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Systematic Review

Educational Practice in Education for Environmental Justice: A Systematic Review of the Literature

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Abstract: The environmental crisis makes it necessary to reconsider the practices of environmental education (EE) and guide them towards a transformative perspective to promote critical reflection and the ability to make decisions in the face of complex problems, including a perspective of justice. Using the PRISMA systematic review protocol, this article analysed 49 classroom intervention published on international journals to identify the limitations when working on EE in early childhood education, primary education, and pre-service teacher training classrooms from an environmental justice (EJ) perspective. Considering the variables "contents", "depth of the interventions", "actions required of students", and "resources", the results show a predominance of interventions that promote content knowledge from an ecological perspective and demand actions far removed from reflection and participation, using self-made materials. By not encouraging students to reflect on environmental issues in a holistic way to change their behaviour, it was confirmed that they move away from systems thinking, critical literacy, and action competence. Therefore, there is a lack of integration of the EJ perspective in classroom practices. To achieve educational success in terms of social change for environmental protection, it is necessary to promote research work focused on the didactics of EE including a social justice perspective.

Keywords: environmental justice education; transformative environmental education; Science Education; early childhood education; primary education; pre-service teacher training

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1. Introduction

Environmental problems are one of the major concerns of our time, but this should come as no surprise, given that we were warned about this more than sixty years ago [1]. In this respect, our lifestyle and the values legitimised have led us to this crisis situation [2], determined by, among other factors, accelerated climate change, the loss of biodiversity, or the unequal distribution of water and food [3].

Aware of this situation, several strategies have been developed to try to minimise the impact of our actions on the environment, which also affect other areas such as the economic, social, and health fields [4]. Among the international initiatives developed, the various conferences and agreements promoted by the UN from the 1970s to the present day stand out: Stockholm Conference (1972), International Seminar on Environmental Education (Belgrade, 1975), Tbilisi Intergovernmental Conference on Environmental Education (1977), Earth Summit (Rio de Janeiro, 1992), Millennium Summit (2000), World Summit on Sustainable Development (Johannesburg, 2002), United Nations Conference on Sustainable Development (Rio de Janeiro, 2012), and United Nations Summit on Sustainable Development (2015). All of them have resulted in reports focused on reducing inequalities and seeking environmental balance, which governments have subsequently considered to develop initiatives (e.g., low emission zones in cities) and suggest solutions to their citizens (e.g., use of public transport and purchase of eco-vehicles).

On the other hand, since the Stockholm Conference, the importance of education in building new sustainable habits in students during their compulsory education has been

recognised. This was suggested by Stapp et al. in 1969 [5], when they first defined the concept of environmental education as the means to create a citizenship informed about the environment and its problems, and that was aware of how to help solve these problems and motivated to work towards their solution. This same idea has been contemplated in international summits and further work until the present day, emphasising the need to promote knowledge, skills, values, and attitudes from an early age to empower students to contribute to sustainable development [6]. Despite these intentions at the theoretical level, little work has been developed about how to include these ideas in the education system, and even less in classroom practice [2]. For this reason, one of the main criticisms that environmental education teaching has faced for some time has been its strong conceptual focus, which is far removed from behavioural change in favour of sustainability [7]. This is because it has traditionally been believed that reporting situations and problems can lead to changes in habits. Furthermore, interventions have mainly focused on secondary school students, even though educational research has confirmed that teenage behaviours are often less modifiable than those of children [7,8]. To this end, there has been a tendency to present environmental problems using fear-based narratives, which discourage and even generate feelings of rejection among students [9]. At the same time, the ecological perspective has been the primary focus of research [10,11], resulting in an incomplete understanding of environmental issues by neglecting other relevant perspectives such as social, economic, ethical, and health considerations [12].

In addition to the objectives established in the definition of the concept of environmental education, some authors have highlighted the inequalities in the field of environmental problems. They argue that these issues are inherently matters of justice [13]. In this sense, the environmental justice approach holds that the contribution to the environmental problems and the distribution of consequences is unequal across communities [14,15]. For example, in relation to climate change, we could talk about how melting and rising sea levels can affect small island states, causing their disappearance and forcing their inhabitants to move to new areas (climate displacement), leading to the dismantling of their business fabric. Emerging diseases may also arise, which will affect the population differently depending on the quality of their health system and the hygiene of their areas. Furthermore, decisions to address these issues are likely to be made and implemented at the political and legislative levels, without actively involving affected citizens [15].

The environmental justice approach has gained significant importance [10], and from an educational perspective it enables students to achieve social transformation for sustainability [16,17], which is essential for today's current challenges. In this sense, although it is not explicitly mentioned in the Sustainable Development Goals (SDGs) of the 2030 Agenda [18], the environmental justice approach places the teaching of environmental education within a framework of a scientific literacy that is oriented towards dialogical emancipation, socio-ecojustice, and critical and participatory global citizenship [19]. It is understood as a tool for social change [20].

To effectively develop environmental education from an environmental justice perspective, didactic approaches oriented towards transformative environmental education are necessary. These approaches enable the critical evaluation and questioning of prevailing beliefs (cognitive, social, or moral) that have led to crisis contexts, in order to promote a change towards a sustainable future [21]. In this sense, encouraging students' reflection, critical analysis, and complex problem solving is essential [22]. However, even today, we still have no theoretical frameworks for approaching environmental justice education from a classroom practice perspective, as the literature generally has a strong pedagogical and philosophical focus [23]. This results in the adoption of a more conventional, literacy-based teaching approach to tackle environmental concerns.

Despite the above, several elements have been identified that may be suitable for bringing this approach into the classroom [4,23]. These elements are interconnected and are systems thinking, critical literacy, and action competence. Systems thinking enables students to understand, explain, and interpret complex and dynamic problems in science

classrooms in a holistic way [24]. To achieve this, it is crucial to identify the components of a system and their interrelationships [25]. Critical literacy involves reflecting on and questioning norms, information, practices, opinions, and actions to take a stand in the sustainability discourse, and potentially consider lifestyle changes [6,26]. Therefore, both elements are connected to action competence, which is defined as the capability to responsibly address and resolve environmental issues [11,27].

In general, educational interventions that include these elements are considered helpful in preparing students to become agents of change in favour of sustainability [28]. Research studies have analysed students' performance in the above-mentioned elements. To this end, teaching sequences based on scientific practices such as argumentation or modelling have been designed and developed at different educational levels. Uskola and Puig [29], for instance, have developed an intervention with trainee teachers on the origin of epidemics to identify what level of systems thinking they achieved and what dimensions of future thinking they considered when developing the proposed activities. Additionally, Esquivel-Martín et al. [30] implemented an activity in the One Health education framework to promote evidence-based argumentation in secondary school students (critical literacy). The aim was to identify how participants used the evidence and what solutions they proposed (competence for action) when working on a case related to the use of pesticides in agriculture in different populations connected by the same river and its relationship with reproductive problems in different organisms in the ecosystem. Similarly, Brocos and Jiménez-Aleixandre [31] analysed the results of a didactic sequence with trainee teachers in which they had to construct arguments about healthy and sustainable diets (vegetarian and omnivorous) and decide about them (competence for action). Finally, Evagorou et al. [32] developed an educational intervention to work on the scientific practices of argumentation and modelling with primary school students. To do so, they designed a solution-focused learning situation (competence for action) in response to a local environmental problem: the excessive presence of mosquitoes due to the proximity of a saltwater lake.

In contrast, to the best of our knowledge, there are currently no other systematic reviews available that cover classroom interventions specifically targeting systems thinking, critical literacy, and action competence together. The systematic reviews found in the framework of environmental education focus on analysing other elements. For example, Varela-Losada et al. [27] examined the educational proposals in a formal context to analyse how they contribute to the development of action competence, paying attention to the role of students, the educational practices and conditions posed, and the factors related to environmental education learning. Ardoin and Bowers [33] developed a systematic review of the literature to investigate empirical findings related to early childhood environmental education programmes and practices. Güler Yildiz et al. [34] reviewed articles on early childhood education for sustainability for a descriptive assessment: country, year of publication, research method, participants, and pillars of sustainability addressed. They also examined interventional research and present qualitative data. Finally, O'Flaherty and Liddy [35] developed a systematic review of the literature to explore the impact of interventions in education for sustainable development and global citizenship education. They focused on forms of assessment, education content, and intervention outcomes.

Therefore, none of the above works consider the environmental justice approach. Thus, there is no comprehensive understanding of how environmental justice education has been implemented, despite the importance attached to education to achieve the SDGs and its implicit relationship with environmental justice. Taking into account this gap in the literature and the suggestions derived from the study by Varela-Losada et al. [27], this review aims to determine how environmental education has been implemented in educational practice to identify the existing limitations when working on environmental education in early childhood education (ECE), primary education (PE), and pre-service teacher training (PTT) classrooms from an environmental justice perspective. To this end, a systematic review of the literature was carried out as detailed in the following section.

2. Method

This work presents a quantitative research study with an exploratory-descriptive approach. The methodology used was a systematic review of the literature, as it provides information on the state of knowledge in a given area [36]. This methodology enabled us to determine how environmental education has been implemented in educational practice to identify the existing limitations when working with it from an environmental justice perspective in ECE, PE, and PTT classrooms. This systematic review was developed following the PRISMA 2020 guidelines [36] and the main phases of the study are shown in Figure 1.

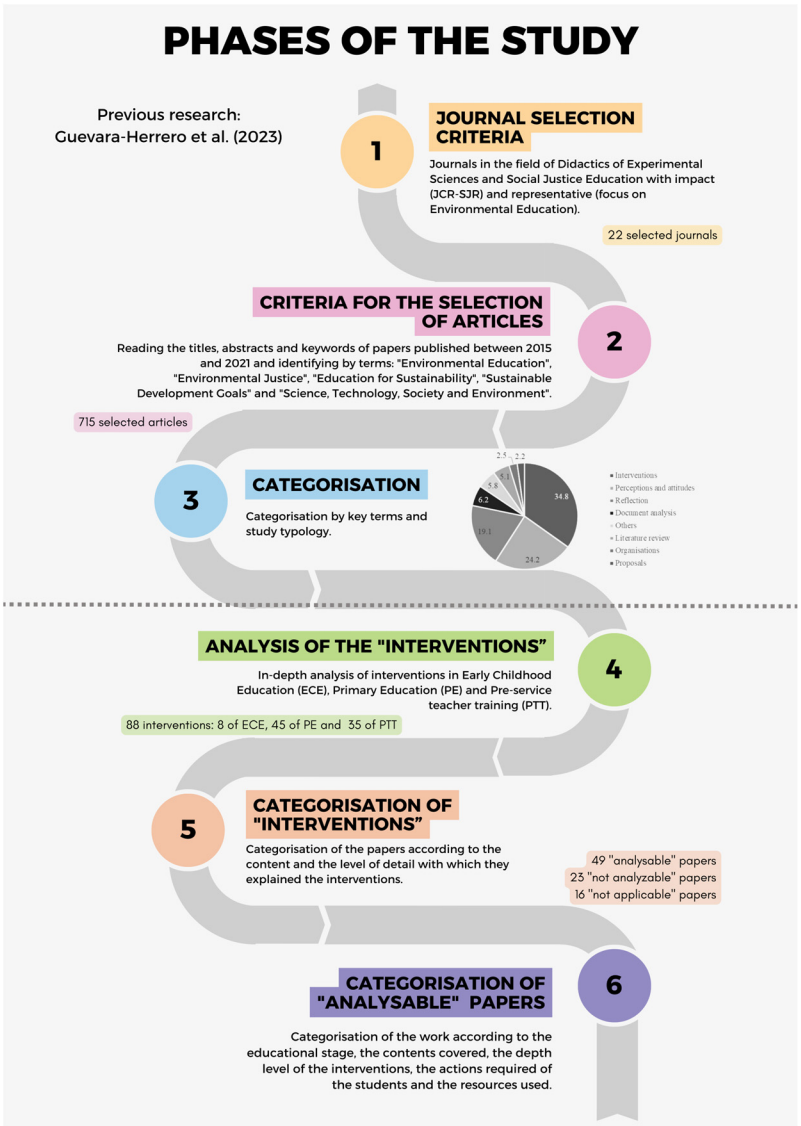

Figure 1. Phases of the study [37].

As illustrated in Figure 1, this study builds on previous research [37] in which 715 articles were analysed to identify what and how environmental education has been addressed in high-impact educational research since the publication of the SDGs.

To locate published articles on environmental education (phase 1), 22 representative journals (focused on environmental education) and impact journals (JCR-SJR) in the fields of Science Education and Social Justice Education were selected. It was decided to focus the study on journals with a JCR-SJR impact factor because they are the ones that set the trend

from an academic point of view, and this would also allow us to know their usefulness for the educational practice of environmental education.

Phase 2 identified articles published between 2015 and 2021 containing any of the following terms in the title, abstract, or keywords in English or Spanish: "Environmental Education" or "Environmental Justice" or "Education for Sustainability" or "Sustainable Development Goals" or "Science, Technology, Society and Environment". The period (from 2015 to 2021) was selected to consider the impact of the 2030 Agenda on educational research on environmental education, because the SDGs are implicitly related to environmental justice. Furthermore, the terms were chosen because the framework of environmental education was redefined after the publication of the SDGs to incorporate a social and moral component (environmental justice). From this new perspective, to achieve sustainable development (education for Sustainability), environmental problems must be addressed by considering different points of view, which links environmental education with the educational approach of science, technology, society, and the environment.

Next, in phase 3 an analysis tool was constructed to categorise selected works on environmental education by type of study: literature reviews, reflections, document analyses, proposals, interventions, organisations, perceptions, and attitudes, and others. It was found that works with results about the implementation of proposals, programmes, or activities (categorised as interventions) were the most frequent type of study. Therefore, it was considered relevant to analyse these studies in depth in future research to identify the characteristics of these interventions and their limitations [37].

For this purpose (phase 4), the 88 interventions developed in the ECE (8), PE (45), and PTT (35) stages were categorised (phase 5) into "analysable", "not analysable", or "not applicable" based on their contents and level of detail. Works were considered "analysable" when their interventions were related to environmental education contents and provided the necessary information to identify the existing limitations when working from an environmental justice perspective in the classroom. Articles were categorised as "not analysable" if they dealt with environmental education content but did not explain in detail the intervention carried out to identify existing limitations. Finally, the "not applicable" category included those studies that, despite including some of the terms used to identify the sample, did not deal with environmental education content. Based on this categorisation, out of the 88 articles, 49 were considered "analysable", 23 "not analysable", and 16 "not applicable". All the inclusion and exclusion criteria discussed above are listed in Table 1.

Table 1. Inclusion and exclusion criteria.

Type of Criterion	Criteria	Inclusion	Exclusion
Representativeness	Environmental education issue	X	
	Others		X
Impact factor	JCR or SJR	X	
	Others		X
Publication period	2015–2021	X	
Language	English	X	
	Spanish	X	
	Others		X
Terms in tittle, abstract, or keywords	Environmental Education	X	
	Environmental Justice	X	
	Education for Sustainability	X	
	Sustainable Development Goals	X	
	Science, Technology, Society and Environment	X	

Table 1. *Cont.*

Type of Criterion	Criteria	Inclusion	Exclusion
Type of study	Literature reviews		X
	Reflections		X
	Document analyses		X
	Proposals		X
	Interventions	X	
	Organisations		X
	Perceptions and attitudes		X
	Others		X
Area	Formal education	X	
	Non-formal education		X
Educational stage	Early childhood education	X	
	Primary education	X	
	Secondary education		X
	Pre-service teacher training	X	
Level of detail	Analysable	X	
	Not analysable		X
	Not applicable		X

This paper shows the analysis of the "analysable" articles (ECE: 7; PE: 26 and PTT: 16), which were categorised according to different variables (phase 6): "educational stage", "contents", "depth level", "actions required of students", and "resources". Figure 2 presents the categories and subcategories of analysis associated with each variable.

The categories established for the variables "educational stage", "contents", and "resources" were created in interaction with the data found in the sample analysed [38]. However, the categories associated with the variables "depth level" and "actions required of students" are based on previous work. On the one hand, in the variable "depth level", the categories were defined based on the objectives of environmental education since its origin (see Belgrade Charter, 1975), up to the present time [6]. Thus, considering the need for students to acquire knowledge, skills, values, and attitudes to contribute to sustainable development, the categories "content knowledge" (knowledge), "awareness-raising" (values), and "action-taking" (skills and attitudes) were established:

- "Content knowledge" refers to interventions that promote the learning of conceptual knowledge about the environment or environmental problems.
- "Awareness-raising" refers to interventions that focus on students recognising the importance of environmental issues.
- "Action-taking" refers to interventions that allow students to recognise their role in the issue at hand to propose and carry out actions on their own.

Different subcategories were identified within each of these categories.

Furthermore, the categorisation developed by Medir et al. [39] and applied with modifications by Pérez-Martín and Bravo-Torija [40] was considered in the variable "actions required of students".

After defining the analysis tool, it was validated by two external experts and corresponding analyses were conducted. To do this, firstly, the absolute and relative values of each of the categories associated with the different variables were recorded for a descriptive statistical analysis. Secondly, an inferential analysis of hypothesis testing (χ^2, $p \leq 0.05$) was performed with IBM® SPSS® Statistics 19 2010 (IBM Company, Armonk, NY, USA) and Microsoft Excel ™. The procedure for developing inferential analysis through hypothesis

testing is as follows: after recording the observed absolute values, they were analysed using SPSS to determine significant differences between two variables. As an example of the analysis carried out, the results of the resources used in the different educational stages are shown in Table 2.

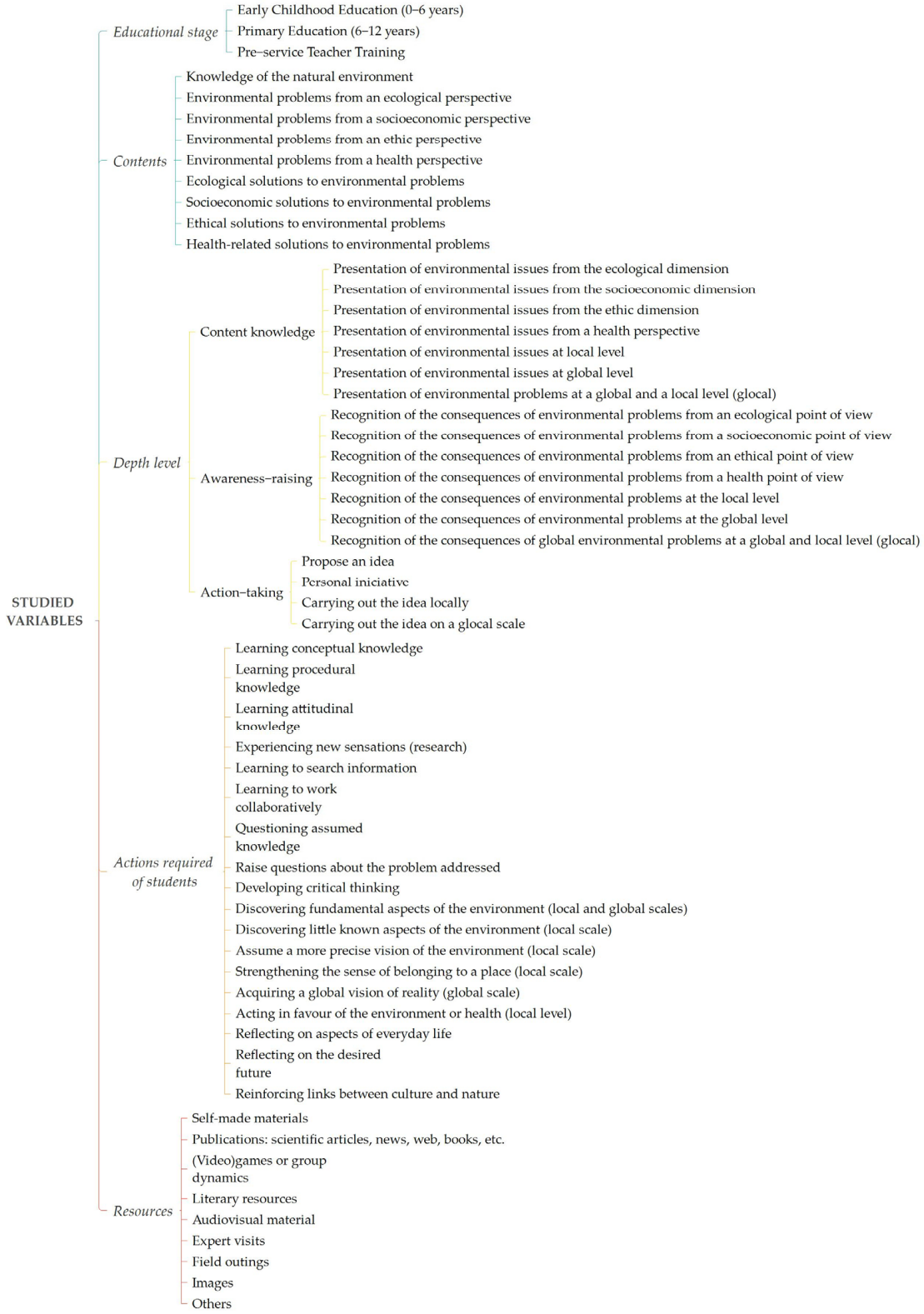

Figure 2. Categories and subcategories used in the analysis of the variables involved in the study.

Table 2. Results of the absolute values observed for the resources used according to educational stage. * Differences are significant if p-value ≤ 0.05.

Resources	ECE	PE	PTT	Total	p-Value
Self-made materials	6	12	8	26	0.169
Others	4	8	10	22	0.104
(Video)games or group dynamics	5	7	9	21	0.045 *
Field outings	1	12	7	20	0.301
Images	6	6	4	16	0.005 *
Publications	2	4	5	11	0.448
Literary resources	5	4	0	9	0.000 *
Audiovisual material	3	2	3	8	0.078
Expert visits	1	4	3	8	0.948
Total	33	59	49	141	

The expected values were estimated using the observed values (Table 3). This was achieved by multiplying the total of each row by the total of each column and dividing by the overall total.

Table 3. Expected absolute values of resources used based on educational stage.

Resources	ECE	PE	PTT
Self-made materials	6	11	9
Others	5	9	8
(Video)games or group dynamics	5	9	7
Field outings	5	8	7
Images	4	7	6
Publications	3	5	4
Literary resources	2	4	3
Audiovisual material	2	3	3
Expert visits	2	3	3

Finally, in those cases where the SPSS analysis indicated significant differences (χ^2, $p \leq 0.05$), the observed results were compared with the expected results (Tables 1 and 2).

3. Results

The analysis results are presented below, considering the "contents" and the "depth level" of the interventions, the "actions required of students" and the "resources" used. In all cases, the results are presented in a general way and then compared according to "educational stage". In addition, "actions required of students" and "resources" were also compared according to "contents". This allows us to observe the distinctions among the categories linked to the variables based on other variables. A complete list of all publications analysed in this review can be found in Supplementary Material Table S1.

3.1. Contents

First, the analysis of the variable "content" (Figure 3) shows that works on issues related to "knowledge of the natural environment" (33.1%) or on "environmental problems from an ecological perspective" (20.0%) represent 53.1% of the sample. Others, such as work on "environmental problems or solutions from a socioeconomic perspective", appear in around 13% and 12%, respectively. In contrast, addressing problems or solutions to problems from an ethical or health perspective in the classroom is less frequent (less than 5%).

Considering the educational stages in which these topics can be addressed (Table 4), it is evident that environmental education interventions cover the same topics regardless of the educational level (χ^2, $p \leq 0.05$). Throughout all stages, the focus is on issues related to "knowledge of the natural environment" (ECE: 37.5%; PE: 34.4%; PTT: 30.0%). The

second most frequent content differs between stages. In ECE, it corresponds to work on "socioeconomic solutions to environmental problems" (18.8%), whereas in PE and PTT, the focus is on "environmental problems from an ecological perspective" (21.9% and 20.0% respectively).

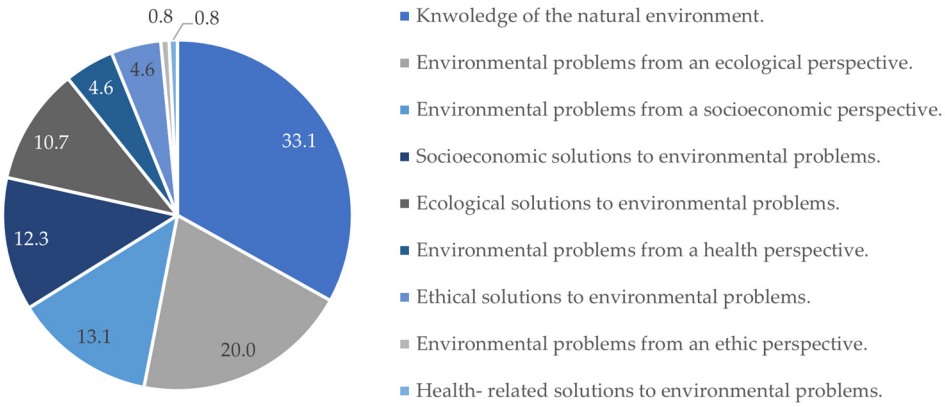

Figure 3. Relative frequency of contents covered in the environmental education activities.

Table 4. Frequency (%) of content addressed according to educational stage.

Contents	ECE	PE	PTT
Knowledge of the natural environment	37.5	34.4	30.0
Environmental problems from an ecological perspective.	12.5	21.9	20.0
Environmental problems from a socioeconomic perspective.	12.5	12.5	14.0
Environmental problems from an ethic perspective.	0.0	0.0	2.0
Environmental problems from a health perspective.	0.0	4.7	6.0
Ecological solutions to environmental problems.	12.5	10.9	10.0
Socioeconomic solutions to environmental problems.	18.8	9.4	14.0
Ethical solutions to environmental problems.	6.3	4.7	4.0
Health-related solutions to environmental problems.	0.0	1.6	0.0

3.2. Depth Level of Interventions

The analysis of the depth level of interventions (Figure 4) indicates that environmental education activities primarily aim to raise the awareness of students (44.1%), as well as to teach content knowledge (40.1%). However, promoting their participation and action is less frequent (15.8%).

Examining the subcategories, it is evident from Figure 4 that content knowledge is primarily approached from an ecological perspective (CK-SC.1: 17.8%), with less frequent consideration given to other perspectives such as ethics (CK-SC.3: 1.5%) or health (CK-SC.4: 2.5%). There is a similarity between all these problems in terms of their scale (CK-SC.5: 4.5%; CK.SC.6: 3.5%; and CK.SC.7: 3.5%). Regarding awareness-raising, the emphasis is again on the ecological (AR-SC.1: 13.4%) and socioeconomic perspectives (AR-SC.2: 10.8%), in contrast to other minority perspectives such as ethics (AR-SC.3: 3.0%) or health (AR-SC.4: 3.5%). To promote action-taking, it is common to allow students to propose ideas (AT-SC.1: 7.3%), rarely leading to action on a personal (AT-SC.2: 3.5%), local (AT-SC.3: 4.5%), or global (AT-SC.4: 0.5%) level.

The analysis revealed significant differences in the depth of the activities according to the level of education (χ^2, $p \leq 0.05$). Figure 5 shows that content knowledge is more frequent in the early stages (ECE: 40.0% and PE: 45.6%) than in the higher stages (PTT: 30.2%). Interventions promoting awareness-raising increase as the age of the students increases, reaching their peak at PTT (ECE: 24.0%; PE: 43.9%; and PTT: 52.3%). Action-taking is the least frequent category at all stages of education (PE: 10.5% and PTT: 17.5%), except in ECE (36.0%), whose frequency is higher than that of the "awareness-raising" level.

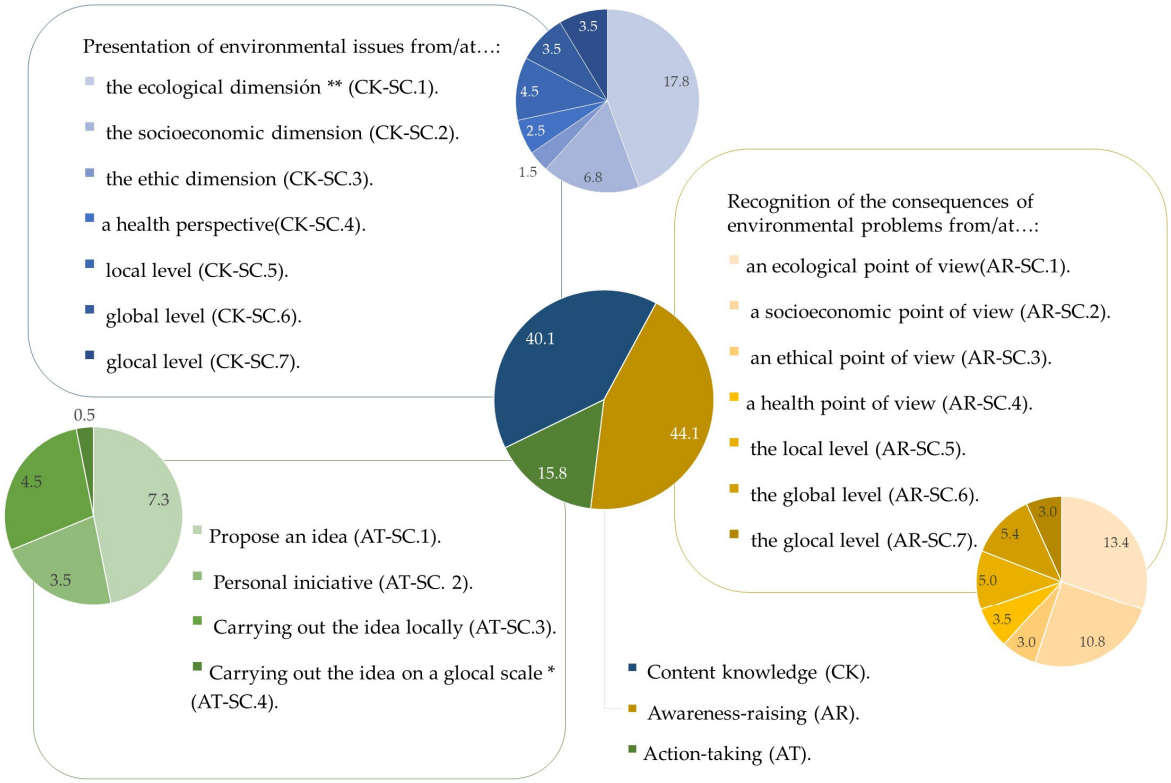

Figure 4. Results obtained for the depth level observed in the activities on environmental education according to the categories and subcategories used. * Differences are significant if p-value ≤ 0.05. ** Differences are significant if p-value ≤ 0.01. Note: SC: Subcategory.

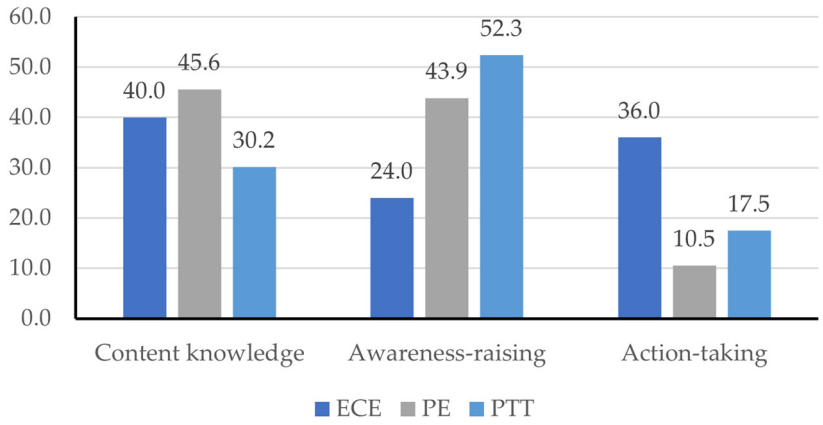

Figure 5. Relative frequency of the depth level (categories) reached according to the stage of education.

In terms of the subcategories (Figure 4) in ECE and PE, priority is given to "presenting environmental issues from an ecological perspective", which is not the case in PTT (χ^2, $p \leq 0.01$). In addition, activities that require action at the global level are very rare, with only one case appearing at the ECE stage (χ^2, $p \leq 0.05$).

3.3. Actions Required of Students

Regarding the type of actions required of students (Table 5), the most important categories in total are: "learning conceptual knowledge" (13.8%), "learning to work collaboratively" (9.8%), "learning to search for information" (8.0%), and "discovering fundamental aspects of the environment" (8.0%). By contrast, the categories "discovering little-known aspects of the environment", "acquiring a global vision of reality", "reinforcing links be-

tween culture and nature" (3.1%), "learning attitudinal knowledge", and "reflecting on the desired future" (2.8%) are less frequent.

Table 5. Frequency (%) of actions requested from pupils in total and according to educational stage.

Actions Required	ECE	PE	PTT	Total
Learning conceptual knowledge	1.8	7.7	4.3	13.8%
Learning to work collaboratively	1.8	4.0	4.0	9.8%
Learning to search information	1.5	3.1	3.4	8.0%
Discovering fundamental aspects of the environment	1.5	4.3	2.1	8.0%
Learning procedural knowledge	1.5	4.6	1.5	7.7%
Questioning assumed knowledge	0.9	1.8	3.4	6.1%
Assume a more precise vision of the environment	1.5	3.4	1.2	6.1%
Developing critical thinking	0.6	2.1	3.1	5.8%
Experiencing new sensations (research)	0.9	3.1	0.9	4.9%
Acting in favour of the environment or health	0.9	2.5	0.6	4.0%
Reflecting on aspects of everyday life	0.6	2.1	1.2	4.0%
Raise questions about the problem addressed	0.9	1.8	0.9	3.7%
Strengthening the sense of belonging to a place	0.3	1.5	1.5	3.4%
Discovering little-known aspects of the environment	0.0	2.1	0.9	3.1%
Acquiring a global vision of reality	0.6	0.9	1.5	3.1%
Reinforcing links between culture and nature	0.6	1.2	1.2	3.1%
Learning attitudinal knowledge	0.9	1.2	0.6	2.8%
Reflecting on the desired future	0.6	1.2	0.9	2.8%

If we analyse the type of specific actions that are demanded of students depending on the educational stage, we find that they are the same in all of them (χ^2, $p \leq 0.05$), except for the category "questioning assumed knowledge", which is lower than expected in ECE and PE, and higher in PTT (χ^2, $p \leq 0.05$).

Furthermore, it was found that the actions required of students differ depending on the subject matter. Thus, the analysis carried out shows that works on "environmental problems from an ecological perspective", the "learning of conceptual knowledge", the "questioning of assumed knowledge", and the "development of critical thinking" are more frequently demanded (χ^2, $p \leq 0.05$). However, it is not very common to work on this content in proposals that demand action in favour of the environment or health (χ^2, $p \leq 0.05$), something that does happen if problems are addressed from a socioeconomic perspective (χ^2, $p \leq 0.05$). To address the ethical perspective, the main actions are related to "acquiring a global vision of reality" and "reflecting on the desired future" (χ^2, $p \leq 0.05$).

It was also detected that, in order to work on socioeconomic solutions to environmental problems, priority is given to critical thinking (χ^2, $p \leq 0.05$), and when it is done from an ethical perspective, there is a predominance of actions related to environmental- or health-related action (χ^2, $p \leq 0.01$) and reflection on the desired future (χ^2, $p \leq 0.05$).

3.4. Resources

In the analysis of the resources used when implementing environmental education activities (Figure 6), there is a predominance of "self-made materials" (18.4%), followed by "games or group dynamics" (14.9%) and "field outings" (14.2%). On the other hand, using "literary resources" (6.4%) or "audiovisual material" (5.7%), or receiving visits from experts (5.7%), are less frequent. It is worth mentioning that, in environmental education, interventions using resources other than those considered in the categories is also very frequent (15.6%).

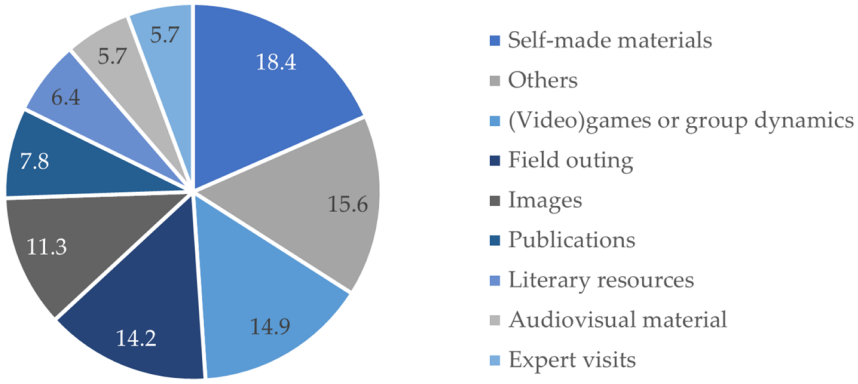

Figure 6. Relative frequency of resources used in environmental education activities.

Reviewing the types of resources that are used according to the educational stage (Table 2), statistically significant differences are observed in the categories "(video)games or group dynamics", "literary resources", and "images". In this sense, ECE prioritises the use of literary resources and images (χ^2, $p \leq 0.05$). In PE, (video)games or group dynamics and images are used less than statistically expected (χ^2, $p \leq 0.05$). In PTT, unlike in ECE, literary resources are not used, and little use is made of images, prioritising (video)games or group dynamics (χ^2, $p \leq 0.05$).

Finally, the analysis indicates that there are significant differences between the resources and the content being worked on in some cases. In particular, self-made materials are preferably used to work on socioeconomic solutions to environmental problems (χ^2, $p \leq 0.05$). However, this is less common when working on ecological solutions (χ^2, $p \leq 0.05$). On the other hand, field outings are used to work mainly on knowledge of the environment (χ^2, $p \leq 0.05$).

4. Discussion and Conclusions

The aim of this research was to identify the existing limitations when working on environmental education in ECE, PE, and PTT classrooms from an environmental justice perspective. It has long been emphasised that environmental problems must be understood as a complex system [24] involving social, economic, environmental, ethical, and health factors [12,41]. Therefore, the latest 2030 Agenda strategy and the SDGs [42] call for an integrated approach to understanding environmental degradation and lifestyles. However, our study suggests that environmental education teaching is still limited to developing environmental knowledge interventions or working on environmental problems from an ecological point of view. These results lead us to infer that this systemic approach has not yet been integrated into educational interventions published in relevant journals in recent years. This fact confirms, with high statistical and sampled evidence, the results found in previous works, which state that teachers frequently consider the ecological dimension in their classes but do not use the systemic approach in their teaching [43]. Since teachers are the ones who ultimately determine what is worked on in their classrooms and how it is done, the presented limitation also carries over to the educational reality, where a lack of holistic and pluralistic perception among students is detected [44]. This demonstrates that global policy efforts to understand environmental issues in an interconnected manner have not yet influenced educational practices.

This resistance to incorporating different dimensions and to limit oneself to working on problems from an ecological perspective may be due to the traditional approach used in educational practices [7]. As the results of this study show, these practices are still very much based on content knowledge and awareness-raising instead of action-taking, even though previous works have confirmed that environmental content knowledge is not sufficient to promote behavioural change [45]. Prioritising conceptual learning and awareness-raising leads to demands on students that are far removed from transformative

environmental education. As this perspective, at a theoretical level, has been considered to be very useful for teaching environmental education [46], it was expected that studies of classroom interventions would find more proposals favouring actions such as "questioning assumed knowledge", "developing critical thinking", "acting in favour of the environment or health", "reflecting on aspects of everyday life", "raising questions about the problem addressed", or "reflecting on the desired future". Furthermore, in order to increase their impact, these actions should appear in the initial stages (ECE and PE), with the aim of training an informed, critical citizenship capable of participating in decision making to face current challenges [28]. However, they should also be promoted in PTT, but from a reflective approach in their professional practice, within the framework of the specific environmental competence for teachers [47,48]. Despite this, the results reflect a predominance of actions associated with conceptual and procedural learning at all educational stages ("learning conceptual knowledge", "learning to search for information", or "discovering fundamental aspects of the environment").

In terms of resources, the results indicate that, when addressing environmental issues, teachers predominantly opt to create their own materials. This could suggest a scarcity of teaching resources or the inadequacy of existing ones for their students. This interpretation aligns with previous studies, in which the analysis of activities on sustainability in Spanish primary school textbooks revealed a significant proportion of activities with minimal cognitive demands related to environmental issues and that were mainly focused on recycling [49]. Group games or dynamics also predominate, as has been observed in previous studies [27], associated with the teaching interest in demanding collaborative work actions to build knowledge through social interaction. Additionally, as found in Ardoin and Bowers [33], who focus on the ECE stage, field trips are frequent. According to Herman et al. [50], experiences with nature can be useful for interpreting science in real situations, but they must be didactically structured and move away from simply acquiring knowledge about the environment. In this sense, they should show environmental issues to students in order for them to reflect on them and make informed decisions [51], which, based on our results, is not the case.

Focusing now on discussing the comparison between educational stages in the different variables, the findings of our study indicate that there is no sequencing of the contents by educational stage. In this sense, despite international intentions to improve the teaching of environmental education [6], no specific curricula have been designed to define the learning that a student should acquire according to his or her educational level. These plans are essential given that, as indicated by Otto et al. [52], environmental attitudes and behaviours differ throughout life, so it does not seem reasonable to work on the same content at all educational stages.

When considering the depth of interventions, variations are observed based on the educational level. The levels used as categories of analysis ("content knowledge", "awareness-raising", and "action-taking") are frequent when talking about the objectives of environmental education in general [6]. However, no previous studies have been found that define the appropriate depth level for content based on the age of the students. Despite this lack of a framework, several studies have pointed out that the ability to have an impact on changing students' behaviours decreases as age increases [7,8]. Therefore, considering that the higher the awareness the greater the possibility of changing habits, it does not seem reasonable that awareness is higher during PTT than in early stages (ECE and PE). Furthermore, we can also criticise the low frequency of the third level (action-taking) in PE and PTT. This suggests that students are not given enough opportunities to apply their knowledge in activities related to their field of action, whether as citizens in ECE and PE or as teachers in PTT, which restricts their development as agents of change.

Regarding the actions demanded, it can be observed that they are similar at all educational stages. In order to define the type of actions that should predominate at each level, it is necessary to have pedagogical models adapted to the age of the students. However, the proposals found [53] (e.g., Hadjichambis and Paraskeva-Hadjichambi, 2020) make

suggestions on a more general educational level, making comparison challenging. In our opinion, it seems reasonable that frequencies of all actions of the category system used have been recorded in all three educational stages. Nevertheless, it is important to balance these frequencies to increase the presence of those actions related to transformative environmental education discussed above.

Considering the above, and that systems thinking, critical literacy, and action competence are key elements in environmental justice education [23], it can be concluded that the main limitation identified when working on environmental education in ECE, PE, and PTT classrooms from an environmental justice perspective is its lack of integration. One possible explanation for this is the strong theoretical focus of publications on both environmental education and environmental justice [37], which has generated a gap between research and educational practice, due to the lack of a definition of the didactic component [47]. This is also reflected in the selection of the study sample, since, out of more than 700 articles, only 88 proposals with classroom intervention were found, and only 49 of them contain detailed information on their implementation. Furthermore, by educational stage, there is a predominance of PE and PTT interventions, as opposed to ECE, which possibly limits the impact of the interventions that are developed [7,8].

For this reason, if the aim of educational research is to improve the teaching and learning of content (conceptual, procedural, and attitudinal), such as environmental problems, the development of a current of research focused on the didactics of environmental education that includes a social justice perspective should be promoted. This tendency should encourage the promotion of studies that define which methodologies (e.g., case study or learning in context), strategies (e.g., thought-provoking questions, mediating questions, socio-scientific issues, or storytelling), or didactic resources (e.g., tables, graphs, news, or videos) are most suitable for achieving educational success in terms of social change for environmental protection. To this end, research should be carried out in which their implementation in the classroom and the results obtained are analysed, such as [30]. In this way, research work closer to the reality of the classroom and to teachers' interests will be promoted, potentially reducing the gap between research and practice. We should point out that this gap may be a consequence of the inclusion and exclusion criteria defined. Specifically, focusing our study on impact journals (SJR-JCR) provides us with a partial knowledge of the topic addressed. Therefore, as a future line of research, it would be interesting to carry out a similar study using lower impact journals as sources. This would allow us to compare the results and obtain a deeper understanding of the role of educational research in environmental justice education.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su16072805/s1, Table S1: complete list of all publications analysed in this review. Table S2: The PRISMA_2020_checklist.

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