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Article

Use of pictograms in the development of comprehension reading in elementary school students: A systematic review

Uso de pictogramas en el desarrollo de lectura comprensiva en estudiantes, de educación primaria: Una revisión sistemática

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Abstract

The present article consists of a systematic review, which aims to: analyze how the use of pictograms affects the development of comprehensive reading of students in primary education, answering the following questions: How pictogram didactic strategies can improve reading and writing in primary education? How does the pictogram influence language comprehension in primary education students? The influence of the pictogram in the syntactic development of language? Scientific productions from SCOPUS, Web of Science, Google academic databases, publications made from 2018 to 2023 were analyzed. The study is based on the PRISMA methodology (Preferred Reporting Items for Systematic reviews and Meta-Anayses), which consists of a flow chart that allows the selection of studies for their construction (Higgins and Green, 2011), which have allowed the systematic coordination of the methods and techniques of studies most related to the research variables.

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Keywords: pictograms, comprehension reading, elementary education, students

Resumen

El presente artículo consiste en una revisión sistemática, que tiene como objetivo: analizar como el uso de pictogramas incide en el desarrollo de lectura comprensiva de los estudiantes en la educación primaria, dando respuesta a las siguientes interrogantes: ¿Cómo las estrategias didácticas de pictogramas pueden mejorar la lectoescritura en educación primaria? ¿Cómo influye el pictograma en la comprensión del lenguaje en estudiantes de educación básica primaria? ¿La influencia del pictograma en el desarrollo sintáctico del lenguaje? Se analizaron producciones científicas de las bases de datos SCOPUS, Web of Science, Google académico, publicaciones realizadas desde el año 2018 al 2023. El estudio, se apoya en la metodología PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Anayses) que consiste en un diagrama de flujo que permite seleccionar los estudios para su construcción (Higgins y Green, 2011), las mismas que, han permitido coordinar de forma sistemática los métodos y técnicas de estudios más relacionados a las variables de investigación.

Palabras clave: pictogramas, lectura comprensiva, educación primaria, estudiantes

Introduction

In the school model of literacy development, all the actors of the educational system are involved, and it is known that, although they are independent competencies, they are closely related to each other, due to their impact on the social reality of people, it is indisputable that writing is a skill that few develop quickly, due to factors directly related to the way of learning.

Batanero (2018) points out that, when the teacher applied the use of pictograms in the classroom, 67 % of the students improved their response capacity in different activities related to the reading level. Esquivel (2022) reveals that 53.8% of the students evaluated do not obtain the ideal level in reading comprehension performance. Jiménez (2022) explains that at the end of 2020, only 42% of children in Latin America were able to read without difficulties, in addition, a high percentage of readers prefer images and texts, while

student readers prefer video and audio, essential at the moment of whether or not to continue reading.

It is undeniable that in various educational institutions, difficulties were detected in the reading comprehension of school-age children, being reading comprehension a skill that teachers have sought to develop in the classroom, but when evaluating the progress of the student, they found low rates, diagnostic tests, give different levels of understanding, having as one of the causes of the problem, the limited use of images, graphics or playful representations that speed up the cognitive processes.

Manjarres (2021) raises a series of factors that accompany this low level of comprehensive reading, such as: the complexity of the texts, resources that are not adequate to the needs of the students, lack of organization, educational practices without self-regulation, among others.

Another cause of the problem is the complexity with which the language and literature teacher uses textual resources when explaining the different curricular contents to his students, in which the students must develop different types of readings, being the comprehensive reading a demotivating and overwhelming process for the students who do not reach the established learning minimums.

The use of images can promote the development of reading, as long as it is validated by expert teachers, both in the area and in the management of didactic and ludic resources, to be used properly, among these resources are: roulette, the reading snake, messy story, among others, which are necessary to solve the problem of the deficit in the comprehensive reading level.

Pineda (2019) points out that teachers cannot make the learning tools effective, despite the organization of the contents, since the student only relates the reading to what he/she uses the most in his/her immediate environment, which distances the student from a logographic reading process; on the other hand, the author also explains that students critically interrelate the reading, due to lack of feedback, which is necessary to activate certain previous knowledge and stimulate the different skills inherent to reading comprehension.

Guerrero (2022) explains the need of students to generate knowledge, which often falls into the obsolescence of the so-called reading strategies implemented in the learning process, in the current study, it is evident the impact of the creation of non-traditional

spaces in favor of reading comprehension, therefore, the teacher needs to make use not only of strategies, but the optimal use of concrete materials that allow exposing, interacting and evaluating in a different way, the way in which the student assumes his role of learning in the area of language and literature. Through the information obtained in Scielo, Scopus and Dialnet databases, it was possible to determine that one of the methodological strategies in favor of the development of reading comprehension is the participation activities in which students can give their different points of view and thus, exchange information through dialogue.

This scientific article is a systematic review study, defined as a well-structured and clear summary of information that responds to the research questions, consisting of multiple primary sources that represent the highest hierarchical level of evidence (Moreno et al., 2018). The study aims to analyze how the use of pictograms affects the development of comprehensive reading of students in primary education, for which, a search of various databases has been made, and 22 original researches have been selected to respond to the research questions: How pictogram didactic strategies can improve literacy in primary education? How does the pictogram influence language comprehension in elementary school students? The influence of the pictogram in the syntactic development of language?

Materials and methods

To carry out the study, the PRYSMA methodology was used, which is represented by a flow chart of the studies found; it begins by describing the number of records retrieved, starting from the bibliographic databases, eliminating duplicate documents and subsequently, the records are related to other studies. The flow chart should present the following: a) number of records that have been identified as a result of the searches; b) number of records excluded after preliminary evaluation in the review of titles and abstracts; c) number of records that have been retrieved in full text; d) number of records that have been excluded after evaluation of the full text; e) number of records that have met the eligibility criteria for review and f) number of studies that have contributed to their main result (Higgins and Green, 2011).

To obtain the results of the systematic review, the following research questions were established:

How can pictogram teaching strategies improve literacy in primary education?

How does the pictogram influence language comprehension in elementary school students?

The influence of the pictogram on syntactic language development?

To compile the information, primary sources related to the topic were located from July 10, 2018 to July 27, 2023. The search period, was proposed for studies published from January 2018 to January 2023. As a search strategy we followed the descriptors: TITLEABS-KEY ("comprehensive reading") OR TITLE-ABS-KEY ("pictograms") AND TITLE-ABS-KEY ("lecto-escritura"), in Spanish language and (TITLE-ABS-KEY ("comprehensive reading") OR TITLE-ABS-KEY ("pictograms") AND TITLE-ABSKEY ("reading-writing") in English language using Boolean operators and and or in the databases: SCOPUS, Web of Science and Google academic (see Table 1).

Inclusion criteria were considered:

- Primary education in English and Spanish
- Studies published between 2018 and 2023
- Full-text open access articles
- Peer-reviewed scientific articles
- Studies that have in their methodology and results the topic of interest on comprehension reading and pictograms in the educational field.

Exclusion criteria were applied:

- Studies with a language other than English or Spanish
- Studies that do not contain discussion
- Studies with a low level of scientific quality
- Studies that do not maintain a relationship with the objective of the systematic review.

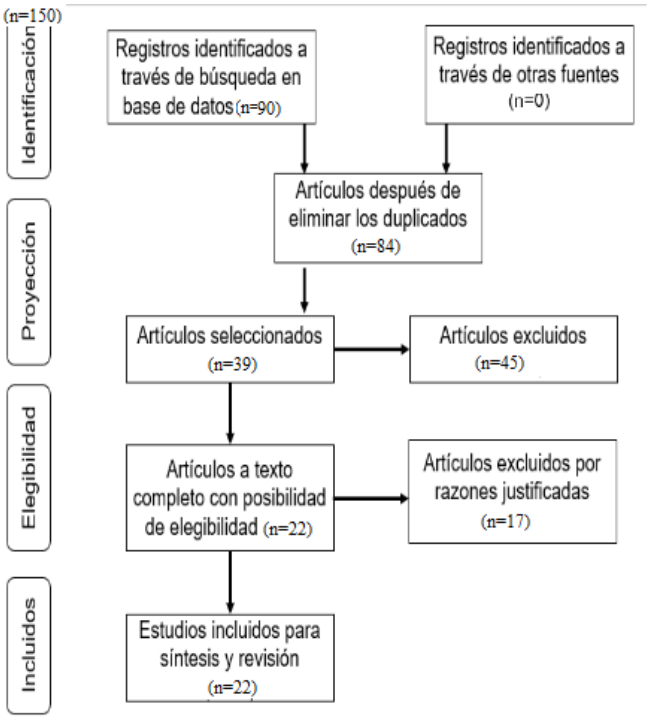
Table 1. *Search strategy used according to the database*

Database Search strategy	**Date of search**	**Selected Results**

SCOPUS	(TITLE-ABS-KEY ("comprehensive Reading") OR TITLE-ABS-KEY ("pictograms") AND TITLE-ABS-KEY ("reading-writing")	10/07/2023 27/07/2023	21	4
Web Of Science	(TITLE-ABS-KEY ("comprehensive Reading") OR TITLE-ABS-KEY ("pictograms") AND TITLE-ABS-KEY ("reading-writing")	10/07/2023 27/07/2023	17	4
Google Academic	TITLE-ABS-KEY ("reading comprehension") OR TITLE-ABS-KEY ("pictograms") AND TITLE-ABS-KEY ("reading-writing"),	10/07/2023 27/07/2023	52	14
	TOTAL		90	22

Source: own elaboration

Figure 1. PRISMA flow diagram.



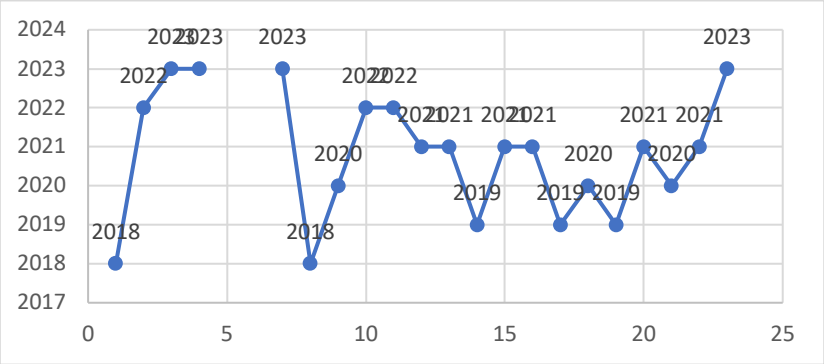
The preliminary sample, prior to the definitive sample, consisted of 90 articles, of which only 22 met the criteria for selection. The studies that were excluded, although they are framed in the use of pictograms in the development of comprehension reading in students, do not focus on basic general education ages (articles for university population and older adults were discarded, as well as non-empirical research). Figure 1 shows the flow chart of the bibliographic search and selection process, following the steps of the PRYSMA method.

Results

The general data of the first results of the bibliographic search of the ESCOPUS database will be presented below, which will allow us to

analyze the trend of the evolution of publications, the number of authors who have published, the main affiliations and the thematic areas in relation to the topic of the study "use of pictograms affects the development of comprehensive reading in students".

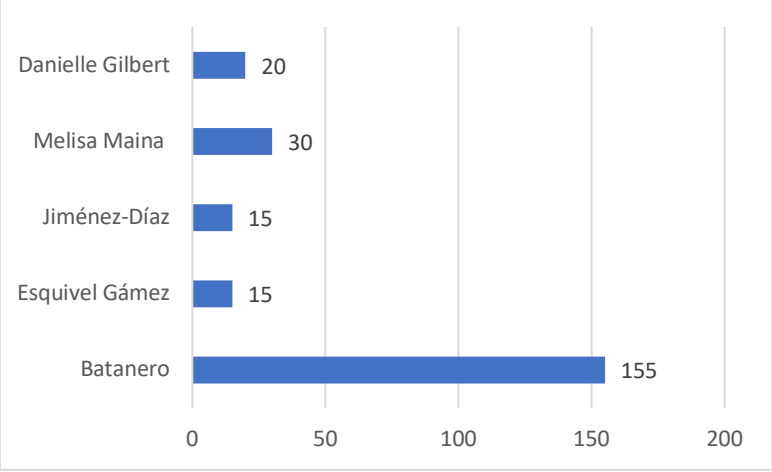
Figure 2: Evolution of publications



Source: own elaboration

Taking the SCOPUS database as a reference, it can be evidenced that from the year 2018 to the year 2023, there has been little importance on the topic of study "use of pictograms affects the development of comprehensive reading of students, but, from the year 2021, the studies have had a growth of interest in publications, until today.

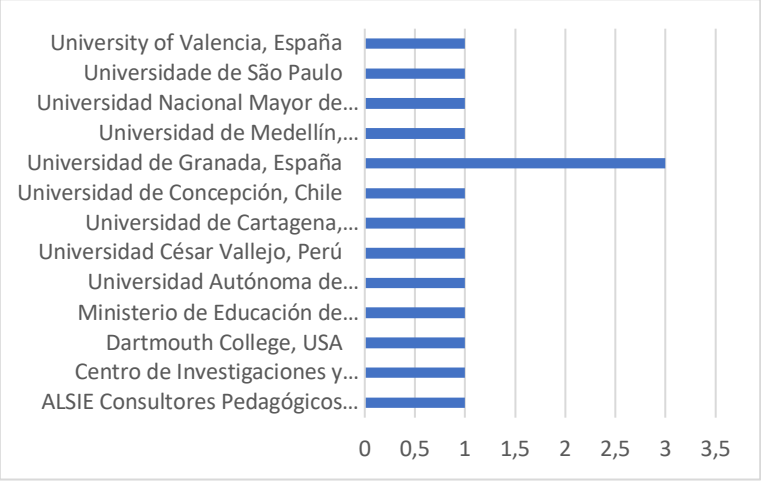
Figure 3. Authors who have published



Source: own elaboration

The main authors are Batanero C., who has the largest number of publications, followed by Esquivel G., Jiménez D., Melisa M., Danielle.

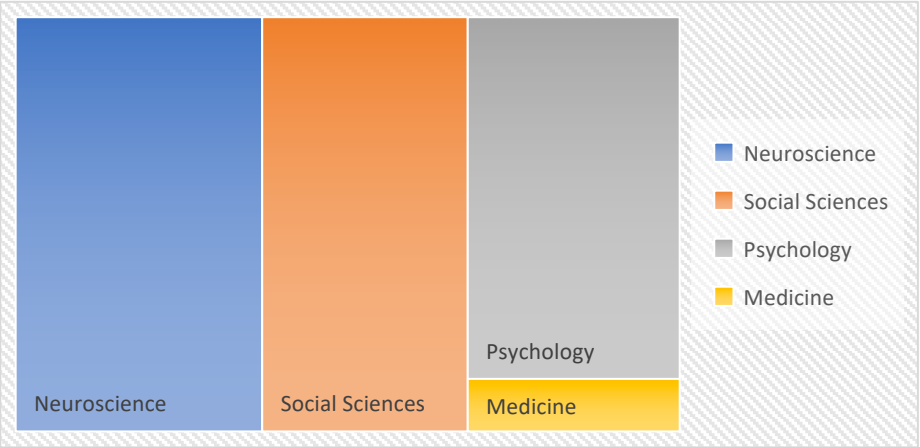
Figure 4. Main affiliations



Source: own elaboration

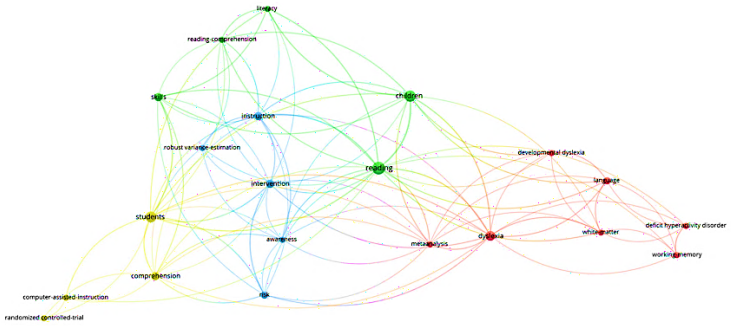
The universities, which stand out as interested in the subject are: University of Granada-Spain, University of Medellin-Colombia, Universidad Nacional Mayor de San Marcos, Lima, Peru, University of São Paulo-Brazil, University of Valencia-Spain, Dartmouth College, USA, Ministry of Education of Ecuador, Universidad Autonoma de Queretaro-Mexico, Universidad Cesar Vallejo-Peru.

Figure 5. Thematic area of research presented



The theme, on the use of pictograms, has an impact on the development of comprehensive reading comprehension of students in primary education, reflecting with greater importance in the areas of neuroscience, social sciences, psychology and medicine.

Figure 6. Most used keywords



Source: own elaboration https://www.youtube.com/watch?v=Sgoh1lKRfuI

The thematic content was analyzed by means of keywords, the most used and related to each other are: reading, literature, language, children, reading comprehension, skills, students, comprehension, dyslexia, memory, intervention, dyslexia.

Figure 6. Countries where it has been published

It is evident that the countries where research related to this topic has been published are concentrated in Spain, Peru, Mexico and Colombia, with a publication trend for the year 2022.

The following are the results of the information extracted from the

scientific articles, which have been selected through an exhaustive analysis. The information had a codification process of qualitative data described in the following questions:

How can pictogram teaching strategies improve literacy in primary education?

Viramontes (2019) points out that when the teacher applied the use of pictograms in the classroom, 67% of the students improved their response capacity, in different activities related to the reading level, the simplicity of applying the reading of a graph, requires the interpretation of each of its elements such as the title, scales, labels, or geometric elements, as well as, of the graph as a whole.

To improve the learning processes inherent to writing and reading, strategies must be used to decode the text, capture its literal meaning, and establish coherent connections between the reader's knowledge and the new information provided by the text; it is possible to determine that reading comprehension is an associative process between the reader and the text, which allows a space for understanding through the decoding of symbols (use of pictograms according to the school age), resulting in the appropriation of meaning.

Castrillón (2020) observed that, in cases in which reading had to be adjusted to a limited time, or when the texts were of an informative nature, reading in tangible material yielded better results in comprehension than reading in electronic format. It was concluded that younger people are more accustomed to using technological tools, especially for social relations and leisure, a habit that did not contribute to the development of reading comprehension of electronic texts. It was also possible to associate that, technological devices in the learning process, are not used to focus the reading process from concentration and learning, but rather, for leisure. The different types of reading, in technological tools, is less efficient than reading tangible material, at a time when the use of digital reading and its application in primary education is increasing.

Author Avendaño (2020) agrees on the possibility that students face digital reading with an excess of confidence and distraction, as if a greater concentration were not necessary when going from a playful reading to a comprehensive one. It can be affirmed that students directly relate digital technology (images, videos) with leisure or interaction with social relations, being pictograms an alternative to

attract attention and open spaces of concentration in reading, at this point, the guidance and direction by the teacher is necessary to monitor the student's progress.

Maina (2023) explains that didactic intervention in school-age students can develop and stimulate the reading and writing processes, as well as develop their potential, as long as they are offered better conditions to do so, as was done through the ludic-literary activities. The use of didactic strategies in reading practice is not limited to schools or determined by family conditions, but is much more flexible and easily adjusted to other needs of the student population. There are antecedents that show that students' motivation for reading is a constant search, beyond the context of the family environment.

Teachers can apply didactic strategies to improve literacy in primary education, through the tasks proposed in the teaching and evaluation processes. It is confirmed that 100% of the students can successfully address school activities related to pictograms, based on the curricular guidelines and textbooks for primary education.

How does the pictogram influence language comprehension in elementary school students?

Puetate (2023) explains that, given the ease with which pictograms, being simple drawings or images, can be applied without the need to be accompanied by words or texts, they are capable of conveying a message. In this context, they are specified for being ecumenical; that is, they can be understood by most students, regardless of the difficulty of written or oral language, so it is determined that they are of immediate applicability, because it is only necessary to make eye contact to cognitively process and relate the pictogram with the message or text.

Pictograms have a direct influence on language comprehension as they are graphic compositions, used in different phases of writing, where cognitive assimilation is represented by images, characters, iconic symbols, figures or strokes, which are used in order to transfer to the student reader a certain information or concept, they are a powerful strategy that seeks to develop and strengthen reading and writing skills, which the teacher teaches in primary education.

Jumps (2021) points out that the use of pictograms can be incorporated into educational practice, due to the use in various situations that the learner can associate with reality, since he/she is imitating based on experiences, which make possible the

transmission of knowledge. Thus, the pedagogy of learning is developed in the field of language as a need of the student to be able to transmit his emotions, thoughts and moods, within an artistic connotation (pictographic) related to culture and society.

Mendoza (2021) expresses that 86% of school-age students do not know the meaning of the words when working with the texts, a situation that directly affects the subsequent analysis of the readings, as well as the elaboration of conclusions. In this way, pictograms can be used in planned readings, given the didactic value that they can have, when applied with comprehensive reading plans. The students, who see that they have developed their reading and writing skills based on the pictograms, also develop the ability to be good communicators, as well as a personality full of confidence and self-esteem.

Rock (2018) points out that students, when handling information, can make use of pictograms to improve performance and speed, with which the student can understand, likewise, the process of reading aloud, as well as, the oral identification of pictograms helps to coordinate the legibility and accuracy of writing. The sequential text can cause a certain level of exhaustion in the reader, given the psychomotor response demanded by the comprehension of the text, therefore, pictograms or representative images become a valuable ally when analyzing texts.

It is undeniable that, when talking about pedagogy, the child must make use of symbols, characters, graphics and other representations that are an inherent part of linguistics and writing. Therefore, according to Puetate (2023) and Saltos (2021) pictograms can be accompanied by other resources, methods and procedures that stimulate the teaching-learning process in the medium and short term.

The influence of the pictogram on syntactic language development?

Paez (2021) affirms about the pedagogical implementation of pictograms that "their creative use in the work and practice of the teacher is infinite". Therefore, there is a great possibility of educational practices that allow the student to develop a comprehensive learning of reading and writing based on pictograms. It is not only a matter of identifying alphabetic and numerical characters, but also of associating the signs of writing and sounds based on the alphabetic code for the acquisition of comprehensible orality and writing. It should be noted that this type of pedagogical tools go hand in hand with the teacher's role as a facilitator of

learning. This position agrees with other authors, since the work of the teacher as a pedagogue, together with the support of the teaching team in the area, are the ones called to plan and design the most appropriate resources to awaken the student's interest and thus, have positive results and of great benefit in the development of skills inherent to the area of language and literature.

Consequently, Venegas (2021) indicates that it is important to know how students understand and interpret the messages or information issued by the teacher. The development of the reading level and the translation of pictograms by students is important for the teacher to be able to identify the students' achievements with reading cards that use concrete symbolic representations. The student can perform a cognitive process of reading and writing in a verbal and nonverbal way, being the learning process that allows associating the linguistic development with the use of visual tools, such as the pictogram, thus allowing the student not only to recognize the characters, but also to associate them in a reflexive way with their environment when reading and writing.

For author Soto (2020) students may have many accuracy problems when reading and writing, causing direct problems in school performance. In view of this situation, reading comprehension should emerge not only as an educational practice, but also as a policy of thorough and periodic research of learning systems and resources for the efficient development of reading comprehension skills in students.

Veintemilla (2022) explains that visual resources (pictograms), graphic organizers, among others, help to identify in a more comprehensible way the main elements that make up the text. This is due to the fact that the learning process involves the development of practical skills and, at the same time, subject to mental schemes, where oral and written information are present in the classroom. It is evident that the assimilation of the information to be transmitted must be sequential, each student has his own learning pace and the way in which the representation of what the student has in his mind will be assimilated will depend a lot on the stimulus and motivation inherent to the visual and verbal codes.

Finally, Espinosa (2021) reveals that the influence of the pictogram in the process of syntactic development of language is based on the encoding process, in which teachers should not only deepen in the recognition of words based on images, but in how these should be transmitted to associate their word with an image, in a motivating

and creative context. The action of determining the meaning and use of words (comprehension in the field of reading and writing), should not be a memoristic process but a practical one, taking into account that the student's cognitive processes can be complex in terms of achieving results, which should be monitored periodically, since the learning process, as well as other research on the pedagogical use of text, graphic images are an important resource with which the student can remember and abstract information more effectively.

Discussion

The pictogram, being a simply graphic symbology, which represents concepts, words, objects and/or actions, allows the teacher the ability to convey a message, which is a powerful strategy for the development of learning in the student as a reader and writer, by providing the structures and regulations of verbal language, especially in the stages of learning reading and literature. Therefore, it is necessary to encourage the use of pictograms as a didactic strategy for the development of reading comprehension in basic education, and thus, a high ability to read according to the stages of learning.

The different authors explain the different variables that can affect the development of reading skills, so that the use of technologies in the development of pictograms should not be directly aimed at, the use of paper using symbols or other characters within the learning process becomes a valid didactic strategy, as long as the teacher applies these strategies in a creative way; likewise, motivation and cooperative work have a positive impact on the development of reading and writing of the students.

The pictograms, by helping to combine in a systemic way the words and therefore the sentences in the reading process, have a positive impact on the development of textual reading articulation and therefore, syntactic language development. The accompaniment of the teacher and the support of the parents is fundamental to monitor the progress of language comprehension and the improvement of reading and writing in primary education.

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