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ENVIRONMENTAL EDUCATION AT THE FEDERAL INSTITUTE OF ALAGOAS: AN ANALYSIS OF THE PEDAGOGICAL COURSE PROJECTS (PPCs)

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ABSTRACT

The need to build a sustainable awareness has been increasingly urgent. This article analyzes the presence and approach of Environmental Education in the Pedagogical Course Projects (PPCs) of technical courses integrated with high school offered by the Federal Institute of Alagoas (Ifal). The research, of a documentary nature, was conducted in 19 courses, distributed in 15 campuses, and used the technique of content analysis based on the keywords: "environmental education", "environment", "sustainability" and "interdisciplinarity". The results demonstrate significant variations in the treatment of these topics between courses and campuses, revealing a need for standardization and greater integration of sustainability concepts in the curricula. The study points to the importance of a deeper institutional alignment in relation to the guidelines of the National Policy for Environmental Education, aiming at a more critical and aware citizenship formation of contemporary environmental challenges.

Keywords: Environmental Education. Sustainability. Technical education. Federal Institutes. Environment. Interdisciplinarity.

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Revista ARACÊ
ISSN: 2358-2472

INTRODUCTION

The effective implementation of Environmental Education in curricula and educational practices is a way to transform the mentality and attitude of students at different levels. The importance of the theme is recognized by the Federal Constitution of 1988 which, in its article 225, item VI, determines that it is incumbent on the public power to promote environmental education at all levels of education and public awareness for the preservation of the environment.

In this sense, Basic Education is an opportunity to encourage discussion and debate on the subject, aiming to present the importance of concern with the needs of the current generation without, however, compromising the possibility of future generations meeting their own needs. It is in this scenario that the Federal Institute of Alagoas (Ifal) is inserted. Present in 15 municipalities, Ifal offers 19 Technical Courses Integrated to High School and has the following institutional mission:

> Promote social, public and free quality education, based on the principle of inseparability between teaching, research and extension, in order to form critical citizens for the world of work and contribute to sustainable development.

To fulfill this mission, Ifal is based on Federal Law No. 9,795/1999, which provides for environmental education and institutes the National Policy for Environmental Education, and Decree 4,281/2002, which regulates Law 9,795/1999. In addition to these legal provisions, the Pedagogical Projects of the Courses (PPC) are built based on the Institutional Development Plan (PDI 2019-2023). It should be noted that, according to this PDI (2019-2023):

> [...] Ifal's curricular organization is based on critical theories guided by the freedom to learn, teach, research and disseminate culture, thought, art and scientific knowledge, from the perspective of an integral formation of the student, their preparation for the critical exercise of citizenship, as well as the development of their ability to elaborate more complex intellectual constructions and appropriate concepts necessary for conscious intervention in reality. (IFAL, 2019a, p. 123).

The Institutional Political-Pedagogical Project (PPPI) of Ifal, contained in the PDI, lists general principles of technological education, among them are: Education as a transformation of reality; Preparation for civic life; and Reduction of social inequalities. The latter is closely linked to the idea of fair, egalitarian and sustainable development, which refers to the need to include Environmental Education in the PPC's.

Revista ARACÊ
ISSN: 2358-2472

The PPPI, with regard to curricular organization, determines, as one of its premises, the articulation of curricular contents with socioeconomic and environmental development.

In this context, this research proposes to investigate the existence of articulation between the curricular contents present in the Pedagogical Course Projects of the 19 Technical Courses Integrated to High School of the Federal Institute of Alagoas. The study seeks to identify whether the PPCs present, in an explicit way, terms associated with social, economic and environmental demands, aiming to contribute to a sustainable development aligned with regional and global needs.

METHODOLOGY

This is a documentary research, in which the PPC's of the 19 Technical Courses Integrated to High School offered by Ifal and distributed in 15 Campi, as shown in table 1, were analyzed. The analysis was made in each PPC, in its entirety, according to the course and the Campus offered. The following keywords were used: environmental education; environment; sustainability; and interdisciplinarity, seeking to identify the incidence of these terms in the PPC's and in which contexts they appeared. The data obtained were spreadsheets with the following objectives: 1) Quantification of the keywords in the texts; 2) Identification of the context in which the keywords appear in the text; 3) Comparative analysis between courses and intra-courses in different campuses.

Table 1 – List of courses and location of the offer.

Course	Campus
Administration	Santana do Ipanema
Agroecology	Maragogi
	Piranhas
	Murici
Agroindustry	Batalha
	Satuba
	Murici
Agricultural	Piranhas
	Satuba
	Santana do Ipanema
Biotechnology	Batalha
Systems Development	Maceió
Electronics	Arapiraca
Electronics	Maceió

Revista ARACÊ
ISSN: 2358-2472

Electrotechnics	Palmeira dos Índios
	Maceió
Roads	Maceió
Buildings	Coruripe
	Maceió
	Palmeira dos Índios
Tour Guide	Marechal Deodoro
Hosting	Maragogi
Computer science	Arapiraca
	Palmeira dos Índios
Internet Computing	São Miguel dos Campos
Mechanics	Coruripe
	Maceió
Environment	Marechal Deodoro
	Penedo
Chemistry	Maceió
	Penedo
Occupational Safety	Palmeira dos Índios

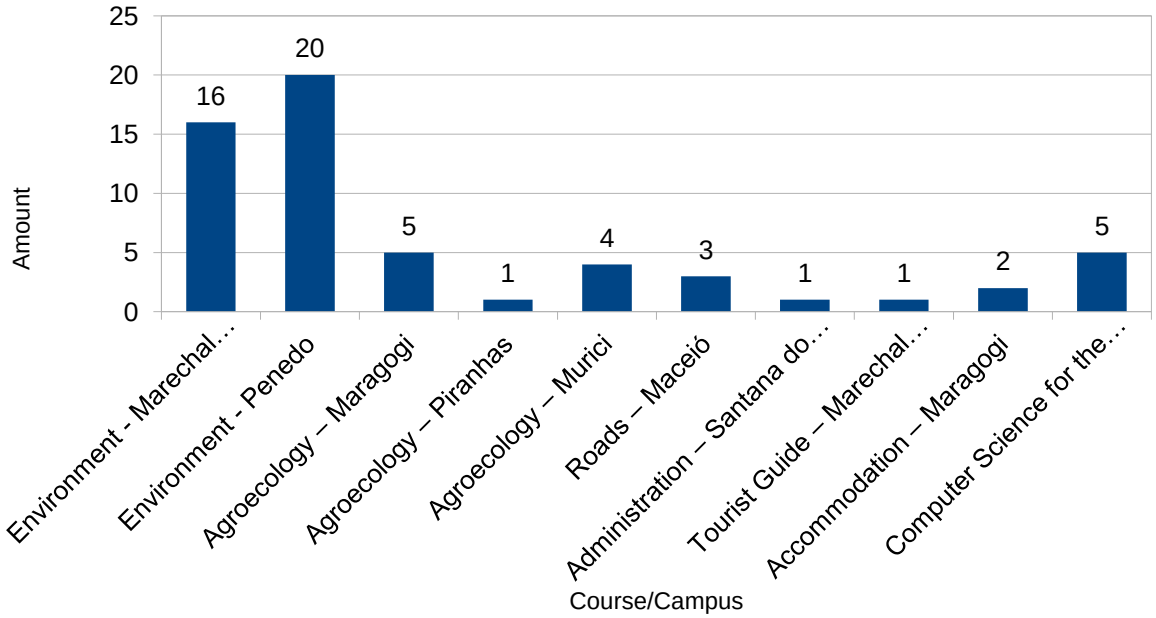
RESULTS AND DISCUSSION

The results of this research reveal disparities in the incorporation of the themes "Environmental Education", "Environment", "Sustainability" and "Interdisciplinarity" in the PPC's analyzed.

As we can see in Graph 1, the analysis revealed that the term "Environmental Education" was found in only 32% of the PPC's analyzed. This incidence demonstrates that, despite its relevance recognized by Brazilian legislation, environmental education is still not treated centrally in the curricula of many technical courses at Ifal. In courses such as Administration, Agroindustry and Mechanics, the term was mentioned in a limited way.

Revista ARACÊ
ISSN: 2358-2472

Graph 1 – Incidence of the keyword "Environmental Education".



Source: Authors, 2024.

In the courses of Mechanics, Chemistry, Occupational Safety, Agroindustry, Agriculture, Biotechnology, Systems Development, Electronics, Electroelectronics, Electrotechnics, Informatics and Buildings, the keyword "Environmental Education" was not located in any of the PPC's surveyed. In the courses in which the mention of Environmental Education is found, it is verified that it is a curricular component only in the "Environment" course. This course is also the one that stands out in the approach to the theme in the PPC (Chart 1).

Chart 1 – Context of incidence of the keyword "Environmental Education".

Curso	Campus	Item do Projeto Pedagógico de Curso								TOTAL
		Componente Curricular	Ementa de componente curricular	Ementário	Acervo biblioteca	Bibliografia	Perfil profissional de Conclusão	Descrição da Matriz Curricular	Referências do PPC	
Administração	Santana do Ipanema	-	1	-	-	-	-	-	-	1
Agroecologia	Maragogi	-	1	-	3	-	-	-	1	5
	Piranhas	-	1	-	-	-	-	-	-	1
	Murici	-	1	-	2	-	-	-	1	4
Estradas	Maceió			-	3					3
Guia de Turismo	Marechal Deodoro	-	-	-	-	-	1	-	-	1
Hospedagem	Maragogi	-	-	-	2	-	-	-	-	2
Informática para Internet	São Miguel dos Campos	-	1	-	-	4	-	-	-	5
Meio Ambiente	Marechal Deodoro	1	6	1	-	6	1	1	-	16
	Penedo	1	6	1	4	6	1	1	-	20

Source: Authors, 2024.

Revista ARACÊ
ISSN: 2358-2472

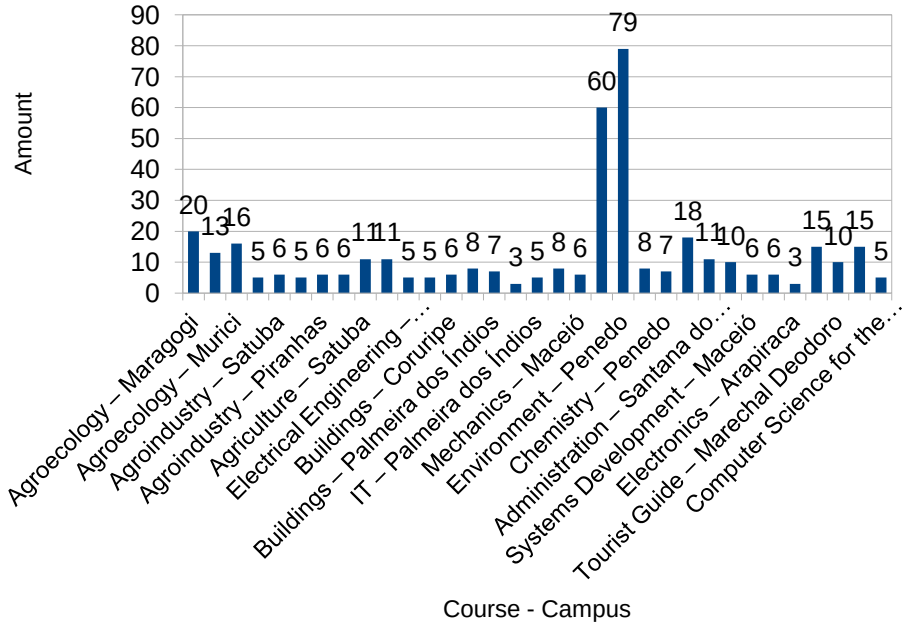
According to Menezes and Miranda (2021), the approach to Environmental Education during Basic Education enables a practical and reflective training that transcends the mere interpretation, information or understanding of reality, seeking, above all, to theorize from human activity, expanding critical awareness and promoting a socio-environmental transformation. This perspective aims not only at understanding, but at revolutionary and emancipatory action in favor of a more balanced and sustainable relationship with the environment.

Environmental Education (EE) has the ability to integrate several areas of knowledge, assuming an interdisciplinary practice that, when developed in the school environment, becomes essential to support discussions aimed at building a more sustainable future. In this sense, it is essential that the government and the agents responsible for the school structure and organization direct efforts towards the elaboration of a curriculum that meets the demands of contemporary society, considering the intrinsic relationship between human beings and nature (DA SILVA, 2022).

The term "Environment" was the most present among the four terms analyzed, appearing in 100% of the PPCs (Graph 2). However, its occurrence varied in depth and context. In the Environment course offered at the Marechal Deodoro and Penedo campuses, the term appears extensively, reflecting the relevance of the theme for the education of students. On the other hand, in courses such as Systems Development and Electroelectronics, the term was found predominantly in bibliographies, with little emphasis on the syllabus of the curricular components (Graph 2).

Revista ARACÊ
ISSN: 2358-2472

Graph 2 – Incidence of the keyword "Environment".



Revista ARACÊ
ISSN: 2358-2472

Chart 2 – Context of incidence of the keyword "Environment".

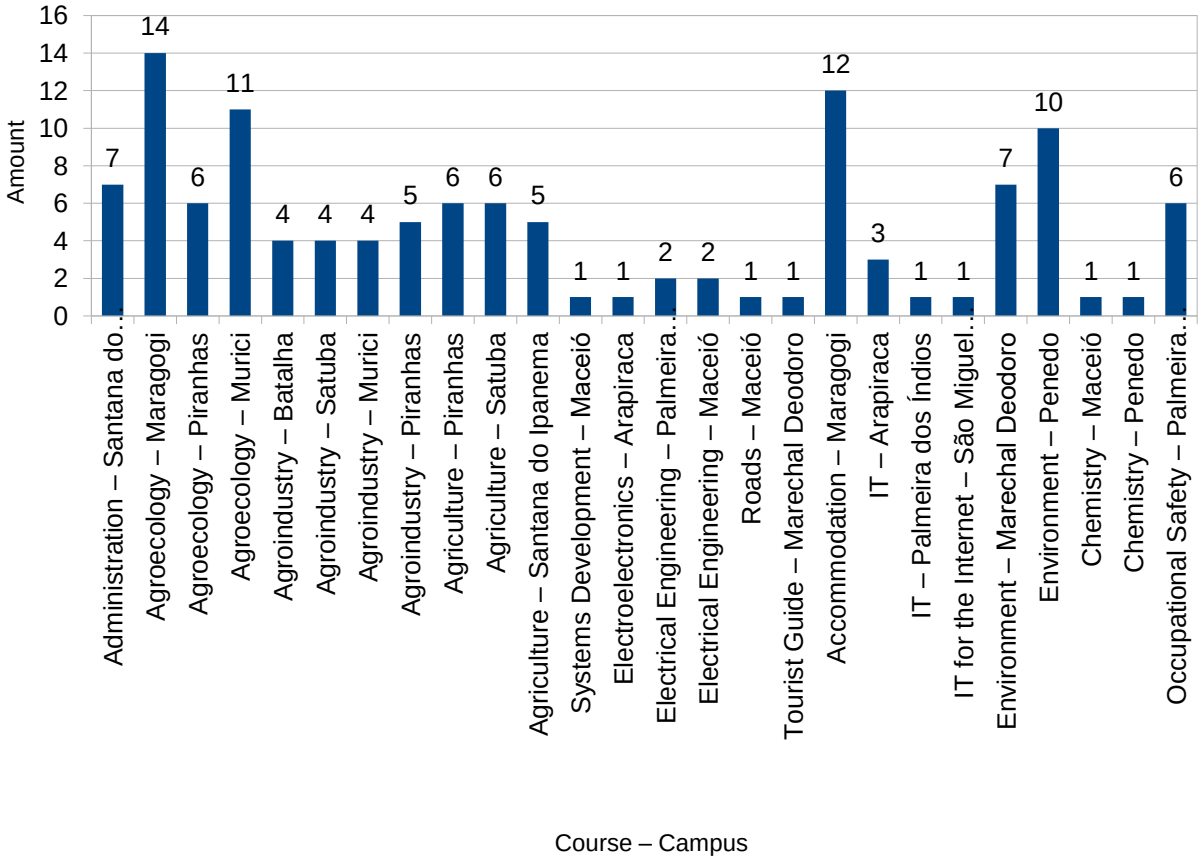
Curso	Campus	Ítem do Projeto Pedagógico de Curso															TOTAL
		Nomenclatura de Eixo	Nomenclatura do curso	Nomenclatura de Laboratório	Identificação do curso	Justificativa e objetivos	Apêndice	Componente Curricular	Ementa de componente curricular	Acervo biblioteca	Bibliografia	Perfil profissional de conclusão	Perfil do pessoal docente e técnico	Descrição da Matriz Curricular	Referências PPC	Organização Curricular	
Administração	Santana do Ipanema	1	-	-	-	-	-	-	3	3	4						11
Agroecologia	Maragogi	-	-	-	-	6	-	-	2	3	9	-		-	-		20
	Piranhas		-	-	-	1	-		2		9					1	13
	Murici	-	-	-	-	3	-	-	2	2	9	-		-	-		16
Agroindústria	Batalha	-	-	-	-	-	-	-	1	-	4	-		-	-	-	5
	Satuba	-	-	-	-	1	-	-	1	-	4	-		-	-	-	6
	Murici	-	-	-	-	-	-	-	1		4						5
	Piranhas	1	-	-	-	1	-	-	1		3						6
Agropecuária	Piranhas	1	-	-	-	1	-	-	1	-	3	-		-	-	-	6
	Satuba	-	-	-	-	3	-	-	1	-	6	-		-	-	1	11
	Santana do Ipanema	1	-	-	-	2	-	-	1	1	6	-		-	-	-	11
Biotecnologia	Batalha	-	-	-	-	-	-	-	2	-	8	-		-	-	-	10
Desenvolvimento de Sistemas	Maceió	-	-	-	-	-	-	-	2		4						6
Eletrônica	Maceió	-				-		-	2	-	4	-		-	-	-	6
Eletroeletrônica	Arapiraca	-	-	-	-	-	-	-	-	-	3						3
Eletrotécnica	Palmeira dos Índios	-	-	-	-	-	-	-	1	-	4						5
	Maceió	-	-	-	-	-	-	-	1	-	4						5
Estradas	Maceió	-	-	-	-	-			7	2	6						15
Edificações	Coruripe	-	-	-	-	-	1		2		3						6
	Maceió	-	-	-	-	-	-	3		1	4						8
	Palmeira dos Índios	-	-	-	-	-	-		3		4						7
Guia de Turismo	Marechal Deodoro	-	-	1	-	-	-	-	1	1	6	1					10
Hospedagem	Maragogi	-	-	-	-	-	-	-	3	6	6						15
Informática	Arapiraca	-	-	-	-	-	-	-	-	-	3						3
	Palmeira dos Índios	-	-	-	-	-	-	-	1	-	4						5
Informática para a Internet	São Miguel dos Campos	-	-	-	-	-	-	-	1	-	4						5
Mecânica	Coruripe	-	-	-	-	-	-	-	1	-	6	1					8
	Maceió	-	-	-	-	-	-	-	1	-	4	1					6
Meio Ambiente	Marechal Deodoro	-	15	1	-	8	-	4	7	1	17	2	1	2	1	1	60
	Penedo	-	21	4	-	3	-	4	7	14	17	4	1	2	1	1	79
Química	Maceió	-	-	-	-	2	-	-	-	1	3	1			1		8
	Penedo	-	-	-	-	2	-	-	-	-	3	1			1		7
Segurança do Trabalho	Palmeira dos Índios	-	-	-	1	-	-	-	2	-	15						18

Source: Authors, 2024.

The term "Sustainability" also had a significant presence, but with variations between courses. In the Agroecology course, for example, "Sustainability" was one of the central concepts, appearing both in the course syllabus and in the bibliographies (Graph 3). In contrast, in the Electroelectronics and Mechanics courses, the mention of the term was sporadic, which may indicate a less integrated approach to the concept.

Revista ARACÊ
ISSN: 2358-2472

Graph 3 – Incidence of the keyword "Sustainability".



Source: Authors, 2024.

According to Pereira (2022) the development of cognitive and emotional skills, combined with technical training, can confer a significant advantage to graduates of Professional and Technological Education (EPT), knowledge about sustainability will be a differential, since the professions of the future will require professionals who master various skills.

Table 3 – Context of incidence of the keyword "Sustainability".

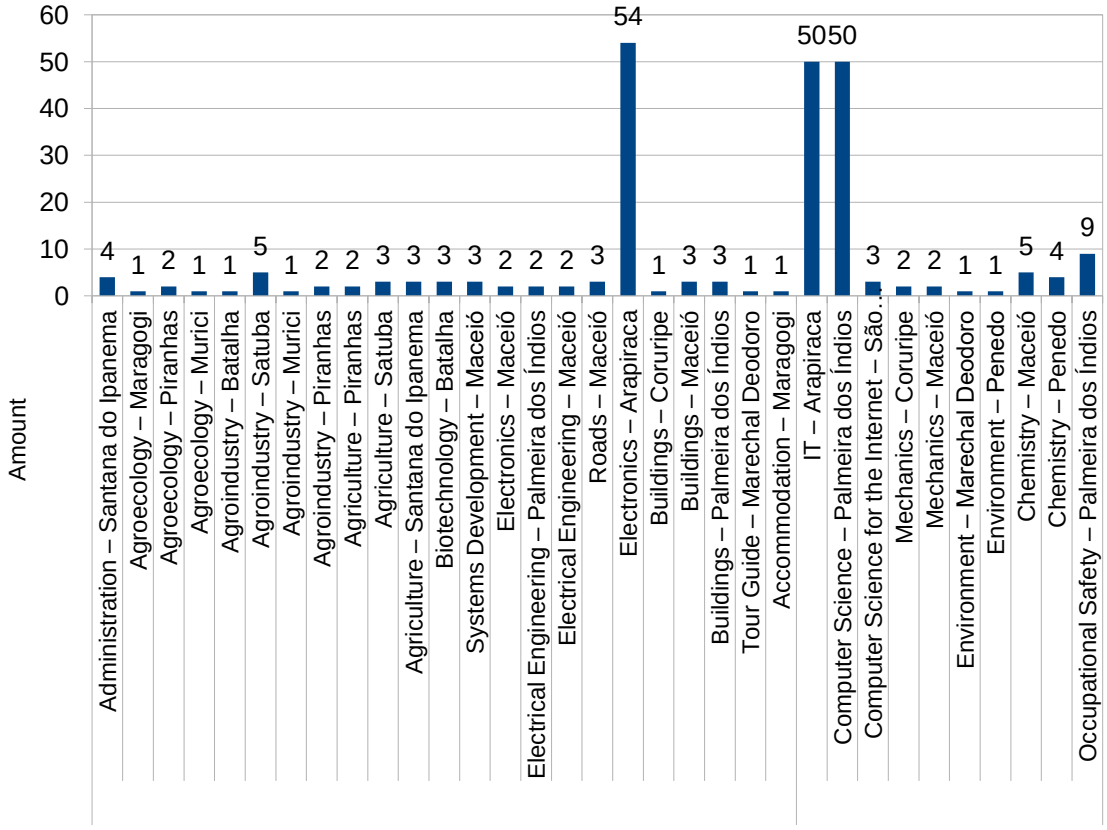
Curso	Campus	Item do Projeto Pedagógico de Curso										
		Nomenclatura de Eixo	Justificativa e objetivos	Componente Curricular	Ementário	Ementa de componente curricular	Acervo biblioteca	Bibliografia	Perfil profissional de Conclusão	Referências PPC	organização Curricular	TOTAL
Administração	Santana do Ipanema	1	2	-	-	-	2	2	-	-	-	7
Agroecologia	Maragogi	-	7	-	-	1	4	-	1	1		14
	Piranhas	-	2	-	-	1	-	-	2	-	1	6
	Murici	-	7	-	-	1	1	-	1	1	-	11
Agroindústria	Batalha	-	2	-	-	-	-	1	1	-	-	4
	Satuba	-	2	-	-	-	-	1	1	-	-	4
	Murici	-	3	-	-	-	-	-	1	-	-	4
	Piranhas	1	2	-	-	-	-	1	1	-	-	5
Agropecuária	Piranhas	-	2	-	-	1	-	-	2	-	1	6
	Satuba	-	3	-	-	-	-	-	2	-	1	6
	Santana do Ipanema	1	2	-	-	-	-	-	2	-	-	5
Desenvolvimento de Sistemas	Maceió	-	1	-	-	-	-	-	-	-	-	1
Eletroeletrônica	Arapiraca	-		-	-	1	-	-	-	-	-	1
Eletrotécnica	Palmeira dos Índios	-	1	-	-	-	-	1	-	-	-	2
	Maceió	-	1	-	-		-	1		-	-	2
Estradas	Maceió	-	-	-	-	1	-	-	-	-	-	1
Guia de Turismo	Marechal Deodoro	-	-	-	-	-	-	-	1	-	-	1
Hospedagem	Maragogi	-	1	1	6		2	1		-	1	12
Informática	Arapiraca	-	1	-	-	2	-	-	-	-	-	3
	Palmeira dos Índios	-	1	-	-	-	-	-	-	-	-	1
Informática para a Internet	São Miguel dos Campos	-	1	-	-	-	-	-	-	-	-	1
Meio Ambiente	Marechal Deodoro	-	3	-	-	-	-	4	-	-	-	7
	Penedo	-	4	-	-	-	2	4		-	-	10
Química	Maceió	-	-	-	-	-	-	-	1	-	-	1
	Penedo	-	-	-	-	-	-	-	1	-	-	1
Segurança do Trabalho	Palmeira dos Índios	-	6	-	-	-	-	-	-	-	-	6

Source: Authors, 2024.

Revista ARACÊ
ISSN: 2358-2472

"Interdisciplinarity" was mentioned in 50% of the PPCs analyzed (Graph 4), but its practical application seems to be limited. In many courses, interdisciplinarity was mentioned as a theoretical principle in the curricular guidelines, but few courses presented clear examples of interdisciplinary practices in the development of activities aimed at environmental education (Graph 4).

Graph 4 – Incidence of the keyword "Interdisciplinarity".



Source: Authors, 2024.

According to Pereira (2022), teaching based on sustainability as an interdisciplinary theme has been widely used. This movement can be achieved through the transformation of two essential dimensions: teachers and the structure of Professional and Technological Education (EPT). In this way, teachers should reflect on their pedagogical practices and seek activities that integrate sustainability in the student's daily context. However, this change will only be effective if there is investment in the continuing education of teachers,

Revista ARACÊ
ISSN: 2358-2472

either by personal initiative or through incentives and institutional practices promoted by the school.

Chart 4 – Context of incidence of the keyword "Interdisciplinarity".

Curso	Campus	Ítem do Projeto Pedagógico de Curso						TOTAL
		Plano de ensino	Ementa de componente curricular	Descrição da Matriz Curricular	Estrutura da matriz curricular	Organização Curricular	Prática profissional integrada	
Administração	Santana do Ipanema	-	-	-	-	4	-	**4**
Agroecologia	Maragogi	-	-	-	-	1	-	**1**
	Piranhas	-	-	-	-	2	-	**2**
	Murici	-	-	-	-	1	-	**1**
Agroindústria	Batalha	-	-	-	-	1	-	**1**
	Satuba	-	-	-	-	3	2	**5**
	Murici	-	-	-	-	1	-	**1**
	Piranhas	-	-	-	-	2	-	**2**
Agropecuária	Piranhas	-	-	-	-	2	-	**2**
	Satuba	-	-	-	-	3	-	**3**
	Santana do Ipanema	-	-	-	-	3	-	**3**
Biotecnologia	Batalha	-	-	-	-	3	-	**3**
Desenvolvimento de Sistemas	Maceió	2	-	-	-	1	-	**3**
Eletrônica	Maceió	-	-	-	-	2	-	**2**
Eletrotécnica	Palmeira dos Índios	-	-	-	-	2	-	**2**
	Maceió	-	-	-	-	2	-	**2**
Estradas	Maceió	-	-	-	-	3	-	**3**
Eletroeletrônica	Arapiraca	-	50	-	-	4	-	**54**
Edificações	Coruripe	-	-	-	-	1	-	**1**
	Maceió	-	-	-	-	3	-	**3**
	Palmeira dos Índios	-	-	-	-	3	-	**3**
Guia de Turismo	Marechal Deodoro	-	-	-	-	-	1	**1**
Hospedagem	Maragogi	-	-	-	-	1	-	**1**
Informática	Arapiraca	-	-	46	-	4	-	**50**
	Palmeira dos Índios	-	-	46	-	4	-	**50**
Informática para a Internet	São Miguel dos Campos	-	-	-	-	3	-	**3**
Mecânica	Coruripe	-	-	-	1	1	-	**2**
	Maceió	-	-	-	-	2	-	**2**
Meio Ambiente	Marechal Deodoro	-	-	-	1	-	-	**1**
	Penedo	-	-	-	-	1	-	**1**
Química	Maceió	-	-	-	1	4	-	**5**
	Penedo	-	-	-	-	4	-	**4**
Segurança do Trabalho	Palmeira dos Índios	-	-	-	-	9	-	**9**

Source: Authors, 2024.

The results of the research show a disparity in the way Ifal's technical courses deal with environmental education and related concepts. In courses focused on the agricultural and environmental sector, such as Agroecology and Environment, these concepts are widely present and seem to be well integrated into the curriculum. These results are in line with the literature on the importance of training professionals prepared to deal with contemporary environmental challenges (Orlando, 2023).

Revista ARACÊ
ISSN: 2358-2472

However, in courses in more traditional technical areas, such as Electronics, Electrotechnics and Mechanics, the themes of environmental education, sustainability and interdisciplinarity are treated in a peripheral way. This reflects a trend identified by authors such as Guimarães (2012), who point to the difficulty of integrating these concepts into technical areas, due to a curricular training more focused on specific skills in the labor market (Guimarães, 2012).

In addition, the absence of a more robust interdisciplinary approach, as identified in many courses, points to the need to revise the PPCs, with the aim of promoting a more holistic and critical education of students. Interdisciplinarity is an essential aspect of environmental education, as it allows students to connect different areas of knowledge to understand and solve complex problems, such as those related to the environment and sustainable development (Jacobi, 2003).

FINAL CONSIDERATIONS

The analysis of the PPCs of the technical courses integrated with Ifal high school reveals that environmental education, although present in some courses, still needs to be incorporated in a more consistent and profound way throughout the institution. The terms "Environmental Education", "Environment", "Sustainability" and "Interdisciplinarity" are treated unequally, with greater emphasis on courses focused on the agricultural and environmental sector, and little or no integration in courses in technical areas.

It is recommended that Ifal re-evaluate its PPCs to ensure a more uniform approach to environmental education, ensuring that all students have the opportunity to develop a critical awareness of the environment, regardless of their area of training. This change is essential to align Ifal's curricula with the guidelines of the National Policy for Environmental Education and to prepare students for the challenges of the contemporary world.

Revista ARACÊ
ISSN: 2358-2472

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