

Environmental Education in the Pedagogy Undergraduate Program: the case of an institution in the countryside of São Paulo¹

Educação Ambiental na Graduação de Pedagogia:
o caso de uma instituição do interior de São Paulo

Educación Ambiental en la Licenciatura en Pedagogía:
el caso de una institución del interior de São Paulo

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ABSTRACT

This study investigates the relationship between the training of Pedagogy students and Environmental Education, aiming to identify points of convergence between these areas and understand the reasons behind this possible connection. The proposal stems from the need to reflect on the role of EE in teaching. Considering that we live under an economic model based on unsustainable production and consumption habits, which harm ecosystems and threaten the planet's regeneration, it becomes urgent to adopt a holistic view of reality, understanding the universe as an integrated network. With this purpose, the study analyzes the Pedagogy undergraduate course at a private university in the countryside of São Paulo, recognizing that teacher education plays a central role in building collective knowledge in Early Childhood Education, Primary Education, and Youth and Adult Education. The research is of a qualitative-quantitative nature and is configured as a case study, based on a literature review, document analysis, and data collection through interviews and questionnaires applied to the course coordinator, professors, and students at the institution. The data were systematized and analyzed descriptively and reflectively. The results reveal deficiencies in the training of future educators, which hinder the overcoming of a fragmented perspective on EE. Nevertheless, the study aims to foster reflections, raise new questions, and contribute to advances in research in the field, strengthening the critical education of students and their professional engagement with Environmental Education.

Keywords: Environmental Education; Contemporary Cross-Cutting Themes; Pedagogue; Teacher Education.

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RESUMO

Este trabalho investiga a relação entre a formação dos estudantes de Pedagogia e a Educação Ambiental (EA), buscando identificar pontos de convergência entre essas áreas e compreender as razões dessa possível proximidade. A proposta parte da necessidade de refletir sobre o espaço ocupado pela EA na formação docente. Considerando que vivemos sob um modelo econômico baseado em hábitos de produção e consumo insustentáveis, que comprometem os ecossistemas e ameaçam a regeneração do planeta, torna-se urgente adotar uma visão holística da realidade, compreendendo o universo como uma rede integrada. Com esse propósito, o estudo analisa o curso de Graduação em Pedagogia de uma universidade privada no interior de São Paulo, entendendo que a formação de professores tem papel central na construção de saberes coletivos na Educação Infantil, no Ensino Fundamental Anos Iniciais e na Educação de Jovens e Adultos (EJA). A pesquisa, de natureza quali-quantitativa, configura-se como um estudo de caso, com base em revisão bibliográfica, análise documental e coleta de dados por meio de entrevistas e questionários aplicados à coordenadora do curso, professores e alunos da instituição. Os dados foram sistematizados e analisados de forma descritiva e reflexiva. Os resultados revelam deficiências na qualificação dos futuros pedagogos, dificultando a superação de uma visão fragmentada sobre a EA. Ainda assim, o estudo pretende fomentar reflexões, suscitar novos questionamentos e contribuir para o avanço das pesquisas na área, fortalecendo a formação crítica dos estudantes e sua atuação profissional comprometida com a Educação Ambiental.

RESUMEN

Este trabajo investiga la relación entre la formación de los estudiantes de Pedagogía y la Educación Ambiental (EA), buscando identificar puntos de convergencia entre estas áreas y comprender las razones de esta posible proximidad. La propuesta parte de la necesidad de reflexionar sobre el espacio que ocupa la EA en la formación docente. Considerando que vivimos bajo un modelo económico basado en hábitos de producción y consumo insostenibles, que comprometen los ecosistemas y amenazan la regeneración del planeta, se vuelve urgente adoptar una visión holística de la realidad, entendiendo el universo como una red integrada. Con este propósito, el estudio analiza el curso de Licenciatura en Pedagogía de una universidad privada en el interior de São Paulo, comprendiendo que la formación docente tiene un papel central en la construcción de saberes colectivos en la Educación Infantil, en los primeros años de la Educación Primaria y en la Educación de Jóvenes y Adultos (EJA). La investigación, de naturaleza cuali-cuantitativa, se configura como un estudio de caso, basado en revisión bibliográfica, análisis documental y recolección de datos a través de entrevistas y cuestionarios aplicados a la coordinadora del curso, profesores y estudiantes de la institución. Los datos fueron sistematizados y analizados de forma descriptiva y reflexiva. Los resultados revelan deficiencias en la formación de los futuros pedagogos, lo que dificulta superar una visión fragmentada sobre la EA. Aun así, el estudio pretende fomentar reflexiones, suscitar nuevos cuestionamientos y contribuir al avance de las investigaciones en el área, fortaleciendo la formación crítica de los estudiantes y su actuación profesional comprometida con la Educación Ambiental.

Palabras clave: Educación Ambiental; Temas Contemporáneos Transversales; Pedagogo; Formación Docente.

1 Introduction

The growing environmental crisis currently facing humanity has led to profound societal challenges within an economic model that continues to prioritize profit maximization and unsustainable patterns of production and consumption, resulting in significant environmental impacts.

According to Loureiro (2004), the globalization of the environmental crisis and the intensification of ecological impacts demonstrate that, although we inhabit a planet endowed with remarkable biodiversity, its ecological stability remains highly vulnerable to human activities. The current scenario poses a tangible threat to ecosystem balance and to the Earth's capacity for regeneration, ultimately jeopardizing human survival.

Within this context, it is essential to recognize the inseparability of society and nature. Freire (1985) argued for overcoming the dichotomy between human beings and the natural world, emphasizing their fundamental interdependence. Consequently, discussing and critically reflecting on environmental issues is indispensable for fostering environmental awareness, empathy, and commitment.

Expanding upon this perspective, Jacobi (2003) advocates the construction of a holistic understanding of reality based on the conception of the universe as an interconnected network, in which all elements are intrinsically related. Such a perspective calls for a reassessment of contemporary lifestyles, the implementation of public policies aligned with sustainable development, and the adoption of the principles of Environmental Education (EE) as guiding frameworks for social transformation.

From this perspective, Environmental Education emerges as a strategic instrument for strengthening environmental awareness and shared ecological responsibility. Through the work of educators, it is possible to broaden engagement across different fields of knowledge, thereby reinforcing the central role of EE in teacher education.

Critical Environmental Education assumes a fundamental role because it extends beyond merely transmitting information about environmental conservation or encouraging environmentally responsible individual behaviors. Instead, it promotes a broader and more critical interpretation of reality by relating environmental issues to modes of production, consumption patterns, social inequalities, and political decisions that shape collective life. This perspective is consistent with Freire's conception of critical consciousness and the transformative reading of the world (Freire, 1985; Jacobi, 2003).

Within this framework, the Pedagogy degree program occupies a particularly important position, as it prepares professionals to work in Early Childhood Education, the early years of Elementary Education, and Youth and Adult Education (YAE). The program fulfills a significant social function, given that pedagogues act as mediators in the teaching-learning process and contribute to the critical development of socially engaged individuals.

Accordingly, reflecting on the initial education of these professionals is essential, as they are responsible for shaping the educational experiences of a substantial portion of the population from the earliest stages of schooling. Platzer (2014) emphasizes that initial teacher education provides the foundation for the professional competencies required throughout teaching practice.

Against this backdrop, the present study examines the relationship between Environmental Education and initial teacher education, based on the premise that future teachers who develop a critical understanding of environmental issues are better equipped to disseminate values and practices that contribute to the construction of a more sustainable society. Such preparation has the potential to foster meaningful and transformative educational experiences while expanding the number of individuals engaged in environmentally responsible citizenship.

The study is grounded in the hypothesis that the initial teacher education provided by the Pedagogy program at the institution under investigation presents shortcomings in integrating the theoretical and practical dimensions of Environmental Education, resulting in a fragmented and predominantly naturalistic approach to the subject.

Accordingly, this study investigates how Environmental Education has been incorporated into the Pedagogy curriculum, aiming to stimulate further academic debate, contribute to research in the field, and encourage students' critical reflection throughout their teacher education and future professional practice.

This investigation is characterized as a case study. According to Yin (2005), this methodological approach enables an in-depth examination of phenomena within their real-life context, thereby providing a more comprehensive and integrated understanding.

The research began with a literature review based on the selection of relevant authors and studies addressing Environmental Education. This stage provided the theoretical foundation for the investigation, informed the development of the data collection instruments (interviews and questionnaires), and supported the analysis and interpretation of the findings.

The study received approval from the Research Ethics Committee. Subsequently, contact was established with a private higher education institution located in the state of São Paulo, Brazil, as well as with the coordinator of the Pedagogy program, who authorized access to institutional documents, statistical data, and research participants, including the program coordinator, faculty members, and students selected through purposive sampling, all of whom provided informed consent. The data collection procedures included the analysis of pedagogical documents, course syllabi, and the curriculum matrix; semi-structured interviews with the program coordinator and faculty members; and questionnaires administered to students. All procedures ensured participants' confidentiality and anonymity. The collected data were organized and analyzed through a descriptive and reflective approach in order to understand how Environmental Education is incorporated into initial teacher education within the Pedagogy program.

2 Environmental Education and Pedagogy: Possible Dialogues

Understanding the intersections between Environmental Education (EE) and Pedagogy first requires reflecting on the concept of the environment, understood not merely in its natural dimension but as a historical and social construct. This perspective, developed by authors such as Lefebvre (1999) and Massey (2008), conceptualizes space as the product of the dynamic relationship between society and nature, positioning it as a fundamental element in contemporary educational debates.

Within this framework, Environmental Education is closely connected to the field of Pedagogy through its social, political, and educational character. Both share the purpose of mediating social relations while fostering their transformation. According to Reigota (2010), the environment should be understood as a space of dynamic interactions between natural and social dimensions, encompassing cultural, technological, and political transformations.

Despite its growing recognition, Environmental Education remains, in many educational settings, confined to conservative practices that are disconnected from the development of critical awareness. Consequently, an emancipatory and transformative approach grounded in critical pedagogy has been proposed. In this regard, Cavalcante (2005) argues for breaking away from traditional educational models and integrating Environmental Education into a broader political project that engages with the school curriculum.

When examining the relationship between curriculum and Environmental Education, the critical theories of curriculum emerge as an essential foundation for educational practices aimed at fostering critical interpretations of reality. Cavalcante (2005) contends that Environmental Education must embrace a political commitment to social transformation by acknowledging the power relations that shape interactions between society and the environment.

Junqueira (2007) expands this perspective by proposing a Social Pedagogy that values socio-environmental relationships within the school context. The author advocates moving beyond Environmental Education centered on isolated or occasional activities and emphasizes educational practices rooted in learners' everyday experiences, thereby strengthening affective, social, and ethical connections with their surroundings.

Drawing on these contributions, it becomes evident that Environmental Education can only be effective when grounded in students lived realities, enabling meaningful connections between school knowledge, local experiences, and environmental issues. Such an approach requires the development of technical, social, and conceptual competencies aimed at preparing critically engaged individuals capable of active participation in society.

From the perspective of critical Environmental Education, Loureiro (2004) argues that educational practices should move beyond merely providing information or promoting environmentally responsible behaviors. Instead, they should recognize that socio-environmental conflicts are deeply intertwined with economic interests, power relations, and unequal access to natural resources. Consequently, the inclusion of Environmental Education in initial teacher education should not be viewed solely as compliance with legal requirements but rather as an opportunity to prepare future teachers who are capable of critically analyzing reality within its broader social context, questioning taken-for-granted practices, and acting in more informed and socially responsible ways. In this sense, Environmental Education contributes to a model of teacher education committed to emancipation and social transformation.

Finally, Environmental Education should not be understood merely as an instrument for conserving natural resources. Rather, it constitutes a comprehensive educational process encompassing ethical, cultural, economic, and political dimensions. Its effective implementation depends on educational environments committed to fostering active citizenship and promoting sustainable alternatives for the relationships between human societies and the natural world.

3 Results and Discussion

3.1 Characteristics of the Pedagogy Degree Program

The Pedagogical Project (Projeto Político-Pedagógico - PPP) of the undergraduate Pedagogy degree program was analyzed to investigate how Environmental Education (EE) has been incorporated into initial teacher education. As the institutional document that guides and regulates pedagogical practices, the PPP provides an important basis for understanding the institution's commitment to preparing critically engaged and socially responsible future teachers. Developed in accordance with the Brazilian National Education Guidelines and Framework Law (Lei de Diretrizes e Bases da Educação Nacional - LDB, Law No. 9,394/1996) (Brazil, 1996), the document incorporates the national guidelines for initial teacher education, including cross-cutting themes such as Human Rights, Afro-Brazilian and Indigenous History and Culture, Environmental Education, and Brazilian Sign Language (Libras).

The program is offered in a face-to-face format, with a minimum duration of four years and a maximum of eight years, comprising a total workload of 3,200 hours. Its curriculum is organized into three components: a foundational studies core, an advanced and diversified studies core, and an integrative studies core. This curricular structure is intended to comply with the National Curriculum Guidelines, including National Education Council Resolution CNE/CP No. 2 of June 15, 2012 (Brazil, 2012), which establishes the national guidelines for Environmental Education in higher education.

The analysis of the 74 courses included in the curriculum identified seven that explicitly address Environmental Education: *Education and Ethics*; *Natural Sciences: Content and Methodology I, II, III, and IV*; and *Geography: Content and Methodology I and II*. These courses were selected based on the presence of specific descriptors and/or explicit references to Environmental Education in their respective course syllabi.

The course *Education and Ethics* addresses Environmental Education primarily from a theoretical perspective, relating it to discussions of sustainability and social responsibility. Its recommended bibliography includes the *National Curriculum Parameters* (Parâmetros Curriculares Nacionais - PCNs) (Brazil, 1998), in which Environmental Education is addressed through the broader framework of cross-cutting themes. However, the course does not provide an in-depth discussion of concrete pedagogical practices related to environmental issues.

The courses *Natural Sciences: Content and Methodology I and II*, which focus on Early

Childhood Education, adopt a more applied approach by proposing activities such as the analysis of teaching materials, the development of educational projects, and the discussion of films and documentaries. National Education Council Resolution CNE/CP No. 2/2012 (Brazil, 2012) is identified as the principal legal framework supporting these activities. Nevertheless, the course documentation does not specify the teaching resources employed, making it difficult to assess the effectiveness of the proposed pedagogical practices.

Similarly, the *Geography: Content and Methodology I* and *II* courses incorporate Environmental Education through reference to the same national resolution while emphasizing Geography's contribution to the development of environmental citizenship. The proposed teaching strategies include dialogic lectures, group activities, the production of educational materials, and the use of multiple forms of language and expression. However, as observed in other courses, the lack of detail regarding the specific instructional content weakens the connection between theoretical principles and pedagogical practice.

The curriculum components *Natural Sciences: Content and Methodology III* and *IV*, designed for the early years of Elementary Education, revisit the objectives and pedagogical proposals introduced in the preceding courses while maintaining an emphasis on the relationship among science, citizenship, and the environment. These courses include activities such as technical visits to the Center for Scientific and Cultural Dissemination (Centro de Divulgação Científica e Cultural - CDCC/USP) and to the Bauru Zoo, located in the state of São Paulo. However, the absence of clearly defined objectives or instructional guidelines for these activities limits an understanding of their contribution to Environmental Education.

Another noteworthy finding was the recurrence of the same bibliographic references across the courses analyzed, suggesting a considerable degree of standardization in the content offered. Although such consistency may provide students with a common theoretical foundation, it may also restrict exposure to diverse perspectives on environmental issues, thereby limiting the development of a critical and interdisciplinary understanding of Environmental Education.

Overall, the analysis of the Pedagogical Project indicates that, although Environmental Education is formally incorporated into several components of the curriculum, its treatment is frequently superficial and lacks systematic integration. Environmental Education appears to be addressed primarily as a legal requirement, with repeated references to National Education Council Resolution CNE/CP No. 2/2012 (Brazil, 2012), while practical, methodological, and interdisciplinary

dimensions receive comparatively limited attention. The repeated use of the same bibliographic references and the lack of specificity regarding proposed learning activities point to weaknesses in consolidating Environmental Education as a core component of initial teacher education. These findings underscore the need for more consistent investment in teacher education programs capable of promoting a critical, contextualized, and integrative approach to Environmental Education, thereby preparing teachers who are committed to socio-environmental transformation.

3.2 Faculty Perceptions

Based on the analysis of the course syllabi of the seven courses addressing Environmental Education (EE), semi-structured interviews were conducted with the faculty members responsible for teaching these courses to gain a deeper understanding of their pedagogical approaches. The interviews were conducted remotely via Google Meet.

The courses were taught by two faculty members: Faculty Member 1 (Ph.D., with 12 years of teaching experience) and Faculty Member 2 (Postdoctoral researcher, with 17 years of teaching experience). Both participants demonstrated a strong interest in environmental issues and were highly cooperative throughout the research process.

During the interviews, the recurrence of the same bibliographic references across several courses was noted. According to the participants, this resulted from the restructuring of the curriculum, in which annual courses were converted into semester-based courses beginning in 2019. They explained that the Pedagogical Project of the Program (Projeto Pedagógico do Curso - PPC) is still undergoing revision and that the course syllabi are expected to be updated accordingly.

The interviews also addressed the implementation of field-based learning activities and their relationship to Environmental Education. Although the faculty members expressed a strong interest in promoting such experiences, they identified several logistical challenges that hinder their implementation. Most students work full-time during the day and attend classes in the evening, making participation in extracurricular activities difficult. Program Coordinator 1 reported that organizing weekend field trips has also proved challenging because educational institutions, such as zoos, often lack staff available to support these activities outside regular operating hours. Even when such activities are carefully planned, student participation tends to be limited due to fatigue, family responsibilities, or competing academic commitments.

Considering these challenges, the participants emphasized the need to rethink existing

pedagogical strategies. They suggested prioritizing learning activities conducted during regular class hours while incorporating alternative approaches, including gamification, project-based learning, case studies, workshops, and virtual interaction with other educational groups.

Faculty Member 1, who taught the course *Education and Ethics* only once, in 2019, sought to align the course content with her academic expertise and with the profiles of both the Pedagogy and Biology programs, using student seminars as the primary instructional strategy. She was unable to evaluate the course's effectiveness because it was not offered again after its initial implementation.

Faculty Member 2, who was responsible for teaching the Natural Sciences and Geography courses, reported difficulties in addressing Environmental Education in greater depth due to the extensive curriculum and limited instructional time. To enhance student engagement, she incorporates TED Talks videos, short training courses, and readings by key scholars in the field to stimulate students' initial reflections on Environmental Education.

During the COVID-19 pandemic, all classes were delivered remotely, allowing greater use of audiovisual resources and improved access to instructional materials through Google Classroom. However, the lack of face-to-face interaction and the limited technological infrastructure available once in-person teaching resumed made it difficult to implement fully the pedagogical strategies outlined in the Program's Pedagogical Project.

Despite these constraints, the interviews indicate that the faculty members make consistent efforts to incorporate Environmental Education into initial teacher education. Nevertheless, the findings also suggest that further curricular and pedagogical adjustments are necessary to ensure its effective integration into the preparation of future teachers.

3.3 Undergraduate Students in the Pedagogy Degree Program

A questionnaire was initially administered to students enrolled in the Pedagogy degree program. However, due to the low response rate, individual semi-structured interviews were subsequently conducted remotely, following a previously developed interview protocol. Four students participated in the interviews, and their identities were kept confidential.

All participants were women over the age of 20 who had enrolled in the program in 2019. These demographic characteristics were consistent with the information provided by the program coordinator and faculty members. The participants also demonstrated a willingness to contribute to the study, which positively supported the development of the empirical dataset.

Regarding Environmental Education (EE), all participants reported having completed the seven courses that explicitly addressed this topic, as specified in the PPC in effect at the time of their enrollment. Their conceptions of Environmental Education were primarily associated with terms such as the environment, nature, recycling, pollution, and deforestation. References to Environmental Education were predominantly linked to the Natural Sciences courses, particularly those entitled *Natural Sciences: Content and Methodology I, II, III, and IV*.

In addition, the participants identified the courses *Education and Ethics* and *Geography: Content and Methodology I and II* as addressing environmental issues on a more limited basis. Of the 74 courses comprising the curriculum, only seven explicitly incorporated Environmental Education, representing approximately 9.46% of the curriculum. This finding highlights the limited presence of environmental issues in the initial education of future pedagogues and contrasts with national educational guidelines advocating the cross-curricular and interdisciplinary integration of Environmental Education. According to the Brazilian National Common Curricular Framework (Base Nacional Comum Curricular - BNCC), Cross-Cutting Contemporary Themes, including Environmental Education, should be addressed throughout Basic Education in interdisciplinary and transdisciplinary ways that encourage reflection on issues related to citizenship and everyday life. Consequently, such themes should be incorporated, to some extent, across all areas of the curriculum. In the case examined here, however, the undergraduate Pedagogy program does not appear to provide sufficient preparation for future teachers to address Environmental Education in accordance with these principles.

With respect to instructional approaches, participants identified the reading of scientific articles, oral presentations, and educational videos as the most frequently used teaching strategies. However, they reported difficulty recalling practical or hands-on activities specifically related to Environmental Education. Concerning extracurricular activities and mandatory teaching internships, two participants indicated that their professional commitments limited their participation, whereas the other two reported occasional attendance at academic events related to Environmental Education and participation in an Environmental Education research group at the institution. Their involvement in research groups highlights the importance of formative spaces that expand both the theoretical and practical dimensions of environmental learning.

When discussing potential educational interventions in future school settings, the participants proposed isolated initiatives such as establishing school gardens, producing toys from recyclable materials, and installing recycling bins. Nevertheless, none of these proposals referred to the need to analyze the socio-environmental context or the specific characteristics of the communities involved. This finding suggests a limited understanding of Environmental Education, centered primarily on isolated activities rather than on a critical and contextualized educational approach.

In this regard, Jacobi (2003) argues that Environmental Education requires a broader educational process aimed at fostering an understanding of the interrelationships between society and nature, promoting the internalization of socio-environmental issues, and developing educational practices grounded in sustainability. The author also emphasizes the role of teachers as mediators of knowledge capable of cultivating critical awareness and responsible engagement with contemporary socio-environmental challenges.

The students' accounts further indicate that Environmental Education continues to be understood in relatively narrow terms, being primarily associated with recycling, pollution, and environmental conservation. Although these dimensions are important, they do not encompass the full complexity of the field. Critical Environmental Education broadens this perspective by recognizing that environmental problems are also shaped by political choices, development models, and unequal social relations. Accordingly, initial teacher education must advance beyond the transmission of environmental content to prepare future pedagogues to approach Environmental Education as a formative dimension capable of fostering critical reflection, active participation, and informed social engagement (Jacobi, 2003; Loureiro, 2004; Sauvé, 2005).

Overall, the findings indicate that the participants' conceptions of Environmental Education remain largely reductionist, emphasizing naturalistic perspectives while overlooking its critical and transformative dimensions. It should also be acknowledged that the COVID-19 pandemic, which was ongoing during the period of data collection, may have influenced both the low level of student participation and some of the limitations identified in the educational experiences reported by the participants.

Finally, the findings suggest that the weaknesses identified in the integration of Environmental Education may not be unique to the institution examined in this study or to the curriculum of a single Pedagogy program. Nevertheless, the finding that only approximately 9.46% of the curriculum explicitly addresses Environmental Education

reinforces the need to reconsider teacher education curricular, particularly undergraduate Pedagogy programs—to ensure the preparation of teachers committed to the principles of critical and emancipatory Environmental Education.

4 Final Considerations

This study provided an in-depth understanding, through a case study approach, of how Environmental Education (EE) is incorporated into the Pedagogy degree program at a private higher education institution in the state of São Paulo, Brazil. The research examined the pedagogical approaches adopted to promote Environmental Education throughout the initial education of future teachers.

The relevance of this study lies in the urgent need to reconsider the socio-environmental impacts generated by an economic model centered on profit maximization and sustained by unsustainable patterns of production and consumption. In this context, it is recognized that humanity inhabits a planet characterized by extraordinary biodiversity whose ecological sustainability is increasingly under threat.

Within this scenario, Environmental Education represents an important pathway toward social transformation by fostering critical awareness and encouraging more responsible forms of environmental engagement. It contributes to the development of environmental citizenship while promoting new ways of understanding rights, responsibilities, and socio-environmental relationships.

The incorporation of Environmental Education into Basic Education through the work of pedagogues is particularly strategic because of their role as mediators of teaching and learning processes. Accordingly, this study sought to understand how this dimension has been incorporated into the initial education of these professionals.

As a starting point, the Program's Pedagogical Project was analyzed, given its role as the primary document guiding educational practices. The analysis revealed that, although Environmental Education is formally included in official documents and is intended to be addressed through cross-curricular and interdisciplinary approaches, only seven of the seventy-four courses in the curriculum (9.46%) explicitly address this subject, indicating that its presence remains limited.

These courses were subsequently examined in greater depth, and interviews were conducted with the faculty members responsible for teaching them. The findings highlighted

the need to diversify pedagogical practices, which remain largely dependent on field-based activities. The results suggest expanding these approaches through the incorporation of active learning methodologies, including gamification, the flipped classroom, project-based learning, workshops, and other instructional strategies integrated into regular classroom practice.

The interviews and questionnaires administered to the students revealed limited participation in scientific activities and research groups, as well as difficulties in designing and proposing pedagogical projects focused on Environmental Education. The findings also indicated a limited understanding of key concepts, including the interdependence between society and nature, network-based perspectives, and environmental awareness.

These findings support the study's initial hypothesis that significant gaps remain in the preparation of future pedagogues with respect to Environmental Education, making it difficult to move beyond fragmented and reductionist perspectives on environmental issues. In this regard, the study advocates an approach to Environmental Education that is critical, emancipatory, dialogical, and transformative.

Overall, the findings indicate that the integration of Environmental Education into the Pedagogy program examined remains limited. At the same time, they underscore the need to strengthen a critical, interdisciplinary, and socially engaged approach to Environmental Education. Ultimately, teacher education in Pedagogy should promote not only knowledge of environmental issues but also the development of pedagogical practices committed to socio-environmental justice, collective participation, and the transformation of the concrete realities experienced by students and school communities.

The findings also suggest that Pedagogy programs have considerable potential to contribute to the environmental education of future teachers, provided that higher education institutions make a sustained commitment to integrating Environmental Education more effectively throughout the curriculum. In this regard, the inclusion of Environmental Education within the *Education and Ethics* course represents a positive initiative that may serve as a model for other curricular areas.

Finally, it is important to acknowledge that this study was conducted during the COVID-19 pandemic, a context that imposed significant challenges and limitations on both teaching and research activities. Nevertheless, the study sought to contribute to the advancement of knowledge in the field by encouraging further investigation and proposing more collaborative and reflective approaches to Environmental Education.

It is hoped that the findings presented here will contribute to strengthening initial teacher education that is more firmly committed to sustainability and to the principles underpinning critical Environmental Education.

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