


THEORETICAL PERSPECTIVES OF ENVIRONMENTAL EDUCATION: an integrative analysis of complexity and eco-formation

PERSPECTIVAS TEÓRICAS DA EDUCAÇÃO AMBIENTAL: uma análise integradora da complexidade e ecoformação

PERSPECTIVAS TEÓRICAS DE LA EDUCACIÓN AMBIENTAL: un análisis integrador de la complejidad y ecoformación


Joel Haroldo Baade

Doutor. Professor and researcher in the Graduate Programs in Development and Society and Professional in Basic Education at the University of Alto Vale do Rio do Peixe – UNIARP. baadejoel@gmail.com

 0000-0001-7353-6648

Pâmela Ribeiro Froguel

Master's student in the Professional Graduate Program in Basic Education at the Alto Vale do Rio do Peixe University – UNIARP. Santa Catarina State Department of Education. pamelaribeiro004@gmail.com

 0009-0002-0310-4596


Luciano Froguel

Master's student in the Professional Graduate Program in Basic Education at the University of Alto Vale do Rio do Peixe – UNIARP. Santa Catarina State Department of Education. lucianofroguel@gmail.com

 0009-0007-5675-5524


Jussara Aparecida Jombra

Master's student in the Professional Graduate Program in Basic Education at the Alto Vale do Rio do Peixe University – UNIARP. Municipal Department of Education of Caçador. jussara.aparecida@uniarp.edu.br

 0009-0002-3191-9506

Ramón Garrote Jurado

Doctor. Senior Lecturer, Library Science, Information, Education and IT college, University of Borås, Sweden. garrote@hb.se

 0000-0002-3971-9894

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ABSTRACT:

This article analyzes how Edgar Morin's approach to complexity and Gaston Pineau's eco-formation can promote an environmental education that recognizes the world's diversity, interdependence, and uncertainty, contributing to an integral human formation about the environment. We based the research on a systematic review of articles on the topic. Given the public policies of environmental education in Brazil, we identified the theoretical contributions of Morin and Pineau to the theme. We selected research papers that allowed us to evaluate the involvement of the two theorists in the context of environmental education in Brazil. We conclude that the complexity and eco-formation approach to environmental education can play an increasingly key role in shaping a sustainable future for all. We suggest that more research is needed to explore these perspectives and evaluate the effectiveness of teaching strategies based on them.

KEYWORDS: Environmental Education; Complexity; Eco-Formation; Sustainability.

Introduction

Environmental Education, provided in the Federal Constitution of 1988 and considered a human and fundamental right, has aroused a growing interest as a response to the process of environmental degradation. According to the National Policy on Environmental Education – PNEA, Law No. 9,795/99, we can understand that:

The processes through which the individual and the community build social values, knowledge, skills, attitudes, and competencies for the conservation of the environment, a good for the common use of the people, essential to a healthy quality of life and its sustainability.

Brazilian public policies for environmental education aim to promote sustainable development, making citizens aware of the importance of conserving the environment and building a fairer society. The National Policy for Environmental Education (PNEA) establishes guidelines and actions for this purpose, seeking to sensitize the population and promote sustainability. However, it is recognized that many individuals still do not take responsibility for environmental damage, which requires a change in mindset. The National Program for Environmental Education (ProNEA) and the National Program for the Training of Environmental Educators (ProFEA) were developed to address this issue, complementing each other by promoting awareness at all educational levels and involving society in a participatory way, encouraging environmental protection (Brasil, 1999, 2002, 2006; Axe; Velasco, & Amin; 2006, p. 164).

These programs highlight the importance of individual actions on the environment and encourage everyone's active participation in environmental conservation. By integrating different social, ethical, economic, and political dimensions, they aim to build sustainable societies throughout Brazil. For these initiatives to be successful, it is essential to strengthen and expand the dissemination of these public policies, ensuring a more balanced future and the preservation of natural resources for future generations (Jacobi, 2003, p. 191).

Therefore, environmental education seeks to promote a more balanced relationship between society and nature, through collective awareness, appreciation of environmental conservation and adoption of responsible and sustainable practices. The interdependence between society and nature becomes evident when we understand that each individual action contributes to global ecological balance or instability.

Given this scenario, authors such as Edgar Morin and Gaston Pineau offer relevant theoretical contributions to a complex and integral approach. Morin proposes overcoming the fragmentation of knowledge through complexity theory, recognizing the multiplicity of dimensions and levels of organization present in the real world (Morin, 2005, p. 83). Pineau, in turn, proposes the tripolar theory of formation, which encompasses the personal, social, and natural aspects, highlighting the interaction between the individual, society and nature (Moraes, 2007, p. 24).

In this sense, this article seeks to explore the integration of complexity and eco-training in the context of Environmental Education, through a systematic review of articles related to the theme. The challenges and perspectives of an approach that

considers the multiple dimensions of human formation in relation to the environment will be discussed.

Edgar Morin and Gaston Pineau: Complexity and Eco-formation

Human beings can develop relationships, interrelationships, reconstructions, and contextualization. However, with the increasing specialization in the various areas of knowledge, we are taught in isolation, fragmenting knowledge, which makes it difficult to create connections (Alvez, & Bianchi, 2021 p. 83). Discipline alone is not enough to deal with the complexity of the cognitive aspect, which is essential to the teaching process. It is necessary to cross its boundaries and interrelate its knowledge with other knowledge from other disciplines. Morin states that knowledge is only pertinent if we can establish it in a context (Morin, 2003, pp. 13-14).

According to Morin (2005, p. 13), the current challenges that impact the planet are due to the lack of understanding on the part of humanity, which is based on a simplistic mentality. These issues include the deterioration of the environment, the indiscriminate exploitation of natural resources, climate change (Alho, 2012, p. 153), social exclusion, the unbridled pursuit of profit, as well as the worsening of socioeconomic disparities, which characterize contemporary dilemmas (Caprara, 2017, p. 426).

The growing process of environmental degradation has aroused interest in various sectors of society, including the field of education, which sees an opportunity to understand environmental problems and promote a more harmonious relationship between society and nature. Through education, we seek to promote a collective conscience that values environmental preservation, as well as a more responsible and sustainable attitude towards the environment. It is believed that, by understanding the interdependence between society and nature, more effective solutions can be found to address environmental challenges and build a more balanced future (Farias, & Souza, 2018, p. 2).

One field of study and practice that aims to promote a more balanced relationship between humans and the environment is environmental education (Jacobi, 2003, p. 204). From this perspective, it is essential to consider the contributions of authors who defend a comprehensive and integrative view of reality, such as Edgar Morin and Gaston Pineau. Their research address relevant aspects from the perspective of complexity and eco-formation, conceptualized as an educational process that encompasses the interaction between the individual, society, and nature.

Edgar Morin, a renowned French thinker, developed complexity theory to overcome the fragmentation of knowledge and thought resulting from the reductionist approach to modern science. He argues that complexity is an essential feature of the real world, composed of multiple dimensions and levels of organization, which interact in dynamic and contradictory ways. His proposal consists of a reform of thought that makes it possible to recognize unity in diversity, order in disorder, organization in disorganization, uncertainty in certainty, subjectivity in objectivity, among other fundamental principles that lead to a more comprehensive and profound understanding of reality (Morin, 2005, pp. 68-69).

Considering the thought of Edgar Morin, Environmental Education can contribute to the recognition of the human being and see himself as part of the whole. Contrary to a fragmented view, which separates the human from nature (Baade; Brandenburg, & Velasco, 2020, p. 93). One way to overcome the technicist paradigm that fragments and isolates is to recognize the interdependence between society and nature and the impossibility to separate them. Thus, we can better understand the relationships we establish with the environment and the consequences they have for our future (Farias, 2018, p. 5).

Gaston Pineau is also a French researcher, who proposed the tripolar theory of formation, considering that every formative process involves three poles: the personal, the social and the natural. The personal pole refers to the subjective and singular dimension of everyone, which is formed from their life experiences, their values, their projects, their emotions, their creativity. The social pole concerns the intersubjective and collective dimension of education, which takes place through interactions with others, institutions, cultures, and knowledge. The natural pole refers to the objective and universal dimension of education, which refers to the relationship with the environment, with natural resources, with physical laws, with biological rhythms. From the tripolar dimension arises the concept of eco-training (Moraes, 2007, pp. 25-26).

As mentioned by Gadotti (2001, p. 91), the concept of "eco-formation" was introduced by Gaston Pineau during his studies on self-training in the 1980s. Pineau established a connection between people's life stories, relating nature in their daily lives. Eco-formation emerged because of these reflections, being originated in the research of permanent education. It is based on the ecological paradigm and seeks to explore the interactions between human beings and the natural world, questioning their dynamics and relationships.

Eco-training is not a specific type of limited or one-dimensional education that sees only through the lens of environmental conservation. On the contrary, it is aligned

with a broad education in relation to life and the planet, an attitude that is not new and should never be forgotten (Navarra, 2007, p. 3).

In this sense, eco-formation emerges in a complex context, as it proposes a reflection that is based on the principle that nature is not something detached from human beings. Thus, environmental issues are being progressively debated in a serious and broad way. The view of nature as an external space, for which we have no great responsibility or future guilt, is no longer acceptable. Studies related to eco-formation present significant challenges that stimulate our acting to change, whether through awareness, reflection, analysis, or action (Salles, 2017, p. 21).

Based on Pineau, eco-training can be reflected as a pedagogical proposal that seeks to integrate the three poles of education in a complex and transdisciplinary perspective. Eco-training aims to develop an ecological awareness in individuals and social groups, recognizing the interdependence between living beings and the environment, promoting a responsible and supportive attitude towards the planet. It also seeks to value personal and collective learning experiences in contact with nature, stimulating aesthetic sensitivity, scientific curiosity, and citizen participation. In addition, it aims to promote dialogue between diverse types of knowledge and cultures about the environment, respecting diversity and seeking integration (Silva, 2007, p. 98).

To understand the relationships between living things and the environment, it is necessary to overcome traditional views that advocate authoritarianism, individualism, ecological degradation, and resistance to change. It is necessary to adopt a more humanistic, collective, and global perspective, which recognizes that human actions have local and global impacts, positive or negative. In addition, it is necessary to develop a transdisciplinary and eco-formative vision, which values ethics, and the well-being of life in all its forms, contributing to socio-environmental sustainability (Souza; Ertzogue, & Zwierewicz, 2020, p. 120).

Morin (2005) provides a significant theoretical contribution to reflection in the field of environmental education as a complex process. The ideas presented encourage us to overcome reductionist and fragmented views of reality, and to build a more holistic and integrative vision, which considers the multiple dimensions of human formation in relation to the environment and society in which we live. It is important to highlight that Pineau's concept of eco-training goes beyond Environmental Education, since it incorporates the principle of transdisciplinarity, encompassing contributions from various areas of knowledge.

Methodology

This research adopted a qualitative approach based on Content Analysis. According to Bardin (1977), this technique is divided into three chronological stages: pre-analysis, analysis of the material and treatment of the results, including inference and interpretation. The objective was to carry out an analysis of scientific articles related to environmental education from the perspective of complexity and eco-formation, with the purpose of presenting an overview of the main theoretical and practical perspectives and their implications for the promotion of ecological awareness and socio-environmental sustainability.

The sample consisted of ten scientific articles selected through a systematic review of the literature. To ensure the representativeness and timeliness of scientific research, articles published between 2005 and 2022 were considered. The selection of articles was made based on criteria of relevance and adequacy to the themes of complexity and eco-formation in Environmental Education. Data were collected through the CAPES journal portal. The following descriptors and search expressions were used in the data collection process: "Eco-formation" AND "Complexity" AND "Environmental Education", which returned 4 (four) results; "Eco-formation" AND "Environmental Education", which returned 16 (sixteen) results; "Complexity Theory" AND "Environmental Education", which returned 59 (fifty-nine) results. The pre-analysis phase consisted of reading the titles and abstracts of the articles and selecting the texts that were in accordance with the proposed problem. At this stage, eighteen articles were obtained. The analysis of the number of citations that each text had received according to the Google Scholar platform was then analyzed. These data were recorded in a table. Finally, the ten texts with the greatest affinity to the theme or that had a volume of citations were selected.

After the selection of the relevant articles, the units of analysis were identified during the complete reading of the selected documents. The units of analysis were categorized according to the themes addressed, such as "Complexity Theory and Environmental Education", "Eco-formation and Environmental Education" and "Complexity and Eco-formation in Environmental Education".

The analysis and interpretation of the data involved the reading of the selected articles, with the objective of identifying patterns, relationships and trends present in the content. The results of the analysis were presented in the form of a table with relevant information from the documents analyzed. The authors, year of publication, titles, objectives, methodology, and results of the research were highlighted.

Results and discussion

After concluding the survey on the subject, chart 1 was composed with the ten selected articles. In the first column of the table, after the names of the authors, the number of citations that the text had already received at the time of data collection, in February 2024, was also recorded.

Chart 1 - Studies Selected by systematic review

Author and citation in articles	Year	Title	Objective	Methodology	Results
Ana Tereza Reis da Silva Seventy cited	2008	Eco-formation: reflections for an environmental pedagogy based on Rousseau, Morin and Pineau	It analyzes the theoretical construction of the term "Eco-formation" in a French research and education experience that focuses on the environment. The Eco-formation Research Group (GREF) is based on the articulation of Jean-Jacques Rousseau's theory of the three masters - man, others, and things - together with the human trinity individual/species/society proposed by Morin. Through this approach, GREF offers original contributions to the development of an Environmental Pedagogy.	Literature Review	The final considerations highlight Eco-training as an innovative approach in Environmental Education that promotes the connection between humanity and the environment, combating modern loneliness and emphasizing co-solidarity between humans and nature. It aspires to transcend the prehistory of the human spirit, fostering a global society that values human and biophysical diversity, however, it emphasizes the importance of doing so without imposing orthodoxies, avoiding the idealization of a perfect world.
Martha Tristão Two cited	2010	Theoretical and methodological approaches of the research group in environmental education at UFES: studies from complexity	The purpose of the group is to integrate research conducted at the master's and doctoral levels as well as teaching, research, and extension projects, in addition to establishing a Reference Center in Environmental Education with an interdisciplinary and transdisciplinary approach.	Literature review regarding theoretical and methodological approaches used by the research group.	The article highlights the importance of the transdisciplinary and interdisciplinary approach in Environmental Education. The group seeks to understand the complexity of environmental issues and recognizes that research conclusions are always partial and relative, due to the impossibility of encompassing all the complexity of environmental reality.
Maria Aparecida Vianna Lodi Two cited	2018	Eco-training in living spaces: phenomenological paths for a collective, learning, and transformative	The work questions the environmental training of teachers and students at a municipal school in living spaces, enriched by the experiences of the IV	A phenomenological approach was used, in addition to participant observation, dialogues and	Eco-training in living spaces: phenomenological paths for a collective, learning, and transformative environmental education.

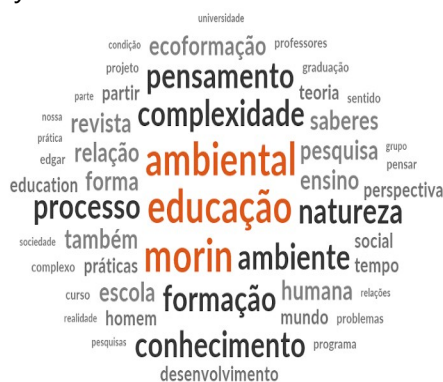
		environmental education	National Conference for Children and Youth on the Environment (IV CNIJMA), along with the realization of field classes, excursions, and guided visits.	narrative investigation.	
Fernanda Rezende Martha Tristão Rosinei Ronconi Vieiras Six cited	2018	Environmental education and complexity: enhancing relationships	The purpose of the study was to establish a dialogue with some of the concepts, notions and ideas related to Complexity Theory and to explore potential contributions to the thinking of Environmental Education.	Literature Review	It was proposed to visualize Environmental Education as a power to the educational processes, to favor a space that would allow the exchange of experiences contextualized with the subject's own daily life, crossing it with possibilities of contributing to the establishment of new relationships with the environment.
Yasmin Leon Gomes; Daniele Saheb One cited	2019	Teaching the human condition: a reflection on environmental education, music, and self-education	It presents reflections on the self-training of educators, based on Edgar Morin's third knowledge, "Teaching the human condition", together with the dialogue between environmental education and music. The importance of the expression of subjectivities and the relationship between eco-formation and music through the concepts of soundscape and acoustic ecology are highlighted.	This is a bibliographic review based on Edgar Morin's third knowledge, "Teaching the human condition".	It is proposed that, for the self-formation of educators, it is essential that they take a closer look at both the ecological/environmental and artistic/aesthetic fields, to explore the human condition in its entirety.
Lucas Antônio Viana Botelho; Francisco Kennedy Silva Dos Santos One cites	2020	Eco-training and socio-environmental protagonism: contemporary eco-educational dialogues and possibilities	It was argued about the challenges and emerging possibilities for the treatment of the local-global socio-environmental problem, aiming at eco-training as a process that enables the socio-environmental protagonism and the eco-educational plots from inside to outside the school walls.	It is a theoretical-reflexive dialogue through a literature review.	Environmental education is essential for the formation of subjects who are aware of and committed to the environment. Eco-training is a promising alternative for this education, as it promotes the socio-environmental protagonism.
Juliana Mara Antonio; Adriana Massê Kataoka; Patricia Neumann Five cited	2020	Teachers' perceptions about environmental education: an analysis based on complexity	The objective of this study was to make a comparison between the perception of the participating teachers before and after the Continuing Education Course in Environmental Education, from the perspective of Complexity, to evaluate its impact on the understanding and practice of Environmental Education	In this study, questionnaires containing open-ended questions were used to collect data from the participants, one applied before the course and the other applied after. For the analysis of the questionnaires, we	It was observed that, initially, the conservative and pragmatic conceptions predominated, but throughout the process, there was an expansion of these views, especially in relation to the Seven Knowledges connected to Environmental Education.

			(EE).	opted for the use of the theory of Discourse Analysis, following the French approach, as proposed by Orlandi.	
Erich de Freitas Mariano Two cited	2020	Complexity theory and outdoor experiential education: a look in the light of environmental education	The work explores the relationship between the theory of complexity, proposed by Edgar Morin, and outdoor experiential education, with a focus on environmental education. The research seeks to understand how complex thinking can contribute to an educational approach that promotes significant learning and the construction of knowledge through experiences in natural environments.	It refers to a literature review on complexity theory, outdoor experiential education and environmental education.	The work highlights the importance of adventure education as an effective approach to promote environmental awareness, the development of scientific and environmental skills, and creativity in students. In addition, it emphasizes the need to integrate complexity and dialogic perspective in environmental education, recognizing that man and nature are interdependent.
Adelmo Fernandes de Araújo; Wanderson Rodrigues Morais; Orlane Fernandes Silva Zero cited	2022	Complexity Theory: discursive functioning in academic productions on Environmental Education in school contexts	To analyze the discourse in statements that are based on Edgar Morin's contributions to the understanding of studies on Environmental Education (EE) conducted in the school environment. The research corpus consists of selected excerpts from theses and dissertations on EE collected by the EArte Project.	The approach of the French Materialist Discourse Analysis of Michel Pêcheux and his collaborators was used as a theoretical basis for the research.	It has been identified that the authors employ a variety of mechanisms, including pre-constructed effects and transverse discourses. They mobilize a wide range of themes based on the theory of complexity, which demonstrates that this approach really dialogues with Environmental Education (EE). In addition, the lack of referential stability was observed in some expressions.
Jussara de Souza Guedes; Simone Carlim Veber; Marlene Zwierewicz; Madalena Pereira da Silva Zero cited	2022	Transdisciplinarity and eco-training in the final years of Elementary School in research with intervention of the professional master's degree	To systematize a transdisciplinary and environmental education experience developed in the final years of Elementary School in a municipal school in Timbó Grande, Santa Catarina, through a collaborative intervention carried out as part of two researches of the Professional Master's Degree in Basic Education (PPGEB) at the Alto Vale do Rio do Peixe University (UNIARP) in Caçador, Santa Catarina.	The methodology used was the proposal of the Eco-Forming Creative Projects (PCE),	The intervention played a key role in boosting transdisciplinary and eco-formative practices, enabling an approach to learning, and teaching focused on transformative education. This was evident when students, even during the pandemic, contributed to activities that promoted individual, social, and environmental well-being.

Source: The Authors (2024).

After analyzing the selected articles, it was possible to identify that only the article entitled "Eco-formation: reflections for an environmental pedagogy from Rousseau, Morin and Pineau" has a connection between the concepts of environmental education, eco-formation, and complexity (Silva, 2008). The other articles deal exclusively with environmental education in relation to eco-formation or complexity, without integrating these concepts. It is worth noting that the studies mentioned represent only a small sample of the studies that have been conducted to date, however, they provide an overview of the main patterns observed in this research. Figure 1 shows a word cloud considering the frequency of the fifty most frequent terms in the ten selected texts

Figure 1 - 50 most frequently used terms



Source: The Authors (2024).

The analysis of articles reveals tendencies in the teaching of environmental education using interdisciplinarity and transdisciplinarity, although the texts do not explicitly resort to these concepts. Environmental education, in this context, integrates knowledge and knowledge from different areas, also dealing with more complex issues. This approach is fundamental for building a more sustainable future, as it allows for an understanding of environmental problems in a comprehensive way. In the data analysis, a prevalence of studies that relate environmental education to Morin's complexity theory was observed. The concept of eco-training, in the selected sample, is less mentioned in connection with environmental education.

The relevance of the complexity approach and eco-training in environmental education can be summarized in three main points: the need to rethink the role of the educator, the curriculum, and the teaching methodologies of environmental education.

The teacher who works with environmental issues should not only be a transmitter of knowledge, but a facilitator of the learning process. It is necessary to promote critical reflection and the construction of knowledge, considering experiences relevant to students. This perspective is especially pleaded in the studies by Araújo, Morais and Silva

(2022); Lodi (2018); Antonio, Kataoka and Neumann (2020) and Rezende, Tristão and Vieiras (2018), but it is also mentioned in the other texts.

Araújo, Morais and Silva (2022) still identify in this aspect a little that cannot be ignored. According to the authors:

The fragility of the teachers' responses, which arise from their distancing from their units about the PPP, give them the illusion that they carry out environmental education projects. Distancing that arises due to resistance to information or lack of assimilation, due to lack of adequate training (Araújo, Morais, & Silva, 2022, p. 223).

Thus, thinking about the role of the teacher in environmental education from the perspective of complexity and eco-training necessarily leads to a debate on the initial and continuing education of professionals in the field of education (Antonio, Kataoka, & Neumann, 2020).

The environmental education curriculum, in turn, should be constructed in a way that reflects the complexity of environmental problems. It should integrate knowledge and ability from different areas of knowledge and promote understanding of the interrelationships between the different elements of the environment. This point of view is advocated especially in the texts of Mariano (2020); Antonio, Kataoka and Neumann (2020); Tristan (2010); Silva (2008); Lodi (2018) and Guedes et al. (2022), although it is also present in the other texts. Antonio, Kataoka and Neumann (2020, p. 9) emphasize that, in their analysis of curricula in the state of Paraná, "Only the guidelines for the disciplines of Geography and Science briefly mention the need for EE [Environmental Education] in projects or articulated in disciplinary contents".

Not least, it is necessary that the teaching methodologies of environmental education consider the active participation of students for the development of a critical environmental awareness. When students engage in the learning process, they can understand environmental issues. The methodologies can be implemented in a variety of ways, such as research projects, games, debates, and field visits. This aspect is highlighted especially by the studies by Guedes et al. (2022); Antonio, Kataoka and Neumann (2020); Araújo, Morais e Silva (2022) and Mariano (2020). Representative of this perspective is the text by Mariano (2020), which refers to education through adventure. According to the author:

We can emphasize that pro-environmental actions only exist when there is an integration of personal identity with the environment. For this reason, the approach to educational practice through adventure

should be associated with the valorization of dialogue and the construction of knowledge based on complementarity. This idea is closely related to the fundamental characteristics of complexity theory, such as the characterization of phenomena as systems, hologrammatic approaches to teaching and learning processes, and the dialogic perspective (Mariano, 2020, p. 25).

Guedes et al. (2022, p. 21) also point out in this regard that "Tangential teaching methodologies from transdisciplinary and eco-formative perspectives in Elementary Education can be a challenge, if we consider the persistence of initiatives based on the fragmentation and decontextualization of knowledge".

For future research on this topic, it is suggested that studies investigate the contributions of eco-training and complexity in the training of teachers who develop activities focused on environmental education. In addition, it would be relevant to evaluate the effectiveness of teaching approaches in environmental education based on these perspectives. This research will help to expand knowledge about the possibilities of addressing complexity and eco-formation in environmental education.

Final considerations

Environmental issues require a complex approach that understands the connections between different elements of the environment. Ecotraining, on the other hand, offers an integrative and holistic vision that can contribute to promoting a more effective and transformative environmental education. These concepts offer a favorable perspective for the development of environmental education, capable of assisting in contemporary challenges, making it possible to overcome the limitations of conventional approaches, which are often fragmented and simplistic.

The systematic review was based on the content analysis of ten scientific articles, revealing trends, connections, and limitations in the field of environmental education. These results have relevant implications for current educational practices and future research.

Therefore, the article argues that the approach of complexity and eco-training in environmental education can play an increasingly relevant role in building a sustainable future for all. We highlight the need for more research to explore these perspectives and evaluate the effectiveness of teaching strategies based on them. The expectation is that such studies will contribute to broaden the understanding of the potential of the complexity and ecoformation approach in environmental education, in addition to fostering teaching in line with current challenges.

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RESUMO:

Este artigo analisa como a abordagem da complexidade de Edgar Morin e a ecoformação de Gaston Pineau podem promover uma educação ambiental que reconheça a diversidade, a interdependência e a incerteza do mundo, contribuindo para uma formação humana integral em relação ao ambiente. A pesquisa é baseada em uma revisão sistemática de artigos sobre o tema. Tendo em vista as políticas públicas de educação ambiental no Brasil, identifica-se as contribuições teóricas de Morin e Pineau para o tema. Depois, seleciona-se pesquisas que permitem avaliar a inserção dos dois teóricos no contexto da educação ambiental no Brasil. Conclui-se que a abordagem da complexidade e da ecoformação na educação ambiental pode desempenhar um papel cada vez mais relevante na construção de um futuro sustentável para todos. Destaca-se a necessidade de mais pesquisas que explorem essas perspectivas e avaliem a eficácia das estratégias de ensino baseadas nelas.

PALAVRAS-CHAVE: Educação Ambiental; Complexidade; Ecoformação; Sustentabilidade.

RESUMEN:

Este artículo analiza como el abordaje de la complejidad de Edgar Morin y la ecoformación de Gaston Pineau pueden promover una educación ambiental que reconozca la diversidad, la interdependencia y la incertidumbre del mundo, contribuyendo para una formación humana integral en relación al ambiente. La investigación está basada en una revisión sistemática de artículos sobre el tema. Teniendo en cuenta las políticas públicas de educación ambiental en Brasil, se identifican las contribuciones teóricas de Morin e Pineau para el tema. Después, se seleccionan investigaciones que permiten evaluar la inserción de los dos teóricos en el contexto de la educación ambiental en Brasil. Se concluye que el abordaje de la complejidad y de la ecoformación en la educación ambiental puede desempeñar un papel cada vez más relevante en la construcción de un futuro sostenible para todos. Se destaca la necesidad de más investigaciones que exploren esas perspectivas y evalúen la eficacia de las estrategias de enseñanza basadas en ellas.

PALABRAS CLAVE: Educación Ambiental; Complejidad; Ecoformación; Sostenibilidad.