboard located in the middle of the nose, with the aim that each eye looks at its corresponding part (right eye-right part). Once divided, a series of activities are carried out such as seeing drawings on one side and drawing them on the other, reading text on one side and writing it on the other, joining sentences, etc. (Annex 4)

It is important to note that J.S.C presents a right-handed lateral predominance, with visual interference. Therefore, it is recommended to enhance right-handed visual dominance so that its overall laterality is well defined from the left. In this way, all exercises or activities are carried out in this case by strengthening the right eye and always covering the left eye. Following the guidelines of Cumandá (2012) and Ferré (2004), some examples of this are:

- Bounce a ball through a circuit with your left eye covered.
- Palming a balloon without it falling and without losing sight of it.
- Craft with the left eye covered.
- Puzzles and board games with a covered left eye.
- Read with a covered left eye.

Auditory laterality

The laterality at the auditory level in J.S.C was well defined, so the intervention in this aspect had as its objective only the enhancement of right-handed auditory dominance. The activities proposed for this purpose have consisted of listening through the right ear to walls, the floor, certain sounds, etc. Specifically, based on Cumandá (2012), the activities carried out have been:

- "Doctor Doctor". This activity consists of playing to listen to the different organs of our body through a tube. For this J.S.C has to choose a predominant ear and exchange them.
- "Messages from a glass". This activity consists of making a "phone" with two glasses and a string and saying words that must be heard by the other through their predominant ear.

Graphomotor skill training for writing improvement

Specifically, in the case of J.S.C there is a difficulty in writing both in form and at runtime, so it is necessary to delve into what are the aspects to improve.

Following the guidelines of Cumandá (2012); Ferré et al (2004) and Mayolas Pi, (2010), writing has been mainly worked through a series of exercises organized by phases in which the subject has had to carry out certain activities using different resources:

- Carry out works on blackboard. The activity has consisted of making different shapes and strokes with the greatest possible precision. One of the most used exercises has been to make a lattice with vertical and horizontal lines, spirals, wavy lines, etc. The objective of these activities is none other than to gradually exercise the different muscular actions of the stroke.
- Works on large paper without guidelines. Activities similar to the previous ones are carried out, with the difference of carrying them out on large paper, introducing the calligraphy of letters and numbers, with the aim of establishing the correct left and right directionality (Annex 5)
- Paper works with guidelines. Letter and number calligraphies are performed with a standard guideline, with the aim of standardizing the normal writing process. In addition, activities have been carried out that consisted of putting the letters in their correct position, with the aim of also working on orientation (Annex 5)
- Color. The activity of coloring the different letters and numbers is also used to work precision and resistance.
- Dictations: Finally, short and simple dictations begin to be carried out, increasing depending on the progression.

It is important to note that the J.S.C scribe tweezer was correct, so it was not necessary to rectify or modify any aspect related to how to take the pen.

Improve spatial and temporal organization

This fourth and final objective has been accomplished due to J.S.C's spatial orientation difficulties regarding right, left, up or down. In this regard, it is important to have previously worked on the knowledge of the body schema itself, since it is essential to have a spatially organized idea of how our own body is organized based on the right-left coordinates

A series of exercises have been carried out to improve spatial organization (Ferré et al, 2004; Gonzato et al, 2011):

- Place elements of the environment. This activity consists of naming objects from the near environment (of the room) and placing them in the right / left, up / down, front / back coordinates. Once achieved, it is done with the eyes closed in a different position.
- Place elements on paper. A drawing is put as a reference (pg .: a house), and objects and elements are placed around it. The subject must say what position each one is in. (Annex 6)
- Paint arrows. Paint arrows of a certain color depending on their orientation. (Annex 6)

Discussion

The present work was carried out with the aim of analyzing the different components and variables that make up the laterality, and to know those factors that are related to it. To do this, a single case study was carried out, in which a subject with apparent psychomotor problems and learning difficulties was evaluated. The results obtained during the complete evaluation have led to a diagnosis of undefined laterality, specifically crossed laterality at the visual level.

The results obtained from the evaluation and subsequent intervention show conclusive data. Although it is true that the etiology associated with laterality is not clear, studies such as that of Oña (1999) or Ferré (2004) conclude that although there is a large part of genetic influence, laterality is a neuropsychological aspect that can be manipulated environmental form, where stimulation plays a crucial role. Therefore, this study has focused on the idea of the possibility of change and improvement of the laterality of the subject through the correct learning and stimulation of those members with difficulties in lateral predominance. The results obtained through this treatment perspective have been evident, since there has been an overall improvement in the subject, as well as significant advances in aspects such as reading, writing, psychomotricity or physicality, thus supporting the aforementioned studies.

This in turn is related to the statement by Bernabéu (2014), in which he exposes in his study that a defined lateral dominance could lead to great advances in learning to read, write or perform mathematical calculations.

Furthermore, the results also provide relevant information about the influence of laterality on academic performance. The results obtained from the evaluation of the subject are in line with the research carried out by Repila (2014), where a relationship was found between a problem in the consolidation of laterality and low academic performance, specifically with problems in reading, writing and calculations. Likewise, although this study cannot be extrapolated due to its individualized nature, it does have the possibility of providing relevant information on the main manifestations of academic performance problems linked to difficulties in laterality. Thus, during the evaluation, manifestations such as difficulties in the automation of reading, writing and calculation, organization problems in space and time, or marked slowness of reflexes have been detected; considering all of them own manifestations also detected by studies such as that of Bernabéu (2014) or Ferré (2016).

On the other hand, the results of the evaluation of the subject's spatial and body orientation showed that there was an apparent affectation in aspects such as fine and gross psychomotricity, corporeality, time-space orientation or difficulties in locating left-right, etc. This, on the one hand, produces relevant information, since it is assumed that, as mentioned by Godino, Fernández Blanco and Díaz-Godino (2011), difficulties or delay in lateral predominance can cause problems related to psychomotricity, coming into consonance with said study

This in turn causes the detection of the problems in psychomotricity to entail a subsequent treatment in it. The results after the treatment focused on this purpose yielded optimal results, in which the subject substantially improved their psychomotor coordination, as well as their corporeality and time-space orientation, showing, as Gonzato et al (2011) and Ferré et al (2004), direct relationship between the improvement of lateral dominance and the improvement of the psychomotor factor.

Lastly, it is important to highlight that the treatment chosen for said study has shown substantial improvements in the difficulties of J.S.C. These results are in line with the studies by Ferré et al (2016), since both studies have used the same intervention objectives and, therefore, have obtained similar results.

However, although the progress of the subject in all aspects is undoubtedly evident, it is also subjective. Laterality is not yet considered a problem worthy of attention by professionals and scientists, and as such is not a study center. This implies that the study has a series of limitations:

- Carrying out a single case study entails difficulties for the study to be considered significant and relevant. Not having a significant sample, the study is considered descriptive.
- Only one laterality test was used, due to the limited time of sessions and execution time. Likewise, the need to develop more reliable evaluation tests for the correct objective diagnosis of an ill-defined laterality, without giving rise to errors, is noted.
- The study shows difficulties when carrying out a specific treatment, since there is no scientific literature that specifies which protocols to follow in cases of poorly defined laterality.
- Laterality, being considered an evolutionary process, can cause confusion about its "resolution". It is difficult to know if the improvement in lateral predominance is due to the stimulation imparted by the therapist or due to the neuropsychological maturation of brain evolution.
- Disorders of laterality present controversy regarding their diagnosis. There are authors such as Ferré (2016) who ponder poorly defined laterality as the basis of learning disorders, ADHD, etc., and yet authors who do not relate laterality problems with said disorders, being totally independent. Be that as it may. This shows the need for training and information on the part of teachers, health professionals and families to help understand that an undefined basic laterality marks a very difficult journey for the minor, impacting on all aspects that make up their life and that if it is detected early, the probability of improvement is, in most cases, complete and effective.

Regarding the possible future lines of research, the need to investigate the evolution of the evolutionary process of laterality a few months later in the minor arises to carry out a pre-post study, since it can yield very significant information. It would also be interesting to extrapolate this study to a study of child laterality and academic performance in a school with minors of different ages.

References

- Amador, J, A., Forns, M (2019). *Evaluación y tratamiento psicológico*. Facultad de Psicología. Universidad de Barcelona.
- Bernabéu, E. (2014). Capítulo 5: Programas de desarrollo de la lateralidad, mejora del esquema corporal y organización espaciotemporal, intervención en dificultades de Aprendizaje.

- En Centro Nacional de Innovación e Investigación. *Procesos y programas de neuropsicología educativa*, 79-92.
- Bilbao, A., y Oña, A. (2000). La lateralidad motora como habilidad entrenable. Efectos del aprendizaje sobre el cambio de tendencia lateral. *Revista Motricidad*, 6, 7-27.
- Blakemore, S y Frith, U. (2007). *Cómo aprende el cerebro. Claves para la educación*. Barcelona: Ariel.
- Bleger, J (1964). La entrevista psicológica. Su empleo en el diagnóstico y la investigación. *Temas de psicología (entrevista y grupos)*. Universidad de Buenos Aires.
- Brusasca, C., Labiano, M., y Portellano-Pérez, J. (2011). Lateralidad y variables de personalidad. *Revista chil. Neuropsicología*, 6 (1), 19-24.
- Casado, Y., Llamas-Salguero, F. y López-Fernández, V. (2015). Inteligencias múltiples, Creatividad y Lateralidad, nuevos retos en metodologías docentes enfocadas a la innovación educativa. *ReiDoCrea*, 43 (4), 343-358.
- Cayhualla, R., Mendoza, V. (2012). *Adaptación de la batería de evaluación de los procesos lectores PROESC en estudiantes de tercero a sexto de primaria en colegios particulares y estatales en Lima Metropolitana* (Tesis de postgrado). Universidad Pontificia Católica de Perú. Escuela de Postgrado. Lima, Perú.
- Corbalán, F.J y Limiñana, R. M. (2010). El genio en una botella. El test CREA, las preguntas y la creatividad. *Anales de psicología* 26 (2), 197-205.
- Corbalán, F.J., Martínez, F., Donolo, D, S., Alonso, C., Tejerina, M^a, Limiñana R, M. (2015). *CREA: Inteligencia Creativa. Una medida cognitiva de la creatividad manual*. (3^a edición). Madrid: TEA Ediciones.
- Cuetos, F., Ramos, J. L., Ruano, E (2002). *PROESC- R. Evaluación de los procesos de escritura*. Madrid: TEA ediciones.
- Cuetos, F., Rodríguez, B., Ruano, E y Arribas, D. (2014). *PROLEC-R. Batería de Evaluación de los Procesos Lectores, Revisada* (5^o edición). Madrid: TEA Ediciones.
- Cumandá, M. (2012). *Influencia del programa de Lateralidad en la eliminación de los errores específicos de aprendizaje en escritura*. (Tesis de postgrado), Universidad de Quito. Quito, Ecuador.

- Dawson, J. L. (1972). Temme-Arunta hand-eye dominance and cognitive style. *International Journal of psuchology*, 7, 219-233.
- Fernández-Ballesteros, R (1992a). *Introducción a la Evaluación Psicológica*. (Vol I y II). Madrid: Pirámide.
- Fernández-Ballesteros, R (2014). *Evaluación psicológica*. Madrid: Pirámide
- Ferradas García, C (2015). *Evaluación de la lateralidad mediante el test de Harris en niños de tres y seis años* (Trabajo final de grado). Universidad de Valladolid.
- Ferré, J., Catalán, J., Casaprima, V., Mombiela, J. (2016). *El desarrollo de la lateralidad infantil. Niño diestro-niño zurdo*. Barcelona: Lebón.
- Ferré, J., Catalán, J., Casaprima, V., Mombiela, J.V (2004). *Técnicas de tratamiento de los trastornos de la lateralidad*. Barcelon: Lebón.
- Ferré, J., e Irabua, E. (2002). *El desarrollo neurofuncional del niño y sus trastornos*. Barcelona: Lebón.
- Flanagán, D. P y Alfonso, V. C (2017). *Essentials of WISC-V Assesment*. New York: John Wiley & Sons.
- Fontana, A., Pereira, Z y Rojas, D (2006). Guía Metodológica para docentes: Actividades para fortalecer el concepto de cuerpo, esquema corporal e imagen corporal en niños y niñas preescolares y escolares. *Revista Electrónica Educare*, IX (2), 1-15. Retrieved from <http://www.redalyc.org/articulo.oa?id=1941/194119272014>
- Galán López, I y Del Río Portilla, Y (2012). Influencia de lateralidad manual sobre habilidades visuoespaciales. *Revista Mexicana de Análisis de la Conducta*. 38 (3), 27-44.
- Galín, D y Ornstein, R. (1972). Lateral specialization of cognitive mode: An EEG study. *Psychophysiology*, 9, 412-418.
- Garaigordobil, M. (2011). *LAEA Listado de Adjetivos Para la Evaluación del Autoconcepto*. Madrid: TEA Ediciones.
- Gazzaniga, M. (2000). Cerebral localization and interhemispheric Communication. Does the corpus callosum enable the human condition? *Brain, A Journal of Neurology* 123 (7), 1293-1326.

- Gonzato, M., Fernández-Blanco, T., Díaz- Godino, J. (2011). Tareas para el desarrollo de habilidades de visualización y orientación espacial. *Revista Números. Revista de Didáctica de las Matemáticas*, 77, 99-117.
- Harris, A. J. (1977). *La lateralidad en el niño y en el adolescente: niños diestros, niños zurdos*. Manuel d'application des tests de latéralité. París: Marfil.
- Hicks, R y Kins-Bourne, M. (1976). On the genesis of human handedness: A review. *Journal of Motor Behavior*. 8 (4), 257-266.
- Huguet, E (2018). Análisis de un protocolo para la evaluación integradora del TDAH en dos casos clínicos. *Revista de psicología clínica con niños y adolescentes* 25 (3), 42-47. doi:10.21134/rpcna:2018.05.3.6.
- Jiménez, F. (2001). *Talleres de actividades para el desarrollo del esquema corporal*. Barcelona: CEAC.
- Maganto, C. (1998). Consideraciones en torno a la evaluación infanto-juvenil. En F. Lozano y M. Gómez de Terreros (Eds.) *Avances en Salud Mental Infanto-Juvenil*. Sevilla: Servicios de Publicaciones de la Universidad de Sevilla.
- Martínez-Zaragoza, F. (2003). Características psicométricas del CREA (Inteligencia Creativa). Un estudio con población española y argentina. *Revista Iberoamericana de Diagnóstico y Evaluación Psicológica*, 16 (2).
- Mayolas-Pi, M.C., Villarroya-Aparicio, A. y Reverter-Masía, J. (2010) Relación entre la lateralidad y los aprendizajes escolares. *Apuntes Educación Física y Deportes*, 101 (3), 32-42.
- Mesonero, A. (1994). *Psicología de la educación psicomotriz*. Universidad de Oviedo: Ediuono.
- Milner, B., Branch, C., y Rasmussen, T. (1964). *Observation on cerebral dominance*. *Ciba foundations symposium on disorders of language*. London: Churchill.
- Oña, A., Martínez, M., Moreno, F. y Ruiz, L. (1999). *Control y Aprendizaje Motor*. Madrid: Síntesis.
- Ostrosky, F. (1986). *Hemisferio derecho y conducta. Un enfoque neuropsicológico*. México:Trilla.
- Portellano, J.A. (1992). *Introducción al estudio de las Asimetrías Cerebrales*. Madrid: CEPE.

- Portellano, J.A. (2008). *Neuropsicología Infantil*. Madrid: Síntesis.
- Pujol, T. (1982). La historia clínica en el proceso psicodiagnóstico infantil. Anamnesis versus entrevista psicológica. *Educacio i cultura: revista mallorquina de Pedagogia*, 3, 179-184.
- Quintero, E., Manaut, E., Rodríguez, E., Pérez, J., Gómez, C. (2003). Desarrollo diferencial del cuerpo calloso en relación con el hemisferio cerebral. *Revista Española de Neuropsicología* 5 (1), 49-64. Laboratorio de Psicobiología. Universidad de Sevilla.
- Repila, A.M. (2014). *Lateralidad y rendimiento académico, su relación* (Trabajo final de Máster) Universidad Internacional de la Rioja, Ciudad de Buenos Aires, Argentina.
- Rivera, M. (2010). *Propuesta didáctica para el dominio de la lateralidad en niños de 5-6 años de edad en la escuela Aurelio Bayas Martínez* (Trabajo final de Grado), Universidad de Azuay, Cuenca, Ecuador.
- Romero, H. (2010). El dominio de los hemisferios cerebrales. *CIENCIA UNEMI*, 3(4), 8-15. <https://doi.org/10.29076/issn.2528-7737vol3iss4.2010pp8-15p>.
- Salvador-Cruz, J., Cuetos-Vega, F., y Aguillón, C. (2016). Adaptación cultural y datos normativos del test de lectura PROLEC-R en niños mexicanos de 9 a 12 años. *Cuadernos de Neuropsicología / Paramerican Journal of Neuropsychology*, 10 (2), 46-58.
- Silva, F. (1998). La entrevista. En R. Ballesteros (Ed), *Introducción a la Evaluación Psicológica*. Madrid: Pirámide.
- Squadrone, R., Gallozzi, C y Pasquini, G.L. (1995). Lateralit e bilateralit. *Revista de Cultura Deportiva*, 14, 36-41.
- Tirapu-Ustárroz, J, & Díaz-Leiva, J (2018). Las desconexiones interhemisféricas y el papel de la lateralización y diferenciación funcional en los trastornos mentales. *Cuadernos de Neuropsicología / Panamerican Journal of Neuropsychology*, 12(1), 42-56.
- Van, Z., Mori, S. Wakana and Nagae-Poetscher,L. (2005). MRI atlas of human white matter. Elviesier: Amsterdam.

Date received: 15/04/2020
Date reviewed: 04/05/2020
Date accepted: 23/06/2020

Annexes

Annex 1

INFORMED CONSENT

Before proceeding to sign this informed consent, carefully read the information provided below and, if necessary, you can consult any questions you have on the phone or address at the bottom of this page.

Nature of study

A study will be carried out which title is "**Evaluation and Intervention in the Event of a Cross Child Laterality Case. Only Case**". The objective of this study is none other than to evaluate and investigate the different processes and areas of laterality from the perspective of the subject to be evaluated (J.S.C).

The study is part of the Master's Thesis of the Master of General Health Psychology of the European University of the Atlantic in Santander (Cantabria).

Specifically, this study will be carried out by the student Isabel M^a Medina Amate, under the supervision of the Doctor and Professor of Child Psychology and director of the master Juan Luis Martín Ayala.

The administration of the questionnaires and the subsequent achievement of the intervention will be carried out in the practice center "*Center for Integral Psychology and Trauma Therapy ITIPA*" and attended by J.S.C on a weekly basis. Said procedure will be tutored by the tutor Noemí Álvarez Boyero.

Implications for the participant:

- Participation is completely voluntary.
- The participant can withdraw from the study when he or she says so, without giving explanations and without this entailing any repercussion for him.
- All personal data obtained in this study is confidential and will be treated in accordance with the Organic Law on Protection of Personal Data 15/99.
- The information obtained will be used exclusively for the specific purposes of this study.
- Participant risks: None

If you require additional information you can contact Isabel María Medina Amate by phone 696518684 or by email imedinaamate@gmail.com.

INFORMED CONSENT

“Evaluation and Intervention in the Event of a Cross Child Laterality Case”

I (First and Last Name):....., **father or mother of subject:**.....
.....

- I have read the information document that accompanies this consent.
- I have been able to resolve the doubts that have been raised.
- I understand that my child's participation is voluntary and I am free to participate or not in the study.
- I have been informed that all the data obtained in this study will be confidential and will be treated in accordance with the Organic Law on Protection of Character Data Staff 15/99.
- I have been informed that the information obtained will only be used for academic and scientific purposes.

I understand that I may withdraw from the study:

- Whenever you want.
- Without having to explain.
- Without this having any impact on my son.

I freely agree to my son participating in the study on "Evaluation and intervention in a case of childhood laterality”.

Signature of the father or mother (or legal representative if applicable)

Mr./Mrs./Ms.:.....

Date:

Annex 2: PROESC dictation

El perro se llamaba Perico y era blanco y negro. Le gustaba jugar con sus amigos los pajaros. Le dan mucho miedo las alturas. Cuando duermo sueña que se come un hueso.

J.S.C
Dictado

Annex 3. Corporeity work and body schema

MARTES



Cruzo los dedos índice y medio de la mano derecha.	Cierro la mano izquierda.
Con el pulgar derecho me toco la nariz.	Con el pulgar izquierdo me toco la frente.

Annex 4. Visual dominance works with separator

J.S.C 30/01/2020

1

Los perros de mi vecina ladran todas las noches.

Pilar y Vicente se han comprado dos patinetes.

Julia siempre lleva un sombrero azul en la cabeza.

La semana pasada fue el cumpleaños de mi abuelo.

A la catedral de Málaga la llaman "la manquita".

Mi profesor dice que hay que leer 2 libros a la semana.

Los perros de mi vecina.

Pilar y Vicente se han

Julia siempre lleva un

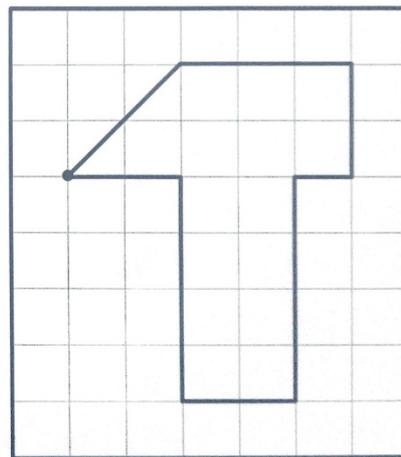
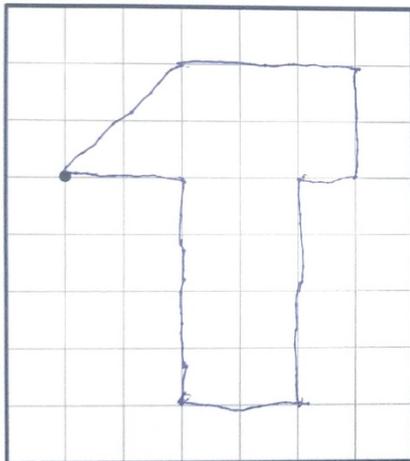
La semana pasada fue el

cumpleaños de mi abuelo

DICTADOS GRÁFICOS

3'58"

2↗ 3→ 2↓ 1← 4↓ 2← 4↑ 2←



30/1/20

B.S.C.

2

Juan y Paloma quieren casarse _____ en la iglesia de las afueras de la ciudad.

Mi ordenador _____ con su familia a visitar París.

Manuel irá de viaje _____ el rock, aunque también me gusta el flamenco.

El libro de matemáticas _____ está viejo, necesito comprarme uno nuevo.

Mi estilo de música favorito es _____ contiene muchos problemas y cuentas difíciles.

El plato favorito de Isabel es el _____ siendo dos de ellas gemelas.

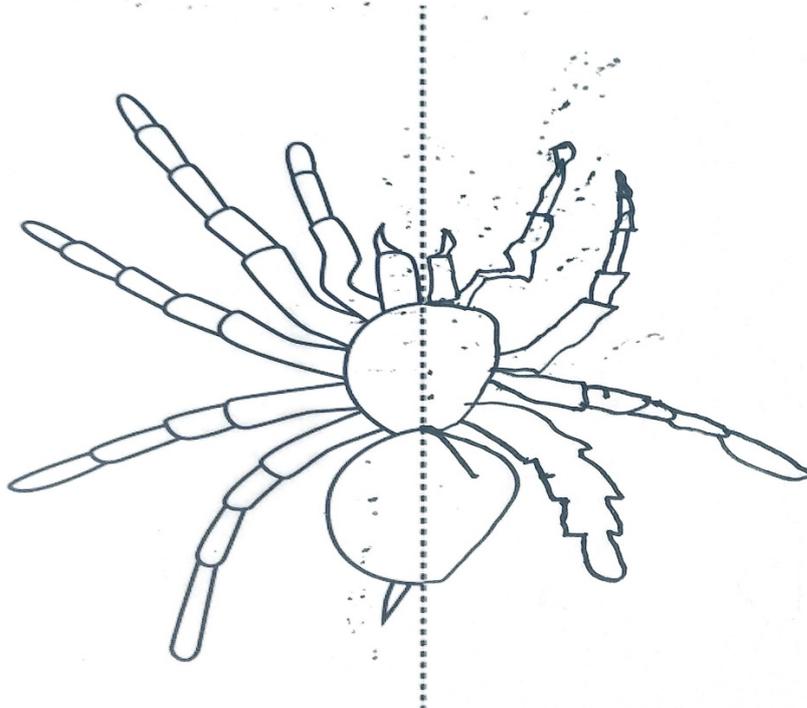
Carlos tiene tres hermanas _____ pastel de queso con mermelada.

Maribel Martínez y Ginés Ciudad-Real

Fichas para mejorar la atención

LOS INSECTOS SIMÉTRICOS

Dibuja el insecto completando la parte que falta sabiendo que estos animales son simétricos



www.orientacionandujar.es

Annex 5. Work of graphomotor skill training

Copia las letras en la posición correcta

A	Z	S	T	K	L	P
G	E	R	W	B	U	Y

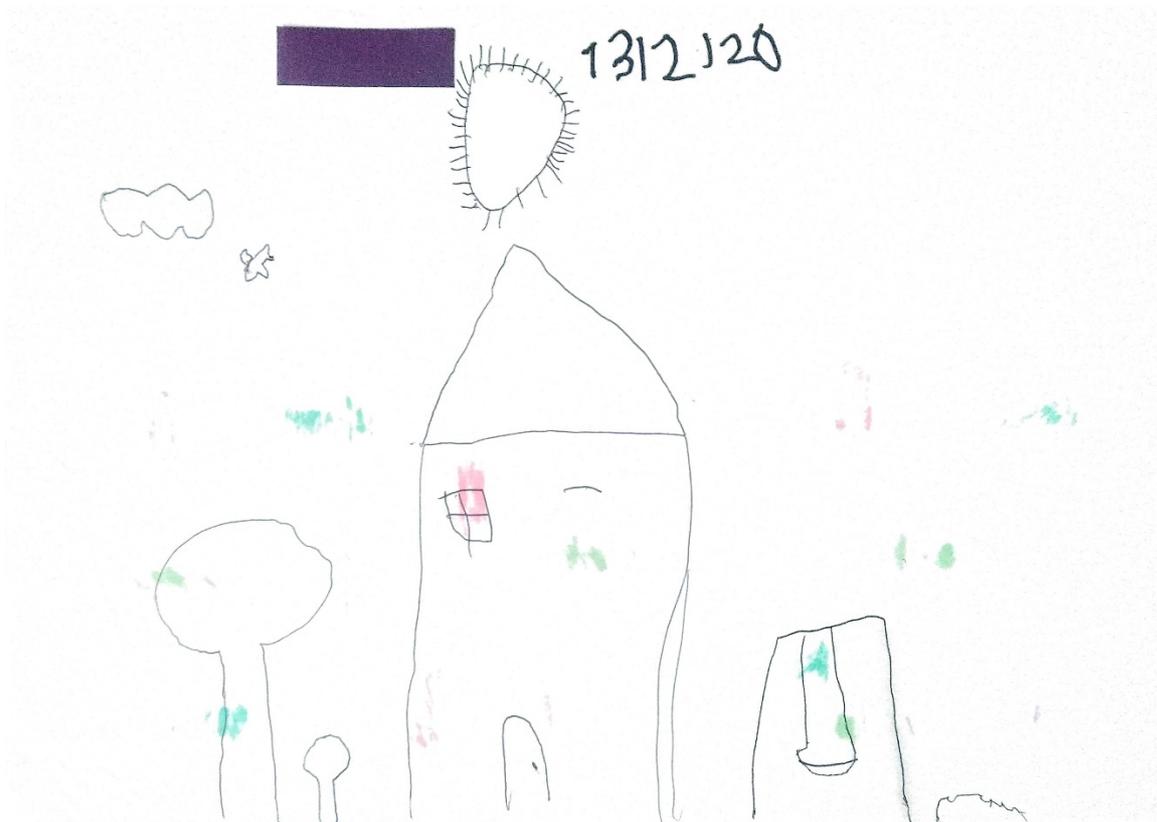


www.educapeques.com

J.S.C.

a	b	c	d	1	2	3	4	5
e	f	g	h	6	7	8	9	
i	j	k	l	10				

Annex 6. Work in spatial orientation



Las flechas hacia arriba son de color azul.
Las flechas hacia abajo son de color amarillo.

Colorea según el modelo:

Cruces

Azul Amarillo

↑	↓	↑	↓
↑	↓	↑	↓
↑	↓	↑	↓

