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Communication

Learning Strategies: A Resource for Clinical Neuropsychopedagogical Intervention

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Abstract

Learning strategies can be understood as deliberate processes aimed at achieving a certain level of learning effectively. The objective is to explore the application of learning strategies as a tool in neuropsychopedagogical intervention within a clinical setting, particularly in the context of teaching or stimulating brain functions where the patient can contemplate their own mental processes. Our aim is to present an intervention that enhances learning opportunities, thus broadening cognitive assumptions. This research contributes knowledge about cognitive and metacognitive processes related to learning strategies within the framework of learning how to learn, suggesting that the Neuropsychopedagogue, informed by neuroscience, selects appropriate stimuli to facilitate learning and evaluates the effectiveness of this process. The majority of studies focused on Neuropsychopedagogy and specific functions such as attention, memory, and executive functions. Another notable observation was the lack of studies utilizing or developing an instrument to assess learning strategies in a clinical-individual context, with the emphasis primarily on studies within an institutional-collective context. Hence, it can be concluded that learning strategies hold promise for enhancing learning and aiding in the organization and utilization of various information from our environment, thereby justifying their classification as a tool for clinical neuropsychopedagogical intervention. This comprehensive understanding underscores the significance of integrating diverse strategies into clinical practice, ensuring tailored interventions that address individual learning needs effectively.

Keywords

Learning Strategies, Metacognition, Clinical Neuropsychopedagogy

1. Introduction

The Learning Strategies for Silva and Sá[1] can be understood as mental processes that play an important role in learning, allowing the subject to raise the level of performance of a task to the maximum of what is within their reach. they are divided into two groups: cognitive strategies and metacognitive strategies [2, 3].

These strategies can be cognitive, which are related to becoming aware, in an analytical way, of the parts to understand the whole, and metacognitive strategies, which refer to learning to learn, in other words, the ability to reflect and monitor one's own learning, with the desire to improve results [1, 4]. With this, we affirm that learning strategies are techniques that optimize a study routine, facilitating the learning of new information [5, 6].

The majority of clinical neuropsychopedagogues are sought out by parents of children of school development age, however this professional is qualified to care for children, young people and adults as long as the main complaint is learning difficulties or the need to enhance and systematize the patient's learning.

When we think about the importance of capturing information and transforming it appropriately, and also about the importance of studying and learning effectively what is taught to us, and also about the importance of optimizing studies and learning, thus saving time and energy, being pertinent ask the following question: How can we learn to improve our own learning? How to optimize it and make it more productive and effective? Is it possible to teach patients with learning difficulties to learn better and to be aware of their own learning?

So the authors Silva and Sá [1] emphasize that a good learner must be aware of their learning objectives, solve problems, select suitable strategies and work methods, know how to identify the basis of their difficulties and then evaluate and repair their personal performance. You see, we can immediately identify that this process requires the heightened functioning of functions, such as attention and memory and, even in more complex terms, executive functions.

It is important that learning strategies are not confused with teaching strategies, since according to the Brazilian Society of Neuropsychopedagogy studies show that neuroscience does not provide teaching strategies, as this role belongs to Pedagogy, which uses knowledge from didactics and teaching methodologies. teaching as support for teaching-learning [7], an the theoretical basis of Neuropsychopedagogy in a clinical context supports studies based on neurosciences related to Education with interfaces to Pedagogy and Cognitive Psychology, which enable the understanding of learning, highlighting aspects ranging from neurological and biological issues, to cognition [8].

In turn, learning strategies imply superior mental processes in a sequence of controllable skills, such as planning, organization and flexibility, in addition to effort and interest on the part of the individual, which involves processes that are explicit from studies also of neurosciences and cognitive psychology [9, 10].

The SBNPp indicates and recommends learning strategies as material for Neuropsychopedagogical assessment and intervention [7]. Based on the knowledge of learning strategies and Neuropsychopedagogical practice, we suggest that intervention with the strategies should focus on stimulating the patient's cognitive and metacognitive functions related to learning, with a focus on enhancing attentional skills, memory and executive functions and consequently improve learning, facilitating the implementation of learning strategies, which will help optimize study habits and improve school results.

Studies on Neuropsychopedagogy, especially in a clinical setting, are considered scarce, however, they have been gaining space in some databases, and there is an even greater scarcity when we relate clinical Neuropsychopedagogy and learning strategies.

2. Materials and Methods

The present study started from the literature review mobilized from the questions: How can we learn to improve our own learning? Can patients with learning disabilities be taught to learn better through individualized Neuropsychopedagogical intervention care in a clinical setting? How does the clinical Neuropsychopedagogue act in the face of an intervention using learning strategies as a tool? We started by reading four main materials, two works: "Knowing how to study and Studying to Know [1]" and "Clinical Neuropsychopedagogy: Introduction, concepts, theory and practice [11]", a dissertation "Learning Strategies in High School: Implications for Teaching Practice" [9] and "Technical Note 02/2017 of the Brazilian Society of Neuropsychopedagogy" [7], whose authors establish a dialogue between learning strategies, cognitive and metacognitive processes and the role of the Neuropsychopedagogue in a clinical environment.

To deepen the notions of mental learning processes and the brain as a learning organ in the light of neuroscience, we expanded our theoretical framework based on research in books; scientific articles; bank of theses and dissertations; digital scientific libraries, such as Scientific Electronic Library On-line (SciELO); periodical portal of the Coordination for the Improvement of Higher Education Personnel (CAPES) and Google Scholar.

The searches focused on keywords referring to both general concepts (neurosciences and learning strategies; neuropsychopedagogy and learning strategies; learning strategies and clinical neuropsychopedagogical practice) and specific concepts (attention and learning strategies; memory and learning strategies; executive functions and learning strategies, metacognition and cognition, stimulation and learning). Having carried out comprehensive analyzes of the summaries we accessed, we continued with the stages of interpretation and theoretical synthesis, delimiting our interest in cognitive and metacognitive functions.

3. Clinical Neuropsychopedagogical Intervention

Neuropsychopedagogical intervention must necessarily be based on the basic foundations of human learning and the development of cognitive functions such as attention, executive functions, language, logical-mathematical and neuro-motor reasoning [8]. To intervene and stimulate cognitively, the neuropsychologist, in addition to playful games and validated programs, the professional creatively develops games, games and verbal/non-verbal activities, in order to provide patients with learning difficulties with different ways of developing cognitive functions and the ability to learn to learn [7, 11, 12].

The Neuropsychopedagogue in a clinical setting has the job of observing, identifying and analyzing the environment in

which the patient is involved. The questions to be addressed must necessarily be related to learning and development in the cognitive and behavioral areas [7].

The Professional Technical Code of Ethics for Neuropsychopedagogy states that the clinical professional works with the "creation of strategies that enable the development of the patient's teaching-learning process" [8]. In this sense, learning strategies become a strategy potentially used as a Neuropsychopedagogical intervention tool, since in turn it is linked to improvements and success in learning and once indicated and recommended by SBNPp in a Technical Note [7].

Learning strategies should be considered as drivers in the development of new learning repertoires [13], with the stimulation of cognitive and metacognitive functions that involve learning strategies allowing the patient to become involved in their own learning [14], and the strategies Learning processes imply a sequence of procedures that we select with the aim of facilitating and effective the acquisition, storage and use of information [3, 10, 15].

Another different implication already mentioned, which brings the same meaning, but more specific and very guided by researchers of learning strategies, is that it involves a sequence of controllable skills such as planning, organization, monitoring and flexibility, in addition to effort and interest on the part of the individual who wants to learn better [1, 14-18].

When we discuss learning strategies, the act of highlighting, summarizing, diagrams, memorizing, rereading and others comes to mind, and yes, it is part of the strategy process, but there is a process of controlling and regulating behavior, so that such information be deciphered and recovered in an even improved form [1, 9, 19]. In this way, we understand that when reading an article and at the same time highlighting the parts considered most important first with a pencil, we are using a strategy that makes us maintain attention while reading, developing cognitive activity, and therefore it is necessary the awareness of re-reading what was underlined with the intention of recovering the main ideas, although in this re-reading we can carry out a re-mark with different material, for example a highlighter, improving the quality of the selections, eliminating some parts and adding others [9].

From this premise, we understand that learning strategies are not, for example, just the act of highlighting, but rather being aware of the strategy used, planning and monitoring its efficiency in terms of learning itself. You see, if we execute the act of underlining and never review the content again, we can consider in a way that the strategy was not effective, this is where awareness, planning and monitoring come into play regarding the strategy and its real importance. this strategy for learning, thus ensuring adequate retention of information [9].

Metacognitive strategies involve essential skills for learning, which depend on systematization [17, 20]. These skills require determining objectives for studies, involving planning that concerns awareness of one's own understanding, which we can call monitoring, and awareness of what one has learned and also the best way to learn, actions that we know as regulation [20, 21].

When we state that learning strategies to be used efficiently require cognitive and metacognitive functions and also a process of control and regulation of behavior, we can then safely include work to stimulate executive functions, which in turn can also be understood. as a process of controlling and regulating behavior [15].

Silva and Sá [1] provided a program with the aim of developing self-knowledge and autonomy in learning. The presentation of this program becomes important when we think about intervention validations that highlight learning strategies, becoming stronger when we collect results that demonstrate that the use of strategies appropriately improves the individual's repertoires in relation to their own learning and routine studies.

The program presents three areas of intervention: Self-control; Cognitive and metacognitive strategies and motivation, the authors present the components of the program and the main objective of the activities applied for stimulation in general are to increase attention/concentration, comprehension of written information, comprehension of oral information, organization and review of information, facilitate memorization and attention, in addition to establishing personal goals and taking responsibility for one's own learning [1].

As a result, the program demonstrated that participants improved their awareness of the best strategies to use towards effective learning. The central aim of a program like this is to develop cognitive skills that will allow the patient to have greater control over their study and learning routines in relation to their school tasks [1].

Boruchovith [21] states that intervention in learning strategies has been gaining ground along with satisfactory results and that interventions in Learning Strategies vary between cognitive, metacognitive, affective and mixed intervention. The author also indicates that there are results that these interventions show a persuasive improvement in the performance of schoolchildren, in the various segments of formal schooling. In general, it has been confirmed that interventions in this model reduce dysfunctions in information processing in mathematics, reading and writing, but have also contributed to the regulation of affective-motivational aspects related to student learning, representing a means of promoting increased the student's ability to self-regulate their own learning [1, 21, 22].

In this way, the implications for the practice of the clinical neuropsychopedagogue professional are evident in the learning strategies. The interest on the part of neuropsychopedagogues in learning about learning strategies and learning how to teach them appropriately and effectively to their patients, prioritizing cognitive and mixed intervention models focused on executive functions, is already a reality.

Pozo [23] states that it is possible to teach learning strategies and train students to improve the process of acquiring, storing and retrieving information, since the strategies converge directly under information processing, with regard to the adequate functioning of cognitive functions [17], which in

turn are the object of stimulation by the neuropsychopeda-gogue professional [7].

Research related to intervention in Learning Strategies has found promising results when we target information processing theory, demonstrating possibilities for improving levels of cognitive development and self-regulation [24, 25].

For more than 20 years, the scientific question has been "How to teach learning strategies?" Valdez, in his research on learning strategies, lists several stimulation and teaching strategies [15]. Grehs, in his most current research, presents a list of learning strategies with their proper definition and description of how to use and teach them [9, 19]. Santos and Alliprandini bring a proposal for intervention in learning strategies with teachers [24]. In other words, the study has evolved over the years, however these studies permeate within the school environment, highlighting strategies that are often pedagogical in nature.

As already mentioned, there is a scarcity of research on learning strategies in general [5, 21], and this scarcity is greater when approaching them in an intervention format, and even greater when we relate them to Neuropsychopedagogy. This implies challenges for new studies and experiences, although it is clear that these are relevant researches for current times. Considering that studies on Neuropsychopedagogy, mainly in a clinical setting, have been gaining space in some databases, but they are clearly still scarce. In the same sense, I categorize that there is an even greater shortage when we relate clinical Neuropsychopedagogy and learning strategies.

4. Evidence of Clinical Neuropsychopedagogical Intervention in Brazil: Rita Russo's Thoughts

In her work "Clinical Neuropsychopedagogy: Introduction, concepts, theory and practice", Rita Russo [11] dedicated a specific chapter to Neuropsychopedagogical intervention, it is an important example for professional practice, explaining everything from the theoretical bases to practical action in a clinical environment.

Its first paragraph already mentions learning strategies and that "one of the roles of the neuropsychopedagogue is to work with varied learning strategies, defining activities or mental operations that the subject can perform to facilitate and improve their learning". Then she explains how we can define learning strategies and their functions within the cognitive and metacognitive context [11].

Russo mentions that learning strategies, being conscious and intentional, imply an action plan, that is, an intervention plan, which occurs as follows: outlining the objectives in the initial, intermediate and final phases of monitoring with the

patient, the main purpose is to stimulate and implement learning skills [11].

Before starting the action plan, it is necessary to plan the intervention goals, taking into account the patient's conditions with regard to preserved or slightly impaired functions and, then, investigate and identify the patient's specific difficulties, in some cases it is necessary to go deeper studies in pathology and also observe the injuries acquired by the patient and, from this, we select materials, techniques and intervention strategies, necessarily aiming at learning in the sense of learning to learn [11].

We use the initial phase to verify how the patient uses their learning abilities, both in a playful clinical environment and in a school environment. It is still essential to recognize their abilities and skills so that they can be explored in order to enhance their motivations to learn and to study. At this time, we discuss with the patient about the desired goals and then determine the subgoals that need to be achieved to achieve the main goal. An example that the author cites is that for the goal of "improving test scores" the subgoals would be "organizing school materials, attending school reinforcement classes, using learning strategies, planning and organizing study time and days ", this is just one example, as in this sense other goals and sub-goals can be established, and the complexity of the task will depend on the patient's level of understanding [5].

The intermediate phase is reserved for making it happen in the action plan. In this phase we use strategies related to information processing, understanding and retaining information and then retrieving and using it. It is at this moment that we work to stimulate cognitive and metacognitive functions, we teach learning strategies and their use. It is still up to the clinical professional to help organize the sub-goals and their structure, as the objectives are achieved, others are established [5].

The materials used in this intermediate phase can be varied, structured research, manual activities, attention games, memory, problem solving, language, mathematics, writing, cloze programs and techniques, PEnCE Pay Attention, among other creatives developed in accordance with with the need for intervention [7, 8, 11].

And then we reach the final phase, in which the results and goals and sub-goals achieved are analyzed. If there is still any difficulty with the need for work and reformulation, a new report is produced highlighting the progress in the intervention and from there a new action plan is drawn up with new goals and sub-goals or, if applicable, the same, but reformulated and improved according to the results already achieved [11].

Thus, there is a variety of strategic activities for Clinical Neuropsychopedagogical intervention, in order to contribute to the learning process, as shown in Table 1:

Table 1. Variety of strategic activities.

Area to be developed	Stimulus activity
Language	Spelling bingo; Production of rhymes; Storytelling, divination, reproduction of stories with or without a book; imitation of sounds; Mote-Photolanguage.
Mathematics	Identification of numerals; Selection of even or odd numbers; Notions of classes and series, spatial, topological and geometric notions; Equivalence between series, equality and difference.
Visual-motor Coordination	Labyrinths; Manual cutouts; Basting; Drilling of various figures; Color with a brush or pencil; Make contours; Collage; Modeling.
Graphomotor behavior	Free and directed designs; Regular and precise lines; Perception of geometric shapes; Doodles.
Body Scheme and Rhythm	Monkey (imitative); Statue; Draw the human body and name it; Cut out parts of the body and reassemble them; Clap your hands to the rhythm of the music; Game five Marias.
Plastic expression.	Manipulation of dough, crayons, markers, colored pencils, various paints and clay; Cut out with your fingers and scissors; Making models; Foldings; Collage with objects or paper.

In the intervention process, the knowledge and clinical reasoning of the Neuropsychopedagogue professional is highly relevant, for this reason a robust theoretical basis is important, in order to make their skills in the face of the different clinical demands in the face of potential learning difficulties, influential to the point of actually improving your patient's life and solving their different difficulties.

5. Conclusions

Having carried out a survey of studies with an attempt to relate learning strategies as a tool for Neuropsychopedagogical intervention necessarily in a clinical environment, it became clear that there is a lack of studies that address learning strategies relating to Neuropsychopedagogy. Most of the studies involved Neuropsychopedagogy and specific functions of attention, memory and executive functions.

Another aspect observed was the scarcity of studies that used or developed an instrument to assess learning strategies for the clinical-individual context, with priority being, to date, on studies in the institutional-collective context.

Logically, knowing how to learn is a promising act not only for academic success, but also for solving problems and diversities in life in general. Improving cognitive functions also leads us to be better people, as the ability to receive and reframe information is essential for both personal success and school or academic success.

And this has an implication for the practice of professionals who must be in a constant search for knowledge. When we approach learning strategies for intervention in clinical Neuropsychopedagogy, we must understand that we are talking about controlling our own learning, which in turn is directly linked to metacognition, learning to learn, and it is this skill that we need to teach our patients to use. Thinking about stimulating the functions that depend on it [26, 27].

Taking into account the results of this study, I believe that learning strategies appear promising to boost learning and facilitate the organization and use of diverse information from the environment in which we live, making perfect sense to consider them as a tool in Neuropsychopedagogical interventions in clinical setting, improving the learning of patients, as long as they are focused on the bias of cognitive and mainly metacognitive functions within the limits of neuropsychopedagogical action. However, providing stimuli to the patient through the use of learning strategies effectively and consisting of a neuropsychopedagogical intervention bias in a clinical setting becomes a new challenge for the professional Neuropsychopedagogue.

Conflicts of Interest

The authors declare no conflicts of interest.

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