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APPLICABILITY OF CARTOGRAPHIC KNOWLEDGE IN EVERYDAY SITUATIONS OF 6TH YEAR STUDENTS AT TARCILA CRUZ DE ALENCAR ELEMENTARY SCHOOL, IN JUAZEIRO DO NORTE, CEARÁ, 2024

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SUMMARY

Cartography has existed since the time of nomadic people, who already felt the need to orient themselves in geographic space in the search for survival and used the natural stars as guides. There is currently a consensus that cartography is an indispensable pedagogical resource linked to the teaching of Geography, since the analysis of space in its dimensions and shapes using cartographic representations makes it possible to visualize what is learned and what is taught, which is fundamental for the acquisition of knowledge and the training of students capable of analyzing geographic phenomena and relating them. Covering the science of Geography, the study of geographic space, the original nature and other knowledge from the world of Geography, this work presents the importance of cartographic literacy in basic education in schools, focusing on the 6th year of Elementary School. We sought to understand the teaching and learning processes involved in teaching Cartography in the 6th year, observing, however, the skills to be worked on raised in the National Common Curricular Base, regarding the teaching of Cartography in Elementary School. The present investigation fits into the positivist paradigm, adapting to the quantitative methodology, as well as containing bibliographical analysis, based on books and scientific articles. The research works with data collection from a specific population to obtain their input, namely, 6th year students at EEF Tarcila Cruz de Alencar in the municipality of Juazeiro do Norte, Ceará, which will consist of the application of a closed questionnaire of a sectional.

Key words: Cartography. Geography. Teaching Cartography.

ABSTRACT

Cartography has existed since the time of nomadic people, who already felt the need to orient themselves in geographic space in the search for survival and used the natural stars as guides. There is currently a consensus that cartography is an indispensable pedagogical resource linked to the teaching of Geography, since the analysis of space in its dimensions and shapes using cartographic representations makes it possible to visualize what is learned and what is taught,

which is fundamental for the acquisition of knowledge and the training of students capable of analyzing geographic phenomena and relating them. Covering the science of Geography, the study of geographic space, the original nature and other knowledge from the world of Geography, this work presents the importance of cartographic literacy in basic education in schools, focusing on the 6th year of Elementary School. We sought to understand the teaching and learning processes involved in teaching Cartography in the 6th year, observing, however, the skills to be worked on raised in the National Common Curricular Base, regarding the teaching of Cartography in Elementary School. The present investigation fits into the positivist paradigm, adapting to the quantitative methodology, as well as containing bibliographical analysis, based on books and scientific articles. The research works by collecting data from a specific population to obtain their input, namely, 6th year students at EEF Tarcila Cruz de Alencar in the municipality of Juazeiro do Norte, Ceará, which will consist of the application of a closed questionnaire of a sectional nature .

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1. INTRODUCTION

Cartography is used by Geography to better understand how space is organized, and this study is possible based on maps that represent geographic space. Cartography is part of the teaching of Geography and must be accessible to all primary school students, as it is necessary to give everyone the opportunity to learn about geographic space.

It enables the understanding of several key contents related to Geography (space, region, place, territory, landscape, society); provides environmental, multidisciplinary and multicultural reflections; but also allows the student to visualize and recognize the world to which they belong, so that they can move around in it and how to represent it (BAGGIO, 2017).

The first knowledge is the location of a given reference point on the Earth's surface, from the most extensive areas, continents and countries, to specific points in a given place, such as a neighborhood or a residence. Associated with this, Cartography also serves for orientation in geographic space and to assist with movement, which is done using maps and compasses or GPS (WORLD EDUCATION). It must be considered as a set of relationships carried out through functions and forms that present themselves as testimony to a history written by past and present processes; that is, space is defined as a set of forms representing past social relations and

of the present and by a structure represented by social relations that are happening before our eyes and that are manifested through processes and functions (SANTOS, 2002, p. 122).

The present work aims at the applicability of cartographic knowledge in everyday situations of 6th year students at Escola de Ensino Fundamental Tarcila Cruz de Alencar, in Juazeiro do Norte, Ceará, 2023.

In the initial stage of Basic Education, Elementary School – initial years, proficiency in languages and logical-mathematical knowledge are emphasized as absolute priorities, which is reflected in the final years in students with little contact with geographic knowledge, especially with regard to cartography. .

Based on these concerns, this research project was designed so that, throughout the 2023 academic year, through diagnostic activities applied in the first week of class and questionnaires throughout the aforementioned period, the applicability of the of cartographic knowledge in students' daily lives, which is so necessary for good performance in the study of Geography and other human sciences, mainly.

The contents must follow a logical sequence with their respective skills and abilities so that learning actually takes place and, systematically, respecting the phases of students' cognitive development. In view of the above, we will check how the aforementioned cartographic knowledge is applicable in the students' daily lives.

The National Common Curricular Base (BNCC) (BRAISL, 2018) for Basic Education in Brazil, when dealing with the teaching of Geography, prescribes that in Elementary Education, during the initial years, students begin, through the exercise of geographic location, a: Develop spatial thinking, which gradually begins to involve other methodological principles of geographic reasoning, such as location, extension, correlation, differentiation and spatial analogy (BRASIL, 2018, p. 363). This logical sequence of skills developed by students in primary and secondary education should not be broken, thus respecting the individuality of each student and the social, political, economic and cultural context to which the student, the teacher, the school and the entire school community is included.

In view of what the BNCC recommends, let's check whether the 6th year students at EEF Tarcila Cruz de Alencar will actually be developing the skills and abilities suggested for their level of education through practice in their daily lives. The project in question

will be developed with the aforementioned students who, according to SIGE – Integrated School Management System for 2024, total 240 (two hundred and forty).

The following problems were observed in the construction of the research: To what extent are 6th year students able to apply cartographic knowledge in everyday situations at EEF Tarcila Cruz de Alencar, in Juazeiro do Norte Ceará? To what extent can 6th year students apply knowledge from models in everyday situations in the school environment? To what extent can 6th year students apply mind map knowledge in everyday and study situations? To what extent can 6th year students apply knowledge from thematic maps in their daily lives?

As for the objectives, we list: evaluating the extent to which 6th year students are able to apply cartographic knowledge in everyday situations at EEF Tarcila Cruz de Alencar in Juazeiro do Norte, Ceará; analyze to what extent 6th year students are able to apply knowledge from models in everyday situations; interpret the extent to which 6th year students are able to apply mind map knowledge in everyday situations; measure the extent to which 6th year students are able to apply knowledge from thematic maps.

The project relies on the commitment of the researcher and the work supervisor to make the research viable. Authorization was obtained from the management group of the school in question and from each student, with their respective guardians, from a meeting to discuss their participation in the research.

2 THEORETICAL FRAMEWORK

2.1 DEFINITIONS OF KEY TERMS

Below, the definitions of the key research terms are succinctly highlighted: Cartography, history and evolution; Geographic space; Cartographic Literacy; The importance of Cartography in Geography classes; Cartography in the initial and final years of Elementary Education in the National Common Curricular Base (BRASIL, 2018).

2.1.1 Cartography: History and evolution

According to Glauber de Oliveira (2012):

> Since primitive people, the existence of the use of cartography has been proven. They mapped shelters, hunting trails, and navigation routes. Therefore, mapping or representing space are facts that have accompanied humanity since its earliest records (apud CASTRO, 2012, p. 19).

The need for cartographic work also appears in Campos' studies (2012):

> The evolution of cartography was increased by wars, scientific discoveries, the development of arts and sciences, and historical movements that enabled and demanded greater precision in the graphic representation of the Earth's surface (CAMPOS, 2012, p. 22).

Cartography has existed since the time of nomadic people, who already felt the need to orient themselves in geographic space in the search for survival, and thus used natural stars as guides. It continued to improve, develop and be useful according to the needs of different societies at each time.

Below is a short summary of the history of Cartography and its evolution, in chronological order, in relation to the people who contributed significantly to its development:

- Antiquity (Babylon, Greece);
- Middle Ages (role of the Church, expansion of the Arab Empire);
- Modern Age (Renaissance, Overseas Navigation);
- Contemporary age.

2.1.1.1 Seniority

2.1.1.1.1 Babylon

We have in Morato and Machado that "the oldest map was found in the Babilônia region in the excavations of the mines in the city of Ga-Sur" (MORATO; MACHADO, 2019, p. 4, apud CASTRO, 2012, p. 3) (figure 1).

Figure 1: Map of Ga-Sur (Mesopotamia) + 2500 BC

Source: Castro (2012)

2.1.1.1.2 Greece

In Greek society, astronomy played an important role in the formation of geographic knowledge. Greek geography is inseparable from the geocentric hypothesis. The Earth is assumed to be spherical and the Earth's coordinate systems are defined. These contributions are related to location and navigation assistance (MORATO; MACHADO, 2019).

Aristotle (384 BC – 322 BC) added his well-known concrete arguments for why the earth is a sphere, such as the curvature of the horizon at sea and the changing shadow of the moon during eclipses. However, it was Eratosthenes (276 BC – 196 BC) who actually calculated the circumference of the Earth, with extraordinary precision, demonstrating its sphericity (MORATO; MACHADO, 2019).

The aforementioned society made a great contribution to cartography, as it demonstrated the sphericity of the earth as well as defining the system for the basis of Geographic Location, Latitude and Longitude, with a relevant contribution to commercial navigation. Eratosthenes, a Lebanese geographer, was the one who confirmed the sphericity of the earth based on lunar eclipses and curvature starting from the sea, where an equatorial measurement is obtained, the closest to reality.

Figure 2: Reconstitution of Eratosthenes' Map

Source: unknown author

The cartographer Cláudio Ptolemy, who lived in the region of Ancient Egypt, created the first world map with latitude parallels and longitude meridians to more accurately represent the areas of the Earth (MORATO; MACHADO, 2019).

> This monumental contribution of Ancient Greece to cartographic science was ignored throughout the Middle Ages and was only resumed in the 15th century, when it began to exert great influence on geographic thought at the time, with the so-called Ptolemaic Renaissance (CAMPOS, 2012, p. 27).

Figure 3: First *world map* (Claudius Ptolemy - 150 AD)

Source: Público Magazine

However, these imaginary lines of the Earth, parallels and meridians, which result in the system of geographic location, latitudes and longitudes, had already been mentioned by Erastosthenes.

2.1.1.2 Middle Ages (Role of the Church)

The Middle Ages were a period dominated by the Christian sense of the supernatural and the divine. The entire tide of discoveries that flooded cartographic studies during Classical Antiquity receded with the beginning of this historical period, at least in Europe. The Catholic Church, for almost ten centuries, influenced all fields of knowledge, also interfering in the way of drawing maps (CAMPOS, 2012, p. 29).

The most characteristic maps of that time are the so-called "T" in "O", which consisted of a circle with a "T" representing rivers and tides and dividing the "O" into three continents: Europe, Asia and Africa (figure 4) . These are letters that represent the interpretation of the world according to Catholicism, as they only included the regions mentioned in the Bible (CAMPOS, 2012, p. 30).

During the Middle Ages (5th to 15th century) everything revolved around the Catholic Church. lica. There was, then, a setback not only in Cartography, but in all sciences.

Figure 4: Orbis Terrarum (Isidore, 570 – 636)

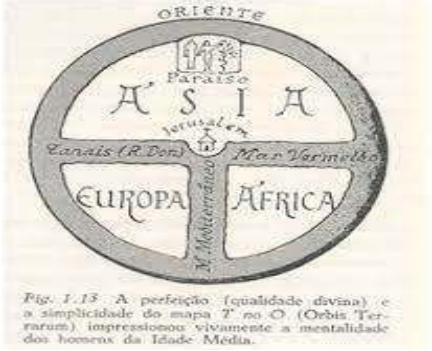


Fig. 1.13 A perfeição (qualidade divina) e a simplicidade do mapa T no O (Orbis Terrarum) impressionou vivamente a mentalidade dos homens da Idade Média.

Source: Castro (2012)

2.1.1.2.1 Arabs (Expansion of the Empire)

> During that period, the great guardians of cartographic culture were the Arabs, who collected and developed what the West had already discovered and forgotten. The religious obligation of pilgrimage to Mecca, the holy city of Islam, led them to visit many places and to trace paths for the correct guidance of pilgrims. The conquest of new territories, such as Mesopotamia (present-day Iraq), Persia (present-day Iran) and Egypt, was also fundamental in expanding the cartographic knowledge of these people, as it was necessary to know them in order to govern them (CAM-POS , 2012, p. 23).

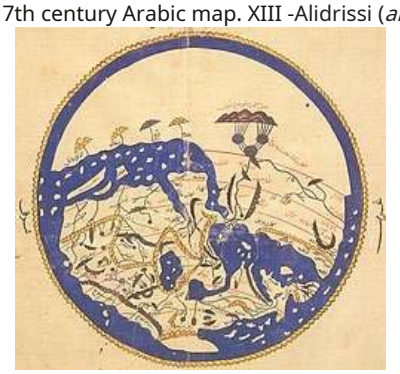
And yet, according to (CAMPOS, 2012, p. 24):

> In the Middle Ages, in the 13th century, a type of map suitable for navigation emerged in Europe, the Portolan Charts, probably designed by admirals and captains of expeditionary fleets. This was possible thanks to the use of the compass, an instrument brought from the Far East to the West by the Arabs in the 12th century. These maps are characterized by the detailed compass rose system and rich details of the coastline of places and ports. With these charts, navigators determined their location and angle in relation to magnetic north, thus finding the direction to follow.

While cartography was forgotten by Westerners, the Arabs also used it for religious purposes. Its use served both as guidance and as the location of the geographic spaces of their interests, as whoever obtained the knowledge controlled the power (figure 5). Well-founded, writes Yves Lacoste (1989) in his book: Geography, this serves first and foremost to wage war.

Another great contribution was the compass, created by the Chinese in the 2nd century and brought by them in the 20th century. XII. Perfected by the Portuguese in the 19th century. XVI, guided commercial navigation with its magnet needle that is attracted to approximately the north direction by the earth's magnetic north pole. From then on, there was also the compass rose that ended up being incorporated into maps. Thus, maps cease to be the exclusive property of kings and begin to assist traders and navigators in their search for the colonization of new lands.

Figure 5:17th century Arabic map. XIII -Alidrissi (*al-Idrisi*)



Source: 1001 Inventions

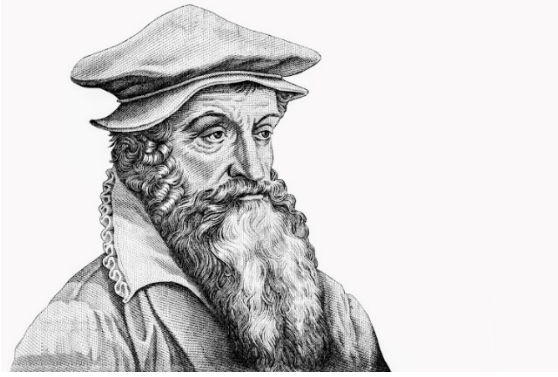
2.1.1.3 Modern Age (Renaissance, Overseas Navigation)

According to Glauber de Oliveira (2012):

> In 1502, the Brazilian coastline appeared on a map for the first time. Inventions such as the terrestrial globe appeared in 1492, but only in 1515 in Juan's globe

> Schoner, America and Terra Australis appear for the first time on a globe. The emergence of cartographic schools such as the Italian, Dutch, French and English. But it was the work of Gerard Mercator (1512-1594), which freed Cartography from the influence of Ptolemy, a major milestone in modern cartography. He developed the Universal Transverse Mercator Projection (UTM) system, which is highly accurate and useful in current Cartography (apud CASTRO, 2012, p. 21-22).

Figure 6: Cartographer, mathematician and geographer Gerhard Mercator (1512-1594)

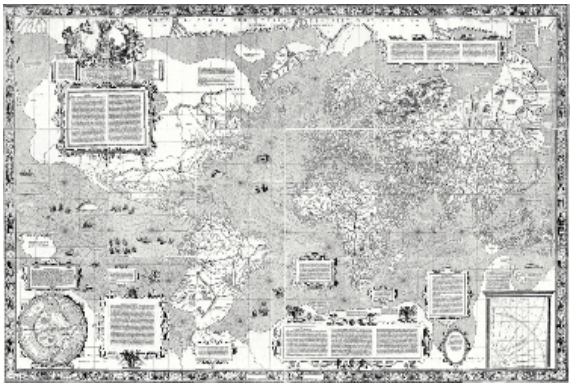


Source: Mundo Educação

> The 18th century known as the age of reason, scientific progress prevailed, with advances in the precision and quality of mapping, thanks to the application of new techniques and equipment, such as the chronometer, used to calculate latitude and longitude, the theodolite with lunette among others. In Brazil, in the period from 1749 to 1882, the first representations relating to physical and political aspects were created (apud CASTRO, 2012, p. 33).

The Modern Age, a time in which Cartography made a huge leap, was responsible for the creation of techniques and various instruments that to this day help with orientation and location in Geographic Space. The crown of Portugal and merchants financed an update to the compass for guidance on the high seas of navigators and traders, who went in search of commercial wealth and territories in the known European maritime navigations. Period in which Mercator uses for the first time on its world map the basis for the location system, geographic coordinates: Latitude and Longitude. Its development was also reflected in Brazilian Cartography, where there was a development of its natural and social representation.

Figure 7: Mercator Projection (Gerard Mercator – 1569)



Source: Suburbano Digital

2.1.1.4. Contemporary age

For Glauber de Oliveira (2012):

> The Post-Industrial Revolution period in the 20th century is marked by the influence of technology on cartography. The emergence of aerial photogrammetry enabled greater precision in topographic surveying. But it was with the appearance of artificial satellites in the 1970s that boosted the representation of space, with new possibilities for Remote Sensing, serving as the basis for Geographic Information Systems (GIS). – Powerful spatial analysis tool. Together with the Global Positioning System, GPS, they integrate Geoprocessing tools (OLI-VEIRA, 2012, sp).

> o Geoprocessing, it can be said that, with the advent of information technology in process automation, several tools emerged for capturing, storing, processing and presenting georeferenced spatial information. The technical and conceptual connection of these tools led to the development of geographic data processing technology, called Geoprocessing (apud ROCHA, 2007, p. 17).

The greatest development of Cartography throughout its history, which is linked to the history of man, was from the changes arising from the 19th century. XX. The techniques created, developed and used during the two world wars and in the post-war period, during the Cold War, made contributions to various sciences, especially to Cartography, such as: aerial photogrammetry, artificial satellites, computers, GPS, internet, among others. . Such achievements made Remote Sensing possible for GIS, which together with GPS integrate Geoprocessing.

2.1.2 Geographic Space

Geography has undergone several transformations over time, especially regarding theoretical-conceptual evolution. Among the most common characterizations today are the definition of Geography as a science capable of understanding geographic space through interactions between society and nature. Geography currently has specific concepts that permeate its analyses, as Polon (2016) demonstrates:

> As a social science, geography has society as its object of study, which, however, is objectified via five key concepts that have a strong degree of kinship, as they all refer to human action shaping the earth's surface: landscape, region, space , place and territory (POLON, 2016, p. 3, apud CORRÊA, 2003, p. 16).

It is understood, in this sense, that man, through his work, has the power to change the environment in which he is inserted, just as the environment has the potential to interfere in human activities, providing, therefore, a dialectical relationship between society and nature.

Geography is the science whose object of study is Geographic Space, which is occupied and transformed by man throughout historical time. They then discuss the transformation of natural space into geographic space, how man acts in his living space, analyzing power relations over territories, and understanding the regionalization of territories to meet the needs of social groups.

In the dialectical relationship between society and nature, it is known that society's interference outweighs nature in terms of negative impacts on the environment. The original nature is called first nature, where its transformation depends on the technical-scientific-informational evolution that society is going through at the time, and the closer man is to first nature, the more impacts it has on it.

First nature, in this context, is understood as the physical space not altered by human hands. While second nature is understood as that already transformed by man, that is, it constitutes a social space. Consequently, the greater the technical-scientific-informational advancement of a given society, respectively the smaller the natural spaces will be, within a logic that states that the further away the objects of nature are, the more perfect they are: “While those objects that meet

close to nature, they are considered imperfect, because they are transformed by man into secondary products, through work relationships" (POLON, 2016, p. 7).

Space is always a constant, a present state, as it materializes in accordance with varied historical times. It is therefore considered a value system that is undergoing permanent transformation. Santos (2008) states that the nature of space is the sum of the accumulated material result of human actions over time and, on the other hand, animated by current actions that give it dynamism and functionality.

> On the one hand, object systems condition the way in which actions take place and, on the other, the system of actions leads to the creation of new objects or is carried out on pre-existing objects. This is how space finds its dynamics and transforms (POLON 2016, p. 6, apud SANTOS, 2014, p. 63).

According to Polon (2016, p. 7) Space is a complex concept, questioned by several theorists in the field of Geography, and one of these who promotes a metaphorical vision to explain space is Ruy Moreira. The author in question approaches the geographical space compared to an indoor soccer court, so that the arrangement of the land reproduces the rules of the game. On this same court, however, other sports can be played, such as volleyball, basketball or handball. In the same way, geographic space is transformed in accordance with the "rules" of society (apud, MOREIRA, 1993). Thus, it is understood that geographic space is dynamized based on the social relations that are established there in different historical periods.

Geographic Space as a result of social transformations throughout historical time, within it places take on different meanings depending on the societies and the arrangement of their techniques and technologies available at any given moment, thus realizing the dynamism of the object's action and social relations .

2.1.3 Cartographic Literacy

According to Grzebieluka (2014), the process of cartographic literacy is developed throughout the students' school life, that is, from the early years of elementary school to high school. Cartographic literacy will enable the training of map readers capable of interpreting the complex data on them.

> Reading maps, therefore, means mastering this semiotic system, this cartographic language. And preparing the student for this reading must involve methodological concerns as serious as teaching how to read and write, count and do mathematical calculations (GRZEBIELUKA, 2014, p. 7, apud ALMEIDA; PASSINI, 2008, p. 15).

According to Grzebieluka (2014, p. 8, apud PISSINATI, 2007, p. 13) there is importance in the act of "showing your students the great presence of cartography in the daily lives of people in general, whether in the exercise of simple location of a phenomenon on the map, or in understanding a route to be taken".

Cartographic reading is essential in a student's school life and should, therefore, permeate all basic education along with learning to read and write and mathematical calculations. In this way, the student will master the reading and interpretation of cartographic elements from their location and orientation in geographic space, and, not least, the types and elements of maps through good methodologies that facilitate the reading of the world using verbal and non-verbal.

For Grzebieluka (2014), cartographic literacy is extremely necessary in our schools so that students understand this process of reading the world. Citing Pissinati and Archela (2008, p. 7), he states that "cartographic literacy is the teaching-learning process through which the student will be inserted into the formal study of the map".

In Simielli (1999, p. 98), we have that this literacy presupposes the development of several notions, such as:

a) oblique view and vertical view;

b) three-dimensional image, two-dimensional image;

c) cartographic alphabet: point, line and area;

d) construction of the notion of caption;

e) proportion and scale;

f) laterality/references, orientation.

Currently, cartographic reading is used in both physical and virtual spaces, and the school, through the teacher's methodological process, is the one who facilitates this learning, especially with the basic cartography contents in the 6th years. It is these contents that bring the types and main elements of a map, such as: title, location (geographical coordinates), legends (conventions), orientation (compass rose), scales (numerical and graphic), font and orientation in space .

2.1.4 The importance of Cartography in Geography classes

Cartography, according to Baggio (2016), entered, or even became Geography itself, as it is concerned not only with the representation of physical space, but with the relationship between man and space, thus promoting the study of the "relationship between the physical environment and human action" (BAGGIO, 2016, p. 08).

> Because of this, it is currently consensual that cartography is an indispensable pedagogical resource linked to the teaching of Geography, since the analysis of space in its dimensions and shapes using cartographic representations makes it possible to visualize what is learned and what is taught, the which is fundamental for the acquisition of knowledge and the training of students capable of "analyzing geographic phenomena and relating them, when possible, to each other (PARANÁ, 2008, p. 79, apud BAGGIO, 2016, p. 08).

Since the origins of man, Cartography has been part of everyday life. Its close relationship with Geography in the contemporary age is inseparable in the most varied areas of scientific knowledge, as we cannot separate geographic space from its representation. Given that during the teaching and learning process in 6th year Geography classes, exclusive content for basic Cartography training, the student realizes this relationship and its importance.

Exactly in this sense, the Basic Education Curricular Guidelines (DCE), regarding Geography, (PARANÁ, 2008, p. 79) advise that:

> [...] the use of cartographic language, as a methodological resource, is important to understand how phenomena are distributed and related in geographic space. However, cartographic language must be worked on throughout basic education, as an effective instrument for reading and analyzing spaces near and far, known and unknown. In this way, cartography cannot be reduced to a specific content addressed only in one of the years/grades of Elementary or Secondary Education.

These and other reasons make the work of the Geography teacher essential, given the relevance of their task in teaching the use, reading and creation of maps, a task possible based on knowledge of cartographic language (BAGGIO, 2016, p. 11) .

For Katuta (1997):

> If reading a written text is to attribute meanings to it and (re) elaborate our knowledge about the reality that surrounds us, we can equally affirm that reading a map is also to attribute meanings, (re) construct representations, revisit or review those we have from of this representation. The map reader, according to the concepts, representations of the most varied types and his worldview, can attribute meanings to it, as long as he is provoked to do so and/ or as long as the need is placed on him, a role that it is up to the teacher (KATUTA, 1997, p. 45).

The process of acquiring cartographic language takes place throughout basic education and the Geography teacher plays a very important role in these classes, attributing significance to their methodologies, respecting the cognitive development of each student. The student, when reading and interpreting maps, the globe, among other representations, is led to have a taste and affinity for the discipline, thus being able to apply it in their daily lives and have a critical view of their local and global sphere.

2.1.5 Cartography in the initial and final years of Elementary Education in the National Common Curricular Base (BNCC)

> It is up to the National Common Curricular Base (BNCC), Brazil's official normative document that integrates the national basic education policy and, therefore, governs teaching in the stages from Kindergarten to High School, to provide guidelines on what and when should be taught, in addition to indications on how to do it. This document guides the public authorities (in the spheres of the State, Federal District and Municipalities) in the preparation of their Curricula, serves as a reference to the Pedagogical Political Project of school institutions and, ultimately, directs the teacher's pedagogical work so that, in theory , the “essential learning”, guaranteed to all Basic Education students, is carried out (MARTINS; ZACHARIAS, 2021, p. 05).

Regarding the study of Cartography based on the BNCC, Martins and Zacharias debate (2021, p. 06):

> Cartography is included in the BNCC implicitly in Early Childhood Education, the first stage of basic training, becoming evident afterwards. Commonly linked to the Geography Curriculum, the method of insertion has changed over time. Unlike before, it is no longer used from a content perspective (for example, a map as a mere illustration aimed at mnemonic teaching, the teaching of the map through the map) and starts to be directed as actions (reading, describing, selecting, comparing, analyze, correlate, produce, etc. – cartographic representations) that are intentional, planned, applied and guided by the teacher.
>
> These actions are described in the Base as skills that students progressively develop, becoming competencies over the course of the school years that make up three major training moments proposed by the Base: Teaching

> Kindergarten, Elementary School (initial and final years) and High School. At each moment, spatial thinking and the forms of representations that encourage graphic and cartographic reasoning adjust to the age group and understanding of the students (MARTINS; ZACHARIAS, 2021, p. 06).

The BNCC, in addition to being a normative document, is also a guide for basic education in Brazil, effectively bringing equity and equality to all students. In it, basic education from pre-school to high school is implicitly covered by Cartography in various curricular components, and, in particular, in Geography.

The contemplation of Cartography arises from a new perspective of critical, investigative, analytical and interpretative education, leaving the old content paradigm, that is, in which the map had no meaning or meaning for the student's experience, also leaving of being teaching mediated by the teacher with actions focused and planned for this same purpose.

Table 1: Cartography in the initial years (1st to 5th year) of Elementary School, curricular component Geography.

Year	Units Themes	Objects Knowledge	Skills
1st year	Ways to re-presentation and thought is-pacial	Reference points	(EF01GE08) Create mental maps and drawings based on itineraries, literary tales, invented stories and games.
			(EF01GE09) Create and use simple maps to locate elements of the living space, considering spatial references (front and back, left and right, top and bottom, inside and outside) and using the body as a reference.
2nd year	Ways to re-presentation and thought is-pacial	Location, orientation tation and representation space tion	(EF02GE08) Identify and develop different forms of representation (drawings, mental maps, models) to represent components of the landscape of living places.
			(EF02GE09) Identify objects and places of experience (school and housing) in aerial images and maps (vertical view) and photographs (oblique view).
			(EF02GE10) Apply principles of location and position of objects (spatial references, such as front and back, left and right, up and down, inside and outside) through spatial representations of the classroom and school.
3rd year	Ways to re-presentation and thought is-pacial	Representations car-tographic	(EF03GE06) Identify and interpret two-dimensional and three-dimensional images in different types of cartographic representation.
			(EF03GE07) Recognize and create captions with symbols of different types of representations at different cartographic scales.

4th year	Ways to representation and thought is-pacial	Guidance system dog	(EF04GE10) Compare different types of maps, identifying their characteristics, creators, purposes, differences and similarities.
		Constituent elements map features	(EF04GE11) Identify the characteristics of natural and anthropogenic landscapes (relief, vegetation cover, rivers, etc.) in the environment in which you live, as well as human action in the conservation or degradation of these areas.
5th year	Ways to representation and thought is-pacial	Maps and satellite images	(EF05GE08) Analyze landscape transformations in cities, comparing sequences of photographs, aerial photographs and satellite images from different periods.
		Representation of cities and urban space	(EF05GE09) Establish connections and hierarchies between different cities, using thematic maps and graphic representations.

Source: BNCC (BRASIL, 2018, p. 370-379), organized by Martins and Zacharias (2021).

Table 2: Cartography in the final years (6th to 9th year) of Elementary School, curricular component Geography.

Year	Units Themes	Objects Knowledge	Skills
6th year	Ways to representation and thought is-pacial	Natural phenomena and social representation of different ways	(EF06GE08) Measure distances on the surface using graphic and numerical scales on maps.
			(EF06GE09) Prepare three-dimensional models, block diagrams and topographic and vegetation profiles, aiming to represent elements and structures of the Earth's surface.
7th year	Ways to representation and thought is-pacial	Thematic maps of Brazil	(EF07GE09) Interpret and prepare thematic and historical maps, including using digital technologies, with demographic and economic information about Brazil (cartograms), identifying spatial patterns, regionalizations and spatial analogies.
			(EF07GE10) Prepare and interpret bar graphs, pie charts and histograms, based on socioeconomic data from Brazilian regions.
8th year	Ways to representation and thought is-pacial	Cartography: anamorfose, sketches and thematic maps of the America and Africa	(EF08GE18) Prepare maps or other forms of cartographic representation to analyze urban and rural networks and dynamics, territorial planning, cultural contexts, way of life and uses and occupation of land in Africa and America.
			(EF08GE19) Interpret cartograms, schematic maps (sketches) and geographic anamorphoses with geographic information about Africa and America.
9th year	Ways to representation and thought is-pacial	Reading and elaboration of thematic maps, sketches and other forms of representation tion to analyze geographic information home	(EF09GE14) Prepare and interpret bar and sector graphs, thematic and schematic maps (sketches) and geographic anamorphoses to analyze, synthesize and present data and information about global sociopolitical and geopolitical diversity, differences and inequalities.
			(EF09GE15) Compare and classify different regions of the world based on population, economic and socio-environmental information represented on thematic maps and with different cartographic projections.

Source: BNCC (BRASIL, 2018, p. 384-395), organized by Martins and Zacharias (2021).

In the Base (BRASIL, 2018) we have:

> In the initial years, students begin, through the exercise of geographic location, to develop spatial thinking, which gradually begins to involve other methodological principles of geographic reasoning, such as location, extension, correlation, differentiation and spatial analogy. In Elementary School – Final Years, students are expected to be able to read, compare and create different types of thematic maps, as well as the most different representations used as spatial analysis tools. This, in fact, should be a guiding concern when working with maps in Geography. They should, whenever possible, serve as support for the repertoire that is part of geographic reasoning, avoiding teaching the map for the sake of the map, as an end in itself (BRASIL, 2018, p. 363-364).

At BNCC, skills are knowledge and procedures that students will acquire with the aforementioned content during classes taught by teachers; Competencies will be the attitudes and values that they will take when faced with different everyday situations. This process must continue throughout basic education, from preschool to secondary education, in accordance with the cognitive development of each student, from the definition of geographic space to its representation, thus comprising Cartography with its graphic representation and its main elements. .

Specifically in Elementary School - early years, the student must learn basic notions of cartography, such as: orientation, location, types of maps, satellite images, aerial photos, analogies, comparisons and differences between the various forms of spatial representations, such as models, block diagram, level curves, among others. In Elementary School - final years, in turn, it is clear that the skills are sequential from the initial years and with a greater degree of knowledge and difficulties.

2.2 VARIABLE SYSTEM

Table 1: Variable system

Variable	Definition Operational	Dimensions	Indicators	Instruments and techniques
Applicability of the knowledge toss cartographic in everyday situations students' dianas 6th year	"Many uses can be attributed to cartography and its products. The first of them is the**location of a given reference point on the earth's surface**, from areas of the most	1. Mockup	1.1 Space in- natural and geographical I am 1.2 Landscape 1.3 Geo-Place graphic	Questionnaires per- questions and answers on scale *Likert.* Index:

	areas, continents and countries, to specific points in a given place, such as a neighborhood or a residence. Associated with this, cartography also serves to**orientation in geographic space and to assist in movement**, which is done using maps and compasses or GPS" (MUNDO EDU-CAÇÃO).	2. Map such	2.1 Points of reference 2.2 Guidance 2.3 Legend	I agree totalmind; I agree; Neutro; No conI agree and disagree totally. Tests with resolutions of problems of day to day student.
		3. Maps matic (alsome of the first main elements toss)	3.1 Coordination of Geographics 3.2 Rose of winds 3.3 Scale	

Source: The author, 2023

3. MATERIAL AND METHOD

3.1 RESEARCH AND INVESTIGATION METHOD

The present investigation fits into the positivist paradigm, adapting to the quantitative methodology, as it uses a mathematical language to describe the causes of a phenomenon and the relationships between variables. According to Gil (2008), positivism and its theory emerge, then, in the expectation of seeking knowledge that would be as reliable as that produced by natural sciences. For him, the main characteristics that underlie the philosophical basis of positivism are four, namely: what we try to do with quantitative studies is to explain and predict the phenomena researched, looking for regularities and causal relationships between elements.

Therefore, different statistical techniques will be used to quantify the applicability of cartographic knowledge in students' daily lives. The approach will also be used to synthesize all information about the experiences in order to achieve the objectives proposed in this research.

This research has a non-experimental research design, that is, the researcher cannot control, manipulate or change the subjects or the results, he relies on observation and interpretation to reach a conclusion.

Descriptive cross-sectional research is used to observe and analyze an exact moment, a certain period of research in the investigated reality, whose objective is to observe, analyze, classify and interpret the data collected. Research of this type aims to

The description of the characteristics of a given population or phenomenon or the establishment of relationships between variables is essential.

There are countless studies that can be classified under this title and one of their most significant characteristics is the use of standardized data collection techniques (GIL, 2008, p. 28). In descriptive research, the researcher plays the role, mainly, of an observer and describes the facts in a natural environment without manipulation or interference, using standardized techniques to collect useful and necessary data for the research, such as variables aimed at the objectives proposed in the research. Thus, new knowledge is built to expand scientific knowledge.

For Silva (2018, p. 7), the research design must be done before the research itself, that is, it refers to a previous stage and combines theory (when talking about the model), techniques (when talking about the data) , with the aim of learning more about the object of study. Despite this general formulation, the association between theory, technique, knowledge and characterization of the object does not follow a single recipe and varies widely between different areas of knowledge. For this reason, the elaboration of a research design and the assessment of its relevance also vary in the different fields that make up science.

Therefore, this research is characterized by the fact that the researcher will not manipulate the variables involved in the investigation, but will gather information on how the process happens and whether in a natural way, according to the subject researched, raising the situation for a possible rethinking and pedagogical redo. .

3.2 PARTICIPANTS

Regarding the perspective of temporality, the study will be sectional, considering that data collection will be carried out at a specific time according to the schedule. The population of this research will correspond to all 6th year students from the six classes, namely: A, B, C, D, E, F, from the morning and afternoon shifts at EEF Tarcila Cruz de Alencar in the municipality of Juazeiro do Norte, Ceará in 2024.

With regard to piloting, 10% of the students, that is, 19 6th year students from the classes mentioned above who study at EEF Tarcila Cruz de Alencar in the municipality of Juazeiro do Norte, Ceará, will answer the test.

As this is a research with a quantitative focus, the data collection techniques and instruments to be applied will be questionnaires and the method of systematic observation. For Gil (1999, apud TURATO, 2020), a questionnaire is an investigation technique composed of a more or less high number of questions presented in writing to people, with the objective of knowing opinions, beliefs, feelings, interests, expectations, situations experienced , etc. Cervo (2002) describes that this is the most used way to collect data, as it makes it possible to measure what is desired with better accuracy.

3.3 QUESTIONNAIRE AND PROCEDURES

The instrument for data collection will be a closed questionnaire according to the recommendations of Pereira (et al, 2018, p. 43) as the "questionnaire must be composed of well-presented questions, which will be sent to interviewees in printed or virtual form". For every research method, one or more techniques correspond. Thus, data collection, which will begin the analyses, will be the capture technique to be used to collect data in the 6th year classes of EEF Tarcila Cruz de Alencar in the municipality of Juazeiro do Norte, Ceará, in 2024, which will consist of in the application of a closed questionnaire.

The procedures that will be adopted for data collection consider procedural methods, also called "specific or discrete, as they are related to the technical procedures to be followed by the researcher within a given area of knowledge" (PRODANOV, 2013, p. 36).

The procedures for carrying out the research will be as follows: inform the school manager about the research and request his/her signature on the Authorization Request Form for Academic-Scientific Research; visit classes to inform students that they will participate in this study; schedule a meeting with parents and/or guardians to inform them that they will participate in the research and at the same opportunity sign the Free and Informed Consent Form; talk to participants about the research so that there are no doubts about terms used in the questionnaire and ask them to sign the Free and Informed Assent Form; schedule with class teachers the day and time when it will be necessary to remove students from class; and, finally, randomly select 10% of students to

answer the test, only among those who have an elementary school record, initial years of EEF Tarcila Cruz de Alencar.

Once ordered and classified, the data will be tabulated to carry out statistical analysis using basic technical procedures of descriptive statistics and the Excel computer program tool. Then, tables and/or graphs will be drawn to represent the results with their respective interpretations.

To carry out the pedagogical interpretation, data will be reviewed according to each objective, thus looking for possible connections and relationships that direct interpretations about the phenomenon investigated. The research results will be analyzed, interpreted and explained, as well as the most representative tables and graphs will be selected to form the research conclusion.

4. RESULTS AND DISCUSSION

Based on the research, it is expected to verify the minimum knowledge required by BNCC for students entering the final years of elementary school at EEF Tarcila Cruz de Alencar in Juazeiro do Norte, 2024, in the discipline of Geography, specifically in matters related to Cartography.

After the results are obtained at the end of the research, they will be published in scientific journals, seminars and other academic events, as well as the presentation of data at school in a pedagogical week for teachers in the initial years of elementary school.

Other results will be given at the end of the schedule stipulated by the researcher (table 2), which are scheduled for July 2024.

Table 2: Schedule of activities

ACTIVITIES	MONTHS – YEARS 2023 / 2024						
	AUG/ 2023	SET/ 2023	OUT/ 2023	NOV/ 2023	TEN/ 2023	JAN/ MAY 2024	JUL 2024
Choice of theme	X						
Bi-lift bliographic	X	X	X				
Design of the product jet				X	X		

Work of field						X	
Processing and Data analysis of the						X	
Preparation of the re-final report				X	X		
Preparation of the thesis party						X	
Defense of thesis							X

FINAL CONSIDERATIONS

The study of Cartography in Elementary School is extremely important for the student to develop a series of skills, as listed in chapter 2 of this research (item 2.1.5); skills that permeate the areas and objects of knowledge of spatial representation, reference points, geographic location, orientation system, constituent elements of maps, satellite images, representation of urban space, natural and social phenomena, reading and elaboration of maps themes, sketches and other forms of geographic representations.

There is currently a consensus that Cartography is an indispensable pedagogical resource linked to the teaching of Geography, since the analysis of space in its dimensions and shapes using cartographic representations makes it possible to visualize what is learned and what is taught, which is fundamental for the acquisition of knowledge and the training of students capable of analyzing geographic phenomena and relating them.

This research sought to discuss the contributions of Cartography to the teaching of Geography, going through its history, evolution through the people who perfected it, reference concepts for Geography, such as geographic space and cartographic literacy, as well as the guiding principles of cartographic teaching in schools, included in the BNCC (2018). However, the main focus is on practical teaching in the classroom, especially in the section used by the researcher: the 6th year of Elementary School, final years.

Studying with models, for example, offers the opportunity to take off paper and put into practice work with three dimensions (height, width and length), both natural and geographic elements. These dimensions are also worked on by several areas

of knowledge. The study also allows us to work on various cartographic contents in the model, such as: type, orientation, compass rose, scale, legend, among others, in addition to having the advantages of being produced with simple materials, including recycling. An interesting factor is that there is attractiveness and involvement in the construction of the material, so the vast majority of students participate in the productions, managing to synthesize learning by participating actively and critically, producing the geographic and cartographic knowledge experienced in their daily lives.

The mental map is one of the instruments of great relevance for studying the lived space, as it works mainly with the cognitive in an idea of perception, analysis and synthesis, creating a notion of exploration of the lived space according to the world of each being. The conscious or unconscious student produces the knowledge acquired mentally on a daily basis, when, for example, when observing the route he takes every day from home to school (lived space), he places it on the mental map (paper), and perceives the notion of space and the presence of cartographic elements. It is worth noting that the mind map is a starting point for working on several other issues. Cartography works with theory, practice and cognition, placing a lot of emphasis on cognition with mental actions, mainly based on mental maps, reference points and location.

Today, the importance of maps is indisputable, as they help in the process of understanding the transformations of problems in the current reality, including in people's daily lives, with various uses and professionals who use them, from the delivery man of *ifood* and app car drivers to heads of nations and international organizations. The contributions of the Geography teacher to direct the student to read and interpret maps are essential, analyzing their objectives and their non-neutrality. Maps, regardless of the title, are in constant dynamism and transformation in contact with the society that produces them, or better yet: Cartography goes hand in hand with technological development, starting with photogrammetry (balloons, planes and today, drones) , artificial satellites (GPS) for the production of digital maps and the *Google Maps*, *google earth* (which have varied purposes: work, entertainment and study), systems used by users in general.

It is unimaginable to work on geographic space without the map (representation of space). They accompany man shortly after his origin, a period in which man was

nomad and felt the need to record everyday scenes that he considered important. This is how cave paintings appeared, with records of everyday life, and soon after Ga-Sur, the first baked clay plate map of the ancient region of Mesopotamia. From then on, man never stopped representing geographic space on maps, that is, on a flat surface in accordance with the techniques and technologies of the moment. Today maps are digital and highly updated from anywhere in geographic space with varied themes depending on the purpose of whoever needs it, with their main elements so that reading and interpretation is safe and reliable. Given this situation, it is clear that technology has greatly favored Cartography, so it is a great ally in the teaching and learning process in the classroom.

It is essential that the teacher's work in the classroom is directed towards the student's experience; This experience needs to be valued and not just serve as knowledge disconnected from its reality. Due to all this relevance, the research was planned and developed based on this premise.

Therefore, due to this situation, in some cases the teaching of Cartography becomes complex and decontextualized for elementary school students, in the early years. It is therefore necessary to have constructive and contextualized pedagogical practices such as the production of mental maps, models, thematic maps, among other materials. Such resources are widely explored not only by Geography but also by other knowledge sciences due to their positive impact on the teaching-learning process. Starting from the student's experience, this methodology and didactics will facilitate the understanding of the knowledge discussed, considering the existing prior knowledge with that acquired and systematized in the classroom, from the local to understand the global, actively participating in classes and learning to thus achieve knowledge becomes utilitarian and solid, understanding the relationship between Geography and Cartography, that is, the study of geographic space and its representation.

This learning process is long and needs to be continuous with appropriate pedagogical practices, based on legal educational foundations, considering the student's experience and cognitive development.

Knowledge of cartographic elements happens, in fact, only when the student is able to apply the theory seen in Geography classes, in their daily practice, whether at home with their family, in a place of fun with their colleagues, or even in the local of prayer, in any

place of your experience. To achieve this, there must be daily and systematic interaction, thus synthesizing the information and acquiring the intellectual knowledge proposed and so desired by the teacher, with the student being the one who gives new meaning to their living space.

This work, which must take place in partnership (elementary school teachers, initial and final years and pedagogical coordination), will only bring benefits, especially for the student, the main protagonist of the process that will continue building in their studies, as well as developing skills and abilities necessary for their human and civic development, analyzing and acting actively and critically in society for a world with more justice and equity, as Cartography is a way for citizens to interact with the world.

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