

International Journal of Human Sciences Research

THE USE OF MIND MAPS AS A PEDAGOGICAL STRATEGY TO PROMOTE ENVIRONMENTAL EDUCATION AMONG STUDENTS IN THE FINAL YEARS OF ELEMENTARY SCHOOL

Ademilson Pereira Ribeiro

Master in Territorial Development
and Environment at: ``Universidade
de Araraquara`` (UNIARA)
Faculdade de Ciências e Tecnologias
de Campos Gerais (FACICA - MG)
Campos Gerais - MG, Brazil

Anderson Ferreira da Silva

Master in Territorial Development
and Environment at: ``Universidade
de Araraquara`` (UNIARA)
Faculdade de Ciências e Tecnologias
de Campos Gerais (FACICA - MG)
Campos Gerais - MG, Brazil

Fernanda Maria Andrade

Graduation student at Pedagogy
Faculdade de Ciências e Tecnologias
de Campos Gerais (FACICA - MG)
Campos Gerais - MG, Brazil

Lauany kételen Coelho do Vale

Graduation student at Pedagogy
Faculdade de Ciências e Tecnologias
de Campos Gerais (FACICA - MG)
Campos Gerais - MG, Brazil

All content in this magazine is
licensed under a Creative Com-
mons Attribution License. Attri-
bution-Non-Commercial-Non-
Derivatives 4.0 International (CC
BY-NC-ND 4.0).



Sabrina Silva Morais

Graduation student at Pedagogy
Faculdade de Ciências e Tecnologias
de Campos Gerais (FACICA - MG)
Campos Gerais - MG, Brazil

Abstract: The main objective of this article is to discuss the relevance of using mind maps as a pedagogical strategy for promoting environmental education. In Brazil, there are not many educational institutions in which, from the perspective of active learning methodologies, mental maps are used as a tool capable of facilitating the experience of implementing Environmental Education as a Transversal Contemporary Theme, making it less arduous and complex.

In the case of the present study, the choice of archives from a Municipal School, located in Campos Gerais – MG – is because it is recognized at the municipal level as the main institution with relevant work on the aforementioned theme that is the subject of this study (CAMPOS GERAIS, 2023). Regarding the implementation of this educational practice, few studies were observed with this objective. Therefore, we conclude that there is a need to develop research that considers environmental education as a focus of intervention.

Keywords: Mind maps, active learning methodologies, environmental education.

INTRODUCTION

In recent years, the implementation of Environmental Education as a Transversal Contemporary Theme has become even more arduous and complex, as a result of the Covid-19 pandemic caused by SARS-COV-2 (BIRMAN, 2021). Along this line of reasoning, Borba et al. (2020) reached a conclusion, through in-depth research, that Science and Biology teachers encountered several difficulties in remote teaching, one of which was doubts about the best methodological approaches for teaching remotely.

Given the complex pandemic scenario, particularly in the field of basic education, the search for different methodologies has become even more important, especially for themes

essential to society such as Environmental Education. To the point that, Garofalo (2018, p. 3) highlights that there are several advantages of using active methodologies in the classroom, among which it stands out that “the main one is the transformation in the way of conceiving learning, by providing that the student thinks differently [...]”.

In this vast field of differentiated learning methodologies, the mind map is a didactic tool and a form of representation of the real world, according to Wille (2010), the idea of using a graphic representation with the aim of creating knowledge, works as facilitator of the learning and knowledge construction process.

Regarding methodological aspects, this article was developed as an experience report based on the application of mental maps in classes from 6th to 9th year of elementary school during the internship period in the Pedagogical Residency Program, as a tool for the construction knowledge of students in basic education. The general objective of the work was to awaken practice in the environmental area, where the topics and subtopics raised by the students were observed and analyzed, with the intention of verifying their prior knowledge about Environmental Education.

Finally, this article is organized with this introduction, a theoretical framework dealing with the application of active learning methodology in environmental education, articulating, especially, the relevance of using mental maps as strategies for developing the skills and abilities of students in final years of Elementary School, followed by the methodological procedures that made this research possible, the results and discussions and, at the end, the final considerations on the topic studied, followed by the references.

REVIEW OF LITERATURE

THE SCHOOL AS A PROPAGATOR OF A NEW ENVIRONMENTAL AWARENESS

In the current period of the 21st century, post-modern times, brought about by the globalization of markets and information technology, society is stuck with exaggerated consumerism. As a result, the scenario that arises is one of widespread production of solid waste in different segments, causing the most diverse environmental problems when they do not have an appropriate destination, contaminating the soil, water and air (PINHEIRO BESERRA; SANTOS ALVES, 2009).

Faced with all this complexity, different fields of activity come together to achieve, through interdisciplinary means, measures to raise awareness about environmental problems, as possible damage to nature is the responsibility of each individual. In this context, Pinheiro Beserra and Santos Alves (2009) argue that:

“education can be seen as a means that will effectively contribute to a sustainable future, with interventions consistent with contemporary times, as well as representing to human beings the importance of self-determination to carry out healthy actions in their environment. (PINHEIRO BESERRA; SANTOS ALVES, 2009, p.69).

School is the appropriate space to discuss environmental problems, as they involve the quality of life of people and communities. Furthermore, environmental aggression can cause irreparable damage to the ecosystem, compromising environmental homeostasis. In this sense, Pinheiro Beserra and Santos Alves (2009) also point out that:

The environmental problem is everyone's responsibility, but many are not aware of it. This lack of commitment increases

the complexity of the problem, requiring interventions that involve environmental health, and it is important to reflect on this issue to achieve human and ecological well-being, as well as the purpose of promoting health and preventing damage. The discussion about ecological issues, however, is increasingly emphasized in various sectors of modern society, since evidence of the process of environmental degradation is reported daily, requiring intervention. (PINHEIRO BESERRA; SANTOS ALVES, 2009, p.69).

Therefore, it can be clearly seen that there is an evident need for the involvement of public and private schools in the development of a new awareness regarding environmental protection, as this entails a change in behavior, providing the search for a lifestyle healthier, however, for this to happen, human beings must overcome the obstacles that prevent them from having a clear perception of reality and assimilating its truth and criticizing it (DE SOUZA; JÚNIOR, 2021).

THE CONCEPTS OF ENVIRONMENTAL EDUCATION IN SCHOOL PRACTICES

After discussing the school as a propagator of a new environmental awareness, it is important in this section to understand that there is a plurality of actions in environmental education, particularly when talking about the initial years of Elementary Education in public and private schools in Brazil. Therefore, the central objective of this section of the work is to present and explain some typologies that can be identified in the school documents analyzed. Perhaps this will make it possible to identify the concepts of environmental education present in school materials and practices (DE SOUZA; JÚNIOR, 2021).

To analyze the typology found in the school practices referred to in this study, three categories of environmental education

conception were chosen: conservative, pragmatic and critical. From these conceptions, five dimensions of analysis were grouped: human-environment relationship, science and technology, ethical values, politics and suggested activities (SILA; CAMPINA, 2011).

In this line of reasoning, the first concept of environmental education to be faced is the so-called Conservative Environmental Education. With regard to this conception of environmental education, Sila and Campina (2011) point out that:

The Conservative Environmental Education category is present in almost all typologies presented. His conceptions date back to the origin of environmentalist practices in the international context, which, according to Pelicioni (2005), are based on romantic ideas, inspiring the preservationist movement of the late 19th century, in which the affective bonds provided by the experience of integrating nature would bring well-being and emotional balance, as well as the appreciation and protection of the natural environment. This perspective is still present in many EA courses and materials. Its main characteristic is the emphasis on protecting the natural world. Characteristics of idyllism also appear (KRASILCHIK, 1994), that is, a return to primitive living conditions. The most apparent environmental problems are presented, ignoring the deeper causes. There is a dichotomous relationship between human beings and the environment, with the former being presented as a destroyer. Virtually no social and political issues are addressed. The keywords would be: nature, conservation, protection and destruction. (SILA; CAMPINA, 2011, p.33).

Secondly, with regard to the so-called Pragmatic Environmental Education concept, the authors (2011) emphasize that:

The Pragmatic Environmental Education category focuses on action, searching for solutions to environmental problems and proposing standards to be followed. This

category of environmental education may have its roots in pragmatic environmentalism (CRESPO, 1998) and in technical conceptions of education. It seeks mechanisms that make economic development compatible with sustainable management of natural resources (sustainable development). The emphasis is on changing individual behavior through the amount of information and standards dictated by laws and government projects, which are presented as ready-made solutions. Although there is a discourse of citizenship and social issues are presented as part of the environmental debate, the conflicts arising from this relationship do not yet appear or appear in the form of a false consensus. Loureiro (2004) points out the existence of a large hegemonic bloc of trends that propose a behaviorist and technocratic pedagogical practice, in which we understand this pragmatic aspect to be included. This same author states that pragmatism in environmentalism is characterized by the theoretical and ideological assumption that the gravity of the situation requires practical, effective and successful attitudes in a short time. The keywords are: behavior change, technique, solution, sustainable development. (SILA; CAMPINA, 2011, p.33-34).

Finally, the third conception of environmental education to be analyzed here is the so-called Critical Environmental Education. From the authors' theoretical perspective (2011):

Critical Environmental Education, in turn, finds support in the perspective of critical education and ideological environmentalism, described by Crespo (1998). The complexity of the human-nature relationship is presented. It privileges the political dimension of the environmental issue and questions the current economic model. It presents the need to strengthen civil society in the collective search for social transformations. Within the history of environmentalism, by taking environmental issues to the public sphere, ecologism gave environmental ideas a political dimension (Carvalho, 2004). In the educational context,

this perspective is based on the critical thinking of Paulo Freire, among other authors, and proposes the constitution of an educational action aimed at transforming current economic, political and social structures. In this context, Reigota (1995) already highlighted that EA aims not only at the rational use of natural resources but basically at the participation of citizens in discussions and decisions on environmental issues. (SILA; CAMPINA, 2011, p.34).

Regarding this explanation, it is possible to point out that teacher training and environmental education have an intrinsic relationship. However, what is observed is how the environmental dimension is presented in academic training and, subsequently, how it is conceived in everyday school life, leads to questions that are precursors and motivators of a new way of immersing ourselves in the educational sphere (DE SOUZA; JÚNIOR, 2021).

Such premises add up to the understanding that the behavioral configuration of current society is based on an economic model marked by unsustainable patterns of production and consumption, causing countless negative impacts, threatening the maintenance of the ecosystem balance, the limits of recomposition of the planet and the human being's own survival capacity. A new holistic understanding of reality, oriented towards the assimilation of the universe in the form of a network and with its integrated elements, becomes essential. To achieve this, the school must employ as many new learning methodologies as necessary (SANTOS; VASCONCELOS, 2017).

In this sense, the role played by those teachers who play a significant social role is essential, assuming the role of mediators of the collective construction of knowledge and working, primarily, in the early years of Elementary School. That said, the following section focuses on understanding how the

creative methodology of mind maps is used as a pedagogical tool capable of bringing the environmental dimension into the classroom, in a critical and reflective way, enabling the understanding of its importance in relation to the of Environmental Education.

MIND MAPS AS A PEDAGOGICAL TOOL FOR ENVIRONMENTAL PERCEPTION

In this section, the focus of this article will be the understanding that after analyzing the foundations of the different conceptions of environmental education and its relationship with meaningful learning, it is essential to delve deeper into the characteristics, functionalities and applicability of so-called mental maps (SANTOS; VASCONCELOS, 2017).

At this first moment, it is important to note, as Santos and Vasconcelos (2017) point out, that:

The study of environmental perception is extremely important so that we can understand the interrelationships between man and the environment, as well as learn how to protect and care for it in the best way, in addition to making individuals perceive the environment in which they live, thus being able to help in the development of methodologies to awaken people's awareness of environmental problems. (SANTOS; VASCONCELOS, 2017, p.345).

Based on this understanding, the authors (2017) highlight the importance of using mental maps:

Through mental maps it becomes possible to recognize the values previously developed by students, as well as evaluate the image they bring of their environment, constituting a methodology to be used in the classroom, aiming to understand the reality and lived space of students, in addition to guiding practices aimed at their reality, Environmental Education not remaining only on paper and in the ideological field. (SANTOS; VASCONCELOS, 2017, p.345).

Given this pedagogical model for the development of environmental education, Oliveira (2012, p.38) points out that there are many potentialities for developing this work in basic education, using mental maps (BUZAN, 1996). They can be used in order to evaluate the perception that individuals have of the space in which they are located. This way, mental maps correspond to drawings made by individuals, which represent their lived space (OLIVEIRA, 2012).

Still according to Oliveira (2012, p.38), for:

Interpretation and analysis of the mental maps created by the interviewees, we selected the representations that contain images, and to carry out the analysis of these images, procedures proposed by Kozel (2001) were adopted, which has as a parameter the interpretation regarding the way in which the elements are represented in the image, being a distribution regarding the classification of icons (by the representation of the natural, built, lived landscape, human and mobile elements), letters, (words complementing graphic representations) and maps, forms of graphic representation of space. Other forms of representation may also appear and will be analyzed according to the theme developed. (OLIVEIRA, 2012, p.38)

Considering what has been exposed, it appears that mental maps are nothing more than images of a certain location that each person has recorded in their memory, which can be directly or indirectly known, it is a concrete spatialization of immediate places, which, according to time permeates the domination of a specific location in joint relationships (KOZEL, 2001; BUZAN, 1996). In this aspect, when directed to the field of environmental perceptions, they become a tool that encourages communication, interpretation and especially the imagination of knowledge about the environment, making it possible to acquire information from personal reflections, seeing, finding and

discovery (OLIVEIRA, 2012).

MATERIALS AND METHODS

It is true that the methodology points the way to be followed, guiding the researcher's actions, through the available sources and tools. Therefore, below, the methodological procedures are described, that is, the paths used to carry out this study, starting from the selection of materials, followed by the methodology designed and executed, essential to the outlined objectives (SEVERINO, 2007).

MATERIALS

In this study, the basic material used consists of information acquired from documentary and bibliographical research, especially with the planning consultation of classes taught in the Science discipline, as well as the respective evaluative activities or not developed during the academic year, sources regulations relating to the topic of environmental education, various scientific articles, news from reliable sources, instructional documents from national bodies of indisputable credibility, as well as newspaper and magazine articles from verified sources, among other relevant items. This data collection took place from February to June 2023. Regarding the inclusion and exclusion criteria, those published in Portuguese and directly referring to the topic addressed here were taken as a basis (GIL, 2007).

METHODS

As for possible methods, this research was carried out by reading the material mentioned above, including comparisons between the information so that the veracity of the facts could be verified, and then a reflection was carried out on the understandings and intentions contained in the documents such as way of enabling a conclusion regarding the topic, with a survey of its problems and the

contemporary actions that are being taken by the government, society and educational agents to search for solutions (GIL, 2007).

Regarding the bibliographic aspect of the study, data collection took place through searches for keywords named by the themes in the Theses Bank of the Coordination for the Improvement of Higher Education Personnel (CAPES), carried out in February 2023. A bibliographic search was also carried out in the Scientific Electronic Library Online (SciELO), which was chosen due to the importance that this tool has for the scientific communication process, as it consists of an electronic collection of academic production at the stricto sensu Postgraduate level. of Higher Education Institutions (HEIs) in Brazil.

The survey of articles for this study was carried out in the search for complete texts, accessed according to the free availability of the databases. In line with inclusion and exclusion criteria, articles that were not freely available in full did not participate in the results of this study.

The search strategies were adapted for each database, considering the peculiarities of each one, always with a view to the problem and objectives of this study and the inclusion and exclusion criteria mentioned above. Therefore, it was possible to maintain the coherence of the material selected for this work. In the aforementioned databases, the keywords "environmental education", "environment" and "mental maps" were used to search for the material.

As regards the presentation of the discussions, an attempt was made to provide a sequential and conclusive chain to the work, to the point that these reflections were allowed to be mapped, grouped and analyzed, enabling the understanding of the importance of the theme studied, seeking to compare and understand the results achieved, with the clear

intention of contributing to the advancement of new questions, notes and research in the area. (SEVERINO, 2007).

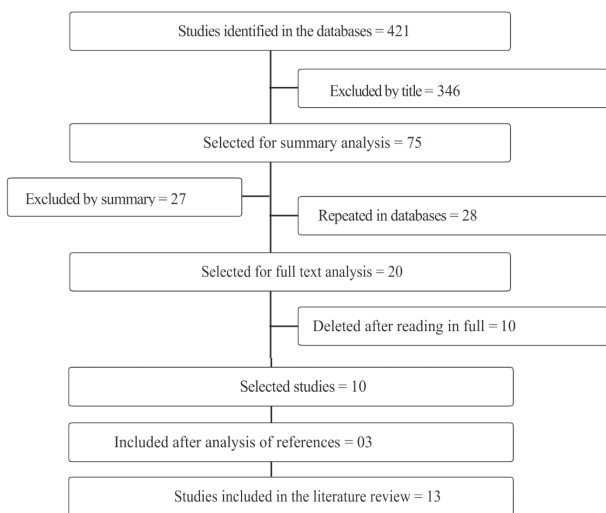


Figure 1. Study selection flowchart.

Source: Prepared by the authors (2023)

RESULTS AND DISCUSSION

From the school's pedagogical archives, with lesson plans, evaluative and non-evaluative activities applied during the school year, that is, from abundant documentation of daily school life, many reflections emerged. However, when comparing the documentary and bibliographical aspect of this research, focusing on articles, concepts, texts, normative sources on the application of active learning methodologies during environmental education classes, initially the focus of this research was on the use of mind maps as strategies for developing the skills and abilities of students in the final years of elementary school.

In this sense, what we intend to bring here are some elements of discussion of this pedagogical experience. Firstly, when the proposed theme of environmental education was put into practice in the classroom in the final years of elementary school, the concept of what a "mental map" is and what it adds to the teaching and teaching process began.

learning for any theme/subject, but with a specific focus on environmental education.

Still according to what can be inferred from the analysis of the pedagogical documents available in the school archive, the use of pedagogical resources as a tool for a dynamic class was noted, the main subject to be worked on in the maps was followed up. Within the main subject, the sub-themes and highly relevant sections that are essential in the creation of mental maps were taken into consideration.

Focusing on the available lesson plans, it was also possible to notice that during the exhibition of mind maps, students obtained an example and inspiration to build their own maps with an environmental theme. Given the arguments above, the applied class resulted in good performance on the part of the students through the activities carried out.

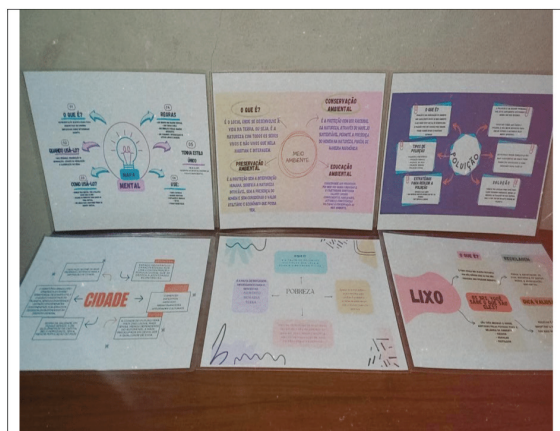


Figure 1: Pedagogical archives and applied works

Source: Authors (2023)

Another point to be highlighted is that the mind map is an advantageous ally for the students' teaching-learning process, where they are encouraged to develop logical reasoning, with playful and creative activity and promoting synthesis and retention of subjects.

Furthermore, environmental education

worked through pedagogical trends of mental maps (mapped pedagogy) will be of great importance in the personal and social lives of students.

The map structure assists in memorization, critical analysis, and synthesis of important content present in various types of assessments that will take place in the student's student life.

In the analysis it was also noticed that only in school life, environmental education will trigger new thoughts and points of view about society and the environment in which they live, thus generating knowledge to raise awareness and preserve something so important for everyone, the environment.

In general, the school where the activity was carried out became much more engaged in environmental issues. Furthermore, students began to be encouraged on a daily basis, together with teachers, to organize science fairs and produce materials for such events at school. In addition, recreational activities aimed at raising environmental awareness were also developed by the school's teachers. Although it is small, the school has a comfortable space for its students, with common areas so that children can play during breaks.

Finally, the analysis of the material was based on key elements for identifying the ecosystem close to the school. This way, the occurrence of elements related to fauna, flora and other environmental conditions were analyzed in the drawings. In this sense, the morphology of the drawn plants was considered, paying attention to the distribution of these plants in the drawings and whether there was a predominance of just one type of plant or several. For fauna, it was observed which animals the children drew, as well as their quantity and for other aspects, the characteristics of the soil and the occurrence of other elements were considered. Thus, the presence or absence of these elements in

the drawings indicates how those children see the mangrove ecosystem, as well as expressing their level of knowledge about that environment.

FINAL CONSIDERATIONS

From all the above, it was evident that mental maps are essential tools not only for analyzing children's perception of the characteristics of the environment, but also for enriching the understanding of the details of the most diverse Brazilian ecosystems. Also, mainly highlighting the points relating to the fauna and flora of the region in which the students are located, using mental maps as an analysis tool, being applied in the context of a municipal school located in the urban area of the municipality of Campos Gerais-MG.

Furthermore, it also became evident throughout this work that mental maps have the importance of identifying the knowledge that children have regarding the most diverse aspects of environmental issues, so that they serve as an object of study for planning activities of environmental education at that school. The use of mental maps, in this sense, can help to better understand the idea of the environment that each child has, since the individual can express more elements in a drawing than would eventually be said in an interview or questionnaire.

The potential of using mental maps is also in the sense that, for many decades, humanity's focus was centered on the extraction of environmental resources to meet human needs without any concern or care for the environment. Over this time, degradations, disasters and environmental crises have continually piled up throughout the history and evolution of capitalism.

Until today's climate crises, collapsing all sectors of society, demanded that the world take a different look at humanity's relationship with the environment.

In this context of complexities, with such profound changes caused by countless questions, new pedagogical practices emerged in view of the way in which social, economic and environmental relations were being constructed and carried out. In this sense, it is expected that such discussions will be directed, not simply towards the presence of human beings in the environment, but towards the measures necessary to re-evaluate and transform the current model of society from a new ecological and sustainable perspective.

Such a scenario of overwhelming crisis, unprecedented in the history of humanity, clearly presents itself as an unmissable opportunity to adopt a new rhythm for society and the economy with the global ecosystem, whether in fact used for the improvement of quality of life and a more sustainable economy, with awareness and understanding of the

need for balance in all existing relationships and recognition of the responsibility shared by all social agents.

Therefore, among the most diverse impacts caused and immediate results evidenced, it is worth highlighting that it is the school's role to transform students' consciousness, pointing to greater integration of economic development strategies with public policies to protect the environment, in conjunction with citizens and organizations more engaged in improving and implementing solidarity mechanisms.

Finally, it is very clear, however, that some explanations of interpretative doubts presented here are, in fact, great demands for unveiling these realities that we intend to understand in order to transform. Therefore, this work does not end here, it simply expands this horizon of discussion a little further.

REFERENCES

BIRMAN, J. **O trauma na pandemia do Coronavírus: Suas dimensões políticas, sociais, econômicas, ecológicas, culturais, éticas e científicas**. 2ª.ed. Rio de Janeiro: Civilização Brasileira, 2021.

BORBA, R. C. do N. et al. **Percepções docentes e práticas de ensino de ciências e biologia na pandemia: uma investigação da Regional 2 da SBEnBio**. Revista de Ensino de Biologia da SBEnBio, [S.l.], v. 13, n. 1, p. 153-171, 2020. Disponível em: <http://sbenbio.journals.com.br/index.php/sbenbio/article/download/337/100/990>. Acesso em: 14 fev. 2023.

BUZAN, T. **O livro de mapas mentais**. Plume, 2ª edição, p. 320, 1996.

CAMPOS GERAIS – MG. **Secretaria Municipal de Educação**. Disponível em: < <https://www.camposgerais.mg.gov.br/> >. Acessado em 23 de abril de 2023.

DE SOUZA, P. R. P., & JÚNIOR, J. N. B. de S. (2021). Educação ambiental: concepções e práticas / Environmental education: concepts and practices. **Brazilian Journal of Development**, 7(4), 43010–43023. <https://doi.org/10.34117/bjdv7n4-660> Disponível em: <<https://ojs.brazilianjournals.com.br/ojs/index.php/BRJD/article/view/28994> >. Acessado em 12 de setembro de 2023.

GAROFALO, D. **Como as metodologias ativas favorecem o aprendizado**. 2018. Disponível em: <https://bit.ly/3vFonFX>. Acesso em: 14 fev. 2023.

KOZEL, S. T. **Das imagens às linguagens do geográfico: Curitiba, a “capital ecológica”**. São Paulo. Tese de Doutorado-Departamento de Geografia da Universidade de São Paulo. 2001.

OLIVEIRA, N. A. da S. (2012). **A educação ambiental e a percepção fenomenológica, através de mapas mentais**. REMEA - Revista Eletrônica Do Mestrado Em Educação Ambiental, 16. Disponível em: < <https://doi.org/10.14295/remea.v16i0.2779> >. Acessado em 16 de set. de 2023.

PINHEIRO BESERRA, E.; SANTOS ALVES, M. D. EDUCAÇÃO AMBIENTAL: PESQUISA BIBLIOGRÁFICA UTILIZANDO PORTAL CAPES. **Revista da Rede de Enfermagem do Nordeste**, vol. 10, núm. 3, julio-septiembre, 2009, pp. 68-73 Universidade Federal do Ceará, Fortaleza, Brasil. Disponível em:< <https://www.redalyc.org/pdf/3240/324027967008.pdf>>. Acessado em 23 de setembro de 2023.

SANTOS, A. dos; VASCONCELOS, C. A. de. Percepção ambiental e mapas mentais: um diagnóstico dos alunos acerca do ecossistema manguezal. **Revista REAMEC**, Cuiabá - MT, v. 5, n. 2, jul/dez 2017, ISSN: 2318-6674. Revista do Programa de Doutorado da Rede Amazônica de Educação em Ciências e Matemática. Disponível em:< <http://periodicoscientificos.ufmt.br/ojs/index.php/reamec>>. Acessado em 23 de setembro de 2023.

SILA, R. L. F. da; CAMPINA, N. N. Concepções de educação ambiental na mídia e em práticas escolares: contribuições de uma tipologia. **Pesquisa em Educação Ambiental**, vol. 6, n. 1, pp. 29-46, 2011. Disponível em:<<https://www.revistas.usp.br/pea/article/view/55932>>. Acessado em 23 de setembro de 2023.

SEVERINO, A. J. **Metodologia do trabalho científico**. São Paulo: Cortez Editora, 2007.

WILLE, M.F.C. **O uso do mapa mental como um facilitador para a criação de conhecimento**. Curitiba-Pr, 2010. Acesso em: 14 fev. 2023.