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TEACHER DIDACTICS AND CHILDREN'S COGNITIVE SKILLS IN EARLY SCHOOL AGE

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ABSTRACT

The study analyzed the relationship between teacher didactics and cognitive skills of attention, memory, speed and verbal fluidity in first-year students of a public school in Cúcuta-Colombia. An exploratory script was used, together with qualitative analysis and mixed-source data collection, with an intentional sample of 22 students and 4 teachers. Cognitive abilities were evaluated through neuropsychological tests standardized for Colombia, and didactics were explored through semi-structured interviews following categories of teaching, learning and techniques. Cognitive skills were analyzed using descriptive statistics and interviews by categorical triangulation analysis, concluding in important children memory-speed and reduced attention and verbal fluidity, remarkable findings linked to didactics based on the use of learning sheets, repetition, mechanization, while lower results were associated with the use of video and hobbies.

Keywords: didactics; cognitive skills; educational strategies; teaching methods

Didáctica de maestros y habilidades cognoscitivas de niños en inicio de edad escolar

RESUMEN

El estudio analizó el vínculo entre la didáctica de maestros y las habilidades cognoscitivas de atención, memoria, velocidad y fluidez verbal en estudiantes de primeros grados de un colegio público en Cúcuta-Colombia. Se propuso un diseño exploratorio concurrente con análisis cualitativo y recolección de datos de fuente mixta, con muestreo intencional de 22 estudiantes y 4 maestras. Se evaluaron habilidades cognoscitivas mediante pruebas neuropsicológicas estandarizadas para Colombia y la didáctica fue explorada mediante entrevista semiestructurada siguiendo categorías de enseñanza, aprendizaje y técnicas. Las habilidades cognoscitivas se analizaron mediante estadística descriptiva y las entrevistas por análisis de triangulación categorial, concluyendo en los niños sobresaliente memoria-velocidad y disminuida atención y fluidez verbal, hallazgos sobresalientes vinculados a didácticas basadas en uso de fichas de aprendizaje, repetición, mecanización, mientras que los resultados inferiores se asociaron al uso de video y pasatiempos.

Palabras Clave: didáctica; habilidades cognoscitivas; estrategias educativas; métodos de enseñanza

Didática de professores e habilidades cognoscitivas de crianças no início de idade escolar

RESUMO

O estudo analisou a relação entre a didática de professores e as habilidades cognoscitivas de atenção, memória, velocidade e fluidez verbal em estudantes de primeiros anos de uma escola pública em Cúcuta – Colômbia. Utilizou-se um roteiro exploratório junto com análises qualitativa e levantamento de dados de fonte mista, com amostra intencional de 22 estudantes e 4 professores. Avaliaram-se habilidades cognoscitivas mediante testes neuropsicológicos normatizados para Colômbia e a didática foi explorada mediante entrevista semiestruturada seguindo categorias de ensino, aprendizagem e técnicas. As habilidades cognoscitivas foram analisadas mediante estatística descritiva e as entrevistas por análise de triangulação categorial, concluindo-se nas crianças importantes memória-velocidade e diminuída atenção e fluidez verbal, achados marcantes vinculados a didáticas baseadas no uso de fichas de aprendizagem, repetição, mecanização, enquanto os resultados inferiores foram associados ao uso de vídeo e passatempos.

Palavras-chave: didática; habilidades cognoscitivas; estratégias educativas; métodos de ensino

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INTRODUCTION

Didactics as part of pedagogical science and as social science, has shown to favor cognitive, emotional and social development (Franco Ligarreto, 2017; Kruschewsky, Kruschewsky, & Cardoso, 2008; Moreno-Pinado & Velázquez Tejeda, 2017; Santiago- Rivera, 2016) where the teacher, the adult-tutor, stimulates the strengthening of different cognitive areas (Núñez, 2010). The above is validated with theories based on neurodevelopment that coincide in signaling that the adult in his/her interaction with the child produces positive and negative effects on cognitive abilities such as: behavioral control (Schroeder & Kelley, 2010), planning, inhibition and mental flexibility (Mauricio, Stelzer, Mazzoni, & Alvarez, 2012), Inteligencia (Escribano-González, Bejarano, Zúñiga, & Fernández, 2010; Shears & Robinson, 2005).

The cognitive development is relevant by warning reports of cognitive and socio-emotional deficiencies in developing countries (La Vanguardia, 2016) that subsequently affect their learning capacity. In Colombia, in a particular way, the study of attention capacities has been relevant, as fundamental processes that allow learning to take into account that about 17% of children in Colombia have difficulties in this capacity (Minsalud-Colciencias, 2015). Attention capacity has been related to memory and learning (Erickson, Thiessen, Godwin, Dickerson, & Fisher, 2015) that have been permeated by children and stimulation by adults, caregivers and teachers. In Norte de Santander-Colombia it has been found that the development of cognitive skills, in particular attention processes, is found under the average in comparison with reference studies in Latin America (Riaño-Garzón, Diaz-Camargo, Torrado-Rodríguez, Salomon, Salón, & Raynaud, 2017).

Studies in the North-Santanderean region of Colombia have shown that children have effects on the cognitive development of children, for example, it has been found that the coercive styles of children are related to smaller developments of attentional capacity while the directed styles with commitment/support, they relate to better verbal fluidity skills among children (Riaño-Garzón et al., 2017). Findings such as this one allow us to infer that the child's interaction with the adult will be determinant in the development of basic cognitive skills.

In this order of ideas, it is worth noting that the child-educating must develop better cognitive skills that allow him/her to respond to the demands of the Colombian educational system which, in addition to the traditional evaluation of competences during each academic period, also monitors the development of final student's competences through the exams *Saber 11º*, evaluation that is administered to Colombian students in their last school year (Fonseca, Salcedo, & Rocha, 2018), defining a diagnosis for their future admission to higher education.

If the acquisition of cognitive skills is important for academic results, I said that exercise presents certain difficulties in some cases, among which have been reported problems in learning the alphabet, errors in reading aloud, difficulties in reading comprehension, imprecision in the identification of mathematical symbols among many others (Ospina, 2011), which respond to different causes, including neurological (Llanos, 2006) and cognitive factors (Riaño-Garzón, 2015) as attention , memory and executive functions.

In order to overcome these difficulties, it is important that the teacher implements didactic strategies that stimulate cognitive skills, as these are skills that contribute to his/her academic development. It is clear that these are not the only skills that must be developed, but if they are a key component within schooled education.

For the above, it is expected to identify the cognitive state of elementary school children, relating their performance to specific practices of teachers, revealing initial inferences about the possible effects of particular didactics on the strengthening of cognitive skills in children of this important age, considering the importance in the maturation of some executive capacities in the preschool age, close to the beginning of the school age (Flores, Castillo, & Jiménez, 2014).

The Didactics

Didactics has been defined as a discipline that studies teaching and learning practices in a communicative and interactive act (Medina & Salvador, 2018) and it is positioned as a branch of pedagogy, with reference to a teaching-educational process, with an objective own, techniques and strategies that come from experiences (Artigue, 2018), which will facilitate the teaching-learning process of students, who work by the hand of a teacher through an organized and efficient procedure (Abreu, Gallegos, Jácome, & Matrínez, 2017; Álvarez de Zaya & González, 1998).

As an influence, the didactics constitute a key point in the life of the student, you can form the way in which the teacher teaches has a direct relationship with his cognitive development (Medina, 2012) warning that among his commitments, he/she must structure the different elements that characterize the teaching process as the problem, the content, the form, and the evaluation of the same. This is how, within the didactic components, are found: the apprenticeship, the teaching and the content of the study material, about which the teachers must guide the work of their students (Álvarez de Zaya & González, 1998).

In this sense, didactics implies a didactic knowledge that contemplates the obstacles of the teaching-

learning process (Vázquez-Bernal, Jiménez-Pérez, & Mellado, 2019), and that points to the idea of developing techniques that allow improving the way in which knowledge is transmitted to students, their skills contribute significantly to their learning, shaping and stimulating their cognitive processes based on a communicative environment (Córdoba-Martínez, Castelblanco Castro, & García-Martínez, 2018). However, it is important to recognize the form in which the information is perceived, which can facilitate and approach the meaning of said apprenticeships, being useful and practical (Morales & Pereida, 2017).

Despite its demonstrated kindnesses, the didactics have been questioned by traditional methods little associated with solving problems in the everyday life of students (Perales-Palacios, 1998) and the tendency towards the use of expository methodologies or what Solbes , Fernández-Sánchez, Domínguez-Sales, Cantó, and Guisasola, (2018) call the model of teaching by transmission, which privileges the storage of information and which has shown less benefits in comparison with problem-based learning strategies (Olivares & Heredia , 2012).

For the above, it is worth clarifying the evidence about meaningful learning in students, where didactic strategies should focus on student self, allowing to stimulate critical thinking, cognitive skills and objectivity from a constructive and significant perspective (Morales & Pereida, 2017); for them, it is important to know the direct relation that is generated between didactics and cognitive development as a basis for learning (Marder & Borzone, 2016).

For these effects on cognitive strengthening (Escribano-González et al., 2010; Núñez, 2010), the didactic implemented by teachers should focus on the promotion of some areas such as phonological awareness (Morales & Ramos, 2014), and knowledge of letters and correspondence, verbal fluidity, vocabulary and comprehension strategies, without setting aside basic processes such as attention, work memory, inhibitory control and planning (Marder & Borzone, 2016) that relate them to school skills (Riaño-Garzón, 2015), as well as other important constructional, visual-spatial, numerical processing, conceptual skills and executive functions (Bravo Valdivieso, 2016; Montiel Ramos, 2017).

Finally, it is worth highlighting the importance of motivation, which will be positively affected by didactics based on teaching methodologies and abstract strategies for the solution of problems related to the programming of the brain for greater effectiveness in the capture, analysis and response of the incoming information (Bravo Valdivieso, 2016).

METHODOLOGY

Design: Following the interpretative paradigm, it was proposed a concurrent exploratory design, with qualitative analysis (Creswell & Plano-Clark, 2017) and data collection from mixed sources (Hurtado, 2010). In the case of the present study, the didactic methodologies between subjects will be triangulated first, giving way to a subsequent triangulation from the didactic method and the level of performance of the group.

***Population*: Students and teachers of the first and second grades of a public school in the city of Cúcuta-Colombia.**

Sample: An intentional sample was defined (Otzen & Manterola, 2017) with inclusion criteria: 1). Children at the beginning of school age from 5 to 8 years old; 2). Enrolled in the first and second grades of the public institution. Likewise, children with perinatal and postnatal clinical antecedents were excluded, the clinical diagnosis of mental health warning the standardization of the texts for Colombia. The sample is formed by 22 children of both sexes and four teachers.

Instruments*:* For the collection of children's cognitive information, 4 neuropsychological questions were used that provide a standardized interpretation for the Colombian population by Arango-Lasprilla, Rivera, & Olabarrieta-Landa, (2017). The tests used were:1). Trail Making Test (Acosta et al., 2017) which consists of connecting points with a pencil in alphanumeric order, demonstrating visual attention skills with this task; 2). Rey's complex figure (Folleco et al., 2017) in which the child is asked to reproduce a figure and subsequently reproduce what he recalls from the image, obtaining information about his/her memory capacity; 3) Digit-Symbol Test (Trujillo et al., 2017) in which the child must replace symbols with numbers for a period of 90 seconds, asking for processing speed skills 4). Verbal Fluency Test (Olabarrieta-Landa et al., 2017) which consists of producing words within a category for one minute. For the collection of qualitative information, a semi-structured interview administered to the teachers was used, which was composed of 13 open questions that allowed exploring the categories of teaching, learning and techniques, which together facilitated the analysis of the didactics. The interview followed a validation by expert judgment.

***Procedure*:** The investigation was carried out in three phases described below: 1). Socialization of the project to the directives and teachers of the educational institution, as well as to the parents, space where in addition the signature of consent is given by the primary and secondary parents. 2). Signing of consent by the students and administration of the protocol of

neuropsychological questions. 3). Firm of informed consent on the part of the 4 teachers and the realization of the semi-structured interviews, the ones that were recorded in audio.

Analysis of the information: From the quantitative information collected through neuropsychological findings, direct scores were obtained by each student, which were converted to the percentile score of the scales for the Colombian population. Percentile scores were averaged by class groups, as well as a total average percentile for each neuropsychological question. The percentile scores were interpreted according to the following ranks: a) 1-20= Low; B). 21-40=medium-low; ç). 41-60=average; d). 61-80=medium-high, y e). 81-99= high. The qualitative information obtained from the interviews with teachers followed a process of artisanal categorical analysis, in which the discourses that in turn generated inductive categories were analyzed. The results are derived from coded and grouped phrases that allowed the formulation of a diagram showing the manifestation of each subcategory of the didactics.

RESULTS AND DISCUSSION

In the first place, the results obtained by the children will be presented in the areas of cognitive ability, determining the average cognitive performance level and later, the analyzes of the interviews with the teachers will be presented, revealing didactic characteristics implemented by them based on the categories of teaching, learning and techniques.

Figure 1 presents the averages of the percentile score (proportional) of each one of the texts, of which it stands out that the skills of attention and verbal fluency are found below the average (50th percentile) advising that they are located in the percentiles 42 and 48 respectively. On the contrary, the children evaluated showed superior performance in memory and speed skills, surpassing the average by more than 13 percentile points, obtaining an average memory percentage of 68% and a speed of 63%, considering the memory and the process higher development in evaluated children.

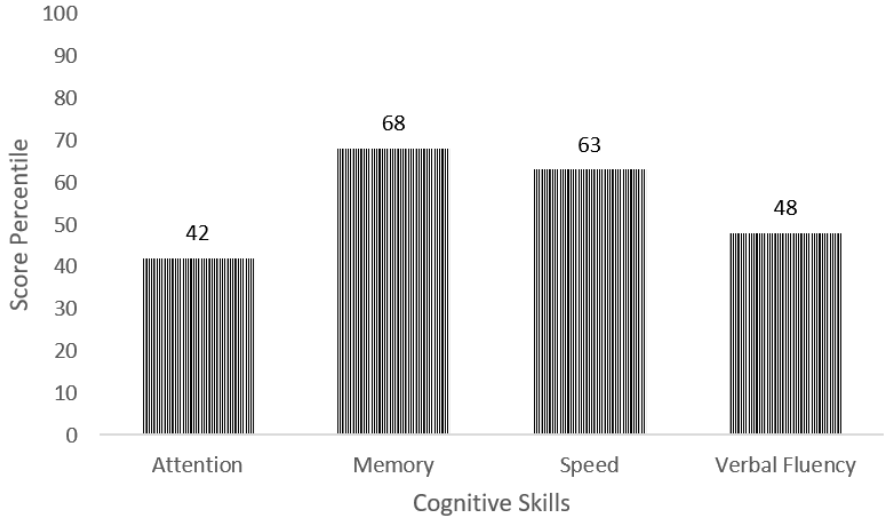
The findings, even though they do not reflect a low global cognitive performance, allow us to infer that the didactic methods that are currently being implemented with the children, are favorably associated with the development of memory skills and speed that were qualitatively located at medium-high levels of understanding with the Colombian standardization. On the contrary, the lower levels will be found in the attention skills where the intermediate-low level predominated.

If so, this result is multi-cause, the continuation will analyze the teaching methodologies of the teachers of the children of the sample with the end of revealing in the first place the characteristics and finally managing to interpret the link between the didactic methods and them outstanding performance in cognitive skills.

Didactics analysis

In order to investigate the didactic processes carried out in the classroom, interviews with teachers were analyzed, taking into account three subcategories, namely: teaching, learning and techniques. The review of the answers given by the educators generated inductive categories, which were grouped into the three subcategories already mentioned. The results are derived from coded and grouped phrases that give as a result each diagram that integrates the links between categories and that lend themselves to continuation from each subcategory.

Figure 1. *Children's Performance Average Expressed in Percentiles (Average percentile=50). n=22 boys and girls.*



Source: Elaborated by the author.

Analysis teaching subcategory

In this subcategory you will find 10 inductive categories that can be seen in figure 2.

They stand out within the inductive categories, the curriculum as an obstacle to teaching, followed by the sheets as a didactic tool, the extra-class spaces to improve teaching and the leadership of colleagues and collaborative work.

When referring to the curriculum as an obstacle to teaching, the teachers think that the students want to inquire about topics that are not included in the programs of the institution. This finding seems coherent with previous reports that indicate the need for curricula to involve the participation of communities and personal learning trajectory (Coll, 2013).

On the other hand, it is worth mentioning statements made by teachers such as: "if you are afraid that you (student) ask me and I include it and modify the assignment plan that give to me, we can't because it's an assignment plan that they give you some content" (Teacher 1). "For the general, he has the program of the school and to get out of the theme is very difficult" (Teacher 2). "Early a child in the teacher wanted to know about it and you were ready to approach the topic from another point of view, it is very limited in time so they are interested" (Teacher 3).

It is evident then, the perception of limitation of the curriculum that seems to derive from the consequence of the lack of interest, when addressing arbitrarily suggested themes, because of the need to plant more motivating and comprehensible strategies (Alfalla-Luque, Medina-López, & Arenas- Marquez, 2011).

The second aspect found refers to the sheets as a didactic tool, from which four recurrent codes were highlighted, which suggest the sheets or guides as a traditional way of approaching the process in the classroom, where the student can develop his/her autonomy and the appropriation of methods for your self-learning (García López, 2002) being accompanied by the maestro.

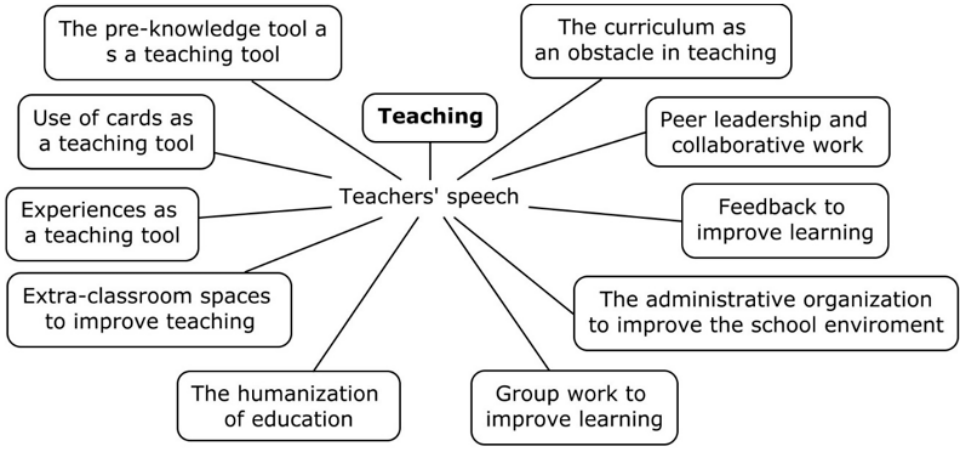
Some phrases are reported, such as: "the guides that are realized allow the development of texts as resources for their own learning, from where they are strengthened more in the themes" (Teacher 3); "We also carry out with the development of workshops the development of worksheets, these more than all strategies are motivated by games and dynamics" (Teacher 4).

The teacher considers that the learning sheets are a motivation for the student, however, one should not overlook the influence of peers in the learning process that results in fostering collaborative work. In this sense, if it is necessary to specify the inductive category on leadership of peers who, as previously reported, have association with communication (Pareja, 2007) and school performance (Horn Kupfer & Marfán Sánchez, 2010).

With respect to the teachers interviewed, they state that "One takes advantage of how these leaders (if they support the students) facilitate teamwork and learn more easily among all" (Teacher 1); "I generally use peer work and cooperative teamwork because they understand me better and always have a leader who helps them to organize themselves" (Teacher 3), the above allows us to infer students who are advancing with greater celerity when they have monitoring of monitors and developing collaborative work.

In coherence with the importance of leadership, the importance of group work is summed up while allowing for a better pace of learning while also facilitating a proactive stance, listening to other proposals, adapting and collaborating (Chica, 2011).

Figure 2. *Analysis of Teaching Subcategory.*



Source: Elaborated by the author.

The above is evidenced in the following statement "I support myself on those who understand, because they help me to improve, I trust a lot in them when working in a group because among all they seek solutions and are more active" (Teacher 3). "Well the main strategies that are used in the class, which tells that there are children with attention deficit and hyperactivity, also manages group work but every week we are looking for a leader so that everyone participates as a leader and he has follow-up improving all the teaching process" (Teacher 4).

Likewise, it is also clear that the teachers consider that having extra-classroom spaces are fundamental for the development of students, a topic that Missiacos Cárdenas (2011) has addressed, which has signaled that the exits in the middle, strengthen the work in equipment, adaptation, favoring a more dynamic view of the world. Likewise, it is considered a scenario with didactic-pedagogical potential (Molina, 2007).

Following this line of thought, the teachers look for the extra-classroom activity in the following way: "One uses the park here or the yard of the institution that is covered, all the activities are more pleasant and if they are more motivated" (Teacher 1). However, given the conditions of the institution, it is suggested by the teachers an improvement in the infrastructure, referring: "for example, it would be good to be able to integrate some outputs, because it is that the case that we use socialize, we interact, we manipulate the environment, it only helps us to increase knowledge, so it is soon part of the infrastructure of the spaces, which could be more didactic" (Teacher 2). "It's not like here the college doesn't have green areas like spaces that I say today, they're going to take off after a break, it's very difficult" (Teacher 3). On the other hand, it is considered a significant advance in the visit to historical sites from the social classes, bringing students closer to reality.

Finally, it is important to emphasize the use of feedback as a way of improving learning, although not all respondents mention it. But it is found that "When one observes that at the moment there is a child who has not grasped that he has not been able to understand, he goes back to it, that is, we do several exercises on the board, we come back, we go back, yes, but in a way that is not marked or anything, but in general we go to see how it is, you are going to remember me and we go back and say the process we go back and do the exercise" (Teacher 1); "Usually, there is a comment or a brief conversation after the explanation of the topic, an interrogation is also carried out and they are answered and there is an account if they have been understood and if they are fed back. They say that they remember better this way, when asked" (Teacher 4).

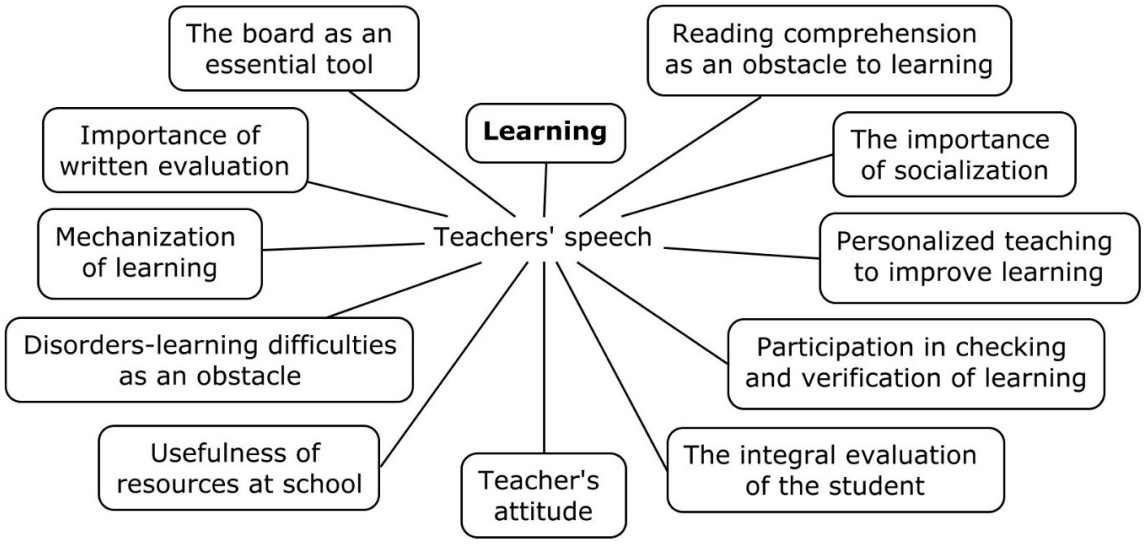
Analysis of the learning subcategory

The learning subcategory is made up of 11 inductive categories that emerged from the analysis of the interviews carried out. Figure 3 summarizes tips on inductive categories and their recurrence.

The categories that stand out for their recurrence are the reading comprehension as an obstacle for learning, the personalized teaching to improve the learning process, the participation in the learning verification, the integral assessment of the student, the board as a tool for evaluation and the actions they teach the learning.

In the first place, reference will be made to reading comprehension as an obstacle to learning, which is a daily problem in the development of classes, advising

Figure 3. *Analysis of the Learning Subcategory*



Source: Elaborated by the authors.

the importance of reading in the acquisition of knowledge (Román Sánchez, 2004), being a recurrent problem reported by the maestros interviewed with statements such as "I know that this child has a certain need since the other because he is a child who suddenly does not have that reading comprehension" (Teacher 2); "His literacy process is not up to date with the parameters that the institution gives us" (Teacher 3), results that permeate limitations in learning as reported in other studies (Rueda-Sánchez & López-Bastida, 2016). In this sense, it is possible to infer the use of didactics based on repetition and memorization of symbols, with low emphasis on the development of the students' analytical capacities.

Secondly, it refers to personalized learning to improve learning, a methodology that is valid when individual difficulties arise. Regarding the participants, they referred: "I have 4 children who are very difficult, so I sat with them and let's go little by little with the record" (Teacher 2) "I try to give as greater attention to those children who have the need to comply with their particularity I am only referring to children who have some disability condition but each child is different has a different world" (Teacher 4).

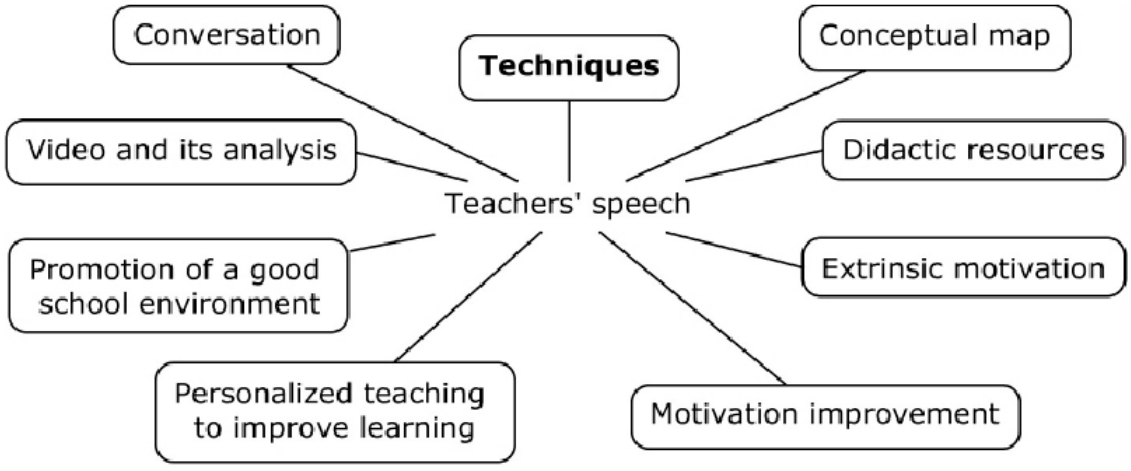
In this sense, Coll's (2016) plans stand out, which resumes the importance of personalization of learning, advising the tendency to adjust and adapt the information in terms of individual needs. Where on the ground it is necessary to face special educational needs, as it is a need for students given the individual characteristics of learning.

Following the teachers' contributions, the ways to achieve a better learning have been highlighted, however, it is necessary to analyze in addition to the strategies of checking this learning that are achieved through verification, which seems to be limited to student participation as some maestros pointed out: "I know if the student understood or did not understand because the class should be participatory" (Teacher 1). "Let's say in the participation in the class in the realization of sheets and lastly in the evaluation, who participate in the class who wants to decide that it's a child that the theme has fallen clear" (Teacher 2). Well, the look at the verification of learning is an essential exercise of the teacher, which is approached from the instrumental evaluation that is part of the school systems and allows an estimation of the evolution of the learning, also has its implications in the state of the students, because of which negative consequences have been reported among those found in school dropout (Silvera, 2016) and school failure, among other implications that can be explained by the design of evaluations devoid of the evaluated subject, the unidirectional look at the teacher-student relationship, the conception of evaluation away from learning (Perassi, 2009).

In response, in Colombia, the integral evaluation model has been worked on (Moreno Durán, 2008) as a process where the participation of the entire educational network is sought, including attitudes and values of school actors. However, the teachers stated that the evaluation "does not refer only to a written evaluation, for example what you decided to be looking at your attitude of looking at how you are interacting with your partners" (Teacher 1), despite in the similar speeches among the teachers, there is a divergence with the normative evaluations carried out between the college and the state where knowledge is evaluated with numerical results mainly, which do not need to say integrality.

Within the framework of the evaluation, there were

Figure 4. Analysis Technical Subcategory.



Source: Elaborated by the authors.

also sheets on the use of resources such as carrying out activities on the table, considering the possibility that it offers to interact with their partners and generate collaborative responses, in addition to the benefits reported in studies such as the best understanding and memorization of themes when using the board (Álvarez, Alonso, Muñiz, & Brito, 2013). With respect, Teacher 4 states: "They like a lot of participation on the board, pass the board, take the marker and write in front of the others, they like much and they feel recognized".

To finish with this section of the analysis of learning, it is pertinent to have in account the appreciations the teachers have about the attitudes, warning that "There are movements of the body that I generally use when they see them very distracted or they are talking a lot, so they can be awakened and returned to concentrate again. (…) to see their behavior you can know if they have understood or not…" (Teacher 3); "When the child is very withdrawn, very shy, there is no participation, if he is called by the notebook, you can see that he does not do it alone" (Teacher 4).

As has been reviewed, the evaluation from different strategies allows us to know how to advance in learning, both from the observation and from the written plan. However, it is also necessary to specify individual forms of verification that can be applied to both the teacher and the student, understanding self-verification as a cognitive process or individual capacity that refers to the so-called executive functions and that specific way can be understood as self-reliance monitoring (Flores Lázaro & Ostrosky, 2012; Tirapu-Ustárroz, Cordero-Andrés, Luna-Lario, & Hernáez-Goñi, 2017) that allows the person to check and follow up on their own actions. This skill, if mature with development, can be exercised in the school scenario, while the student is invited to review their deliveries, follow up on their progress, evaluate their successes and errors among other activities.

Analysis of the technical subcategory

This subcategory was considered as inductive categories of higher recurrence: the use of didactic resources and the video as a didactic tool (Figure 4).

The use of video has expanded significantly in the development of the classes, following the evaluations, stimulating the students' attention capacity, their participation, but over the entire listening and observation capacity (Teachers 1-4). Regarding the contribution of Corpas (2000), it is worth mentioning that the video provides a development of comprehension, the work on non-verbal elements, the variety in the available information and the proximity with the real world. Likewise, video stands out as a mediator and facilitator of learning (Bartolomé-Pina, 2018; Jiménez Bernal, & Ordóñez, 2019).

In view of the didactic resources, the report of the teachers is varied, including: alphabet soups, coloring, crosswords, "concentrate" (memory game based on peering) and access to recreational activities on the internet with the support of technological equipment (Maestras 1-4). Of the mentioned didactic strategies, benefits in learning have been reported, among them it is worth mentioning, for example, the crosswords that benefit in the cognitive development, especially in the concentration and resolution of problems, improving in turn the academic performance (Olivares et al., 2008). Likewise, Rosales, Ruiz, Mariel, Padrón, & Garrocho (2016) have reported benefits of the crossword puzzle in the development of information organization skills and allow revision, which in turn increases memory. In this same sense, it is worth mentioning Alphabet Soups as a didactic strategy whose benefits include motivation, the review of contents that in turn stimulate memory (Vallina, 2009) and whose presentation can be given from the printed plan or digital.

On the other hand, the use of coloring could be taken into account from the scopes, the first that refers to the exercise of behavioral organization that requires the act of coloring without leaving the contours, which in turn stimulates attention capacity and executive functions (Castañeda & Riaño, 2016) and according to the above mentioned the impact of exposure to colors and its benefit in learning (Ortiz Hernández, 2011).

The activities mentioned here have the advantage of adapting to different themes and means of presentation, especially the possibility of being presented in digital or computer-assisted mode, which can be used according to the children's interests. However, it is necessary to specify antecedents that refer to the implications of the specific use of the screens (computer, tablet or telephone) on mental development. In addition, it is worth mentioning the contributions of Vara et al. (2009) who found that the longest time of exposure to computer games is given lower scores in a mental development process, evidencing negative effects of the use of screens. Also, recent studies have reported that the restriction of television and computer use is related to a greater cognitive and social development of children (Hu, Johnson, & Wu, 2018)

Analysis of the association between cognitive and didactic skills employed by teachers

Chart 1 presents the different didactic subcategories employed by the teachers and their association with the evaluated cognitive skills, finding different didactic strategies that directly or indirectly favor the cognitive development, however, it is worth mentioning that the techniques aimed at strengthening attention and fluidity showed comparatively smaller effects.

In this sense, slightly lower results will be found in the areas of attention, a result that is worth analyzing

Chart 1. *Association Between Teacher Didactics and The Cognitive Skills of Students.*

Didactics used by teachers	Cognitive abilities in students
Feedback Board Use Use of video	Attention (Decreased)
Use of records Repetition Pre-knowledge assessment Check-verify	Memory (Outstanding)
Intrinsic-extrinsic motivation Mechanization	Speed (Outstanding)
Socialization Conceptual map Conversation	Fluency (Decreased)

from the didactic strategies, where priority is found in resources such as the video directed at motivation and better concentration of students (Teachers 1, 3, 4), however, given the literature reviews, an inverse relationship has been found between the time of exposure to screens and the ability to pay attention, reporting greater problems with attention in children who wear screens more than two hours a day (Tamana et al., 2019) where the hours of video exposition at school are found, added to the hours of screen use at home.

On the contrary, the memory that has been strengthened can be associated with the use of traditional didactic strategies such as repetition and transcription, as well as specific strategies such as Alphabet Soups, crosswords, pairing among others, which according to literature contribute in cognitive development specifically in memory (Olivares et al., 2008; Rosales et al., 2016; Vallina, 2009).

In addition to the previous one, the performances in memory can also be attributed to other didactic practices, such as the use of cards and a guide that in most cases must be transcribed, which stimulates the memory capacity (Alfaro & Chavarría, 2003) and that are available even in technological applications with easy access for teachers and students (GoConqr, 2018). Likewise, the results in the speed capacity, can also be related to the constant use of the sheets where the students can write the answers and transcribe them in the notebook in the shortest time; said transcription has been related to better executions in written composition (Yausaz, 2005).

Finally, verbal fluidity, which permeates the entire school dynamics that occurs in the teacher-student relationship, can be attributed to more contextual variables related to the primary socialization group that is the family, for which studies have revealed a relation between verbal fluency and the schooling of parents, as well as the time when they accompany their children (Riaño-Garzón, Diaz-Camargo, Torrado-Rodríguez, Bautista Sandoval, & Chacón Lizarazo, 2017).

CONCLUSIONS

It was found that students at the beginning of the school age showed outstanding cognitive performance in memory and speed capacities, results that have shown association with the complementary didactics used by teachers for the development of classes among those that stand out in the use of the board , the learning sheets, the transcription, the repetition and the use of hobby-type activities such as crosswords, and word Alphabet Soups and image matching activities; each with previous reports of effectiveness in strengthening learning (Rosales et al., 2016; Vallina, 2009).

In the evaluation, the constant use of the table was reported as an evaluation tool, which allows the student to quickly assimilate the concepts given in class (Álvarez, Alonso, Muñiz, & Brito, 2013), as well as the constant use de guides also contribute to this process, as the student must process the information in order to enter it in the notebook.

The children's attention capacity was ubiquitous because of the average result that could be related (among other reasons) with the repeated use of classroom videos, which are also selected according to the curricular contents, are presented on television screens or computer that, according to scientific background, its greater use than the daily hours has

been related to lower cognitive performance (Tamana et al., 2019; Vara et al., 2009).

In the same sense, the verbal fluency is located in the low level, a result that can be attributed more to family characteristics than to the school activity, where the didactics clearly favor the development of the verbal fluency with different activities that stimulate the verbal expression.

Finally, it is worth concluding that, in general, the cognitive development of children approaches the average, from which didactic effects are evidenced, especially on the development of memory and speed, however, if there is a need to approach the attentional capacities as a priority warning the relationship between attention capacity and other school aptitudes such as academic performance (Rangel Araiza, 2014), behavior (Fonseca, Rodríguez, & Parra, 2016), emotional adjustment (Sánchez-Pérez & González-Salinas, 2013), memory, thought and intelligence (Jiménez, 2012).

Hopefully, these results will promote the development of research lines in the framework of neuroeducation that allow us to better explain the contribution of specific didactics with the strengthening of cognitive processes with in class.

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