

## Cognitive Skills and Their Development in Early Childhood

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### **Abstract**

*A documentary review was carried out on the production and publication of research papers related to the study of the variables Cognitive Skills and Early Childhood. The purpose of the bibliometric analysis proposed in this document was to know the main characteristics of the volume of publications registered in the Scopus database during the period 2017-2022 by Latin American institutions, achieving the identification of 72 publications. The information provided by this platform was organized through graphs and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics have been described, the position of different authors regarding the proposed theme is referenced through a qualitative analysis. Among the main findings made through this research, it is found that Chile, with 22 publications, was the Latin American country with the highest scientific production registered in the name of authors affiliated with institutions in that nation. The Area of Knowledge that made the greatest contribution to the construction of bibliographic material related to the study of cognitive skills and their impact on growth and development in early childhood was Social Sciences with a total of 29 published documents, and the most used Type of Publication during the period indicated above were Journal Articles with 83% of the total scientific production.*

**Keywords:** *Cognitive Skills, Early Childhood.*

### INTRODUCTION

Developing cognitive skills in early childhood is a complex and exciting journey that sets the stage for a child's future intellectual and academic success. Cognitive abilities include a wide range of mental processes that allow individuals to perceive, process, store, and use information from the world around them. These skills are essential for developing a child's ability to think, reason, solve problems, and adapt to their environment. Understanding the complex interplay between biology, environment, and experience during the development of cognitive skills is critical for parents, educators, and educational institutions, as it has significant implications for children's overall development and life course. Early childhood, which typically lasts from birth to about eight years old, is a critical period for cognitive development. During this period, children experience rapid and transformative cognitive growth, making it an opportunity to nurture and understand their cognitive potential. The cognitive skills that emerge in early childhood are the building blocks of more complex cognitive functions that develop later in life. These essential skills include perception, memory, attention, language acquisition, problem-solving, and social cognition, all of which play a vital role in a child's educational journey and beyond.

The development of cognitive skills in early childhood is a dynamic process influenced by many factors. Genetic predisposition paves the way for cognitive potential, but environmental and experiential factors

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play an equally important role. A child's family, cultural background, socioeconomic status, and access to quality early education help shape their cognitive development. In addition, significant changes occur in the brain during this period, as neural connections are formed and strengthened in the process of synaptic branching. Understanding how these factors interact with and affect cognitive development is critical to optimizing the learning environment and promoting positive outcomes for children.

In addition, research on early childhood cognitive development has important implications for educational decisions. Early intervention programs aimed at developing cognitive skills have been shown to have lasting effects on children's academic performance and social-emotional health. Recognizing the plasticity of cognitive abilities during this period emphasizes the importance of creating a nurturing and stimulating environment that promotes healthy development. It also highlights the need for policies and investments to ensure that all children, regardless of their background, have equal access to opportunities that promote cognitive development.

In this comprehensive study of early childhood cognitive skills and their development, we will delve into all aspects of cognitive development, from the emergence of basic skills to the critical role of environmental influences. By gaining a deeper understanding of these processes, we can better understand the unique journey each child undertakes toward cognitive maturity. This knowledge provides parents, educators, and policymakers with valuable information to create a supportive and nurturing environment that enables children to reach their full cognitive potential and pave the way to a better future. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variables Cognitive Skills and Early Childhood, as well. Such as the description of the position of certain authors affiliated with institutions, during the period between 2017 and 2022.

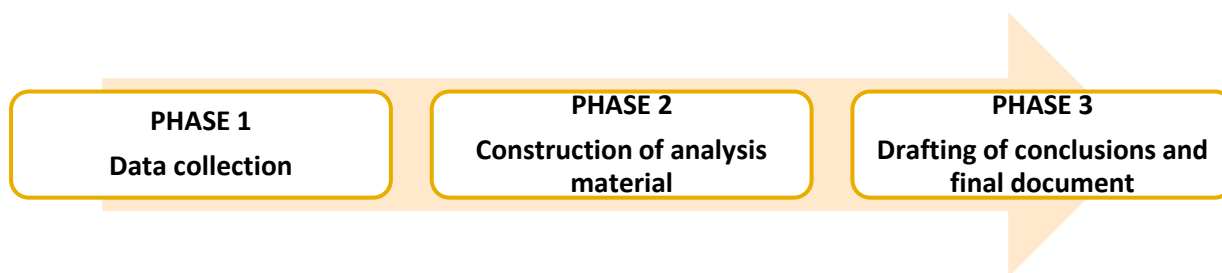
## **GENERAL OBJETIVE**

To analyze, from a bibliometric and bibliographic perspective, the preparation and publication of research papers in high-impact journals indexed in the Scopus database on the variables Cognitive Skills and Early Childhood during the period 2017-2022 by Latin American institutions.

## **METHODOLOGY**

This article is carried out through a mixed orientation research that combines the quantitative and qualitative method. On the one hand, a quantitative analysis of the information selected in Scopus is carried out under a bibliometric approach of the scientific production corresponding to the study of the variables Cognitive Skills and Early Childhood. On the other hand, examples of some research works published in the area of study indicated above are analyzed from a qualitative perspective, based on a bibliographic approach that allows describing the position of different authors regarding the proposed topic. It is important to note that the entire search was carried out through Scopus, managing to establish the parameters referenced in *Figure 1*.

### **Methodological Design**



*Figure 1. Methodological design*

Source: Own elaboration

### **Phase 1: Data Gathering**

Data collection was carried out from the Search tool on the Scopus website, where 72 publications were obtained from the choice of the following filters:

TITLE-ABS-KEY (cognitive AND skills, AND early AND childhood) AND PUBYEAR > 2016 AND PUBYEAR < 2023 AND ( LIMIT-TO ( AFFILCOUNTRY , "Chile" ) OR LIMIT-TO ( AFFILCOUNTRY , "Brazil" ) OR LIMIT-TO ( AFFILCOUNTRY , "Peru" ) OR LIMIT-TO ( AFFILCOUNTRY , "Argentina" ) OR LIMIT-TO ( AFFILCOUNTRY , "Mexico" ) OR LIMIT-TO ( AFFILCOUNTRY , "Colombia" ) OR LIMIT-TO ( AFFILCOUNTRY , "Uruguay" ) OR LIMIT-TO ( AFFILCOUNTRY , "Ecuador" ) OR LIMIT-TO ( AFFILCOUNTRY , "Guatemala" ) OR LIMIT-TO ( AFFILCOUNTRY , "Cuba" ) )

- Published documents whose study variables are related to the study of the variables Cognitive Skills and Early Childhood.
- Limited to the period 2017-2022
- Limited to Latin American countries.
- Without distinction of area of knowledge.
- Without distinction of type of publication.

### **Phase 2: Construction of analysis material**

The information collected in Scopus during the previous phase is organized and then classified by graphs, figures and tables as follows:

- Co-occurrence of words.
- Year of publication
- Country of origin of the publication.
- Area of knowledge.
- Type of publication.

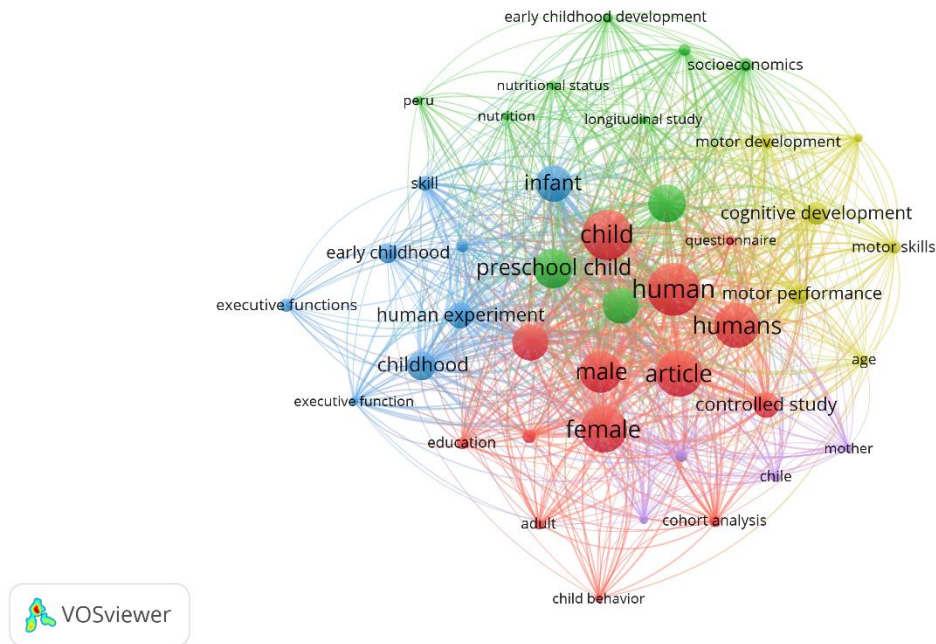
### **Phase 3: Drafting of the conclusions and final document**

In this phase, the analysis of the results previously yielded is carried out, resulting in the determination of conclusions and, consequently, the obtaining of the final document.

## **RESULTS**

### **Word co-occurrence**

*Figure 2* shows the co-occurrence of keywords found in the publications identified in the Scopus database.



**Figure 2.** Word co-occurrence

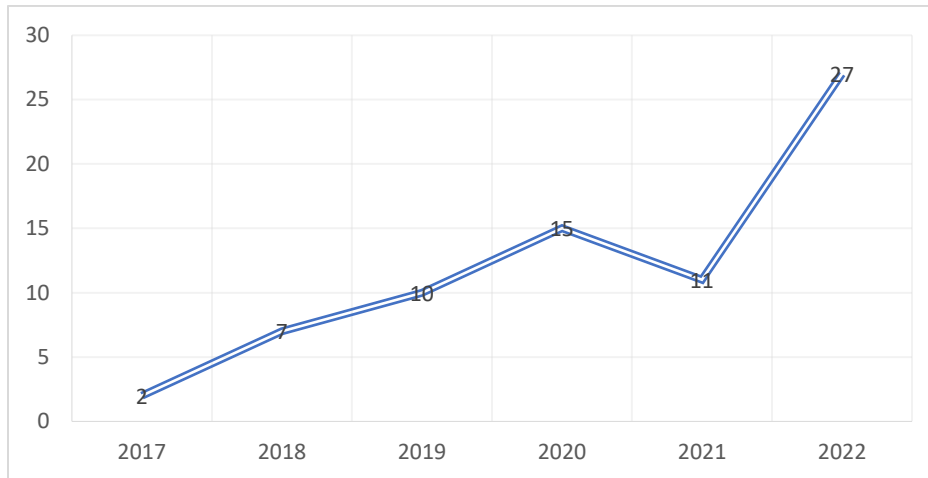
**Source:** Own elaboration (2023); based on data exported from Scopus.

Cognitive Skills was the keyword most frequently used within the studies identified through the execution of Phase 1 of the Methodological Design proposed for the development of this article. Early Childhood is among the most frequently used variables, associated with variables such as Cognitive Development, Controlled Studies, Childhood, Education. From the above, it is striking that cognitive skills in early childhood is a dynamic process that is influenced by the child's growth environment and development. This critical period of cognitive development is characterized by a rapid expansion of neural connections and brain plasticity, which means that children have an amazing ability to learn and adapt to new experiences.

It is important to note that cognitive development in early childhood does not occur in isolation, but is closely related to other aspects of development such as emotional, social, and physical. When children have the opportunity to interact with caring and stimulating adults and explore their environment safely, they tend to develop strong cognitive skills and build a strong foundation for future learning.

### Distribution of scientific production by year of publication

Figure 3 shows how scientific production is distributed according to the year of publication.



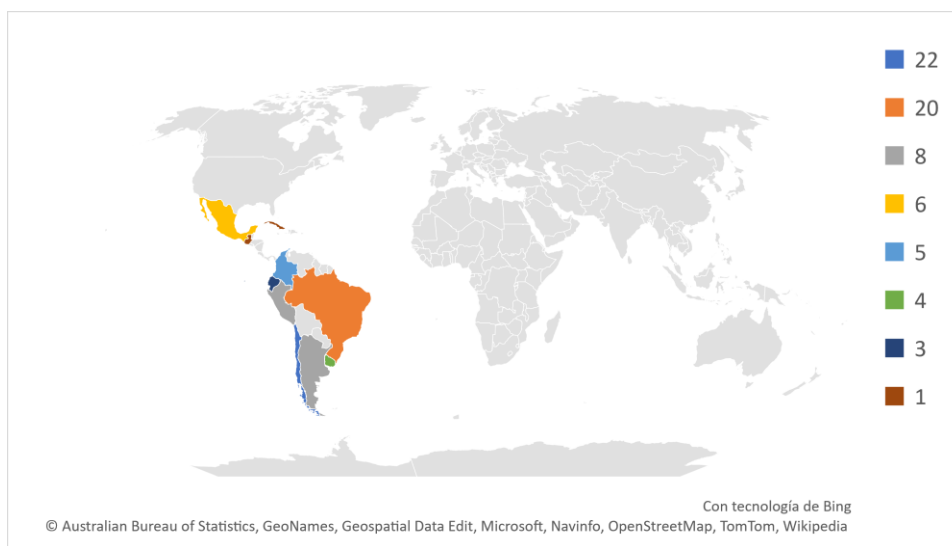
**Figure 3.** Distribution of scientific production by year of publication.

**Source:** Own elaboration (2023); based on data exported from Scopus

Among the main characteristics evidenced by the distribution of scientific production by year of publication, a level of number of publications registered in Scopus was noted in 2022, reaching a total of 27 documents published in journals indexed on said platform. This can be explained thanks to articles such as the one entitled "Body weight and human capital development: evaluating the impact of obesity on socio-emotional skills during childhood in Chile". This article analyzes the effect of body weight on the socio-emotional skills of children aged two to 12 years in Chile. Using an instrumental variables approach and a representative survey, we show that both BMI and obesity are causally related to children's social-emotional development, even after assuming that our instrument is imperfect. Although we did not find significant differences between boys and girls, we did identify heterogeneous effects by age: weight penalization for girls begins earlier than for boys. Our findings suggest that early interventions for childhood obesity could not only lead to positive impacts on children's health, but also a greater accumulation of non-cognitive human capital in the future. (Sarrias, 2022)

#### Distribution of scientific production by country of origin.

Figure 4 shows how scientific production is distributed according to the nationality of the authors.



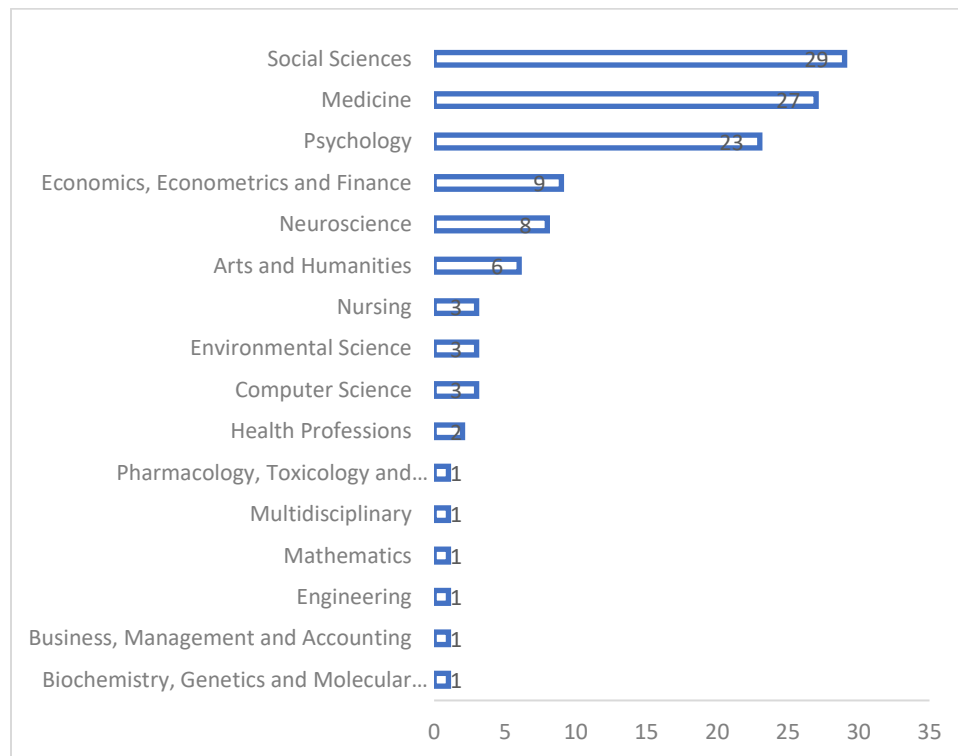
**Figure 4.** Distribution of scientific production by country of origin.

**Source:** Own elaboration (2023); based on data provided by Scopus.

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing Chile as the country in that community, with the highest number of publications indexed in Scopus during the period 2017-2022, with a total of 22 publications in total. In second place, Brazil with 20 scientific documents, and Argentina occupying the third place presenting to the scientific community, with a total of 8 documents among which is the article entitled "Executive function, self-regulation skills, behaviors and socioeconomic status in early childhood." The goal of the present study is to systematically examine SES-related differences in young children's executive function (EF), self-regulation skills, and behaviors. Methods The current study analyzed data from 2,309 young children from the Harvard Early Learning Study (ELS@H). Information from multiple methods (direct assessment and reporting) and multiple informants (parents and early education and care educators) was used on children's executive function, self-regulation skills, and internalizing, externalizing, and adaptive behaviors. A parametric framework employing ordinary least squares (OOL) estimation was used to quantify the size of SES-related differences in this set of children's fundamental socio-emotional skills. Results On average, there were differences of 0.24 to 0.45 SD for EF, 0.22 to 0.32 SD for self-regulation skills, and 0.27 to 0.54 SD for behaviors favoring children in the highest SEL quartile of the SEL distribution relative to children at the lowest level.(Cuartas, 2022)

**Distribution of scientific production by area of knowledge**

Figure 5 shows the distribution of the preparation of scientific publications based on the area of knowledge through which the different research methodologies are implemented.



**Figure 5.** Distribution of scientific production by area of knowledge.

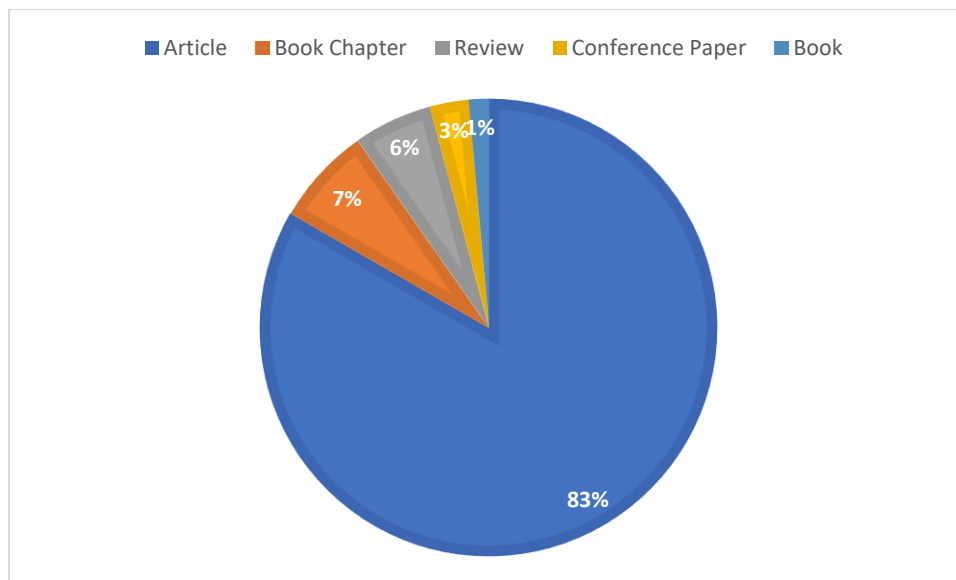
**Source:** Own elaboration (2023); based on data provided by Scopus.

Social Sciences was the area of knowledge with the highest number of publications registered in Scopus with a total of 29 documents that have based their variable methodologies Cognitive Skills and Early Childhood. In second place, Medicine with 27 articles and Psychology in third place with 23. The above

can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by the Social Sciences area entitled "Predictive analysis of academic performance in Peruvian children: the role of intentional control and liking towards school" the objective of this study was to predict the perceived academic performance of a group of students based on the following variables: effort control (CE) and liking school (SL). Method. A sample of 423 students, between 5 and 8 years old ( $M = 6.29$ ,  $SD = 0.89$ ), from public schools in socioeconomically disadvantaged areas of Lima was gathered. A total of 45 teachers provided information on their perceptions regarding the study variables in their respective students. Results. The results of the hierarchical linear regression analysis show that both strained control and liking for school are positive and significant predictors of perceived academic performance, even after controlling for students' cognitive abilities and their mothers' educational level. Discussion and conclusion. Possible explanations for these findings and their relevance in the Peruvian context are discussed.(Alfaro-Cárdenas, 2022)

### Type of publication

In the following graph, you will see the distribution of the bibliographic find according to the type of publication made by each of the authors found in Scopus.



**Figure 5.** Type of publication.

**Source:** Own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was entitled Journal Articles with 83% of the total production identified for analysis, followed by Book Chapter with 7%. Journal are part of this classification, representing 6% of the research papers published during the period 2017-2022, in journals indexed in Scopus. In this last category, the one entitled "Educational robotics intervention to promote computational thinking in preschool children: effects of children's participation in tasks" stands out. This study presents a novel educational robotics (ER) intervention using RoboTito, a robot programmable through tangible elements in its environment designed for kindergarten children. We used a quasi-experimental design with an active control group. In addition, we carry out a structured observation of the filmed material of the sessions to collect data on the attention and motivation of the children throughout the activities. Fifty-one children (males = 33; mean age = 66 months,  $SD = 5.49$  months) attending level 5 (kindergarten) of a Uruguayan public school participated in the study. Children in our experimental condition participated in an intervention programming RoboTito using tangible items, while children in our control condition played with the

robot through sensorimotor activities using a remote control and did not participate in programming. Motivational and attentional factors were assessed through videotaped sessions of RE activities. Four trained observers who were blind to the experimental conditions participated in the coding. (Gerosa, 2022)

## CONCLUSIONS

Through the bibliometric analysis carried out in this research work, it was possible to establish that Chile was the country with the highest number of published records for the variables Cognitive Skills and Early Childhood, with a total of 17 publications in the Scopus database. In the same way, it was possible to establish that the application of theories framed in the area of Social Sciences, There is no doubt that the cognitive skills of early childhood and its development are critical aspects of the general growth and future success of a child. The transition from infancy to early childhood is characterized by significant changes in cognitive functions, including perception, memory, language, and problem-solving skills. These stages of development are determined by a complex interplay of environmental and experiential factors. Clearly, early childhood cognitive development lays the foundation for later academic achievement, social competence, and emotional well-being. The emergence of cognitive skills such as thinking and reasoning paves the way for more advanced learning and later adaptive skills. In addition, the plasticity of the young brain allows for considerable flexibility in cognitive development, making this period an optimal time to provide intervention and support when needed. Based on extensive research and knowledge gained in recent years, it is clear that promoting healthy cognitive development in early childhood should be a priority for parents, educators, and society as a whole. By providing a nurturing and supportive environment, fostering curiosity, and providing relevant educational experiences, we enable children to reach their full cognitive potential and lay the foundation for lifelong learning and success. Therefore, investing in early childhood cognitive development is not only an investment in individual children, but also an investment in the future well-being and prosperity of societies and nations.

## REFERENCES

- Alfaro-Cárdenas, P. G. (2022). Predictive analysis of academic performance in Peruvian children: the role of intentional control and liking towards school. LIMA, PERU .
- Cuartas, J. H. (2022). Executive function, self-regulation skills, behaviors, and socioeconomic status in early childhood. BOGOTÁ, COLOMBIA .
- Gerosa, A. K.-S. (2022). Educational robotics intervention to encourage computational thinking in preschoolers: effects of children's participation in tasks. MONTEVIDEO, URUGUAY .
- Sarrias, M. B. (2022). Body weight and human capital development: evaluating the impact of obesity on socio-emotional skills during childhood in Chile. CHILE.
- Dondis, Donis A. 1985. The syntax of the image. Introduction to the alphabet. Editorial Gustavo Gili, Barcelona: 1985.
- Eguaras, Mariana. 2018. [Online] May 31, 2018. [Cited on: November 25, 2021.] <https://marianaeguaras.com/reticula-sencilla-caracteristicas-de-una-maquetacion-a-una-columna/>.
- . 2014. Marianaeguaras. [Online] January 27, 2014. [Cited on: 2021 November 25.] <https://marianaeguaras.com/que-tipografia-usar-para-libros-impresos-y-digitales/>.
- Escalante, Dilia Teresa. 2008. <http://ve.scielo.org/>. [Online] January 18, 2008. [Cited on: June 4, 2021.] Available at: [http://ve.scielo.org/scielo.php?pid=S1316-49102008000400002&script=sci\\_arttext](http://ve.scielo.org/scielo.php?pid=S1316-49102008000400002&script=sci_arttext). ISSN.
- Falen Muro, María Fernanda and Rodríguez Azang, Ricardo Junior. 2016. Photography as a didactic tool to complement knowledge in EI students. Jesus of Nazareth, Pimentel - 2016. Universidad Se pr de Sipán, Chiclayo, Peru : 2016.
- Fernández and Ibarra. 2012. OERT. OERT. [Online] 10 Ebero 2012. [Cited on: July 19, 2021.] <http://www.oert.org/variables-tipograficas/>.
- Fraga Herrera, Sahily and Hidalgo, Gabriela. 2014. Illustration of a children's story to rescue traditional Ecuadorian games. Israel University, Quito: 2014.
- García Lluch, Silvia. 2018. Children's illustrated book. Faculty of Fine Arts of Sant Carles, Valencia: 2018.
- García, Estger Ros. 2012. <https://idus.us.es/>. [Online] 2012. [Cited on: June 27, 2021.] Available at: <https://idus.us.es/bitstream/handle/11441/54424/EI%20cuento%20infantil.pdf?sequence=1&isAllowed=y>.
- Illescas Díaz, Francisco Javier. 2020. Akiracomics. [Online] February 17, 2020. [Cited on: November 23, 2021.] Available at: <https://www.akiracomics.com/blog/que-es-una-novela-grafica>.



- calligraphy. 2020. lcaligrafia.info. [Online] April 13, 2020. [Cited on: 2021 November 16.] Available at: <https://lcaligrafia.info/caligrafia-para-cuentos-infantiles/>.
- Lario, Marian. 2011. Marianlario. [Online] August 6, 2011. [Cited on: November 25, 2021.] <http://www.marianlario.com/blog/como-crear-un-album-ilustrado-de-32-paginas-el-storyboard-n8>.
- Children's Literature: Approach to the concept, its limits and its possibilities. Delgado, María Pilar Nuñez. 2009. 1, Granada : María Elvira Rodríguez Luna, 2009, Vol. XIV. ISSN.
- Lossada, Fernando. 2012. Color and its harmonies. s.l. : Codepre Publications, 2012.
- Mariscal Romero, Moisés. 2015. Production orders, equipment and master pages for the layout and layout of graphic products. Malaga : IC Editorial, 2015. ISBN.
- Martínez, Luigui. 2020. Domestika. [Online] May 26, 2020. [Cited on: November 16, 2021.] Available at: <https://www.domestika.org/es/blog/3743-que-es-la-ilustracion-infantil>.
- Maza Pérez, Alejandro Enoc. 2012. An approach to comics: origin, development and potentialities. 2012. ISSN.
- Morales, Purificación Toledo. 2005. The Short Story: Concept, Typology and Criteria for Selection. s.l. : Aprende-IEA, 2005. ISBN.
- Moreno, Luciano. 2004. <https://desarrolloweb.com>. <https://desarrolloweb.com>. [Online] November 2, 2004. [Cited on: July 18, 2021.] Available at: <https://perio.unlp.edu.ar/catedras/iddi/wp-content/uploads/sites/125/2020/04/Tipograf%C3%ADa-y-dise%C3%B1o-web.pdf>.
- Muñoz Razo, Carlos. 2011. How to prepare and advise a thesis research. Second. Juárez : Prentice Hall, 2011. ISBN.
- Netdisseny. 2003. mailxmail.com. mailxmail.com. [Online] Intercom, 02 of 09 of 2003. [Cited on: 2021, 07 16.] Available in: <http://www.mailxmail.com/curso-diseno-composicion-tipografia/grosor-ancho-cursivas-mayusculas>.
- Palacios Manzanillas, María Augusta. 2010. Elaboration of books, applying the POP-UP technique and illustration aimed at children from 10 - 12 years old on the fauna and legend of the Galapagos Islands, in order to encourage children with reading and knowledge of the islands. Universidad de las Américas, Quito, Ecuador: 2010.
- Pedro Gallardo Vázquez, Joaquín León Donoso. 2008. The Short Story in Children's Literature. s.l. : Wanceulen Editorial deportiva, S.L., 2008. ISBN.
- Prieto, Remedios Molina. 2008. Stories help to grow. Granada : s.n., 2008. ISSN.
- Psychologists, National Association of School. 2001. Depression in children. Helping Children at Home and School. Bethesda : A. Canter and S. Carroll, 2001.
- Gordillo-Rodríguez, M. T., Pineda, A., & Gómez, J. D. F. (2023). Brand Community and Symbolic Interactionism: A Literature Review. *Review of Communication Research*, Vol.11, pp.1-32.
- Quicios, Borja. 2018. Children's Guide. [Online] March 19, 2018. [Cited on: November 15, 2021.] Available at: <https://www.guiainfantil.com/especialistas/psicologia/borja-quicios/>.
- Royal Spanish Academy. Self-harm [blog]. [Accessed: 20 October 2021]. Available in: <https://dle.rae.es/autolesión?m=form>
- Royal Spanish Academy. Cognition [blog]. [Accessed: 20 October 2021]. Available in: <https://dle.rae.es/cognición?m=form>
- Royal Spanish Academy. Diuresis [blog]. [Accessed: 20 October 2021]. Available in: <https://dle.rae.es/diuresis?m=form>
- Royal Spanish Academy. Motor skills [blog]. [Accessed: 20 October 2021]. Available in: <https://dle.rae.es/motricidad?m=form>
- Royal Spanish Academy. Onychophagia [blog]. [Accessed: 20 October 2021]. Available in: <https://dle.rae.es/onicofagia?m=form>
- Royal Spanish Academy. Retraction [blog]. [Accessed: 20 October 2021]. Available in: <https://dle.rae.es/autolesión?m=form>
- Royal Spanish Academy. Somatizar [blog]. [Accessed: 20 October 2021]. Available in: <https://dle.rae.es/somatizar?m=form>
- Royal Spanish Academy. Theology [blog]. [Accessed: 20 October 2021]. Available in: <https://dle.rae.es/teología?m=form>
- Redondo García, Miguel. Digital Illustration. National Institute of Educational Technologies and Teacher Training, s.l. : s.n.
- Visual rhetoric: a necessary tool in the creation and interpretation of visual products. Menéndez Pidal, Silvia Nuere. 2010. 2, Venezuela : Revista de Artes y Humanidades UNICA, 2010, Vol. II.
- Revilla Carrasco, Alfonso and Murillo Ligorred, Víctor. 2019. Conceptual Foundations in Visual and Plastic Education. University of Zaragoza Presses, Zaragoza : 2019.
- Rojas, Enrique. 2013. Goodbye, depression. Goodbye, depression. Madrid : Ediciones Temas de Hoy, 2013.
- Sallybooks. Sallybooks. [Online] [Cited on: November 23, 2021.] Available at: <https://www.sallybooks.es/narrativa-grafica/intro-album-ilustrado/>.
- Sanmiguel, David. 2003. All about the technique of illustration. Barcelona : Grupo Editorial Norma, 2003. ISBN.
- Santa Maria, Fiori. 2014. Staffcreativa. [Online] May 21, 2014. [Cited on: 2021 November 25.] Available in: <https://www.staffcreativa.pe/blog/tipografia/>.
- Schiavi, Sofia. 2019. CádracosGaya. [Online] October 10, 2019. [Cited on: 2021 November 15.] Available at: <https://www.cadracosgaya.com.ar/tipoblog/2019/tratamiento-para-textos-infantiles/>.

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- Vados, Andrés Esteban Menza, Sierra Ballén, Eduard Leonardo y Sánchez Rodríguez, Wilman Helioth. 2016. *The Enlightenment: Elucidation and Creative Process*. Research Group in, Bogotá, Colombia: 2016.
- Villabona de Rodríguez, Cecilia, Ordoñez Díaz, Olegario and Sánchez Lozano, Carlos. 1990. *Spanish without borders*. Octave. Bogotá : s.n., 1990. p. 26.
- Yaguachi Olaya, Isabel Normi. 2016. *Methodological proposal for children's illustration based on manual and digital techniques under the concept of creativity: practical case study for children aged 4-6 years from the "MIZPA" foundation in 2016*. Pontificia Universidad Católica del Ecuador sede Esmeraldas, Esmeraldas, Ecuador : 2016.