



Neuro-Pedagogy of the Visual Arts in Reading Comprehension



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Abstract

The research, titled "Neuropedagogy of the Visual Arts in Reading Comprehension," sought to investigate and gather answers to the problems posed and seek to resolve methodological issues. In this context, the research employed both qualitative and quantitative approaches. The methodology employed was a combination of inductive and deductive methods, with a correlational and experimental research approach also being applied. For this purpose, the population consisted of teachers and students from the following institutions: "Oswaldo Castro" Educational Unit, "Raymundo Aveiga" Educational Unit, and "Gonzalo Abad" Educational Unit in the city of Chone, Manabí province. The sample consisted of a total of 60 students, 20 students from each institution. In the data collected during the research, based on the use of strategies based on the neuropedagogy of the visual arts, the objective was to identify and capture, through drawings, the roles of the different characters in the aforementioned excerpt from the novel. At the same time, when calculating the average grades of the experimental group, the following scores were obtained: "Oswaldo Castro" Educational Unit 5.0, "Raymundo Aveiga" Educational Unit 5.3 and "Gonzalo Abad" Educational Unit 5.7, which showed that there was a significant difference between groups when evaluating the exercise.

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1 Introduction

The problem of learning reading comprehension among students at all levels of BGU is and always has been one of the greatest challenges facing the education system; however, the aspects that impact this problem are diverse and complex. The relationship between epistemology and teacher training requires the incorporation of new methodologies and the updating of pedagogical tools to optimize knowledge generation processes in teaching. At the same time, it is important to propose continuous improvement processes in teacher training to support their development as individuals and as future professionals (Moghadam et al., 2012).

The epistemological requirements of education require teachers to develop pedagogical updating processes based on interdisciplinary aspects, but they also propose the exercise of good teaching practices based on specialized teacher training. In this sense, the proposed research revolves around the topic of neuropedagogy of the visual arts in education, where these types of procedures constitute a didactic tool through which teachers can contribute to solving the problem of low reading comprehension levels that affect a majority of students at all levels, including university students.

It is therefore assumed that teacher training must be distinct, constructive, and work toward incorporating complexity into the practices involved in this activity. Based on this, Gorodokin (2005) considers it feasible to use neuropedagogy as a tool to contribute to the reorientation and improvement of teacher training practices (p. 6). Historically, teacher training has been characterized as traditional and theoretical. From our perspective, teaching practice should be considered a social activity where the incorporation of sociocultural aspects is combined with educational models that respond to current needs.

Furthermore, the research aimed to motivate the learning of reading comprehension based on the development of neuropedagogy techniques for the visual arts in BGU students from the following institutions: "Oswaldo Castro" Educational Unit, "Raymundo Aveiga" Educational Unit, and "Gonzalo Abad" Educational Unit, where lower levels of reading comprehension are recorded. Taking this problem into account, exercises incorporating the visual arts were developed, such as drawing with watercolors, so that students could carry out activities linked to sensory stimulation that involve the physiological processes through which the brain collects information related to its environment (Delgado et al., 2018).

The objective of the research was to determine the impact of the neuropedagogy of the visual arts on education to improve the learning of reading comprehension at all levels of BGU institutions. The hypotheses posed were: H_a = There are significant differences between the control and experimental groups regarding the impact that the incorporation of dynamics such as drawing with watercolors has on reading comprehension and H_o = There are no significant differences between the control and experimental groups regarding the impact that the incorporation of dynamics such as drawing with watercolors has on reading comprehension. At the same time, answers are sought to fundamental questions such as: What type of methodological strategies should be proposed in the teaching-learning process of reading comprehension? How can the neuropedagogy of the visual arts be linked to improve the learning of reading comprehension at the level of BGU students?.

2 Materials and Methods

The research called the neuropedagogy of the visual arts in reading comprehension, sought to investigate and collect answers to the problems raised, seeks to resolve methodological issues that contribute to improving the teacher/student relationship, as well as seeks to have a better understanding of reality and how teachers manage to motivate their students. In this context, the research adopted a qualitative and quantitative approach, which sought to articulate a description of the actions carried out by teachers and that are actively accepted by the student. From their point of view, Vasilachis et al. (2019), consider that the flexibility of the qualitative research process leads the researcher to return to the field, to the situation, to the encounter with social actors, to the corpus, to the field notes, again and again (p. 21).

The methodology used was linked to the inductive method, which organized and analyzed the information gathered to develop conclusions, starting from the specific context and moving toward the general context. Furthermore, the deductive method helped demonstrate the current state of the teaching-learning process. At the same time, a correlational research level and the type of experimental research were determined (Handayani et al., 2019).

Data collection was conducted through a reading exercise and test for BGU students from each institution (control and experimental groups). Initially, a reading comprehension exercise was developed and evaluated for the control group, using an excerpt from the novel "Chronicle of a Death Foretold" by Colombian author Gabriel García Márquez.

The purpose of this exercise was to identify and describe the roles of the different characters in the excerpt. Secondly, the same reading comprehension exercise was implemented and evaluated for the experimental group to identify and capture the roles of the different characters in the excerpt through a graphic composition.

According to [Castillo \(2023\)](#), Neuropedagogy emphasizes the development of brain capacities, rather than the learning of traditional models, as it constitutes a revolutionary vision of the exercise of a student focused on taking advantage of their brain potential, their cognitive abilities, which derive from their ability to analyze, discern and choose the best option, when faced with a decision-making situation (p. 24).

For this purpose, the sample consisted of BGU teachers and students from the following institutions: "Oswaldo Castro" Educational Unit, "Raymundo Aveiga" Educational Unit, and "Gonzalo Abad" Educational Unit. The sample also included. The study consisted of a total of 60 BGU students, 20 from each institution. To implement the research, control and experimental groups were formed at each institution.

3 Results and Discussions

Neuropedagogy

By definition, pedagogy is the science that studies the teaching and learning process, and its purpose is to understand its dynamics to design strategies that promote the comprehensive development of students. Neuropedagogy is a discipline that combines psychology, neuroscience, and education to develop strategies that improve teaching practices.

In this sense, [Camacho & Robles \(2024\)](#) point out that neuropedagogy has much to contribute to the didactics of learning, it is responsible for relating the emotions that balance the actions that the brain perceives with the way each student learns; with which it is understood that it can make numerous contributions to the teaching and learning processes, considering the following as basic mechanisms in the brain to be able to learn: motivation, attention, emotion and memory (p. 171).

In this regard, perception is everything related to various processes and activities linked to stimulation that involve the physiological processes of the human body. Through these processes, the brain gathers information related to its environment. The actions carried out within it depend on one's mood and the level of connection with the environment. Furthermore, perception is considered the way our brain decodes information from internal or external sources that it captures with the help of the senses, thereby constructing an unconscious or conscious idea.

The development of students' socioemotional skills is crucial to their development, as it fosters awareness, self-knowledge, emotions, and empathy to address their development. Addressing this situation from a neuropedagogical perspective requires a focus on neuroscience to establish different approaches to teaching and learning that stimulate the development of students' socioemotional skills ([Montoya et al., 2024](#)).

For illustrative purposes, it should be noted that the most important organ in a human being is the brain. It is constantly evolving, and during childhood, transcendental changes occur, and the quality of development is determined. It is at this stage that the brain is most sensitive to learning processes, and neural growth is optimized, along with the development of attention, memory, emotional expression, and reasoning.

Currently, there is a growing interest in neuropedagogy as a step beyond applied neuroscience in education. Conferences and training courses on neuropedagogy are beginning to emerge due to the urgent need for today's teachers to learn about this branch of neuroscience. This is because society is constantly changing, which leads to multiculturalism in the classroom and the inherent need for inclusive education ([Díaz, 2022](#)).

At the epistemological level, it allows the development of new scientific philosophical knowledge about neuropedagogy for the improvement of student learning. This approach is oriented towards the optimization of learning, involving subjects who develop based on this learning in their academic training and the development of people in order to strengthen their affective, cognitive, and psychomotor aspects ([Ortiz, 2021](#)). For his part, [Gorodokin \(2005\)](#), marks his position regarding the epistemological stance and determines that the production and interpretation of theories impact teaching and pedagogical practices. He assumes that teacher training and the trainer's profession about a complex model, thinking of knowledge differently and incorporating complexity to objectify one's own practices as an object of study (p. 1).

From [Noro's \(2018\)](#), educating involves putting into motion various learning processes in educatable dimensions, which allow us to define what we are, what we are becoming, and what we should become. We think about ourselves,

we study ourselves, we express ourselves, and with all this documentary source, we educate: we educate ourselves throughout our lives and we educate others (p. 14).

Visual arts in education

Based on the definition of the visual arts, they are considered to focus primarily on the techniques involved in the creation, execution, and artistic expression of drawings, sculpture, painting, designs, prints, and others. Their most important purpose is to convey ideas creatively and sensitively using different techniques, methods, and materials. From this perspective, [Martínez & Lozada \(2022\)](#) point out that the visual arts propose training alternatives in different planes and forms that represent common objects. For this reason, drawing is the fundamental basis for personal graphic manifestations, and feelings can be expressed, with just a few lines that identify the individual's criteria, that is, it can develop countless possibilities and ways to solve a problem or define a figure and reach a solution (p. 89).

The visual and plastic arts are not only the result of specific manual skills and technical perfection in the use of materials and tools, but they also provide us with a knowledge of the world that is distinct and complementary to that of the sciences. From the stimuli collected by the senses, humans discover, organize, and recreate reality, becoming aware of it through perception. In this way, humans become aware of themselves and of the world around them through their senses ([Alcaide, 2011](#)).

Teaching strategies based on the visual arts have allowed for the development of skills and abilities because, from an early age, children master interdisciplinary subjects ([Ulger, 2016](#)). The visual arts are characterized by including all those art forms whose final objects or works are tangible; that is, they are real and can be seen and/or touched. This indicates that students mostly learn through the senses, and, as science indicates, when one sense is not developed, it is replaced by another, a fact reflected in the cases of students with special educational needs ([Loor & Tuárez, 2023](#)).

In this regard, [Gardner \(1995\)](#), in his theory of multiple intelligences, divides the human brain into 8 cognitive blocks, each with its characteristics, in which it is proven that depending on each person there is a diverse development, it is through this that the strengths and weaknesses of each person are explained; This theory linked to what was mentioned by [Vigotsky \(1997\)](#), about social learning, it can be mentioned that the plastic arts begin their development, taste and strengthening at home and in the social environment in which they develop.



Starting from the premise that the arts are fundamental for the development of 21st-century skills, and that interculturality is transversal, however, it has an inclusive character where respect and appreciation for cultural diversity are essential to achieve a comprehensive education. Emphasis is placed on the creation of visual arts strategies that include diverse cultural manifestations and expressions in which painting, drawing, engraving, ceramics, goldsmithing, and crafts have a place, with which students enjoy a meaningful teaching-learning process and develop skills that allow them to be interested and actively participate in the cultural and artistic life of their environment, recognizing the richness of living in an intercultural and plurinational society ([Bejarano, 2021](#)).

Extrapolating to educational practice, this requires the implementation of agile and innovative dynamics that allow us to overcome the obsolescence of traditional methodologies. Develop teaching practices based on the construction of affective, motivating scenarios, best practices, and a shift away from obsolete practices that do nothing but impede the development of each student's mental processes. The term obsolescence is described by Jorge Noro in his scientific article "Planned obsolescence: from artifacts to human existence."

Characterization

Table 1 shows the characterization of some reading comprehension exercises applied in the educational units in this sense in the Raymundo Aveiga and Oswaldo Castro unit.

Table 1
Characterization of reading comprehension exercises

	<p style="text-align: center;">Description of the control group exercise at the “Raymundo Aveiga” Educational Unit</p> <p>Reading a fragment from the novel “Chronicle of a Death Foretold” by Colombian author Gabriel García Márquez.</p> <p>A reading comprehension exercise was implemented and evaluated for the control group, to identify and narrate the role of the different characters in the fragment.</p> <p>Aim: Identify the role of the different characters in the proposed novel fragment</p>
	<p style="text-align: center;">Description of the experimental group exercise at the “Oswaldo Castro” Educational Unit</p> <p>Reading a fragment from the novel “Chronicle of a Death Foretold” by Colombian author Gabriel García Márquez.</p> <p>The same reading comprehension exercise was implemented and evaluated for the experimental group, to identify and capture the roles of the different characters in the fragment through a graphic composition.</p> <p>Aim: Identify the role of the different characters in the proposed novel fragment</p>

Source: Reading comprehension exercises for participants

Analysis of results (Control group vs. Experimental group)

By analyzing the data obtained through the implementation of a reading exercise and reading comprehension test based on the implementation of active strategies related to the neuropedagogy of the visual arts in education, the objective was to investigate the current situation regarding the level of reading comprehension among students at the BGU. The aim was to reinforce the belief that these types of strategies improve the work of Language and Literature teachers, who apply different strategies and methodologies to achieve meaningful learning in their students.

The purpose of this exercise (Tables 1, 2, and 3) was to demonstrate the existence of significant differences between the participating student groups (Control and Experimental) regarding the implementation of active strategies related to the neuropedagogy of the visual arts in education, compared to traditionalist strategies in the teaching-learning process of reading comprehension. At the same time, it was intended to determine whether the use of strategies based on the neuropedagogy of the visual arts impacts in one way or another the learning of BGU students from the following institutions: "Oswaldo Castro" Educational Unit, "Raymundo Aveiga" Educational Unit, and "Gonzalo Abad" Educational Unit.

Using an excerpt from the novel “Chronicle of a Death Foretold” by Gabriel García Márquez, the research highlights the importance of reading comprehension in the teaching-learning process, especially for BGU students. Where the lack of reading comprehension is one of the main problems that exists at this level, even affecting their university admission. Additionally, the obsolescence of traditionalist methods leaves students without options to develop this skill. [Rivadeneira et al. \(2024\)](#), consider the fact that if students do not have an adequate level of reading comprehension, they will not have acceptable learning, which is why better strategies are required for students to understand what they read (p. 10). Table 2 shows the results obtained at the Oswaldo Castro educational unit.

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Table 2
Results of the "Oswaldo Castro" Educational Unit

"Oswaldo Castro" Educational Unit					
Experimental Group Scores			Control Group Scores		
Students	Exercise	Characterization	Students	Exercise	Test
Ex1	3	5	Con1	3	4
Ex2	2	5	Con2	5	4
Ex3	3	4	Con3	2	5
Ex4	3	5	Child4	3	3
Ex5	4	6	Con5	3	5
Ex6	3	4	Con6	4	3
Ex7	3	6	Con7	3	5
Ex8	2	4	Con8	2	2
Ex9	4	5	Con9	3	4
Ex10	5	6	Con10	5	4
Media	3.2	5.0	Media	3.3	3.4

Source: Results of the knowledge test for the control and experimental groups

Table 3 shows the results obtained at the Raymundo Aveiga educational unit.

Table 3
Results of the "Raymundo Aveiga" Educational Unit

Raymundo Aveiga Educational Unit					
Experimental Group Scores			Control Group Scores		
Students	Exercise	Characterization	Students	Exercise	Test
Ex1	4	5	Con1	4	5
Ex2	2	5	Con2	4	4
Ex3	3	6	Con3	3	4
Ex4	3	5	Child4	3	3
Ex5	3	6	Con5	4	4
Ex6	3	4	Con6	4	5
Ex7	4	6	Con7	3	4
Ex8	3	4	Con8	5	6
Ex9	4	6	Con9	3	4
Ex10	4	6	Con10	3	4
Media	3.3	5.3	Media	3.6	4.3

Source: Results of the knowledge test for the control and experimental groups

Table 4 shows the results obtained in the Gonzalo Abad educational unit.

Table 4
Results of the "Gonzalo Abad" Educational Unit

"Gonzalo Abad" Educational Unit					
Experimental Group Scores			Control Group Scores		
Students	Exercise	Characterization	Students	Exercise	Test
Ex1	3	5	Con1	3	4
Ex2	5	6	Con2	4	4
Ex3	2	6	Con3	4	5
Ex4	3	5	Child4	3	3
Ex5	3	6	Con5	3	5
Ex6	4	7	Con6	4	6

"Gonzalo Abad" Educational Unit					
Experimental Group Scores			Control Group Scores		
Ex7	3	6	Con7	3	5
Ex8	2	4	Con8	3	3
Ex9	3	5	Con9	3	4
Ex10	5	7	Con10	3	4
Media	3.3	5.7	Media	3.3	4.0

Source: Results of the knowledge test for the control and experimental groups

In the data collected during the investigation, based on the implementation of a reading comprehension exercise of a fragment of the novel "Chronicle of a Death Foretold" by the author Gabriel García Márquez, it was evident that when calculating the average grades of the control group, the following scores were obtained: "Raymundo Aveiga" Educational Unit 3.6, "Oswaldo Castro" Educational Unit 3.3 and "Gonzalo Abad" Educational Unit 3.2 in order of grades obtained.

In the data collected during the research, based on the use of strategies based on the neuropedagogy of the visual arts, the objective was to identify and capture through drawings the roles of the different characters in the fragment of the aforementioned novel. At the same time, when calculating the average grades of the experimental group, the following scores were obtained: "Oswaldo Castro" Educational Unit 5.0, "Raymundo Aveiga" Educational Unit 5.3, and "Gonzalo Abad" Educational Unit 5.7, which showed that there was a significant difference between groups when evaluating the exercise.

The research was based on testing the proposed hypotheses, that is, determining whether or not there is a significant difference between the implementation of strategies related to the neuropedagogy of the visual arts and traditional reading comprehension techniques in BGU students from the following institutions: "Oswaldo Castro" Educational Unit, "Raymundo Aveiga" Educational Unit, and "Gonzalo Abad" Educational Unit. Reading the results obtained provided teachers at these educational institutions with data that can contribute to optimizing the teaching-learning process of reading comprehension.

From a more general perspective, the importance of the neuropedagogy of the visual arts in education is highlighted. However, it is clear that when defining the term neuropedagogy, it is necessary to also refer to terms such as the systematic planning of all the components that make up an educational proposal, which constitutes a tool through which the proposed educational objectives can be assessed. Consequently, such planning must serve as a connecting element between the different elements that comprise it. Likewise, it delimits the training scope that will allow teachers to develop their skills and competencies based on the requirements and demands imposed by society.

The incorporation of strategies related to the neuropedagogy of the visual arts aimed to construct an idea, identify, and capture, through drawings, the roles of the different characters in the excerpt from the novel "Chronicle of a Death Foretold" by Gabriel García Márquez. For illustrative purposes, perception is everything related to various processes and activities linked to stimulation that involve the physiological processes through which the brain gathers information related to its own environment. However, at the institutional level, a fundamental contradiction is revealed between the need to improve reading comprehension in BGU students and the lack of training for Language and Literature teachers. It should be noted that they have not had the opportunity to receive training, nor have they had the opportunity to work with topics related to strategies related to the neuropedagogy of the visual arts.

Today's education requires a new form of teacher-student relationship, where neuropedagogy strategies take center stage in all areas of knowledge. From the perspective of [Lamus de Rodríguez et al. \(2023\)](#), educational praxis currently requires the implementation of various innovative strategies that allow us to leave behind conventional methodologies and make the educational process enjoyable, pleasant, and motivating. Therefore, in work contexts, organizational teams have undergone significant transformations since their inception (p. 39).

In this context, when analyzing the results obtained with the implementation of an exercise and characterization to evaluate the level of reading comprehension in BGU students from the participating Educational Units, the results obtained allowed us to accept the active hypothesis. = There are significant differences between the control and experimental groups regarding the impact that incorporating dynamics such as graphic composition has on reading comprehension, compared to the use of traditional techniques such as reading aloud.

The reflection developed by [Venanzetti & Báez \(2024\)](#) is linked to the different levels of text comprehension based on the construction of students' knowledge and, at the same time, to good teaching practices. These refer to the way of

teaching that includes limiting access to so-called hyperlinks, because their presence within the text distracts the student and hinders the understanding of the content (p. 2).

From a more general perspective, the problem of low reading comprehension is related to the progressive development of students' daily reading habits on digital devices. About this issue, one of the most important components that impedes the development of reading comprehension is the so-called information hierarchy. The term "information hierarchy" refers to the constant, intentional use of so-called hyperlinks on a cell phone or computer screen; that is, opening and expanding the contents of a specific hypertext without following a sequence and without constructing an idea or meaning from a reading exercise.

4 Conclusion

Regarding the neuropedagogy of visual arts in reading comprehension, it is essential to differentiate, indicating that the problem lies not in understanding texts but in generating them. There is a significant difference between understanding a text and producing a text. In this regard, perception is everything related to the various processes and activities linked to the production of texts, through which the brain gathers information related to its environment. The actions developed within it will depend on the student's mood and their level of connection with their environment.

Based on the premise that reading is an eminently communicative act, teachers need to develop their teaching based on open, two-way communication. Neuropedagogy strategies should be part of their planning. Therefore, teachers must always be open to dialogue and sensitive to students' emotional experiences; they must transmit knowledge through experience. They must instill the way reading comprehension contributes to every aspect of life, both in transmitting and receiving information.

Advancing to the high school level should involve deepening the understanding of the construction of meaningful texts, based on distinguishing three fundamental aspects: genre, text, and sentence. Finally, it is worth noting that one of the most determining factors that affect reading comprehension at any educational level is, without a doubt, the socioeconomic environment.

Conflict of interest statement

The authors declared that they have no competing interests.

Statement of authorship

The authors have approved the final article.

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