

Article

Bridging the Gap: How Researcher–Teacher Collaboration Is Transforming Climate Change Education in Secondary Schools

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Abstract: The research presented here is based on the study of secondary school students' conceptions of sustainability and climate change, as well as the barriers described in the literature on the insufficient involvement of teachers in education for sustainability. Based on the results of these analyses, a collaborative intervention carried out with secondary school teachers and their students was designed, implemented, and evaluated in order to respond to the shortcomings and needs of both in this context. The teachers involved participated in an itinerary based on research in didactics of science. As a first step for the intervention, the knowledge of sustainability referred to by pre-service and in-service teachers was studied. The results of the research show the need for more training in sustainability and climate change for secondary school teachers in order to be able to effectively include this content in the subjects they teach. On the other hand, it has been shown that the collaborative work carried out with secondary school teachers improves their willingness and motivation to deal with issues related to sustainability in the classroom, taking advantage of the numerous opportunities offered by the curriculum.

Keywords: sustainability; climate change; student conceptions; teacher training; collaborative work; educational research-practice; SDGs



Academic Editors: Marc A. Rosen and David González-Gómez

Received: 5 November 2024

Revised: 9 December 2024

Accepted: 20 January 2025

Published: 23 January 2025

Citation: de Rivas, R.; Vilches, A.; Mayoral, O. Bridging the Gap: How Researcher–Teacher Collaboration Is Transforming Climate Change Education in Secondary Schools. *Sustainability* **2025**, *17*, 908. <https://doi.org/10.3390/su17030908>

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1. Introduction

In 2023, world leaders met in New York to discuss progress in achieving the Sustainable Development Goals (SDGs) for the period 2015–2030 [1]. At the halfway point of this period, the diagnosis was not good, as the report carried out noted that the world is a long way from meeting the 2030 Agenda, warning that many of the 17 interconnected SDGs had regressed compared to the previous report in 2019 [2]. In short, it claimed that ‘the world is still moving in the wrong direction’.

One of the latest published scientific studies shows that current temperatures are unprecedented in the last millennia of our planet’s history [3]. The climate crisis is just one more manifestation of the complicated and serious situation we face, unique in the history of our planet and our species. A global crisis shaped by a multifaceted problem in which the borders of the major challenges that comprise it are blurred due to the intense interrelation and empowerment existing between them: the degradation of the biosphere and loss of biodiversity; high pollution in all its forms; serious social inequalities between population groups; the scarcity of essential resources, including water; climate change (CC); armed conflicts; and the loss of cultural diversity. A set of serious problems linked to a socioeconomic model committed to endless economic growth that proves to be unsustainable on a finite planet. The pursuit of individual and short-term benefits, without

considering the socioenvironmental consequences, is stretching and even overstepping planetary boundaries. This system is also responsible for other issues, such as migration, conflict, and violence caused by the desire to control essential resources. The main drivers of this complex reality are the disproportionate consumption of resources, energy, goods, and services by a population that continues to grow and in which the gap between rich and poor is widening.

The scale and speed of this socioenvironmental challenge demand coordinated and forceful action, proportional to the severity we face. Among the necessary and urgent measures, this work aims to contribute to educational action by promoting the essential orientation of the academic world so that, responding to the different calls and appeals, it includes the approach in the classroom of global problems and the measures they require. Education for sustainability (ESD) is a key part of the transition to a new world order that corrects all the dysfunctions we have. An education that requires a review of all teaching–learning processes, including the need to acquire a global vision, which is essential for the involvement of citizens in decision-making, with special attention to science education and teacher training [4,5], as well as student-centred, action-oriented work [6].

However, making ESD a reality requires overcoming several difficulties and managing existing challenges and barriers. The concern and interest in sustainability and climate change issues of the younger generations, as well as the lack of competences and skills needed to align with appropriate behaviours, in the context of the current planetary emergency, is a fact repeatedly pointed out in various studies [7–9]. In particular, studies on students' conceptions of climate change show that misconceptions are widespread, consistent, and persistent [10]. Studies suggest that there are difficulties in adequately understanding the risk or threat of this crisis, as well as its origin, consequences, and its link to individual and collective behaviours [11,12].

The limited training of teachers in sustainability issues is another of the barriers that have long been repeatedly cited by research when it comes to making ESD a firm commitment. Research aimed at probing their knowledge, attitudes, and beliefs confirms the difficulties they face to include ESD adequately [13,14]. Their misperception of the global socioenvironmental crisis is a consequence of this insufficient training [15,16].

A situation such as the one described above requires work from different perspectives. One of the most important is to focus on the initial training of teachers, so that they join their schools having acquired ESD competences that will enable them to work in such a specific social context. It is the universities that take on this task of preparing future professionals, including teachers at all stages and in all subjects. For this reason, these institutions have been facing the challenge of this responsibility for decades, given the key role they must play in ESD [17]. Various diagnoses of university teaching guides that have been carried out, with the intention of analysing whether the initial training of future secondary education teachers adequately integrates content and references to sustainability, have shown that there is ample room for improvement, with insufficient attention being paid to the treatment of the planetary emergency and the international context that includes it, namely, the 2030 Agenda and its 17 SDGs [18]. Some research has addressed precisely what future teachers understand by sustainability [19,20] considering that a proper understanding of ESD by pre-service teachers is potentially of great importance for capacity development when integrating ESD in schools. The research shows, precisely, serious gaps that need to be addressed.

In addition to initial teacher training aimed at preparing for active teaching, it is especially necessary to include in these objectives teachers who are still in need of meeting the demands of ESD and who probably have not received adequate initial training to do so [21–23]. Studies on teacher training have pointed out the following:

- Teachers in general and specifically those in scientific disciplines show incomplete and fragmented approaches to this problem and the actions required, which limits their understanding of its seriousness and urgency in all its depth [24].
- Difficulties related to lack of personal interest, lack of time, and, above all, insufficient training are also mentioned [25].
- There are other inhibiting factors that relate to teaching practice where ESD is perceived as an imposition that is difficult to connect with certain academic disciplines, insufficient personal priority, lack of personal or professional incentives, insufficient support and commitment from related external bodies, and, in many cases, the rigid demands of established curricula [26–28].
- Teachers express concern about the demand to incorporate socioenvironmental issues in the syllabuses, considering this situation to be detrimental to students in their training process as future professionals. However, research shows that the result is certainly the opposite, since the special attention to the great planetary challenges that ESD implies promotes a positive attitude of the people involved towards the teaching–learning processes [29–31].

Nuance should consider when talking about teachers and their inadequate training in ESD. Few studies have included teachers themselves with the intention of evaluating certain experiences carried out. Not including their own views limits the scope of such studies [32,33]. In addition, there are several references in the literature that draw attention to the insufficient influence that research in didactics of science has on teaching processes [34]. The configuration of a critical teaching body with the capacity to interpret different academic situations and that incorporates the conclusions derived from a process of research and collective reflection emerges as a highly beneficial practice of continuous improvement for all those involved in education [35].

The aforementioned research in the field of education for sustainability in science teaching, within the framework of the intended study, leads us to formulate the following starting hypotheses:

Hypothesis H1. *Secondary education teachers do not generally consider themselves capable of including sustainability in their teaching practice, given that they have received insufficient training to carry out this task.*

Hypothesis H2. *A formative–collaborative work focused on the attention to the socioenvironmental crisis can contribute to improving motivation and interest in teachers and provide them with the necessary tools and competences for their involvement in education for sustainability.*

2. Materials and Methods

To test the hypotheses, a series of experimental designs and analytical tools were developed to verify whether the results obtained in these designs are convergent with the assumptions made. This involves the collection and analysis of both qualitative and quantitative data, as well as their integration and joint discussion to provide a comprehensive understanding of the research objectives and results.

The questionnaires used were developed ad hoc and validated by researchers in the field under study. The process consisted of sending draft questionnaires to experts with information on this study's objectives, methodological aspects, target samples, and specific questionnaire goals. After their analysis, experts provided feedback, which was incorporated into the final documents. The finalised versions were then sent back to the experts for further review.

For the first hypothesis H1, an initial questionnaire was designed, aimed at in-service secondary school teachers.

The results guide the next steps to be taken, comprising two other experimental designs conceived and implemented for the testing of the second hypothesis H2. These designs consist of (i) the conception of a collaborative teaching intervention and its implementation and (ii) an evaluation questionnaire addressed to the participating in-service teachers.

This research was carried out during the school years 2019–2020, 2020–2021, 2021–2022, and 2022–2023 and involved 14 secondary schools and 42 teachers belonging to these schools. The teachers were engaged in collaborative teams at their schools, participating in numerous meetings with the research team throughout the academic years, analysing the results of studies on their students' conceptions, contributing to the preparation of materials, implementing them in their classrooms, and sharing results with the research team, among other activities. Students from these schools were involved in a previous study on conceptions of sustainability and climate change. The results of the study showed that students are concerned about the current socioenvironmental crisis but lack the necessary knowledge to be adequately involved in the informed decision-making that the situation requires. These shortcomings highlight the insufficient treatment of global issues in the classroom [9].

2.1. Experimental Design for the Test of the First Hypothesis H1

Experimental Design 1: Initial Questionnaire to Participating In-Service Teachers

This questionnaire focuses on studying what kind of training related to sustainability teachers mention, where and how they have received it and how much of a priority they identify this type of content. It is an anonymous, ad hoc survey divided into two units. The first unit is designed to collect sociodemographic data: type of school from which they come, years of professional experience, level of education at which they teach, and subject matter. The second unit, with nine items, combines both open and closed questions and focuses on the opinion of each participant on different aspects related to their training, motivation, and competences regarding sustainability. Open-ended questions predominate, allowing for teachers to express themselves freely, with no space limit and no previous orientations, therefore providing a large amount of information.

Specifically, among other things, it addresses the following:

- Whether the participating secondary school teachers, integrated in the centres involved, consider themselves capable of including sustainability in their teaching practice and what training they have received to carry out this task.
- How much of a priority they consider addressing ESD in secondary education is, as well as what they consider their responsibility as teachers in response to the calls for ESD.
- What their motivations are for getting involved in this researcher–teacher collaboration.
- If they consider the subject they teach to be aligned with sustainability.
- What opinion they have regarding the knowledge and competences of their students on these issues.
- What specific content related to sustainability they think should be included in secondary school according to the subject they teach.

The teachers' answers to the initial questionnaire help acquaint them with the issues identified and start them thinking about the subject they are going to become involved with, as well as to find out about their training needs.

The full questionnaire is included in Appendix A.

The specific criteria and networks for the analysis of the results are shown in Section 3 in the detailed Results and Discussion. The questionnaire consists of 9 items. The first three items deal with the previous training of the participating teachers, asking about the kind of training they consider of interest to them and the reasons why they would

like to take part in this proposal. Items 4, 5, and 6 propose a personal reflection on the contents of their subjects and the relationship with the global crisis and its approach from the perspective of education for sustainability (ESD). Item 7 asks for their opinion on their students' conceptions of sustainability and possible measures in this context. Item 8 focuses on their interests, motivations, and willingness to include ESD in their teaching, as well as what they think would be the appropriate way to do so. Finally, item 9 asks them for topics related to the global crisis that they consider could be included as teaching content.

2.2. Experimental Designs for Testing the Second Hypothesis H2

2.2.1. Experimental Design 2: Development and Implementation of an Itinerary of Working Sessions

Taking into account the results of previous research in relation to students' conceptions of sustainability [9] and climate change and the lack of training and involvement of teachers in this same context, this third design aims to achieve the following:

- Elaborate and propose educational interventions that involve teachers in the treatment of sustainability in secondary school classrooms.
- Contribute, in collaboration with the teachers, to overcoming the shortcomings and needs of the students, thus improving their knowledge and skills.

The intervention proposal has been developed in the area of science education, and specifically ESD, with the support and assessment of teachers and researchers involved in the field of study.

The didactic itinerary is made up of eight sessions; this includes a first one, common to all the centres, and others to be chosen according to the context, interests, student typology, previous contents worked on, etc., as shown in Figure 1.

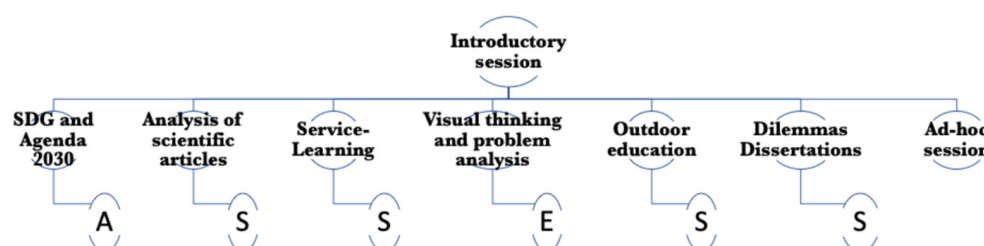


Figure 1. Working sessions with secondary schools. Source: own elaboration.

Experimental design 2 consisted of the preparation and implementation of a comprehensive intervention aimed at the 42 teachers from the 14 selected schools. The intervention focused on several training sessions to be conducted with their students. These sessions were implemented over the course of a full academic year, spanning a total of 4 school terms.

The sessions took place in the regular classrooms of the students at the participating schools and were conducted under the guidance and supervision of the research team. The number of participants per session varied depending on the educational level, with an average of 30 students per class.

For each session, a program of activities was prepared, focusing on selected issues and including didactic comments to guide the teachers conducting the sessions and those who might implement them in the future. Each intervention typically required one or two class sessions to complete.

The main objective was not only to develop interventions to address the misconceptions and gaps in knowledge identified among the students but also to actively involve the teachers from the outset. Teachers were integrated into collaborative teams to work on the proposals developed by the research team, fostering a co-creation process.

Through this collaborative approach, a series of proposals for working with students were developed. This was an open and participatory process, involving teachers in the design, adaptation, implementation, and analysis of the proposals' impact, using materials prepared by the research team.

Initially, an introductory session was designed to address the global crisis, with a particular focus on climate change, aiming to tackle the misconceptions and deficiencies identified in secondary school students. Subsequent sessions were tailored to the specific training needs and interests of the participating teachers and their students.

2.2.2. Experimental Design 3: In-Service Participating Teachers' Evaluation Questionnaire

The purpose of this questionnaire is to critically review the itinerary designed and implemented collaboratively with the in-service teachers involved, in order to guide its continuity as part of a work to improve the intervention.

This is an anonymous survey prepared ad hoc and divided into two units. The first unit was designed to collect sociodemographic data: type of school where they work, years of professional experience, level of education, and subjects that they teach. The second unit, with nine items, combines open and closed questions and focuses on the opinion that each participant has of the intervention of which he/she has been a part.

With the implementation of this design, the following aspects, among others, are addressed:

- Initial interest and reasons for getting involved in this research.
- To what extent the itinerary carried out manages to maintain this interest and involve them in the work carried out.
- Evaluation of the methodology used: materials, duration, accompaniment, etc.
- About the contents included in each of the work sessions: if they are of interest to them, if they miss any of them, if they consider the topics addressed to be relevant or not. . .
- The impact that the intervention has had on their own teaching, whether they think that in subsequent academic years they will incorporate aspects of climate change and sustainability, etc.

The complete questionnaire is included in Appendix B.

The evaluation questionnaire for teachers who have participated in the intervention in at least one school year aims to collect additional information to that obtained in the numerous meetings and contacts held between the research team and the teachers involved. Item 1 asks them about the motivations they had for getting involved in the proposal in which they have just participated. In items 2, 3, 4, 5, and 6, they are asked to make a detailed assessment of specific aspects of the proposal: materials, contents, methodology, support from the research team, among others. Item 7 poses a reflection on the impact they expect this project to have on their future classes and teaching programmes. Item 8 explores the holistic approach of the intervention in which they have been involved, asking to what extent they perceive this holistic vision of education for sustainability. The last item, item 9, asks them in an open-ended way for comments and opinions that might not have been addressed in the previous items.

3. Results and Discussion

This section presents and discusses the results obtained with the experimental designs used to test the two hypotheses. The data obtained are also analysed to draw conclusions to validate or reject the initial conjectures. In order to illustrate the type of answers given by teachers in the questionnaires, examples of their responses to some of the most significant items are shown.

As mentioned above, this research was carried out during the four school years between 2019 and 2023. We worked with a total of 14 secondary schools with 42 teachers involved from different teaching departments (Table 1). The selection of the 42 teachers in the sample was closely tied to the collaboration between the research team and the 14 participating secondary education centres. These centres had expressed a strong interest in education for sustainable development (ESD), which facilitated access to teachers who were initially interested in sustainability-related topics. The participating teachers worked with students in the second cycle of secondary education and high school (Bachillerato), a stage at which students' age is deemed appropriate for addressing sustainability and climate change issues in greater depth.

Table 1. Characteristics of the teachers' sample.

Dimensions		Number	Percentage
School type	Public	16	38.1%
	Private	26	61.9%
	Total	42	100.0%
Area	Urban	37	88.1%
	Rural	5	11.9%
	Total	42	100.0%
Gender	Women	23	54.7%
	Men	17	40.5%
	IDK-N/A	2	4.8%
	Total	42	100.0%

Most of the teachers involved (approximately 80%) taught scientific subjects, such as biology and geology, physics and chemistry, mathematics, and technology. However, during this study, teachers from other areas, including language, philosophy, and history, also joined the initiative after learning about the intervention and recognizing the interdisciplinary nature of ESD. While their participation was less extensive than that of the science teachers, they completed the questionnaires and participated in at least some of the sessions. The teaching experience in secondary education varied between 1 and 34, with an average of 11 years. The sample was selected for convenience, due to the ease of access to the schools by the research team, and the involvement of the management team and teachers.

This approach confirms the transversal and interdisciplinary nature of the contents related to teaching sustainability.

3.1. Results and Analysis of the Testing of the First Hypothesis H1

Results of Experimental Design 1: Initial Questionnaire to Participating In-Service Teachers

The results of the items are shown below.

Regarding item 1, more than three-quarters of the group of teachers surveyed cited reasons for their participation related to their interest in the general theme in which this proposal is contextualised—education for sustainability (ESD) and the SDGs. The rest, 23.8%, do so without specific reasons or because it is a decision of the school to which they belong (Table 2).

Table 2. Results for item 1 of the initial teachers' questionnaire.

Item 1. What Were the Main Reasons for Participating in This Project?	N = 42	%
Level 1: Teachers involved for their formative interest in ESD/SDG	32	76.2
Level 2: Teachers participating for other reasons	10	23.8
IDK-N/A	0	0.0

Below are some literal responses from teachers, classified by level.

Examples of Level 1 responses:

'Interest in incorporating an Education for Sustainability programme into the school's project'.

'I want to actively collaborate in the inclusion of Sustainability in the educational stage, making students aware of this context and involving them in it'.

Examples of Level 2 responses:

'Centre coordination proposal'

Only 26% of the teachers (11 people) stated that they had taken part in some training activity related to the subject of sustainability, SDGs, and Agenda 2030. Most of these responses correspond to initiatives of the school to which they belong, such as strategic planning meetings (Table 3), not formal courses offered by specialised training entities. This is consistent with the insufficient teacher training on ESD suggested by this research.

Table 3. Results for item 2 of the initial teachers' questionnaire.

Item 2. Have You Previously Attended Courses or Other Initiatives Related to Sustainability, Sustainable Development Goals (SDG), or Education for Sustainability (ESD)? Please Specify If Applicable	N = 42	%
Level 1: Teachers who have attended ESD/SDG courses	11	26.2
Level 2: Teachers who have not attended ESD/SDG courses	31	73.8
IDK-N/A	0	0.0

A group of respondents highlighted formative aspects related to content (18), while a similar number (17) focused on the practical application of a potential intervention with students. Additionally, six respondents expressed a preference for including methodological aspects related to sustainability (Table 4). Notably, many responses were general and lacked specificity, making them challenging to categorise. This trend may reflect a broader difficulty in proposing deeper content or training enhancements in areas where teachers themselves have not received prior instruction, as revealed in their answers to the previous item.

Table 4. Results for item 3 of the initial teachers' questionnaire.

Item 3. In Your Opinion, What Training Aspects Would Be of Interest to Enrich or Improve Teacher Training on Sustainability and SDGs? Cite Them	N = 42	%
Level 1: Sustainability and SDG content	18	42.9
Level 2: Specific methodological tools for ESD (and their evaluation)	6	14.3
Level 3: Specific teaching proposals	17	40.5
IDK-N/A	1	2.4

Examples of Level 1 responses:

'Specific courses on any of the SDGs'.

‘Current issues in our environment’.

Examples of Level 2 responses:

‘Methodology to bring teachers and students together in the transition to sustainable human development’.

‘Deepening its practical aspect’.

Examples of Level 3 responses:

‘It would be very interesting to propose practical training courses on real cases where to apply the SDGs’.

‘It would be interesting to hear about proposals for linking these issues with subject programming’.

More than 60% of the teachers surveyed (26 people) consider that the current curriculum addresses little or not at all the ongoing socio-environmental crisis and issues related to the transition to sustainability (Table 5). The inclusion of these contents is recent and seems to be considered still insufficient by the participating teachers.

Table 5. Results for item 4 of the initial teachers’ questionnaire.

Item 4. In Relation to Your Subjects, to What Extent Do You Consider That Sustainability Is Explicitly Addressed in the Curriculum? Please Give Details of Your Answer	N = 42	%
Level 1: It is addressed appropriately	16	38.1
Level 2: Insufficiently addressed	24	57.1
Level 3: Not addressed	2	4.8
IDK-N/A	0	0.0

Examples of Level 1 responses:

‘It is approached from different aspects, with special emphasis on the care and use of spaces and materials’.

‘From the subject, there are several topics related to this aspect, and we try to approach it from a commonsense point of view, trying to raise awareness among students in order to have a better future’.

Examples of Level 2 responses:

‘Sustainability is vaguely addressed from Biology. It is more part of transversality than of the subject areas’.

‘In a very superficial way, but it is clear that we can link any of the SDGs with History’.

Examples of Level 3 responses:

‘The curriculum does not address Sustainability’.

Most of the participating teachers consider that there are contents that allow them to be linked to the socio-environmental crisis and issues related to Sustainability (Table 6). Only 15 people said that any content could be approached from this perspective.

Table 6. Results for item 5 of the initial teachers’ questionnaire.

Item 5. What Contents of the Curriculum Do You Think Could Be Used to Enhance Education for Sustainability (ESD)? Please Specify Your Answer	N = 42	%
Level 1: All types of content (cross-cutting treatment, considering conceptual, procedural, and axiological aspects) are mentioned	15	35.7
Level 2: Only a specific topic in his/her subject is mentioned	26	61.9
Level 3: There are no contents in his/her subject mentioned to be related and used	0	0.0
IDK-N/A	1	2.4

As already pointed out, the global nature of the socio-environmental crisis, the close link between the different problems to be faced (both in the social and environmental spheres) highlights the need and, above all, the possibility of approaching them from all disciplines.

Examples of Level 2 answers:

‘In Chemistry: chemistry and environment. In Physics: renewable energies’.

‘Those related to landscape, energy sources, consumption, waste. . .’.

‘Food and nutrition, healthy habits and ecosystems and environment’.

The majority of the teachers surveyed (60%) consider issues related to socioenvironmental problems addressed by the SDGs to be both relevant and closely related to their context. According to research, these topics directly impact people’s lives in general and secondary school students in particular. Understanding these issues in depth contributes significantly to basic scientific literacy, which is key to the comprehensive development and empowerment of individuals to make informed and conscious decisions. However, 40% of teachers still perceive these topics as difficult and not particularly relevant to students’ current interests (Table 7). This may suggest that, in the view of some teachers, while the topics themselves are important, the curriculum does not adequately address them or fails to present them in ways that align with students’ interests and realities.

Table 7. Results for item 6 of the initial teachers’ questionnaire.

Item 6. Do You Consider the Contents Directly or Indirectly Related to Sustainability to Be Relevant and Close to the Students? Why? Explain with an Example	N = 42	%
Level 1: They are relevant and close	25	59.5
Level 2: They are often complicated and not always close	9	21.4
Level 3: These subjects are far away from the lives and interests of students	7	16.7
IDK-N/A	1	2.4

Examples of Level 1 responses:

‘Of course I think they are relevant for learners. Small changes make big changes and it is a fact that we in education have to be part of the change’.

‘I think they are close and they are at an age where most of them find the topic at least interesting. They show interest, contributing ideas and looking to the future.’

Examples of Level 2 responses:

‘From my point of view, the theoretical is of no interest, but when the action is physical, like doing food campaigns, care and cleanliness of the environment. . . they are more effective and motivating’.

‘They are relevant, but they could be more relevant.’

Examples of Level 3 responses:

‘No because the curriculum doesn’t give them the importance they have’.

‘They are not important across the board, although there is a lot involved. I think it is too abstract and theoretical a concept for them and at the same time without practical implications’.

As anticipated, 93% of the teachers surveyed (39 respondents) consider that students lack sufficient knowledge about the global socioenvironmental crisis. In contrast, only three teachers consider students’ understanding of this subject to be adequate (Table 8).

With regard to the measures they propose to improve the students’ lack of knowledge, a large majority, 33 people, emphasise the need to reorient the curriculum to incorporate content that connects students with global issues. Additionally, four people mention the explicit need to improve teacher training as a key step toward empowering and educating

students more effectively. Meanwhile, five respondents were unsure of what actions could be taken or did not provide specific suggestions (Table 8).

Table 8. Results for item 7 of the initial teachers' questionnaire.

Item 7. In Your Opinion, Do Secondary School Students Have Sufficient Knowledge About Global Issues?	N = 42	%
Level 1: Insufficient knowledge	39	92.9
Level 2: Sufficient knowledge	3	7.1
IDK-N/A	0	-
On what could be done about it		
Level 1: Incorporating content into the curriculum in a more relevant way, reorienting existing content	33	78.6
Level 2: Improved teacher training and involvement	4	9.5
Level 3: The curriculum is already very broad and nothing more can be added.	0	-
IDK-N/A	5	11.9

Examples of Level 1 responses:

'There is a great disparity among the student body that is motivated by personal interests. In general, there is a great lack of knowledge about the problems of the planet and only when a large and attractive movement such as Fridays For Future is generated does interest arise. However, this tends to be short-lived.

'They don't have all the knowledge, but they have a great willingness to learn about it'.

Examples of Level 2 responses:

'They have it, but as a collective we need to involve them and make them more protagonists of the change we need'.

'They have a lot of information, but there is a lack of involvement of secondary school students'.

Most of the teachers surveyed (29 people, almost 70%) answered appropriately to the premises (Table 9). In general, they consider that sustainability is a priority objective in education that can and should be addressed together with the specific subjects of each teacher and that institutional support may be necessary to ensure that it is dealt with appropriately. Thirteen people (30%) have doubts about their responsibility in addressing or not addressing ESD or in aligning their subjects with the contents related to the global crisis.

Table 9. Results for item 8 of the initial teachers' questionnaire.

Item 8. In General, I Believe That Sustainability Is a Priority Objective in Education, That It Can and Should Be Addressed Together with Specific Subjects, and That Institutional Support Is Needed	N = 42	%
Level 1: Teachers who agree	29	69.0
Level 2: Teachers who have doubts	13	31.0
IDK-N/A	0	0

One-third of the teachers surveyed (13 respondents) approach ESD from a holistic perspective and linked way, considering global problems and measures. In contrast, the remaining respondents talk about specific problems and propose isolated measures to address them (Table 10). According to the research, reductionist views represent one of the most significant barriers to effectively addressing the planetary emergency in educational contexts. To ensure that measures are both effective and sustainable, it is essential to adopt a comprehensive approach that acknowledges the interrelationships between issues.

Table 10. Results for item 9 of the initial teachers' questionnaire.

Item 9. What Socioenvironmental Issues Do You Think Should Be Addressed Through Education?	N = 42	%
Level 1: The set of interconnected problems, causes, and consequences and the types of measures required (holistic view perspective)	13	31.0
Level 2: Some of the problems that constitute the global crisis and the measures that are needed	8	19.0
Level 3: Measures required	3	7.1
Level 4: Specific problems: climate change, ecosystem degradation, etc.	17	40.5
IDK-N/A	1	2.4

As on other occasions, the interest of the questionnaire itself is highlighted by the contribution it makes to reflection on the issue of sustainability as it is answered.

3.2. Results and Analysis of the Testing of the Second Hypothesis H2

3.2.1. Results of Experimental Design 2: Itinerary of Working Sessions (Elaboration and Implementation)

As mentioned above, the teaching proposal described below was developed within the framework of science education, and specifically ESD, with the participation and assessment of teachers and researchers involved in the field of study.

First of all, a common session was held for each and every participating school, given by teachers involved in this study, in an open class format. Its main objective was to reflect with students and teachers, resolve doubts, transfer key concepts, etc., with the intention of responding to the interest and motivation around the issues of sustainability shown in previous questionnaires to students.

Classroom sessions were then developed into a series of activities designed by the research team, where participating in-service teachers were involved in their development and subsequent implementation with their students. They were carried out by choice according to the needs and interests of each school and the specific group of students. There are seven interrelated options, each with a programme of activities for the collective work of the students, with didactic comments for the teacher. They combine, in a context of education for sustainability, different topics and methodological tools in order to further deepen the issue of sustainability and climate emergency, which requires the acquisition of a holistic view of socioenvironmental issues, considering their close connection and their implications for humanity as a whole and our planet:

- Session on the Sustainable Development Goals: its main objective is to learn about the meaning and importance of the SDGs.
- Session on the analysis of scientific dissemination articles selected to address different topics through the analysis of their content, combining individual and collaborative group work.
- Session based on the service-learning methodology: the aim is to detect how and where the contents worked on can be applied and put into practice through community service.
- Session focused on the analysis of complex problems with visual thinking tools: a specific challenge is posed, and with the help of different graphic representations, the analysis and systematisation of the available information are facilitated, advancing through knowledge, understanding, and the search for the necessary commitment
- Outdoor education sessions to nearby destinations with teaching potential are organised. Of particular note is the proposal around the Jardí Botànic (Botanical Garden) of the University of Valencia, a centre for ex situ plant conservation.

- Session related to ethical dilemmas and philosophical dissertations: the aim is to encourage reflection on the great challenges human beings are facing, reviewing our own scale of values and the concept of individual and collective responsibility.
- Ad hoc training session: each participating school has the possibility of proposing, according to its interests and needs, other types of topics and tools. In such case, they are prepared and implemented in collaboration with the teachers.

Once the session or sessions have been chosen, the work is developed in close collaboration with teachers, adapting it in terms of duration, depth, specific course, subject chosen to connect with the specific contents, as well as the vehicular language (Spanish, Valencian, or English). The sessions are organised in a programme of activities structured as follows: At the beginning, there is an introduction that contextualises the proposed work. This is followed by a series of activities for the students, including comments for the teachers. The activities are based on active methodologies in which student participation is a central aspect. Students in working groups carry out the different proposals first in small teams and finalise them in a large group, sharing and exchanging opinions, guided by the teacher. Appendix C shows a part of a programme of activities as an example. The concrete application and adaptation of these programmes must respond to the specific needs of each of the groups of students, which is why the involvement of their teachers is a necessary requirement. Due to the extent of the materials and the responses of the work carried out (to be published soon) with 944 students (most of them belonging to the secondary and baccalaureate courses) and the 42 teachers over 4 years, at different levels and in different groups, the results are shown, as an example, obtained with the implementation of the session focused on the SDGs.

Example of a working session. Approaching the 2030 Agenda and the SDGs to the local context. This session aims, on the one hand, to raise awareness of the institutional framework of the United Nations in relation to the transition to sustainability and, on the other, to carry out a deep reflection with teachers and students, individually and collectively, on the great planetary challenges and the need to identify and address them in the immediate context. Once the contextualisation has been carried out, students are divided into groups to work on a document that assigns an SDG to each of them. Each group has to identify problems and challenges, as well as actions and/or measures to address them, applied to two different contexts: family/social and educational. The teams write down their proposals so that they can be shared with the rest of the working groups in a final part of the session, aimed at promoting interaction, debate, and reflection.

It is important in the final synthesis, and with the help of the teachers, to connect the issues of the different SDGs and the actions that can be implemented, individually and collectively, as well as their impact in the short and long term. The groups, after brief individual reflection, work collectively, write down their proposals, and then a sharing of all the teams takes place; this last part of the session is intended to promote interaction, debate, and further deliberation, as well as to carry out a final synthesis of the contents worked on.

It is worth highlighting the general interest shown by the students in the different topics, as well as their ability to transfer the challenges of each SDG to situations in their immediate context, and to propose actions aimed at tackling them and understanding their close links. It is also an opportunity to detect the limitations of the Agenda, and to take a critical approach. For example, they propose reviewing individual consumption habits, relating them to overexploitation of resources, polluting emissions, and inequalities (SDGs 12, 10, and 13). They also include in these considerations the consumption of water and energy (SDGs 6 and 7) in the most developed countries (SDGs 10 and 12), mentioning the need for the price of products consumed to integrate their true social and environmental

value. They also relate the situation of dependence between countries, some of which are major users of natural resources and labour, and others, which to a greater extent provide them without receiving in most cases a fair price or social and economic benefits for their populations (SDGs 1, 2, 8, and 10). With regard to the management of the natural environment and the processes that threaten it, such as global warming (SDGs 13, 14, and 15) and its consequences, they point to the implementation and enforcement of international protection agreements as essential, as well as the establishment of economic sanctions for those who do not comply with the commitments made (SDGs 16 and 17). One of the goals that most motivates and challenges them is SDG 3 on health and well-being, relating health issues to healthy eating and physical exercise habits (SDG 12). SDG 5, which pursues gender equality, has been one of the goals that has promoted the debate the most, as it identifies situations that need to be corrected in order to achieve equal opportunities between men and women (family reconciliation, care for dependents, wage differences). SDG 4 (quality education) is perceived as a priority, as well as an essential tool for achieving the rest of the goals. They demand more support and resources for those in the most disadvantaged situations (SDG 10).

The average number of working sessions implemented by each of the participating schools is four. Most of the groups carried out the outdoor education session in the Jardí Botànic of the University of Valencia, which addresses the relationship between climate change and biodiversity conservation.

3.2.2. Results of Experimental Design 3: Participating In-Service Teachers' Evaluation Questionnaire

It is worth highlighting that an initial positive assessment is shown by the fact that numerous meetings were held throughout the school years for the design, coordination, and programming of the work sessions with each of the centres and teachers involved. These meetings have consistently demonstrated a high level of teacher engagement from the beginning, as well as a good reception and favourable opinions about the work carried out. The following meetings have been held with all the participating schools:

- Initial meeting at the beginning of each school year. This meeting involved each participating school. The aim was to plan the sessions in each term as concretely as possible, although always subject to a certain degree of flexibility depending on the availability and needs of those involved. Whenever possible, this meeting was scheduled in person at the school.
- Pre-session meeting. Held before each session, this meeting detailed the session's development, including the number of days allocated, participating students, subjects involved, required resources, and any other relevant information to be shared between the teachers and the research team. Depending on the circumstances, these meetings were conducted either in person or via video conference.
- Post-session meeting. In this case, the most immediate assessment was sought once the specific work had been carried out so that, with very recent information, conclusions could be drawn to validate or reorientate what was necessary. Whenever possible, this evaluation was conducted directly after the session. If scheduling or availability constraints arose, the meeting was held via video conference or a telephone call.

The majority of the teachers consistently provided a positive assessment of this proposal, which outlines various approaches to incorporating sustainability into secondary education, while allowing for sufficient flexibility to tailor it to the specific realities of each context. This feedback, repeatedly gathered during meetings and systematic interactions with the research team, is confirmed by the responses in the questionnaire completed to evaluate the intervention.

The questionnaire was completed by 37 teachers, 5 fewer than those who answered the initial questionnaire (see Section Results of Experimental Design 1: Initial Questionnaire to Participating In-Service Teachers) due to difficulties related to teacher mobility.

The results of the items are shown below.

Once the collaboration for the design and implementation of a work itinerary within the framework of ESD had been carried out, the teachers confirmed the initial reasons for their decision to participate. Three-quarters of the teachers mentioned their interest in the subject of sustainability as the primary motivation for joining this research. Additionally, some teachers mention other reasons such as their school's commitment or their interest in exploring different types of interventions and collaborations (Table 11).

Table 11. Results for item 1 of the participating teachers' evaluation questionnaire.

Item 1. What Were the Main Reasons for Participating in This Project?	N = 37	%
Level 1: Teachers involved for their formative interest in ESD/SDG	28	75.7
Level 2: Teachers participating for other reasons	9	24.3
IDK-N/A	0	-

With regard to item 2 (Rate from 1 to 5 the usefulness and interest of the work in which you have participated in terms of the following aspects), Figure 2 shows the number of teachers (Y-axis) and the different aspects rated (X-axis): 75% of the participating teachers gave a score of 4 or 5 to the different aspects they were asked about. In other words, in general, the project met their expectations and they very positively valued the topics covered, the materials used, the duration, and, in particular, the support provided by the research team.

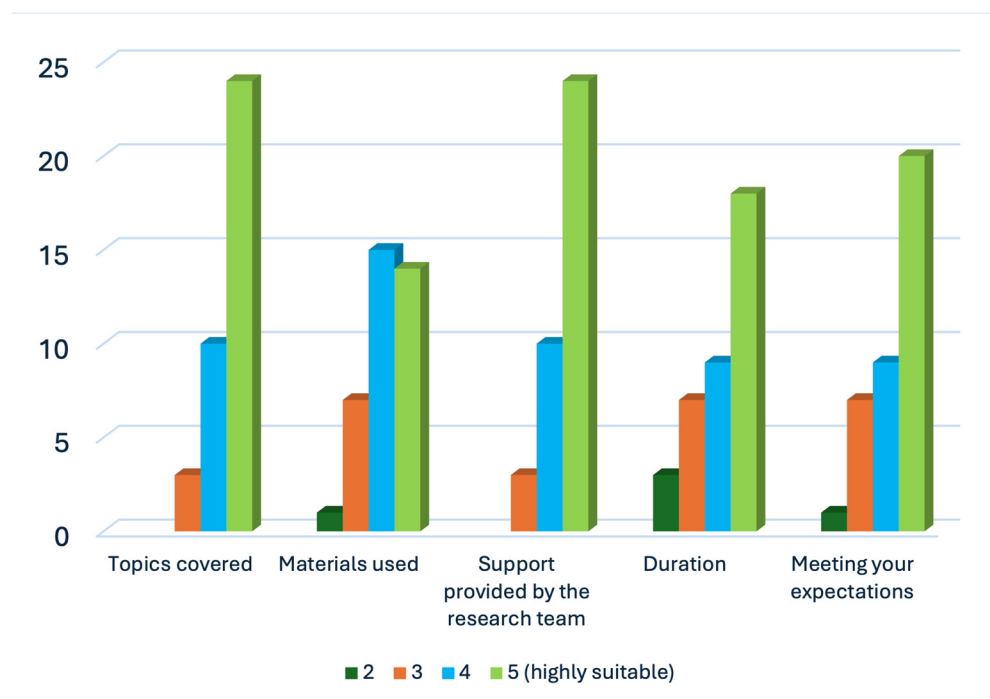


Figure 2. Results for item 2 of the participating teachers' evaluation questionnaire. N = 37 teachers (Y-axis = number of teachers).

The results are very positive, as almost 80% of teachers out of the 37 who answered the questionnaire rated the methodology as having been implemented positively, considering it to be adequate and well founded (Table 12).

Table 12. Results for item 3 of the participating teachers' evaluation questionnaire.

Item 3. Assess the Methodological Aspects of the Intervention. Explain Your Opinion on the Proposed Itinerary	N = 37	%
Level 1: Teachers who consider the methodology to be adequate	29	78.4
Level 2: Teachers who consider the methodology to be inadequate or poorly chosen	6	16.2
IDK-N/A	2	5.4

Examples of Level 1 responses:

'I like the flexibility of the project and the concern and follow-up that those responsible for it have done to adjust to the context of the centre and what our students needed'.

'I consider that the methodology has been appropriate to motivate and raise awareness among both students and teachers'.

'The methodology has been active. I liked the possibility of student participation'.

Teachers considered the contents chosen for the intervention to be of interest, some of which were incorporated at the request of certain teachers (Table 13).

Table 13. Results for item 4 of the participating teachers' evaluation questionnaire.

Item 4. Which of the Contents of the Intervention Did You Find Most Interesting? Why?	N = 37	%
Level 1: Teachers who consider SDG content more interesting	6	16.2
Level 2: Teachers who consider climate change content more interesting	6	16.2
Level 3: Teachers who consider the botanical garden more interesting as an educational resource	4	10.8
Level 4: Teachers who consider all content interesting	10	27.0
IDK-N/A	11	29.7

Examples of responses. Levels 1, 2, 3, and 4 (different types of content):

'The SDGs, we need to have them very present in our daily lives'.

'The multidisciplinary possibilities of the Botanical Garden'.

'All because it deals with all the social aspects that influence the problem in a cross-cutting way'.

'Concepts, cause and effects, as well as concrete measures for climate change management were very interesting. Also, the methodology based on the analysis of scientific articles was very enriching'.

Examples of answers 'Other':

'Sustainable food'.

'The moral dilemmas seemed to me very well exposed and motivated, opening the reflection without the curricular pressure'.

More than 70% of the teachers interviewed considered that the contents included were adequate, offering no specific suggestions for improvement (Table 14). However, eight people suggested additional topics to be addressed in interventions of these characteristics, such as dealing more directly with the energy model, issues related to the eco-economy, the role of women in the transition to sustainability, or more local issues such as the problems of the Valencian 'Huerta' or the proposed expansion of the port of Valencia.

None of the participating teachers considered that any of the contents covered in the educational intervention should be excluded (Table 15). Although other relevant topics could arise during the sessions, the unanimous agreement in this response is mainly due to the fact that the proposal designed and implemented was the result of collaborative university–educational centre work. As such, everything included was mutually agreed upon by the team.

Table 14. Results for item 5 of the participating teachers' evaluation questionnaire.

Item 5. What Content Would You Have Liked to Include in the Intervention but Was Not? Reason Your Answer	N = 37	%
Level 1: Teachers who do not consider other content to include	27	73.0
Level 2: Teachers proposing different content to be included	8	21.6
IDK-N/A	2	5.4

Table 15. Results for item 6 of the participating teachers' evaluation questionnaire.

Item 6. What Content Should the Intervention Not Have Included, and Why?	N = 37	%
Level 1: Teachers who do not consider any content inappropriate	37	100
Level 2: Teachers who consider some content inappropriate	0	-
IDK-N/A	0	-

Almost all the teachers who collaborated and completed the questionnaire considered that participation in this research will have an effect on their future classes, as they intend to include the topics addressed in subsequent courses (Table 16).

Table 16. Results for item 7 of the participating teachers' evaluation questionnaire.

Item 7. What Impact Do You Think Having Participated in the Intervention Will Have on Your Teaching? Will You Include Some of the Topics Discussed in Your Classes? In What Way?	N = 37	%
Level 1: Teachers who plan to include in their classes what they have worked on	35	94.6
Level 2: Teachers who do not plan to include in their classes what they have worked on	1	2.7
IDK-N/A	1	2.7

Examples of Level 1 responses:

'Having a broader vision of the topic being worked on and knowing that it can be addressed from each subject facilitates the search for and interest in the topic and encourages working on it in each of the subjects. In my subject I will address health and food, it is an important topic and we are interested in working on it with the students'.

'I will work on the SDGs on an annual basis to improve students' awareness of the current situation and what everyone can contribute to it'.

'Guide my activity in a more concrete and less abstract sense'.

Following reflection, design, and implementation work on curricular sustainability, the results of item 8 (In general, what socioenvironmental issues do you think should be addressed through education?) show that teachers acquire a more holistic view of the current socioenvironmental crisis, so that they consider all the problems and their possible measures to be susceptible of being addressed in education. Around 80.0% of the teachers surveyed considered all the major global challenges as potential content to be dealt with in secondary school (Figure 3), compared to 35.7% in the initial questionnaire (see Table 6). The results are shown in Figure 3, indicating on the Y-axis the number of teachers and on the X-axis the teachers' responses.

With regard to the suggestions made by teachers in item 9 (comments, suggestions), examples of responses are shown below.

'More sessions outside the classroom in green environments'.

'I think it is important to insist on historical philosophical, economic and political development in order to have the global perspective of the problems'

'Talk more about associationism, how you can collaborate in community, NGO's where to collaborate, etc.'

‘I would like to see more training sessions for teachers. It would help to reinforce ecological and sustainable values’.

‘Itineraries for teachers’.

‘Perhaps a common space on the internet where students could exchange ideas and propose practical cases to be applied in the students’ different schools’.

‘I would like to see more training sessions for teachers’.

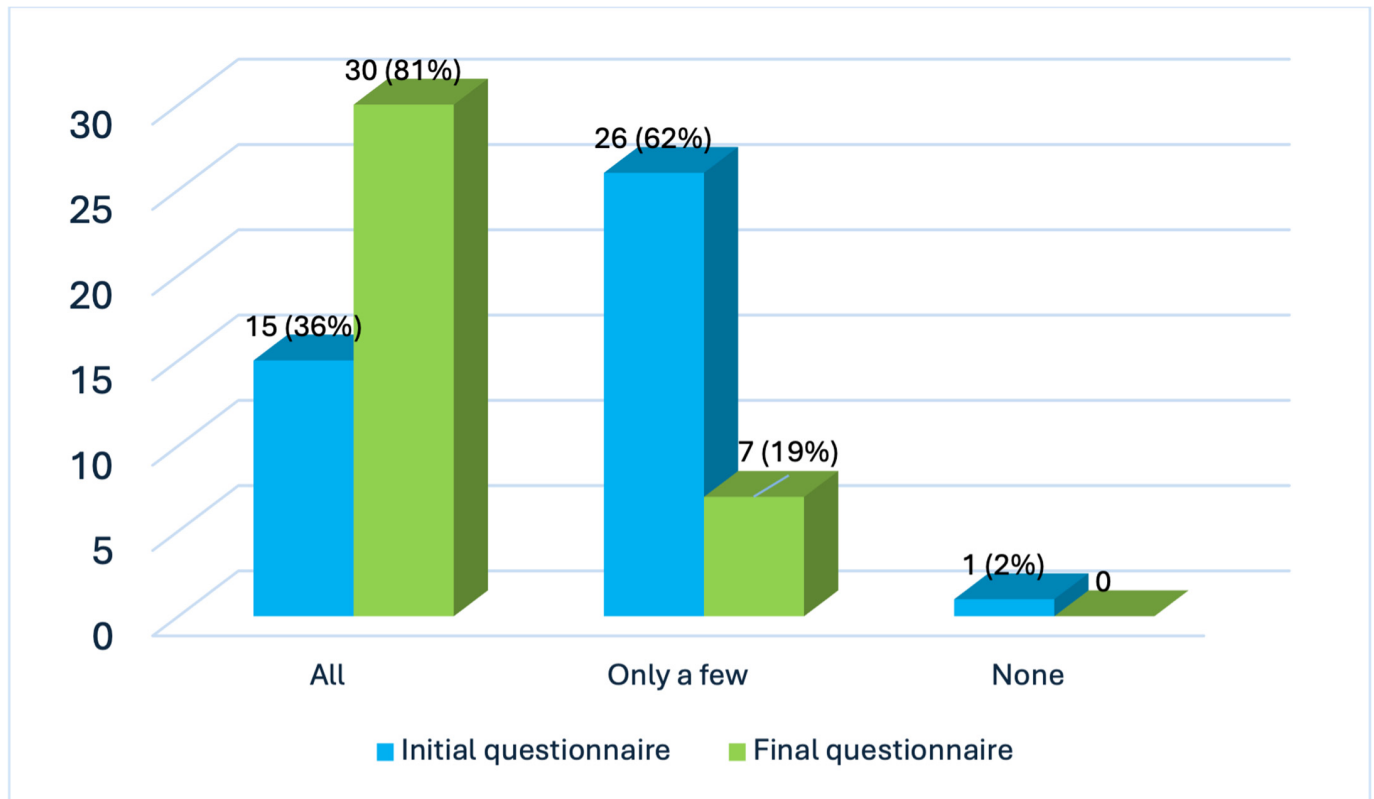


Figure 3. Results for item 8 of the participating teachers’ initial (N = 42) and evaluation (N = 37) questionnaire (Y-axis = number of teachers).

4. Conclusions

With the appearance and aggravation of global problems in recent decades, there are many calls for the necessary reflection and reorientation regarding various aspects of the socioenvironmental model adopted by our societies. The involvement and commitment of all citizens to the changes that are demanded is an essential requirement in this transition [36–38]. For all these reasons, education for sustainability is shown to be a key instrument to be implemented, and teachers are the indispensable protagonists.

The proposal sets an innovative intervention by involving in-service teachers from the beginning. This approach allowed for the sequence to be tailored to the specific circumstances of each participating school. Moreover, continuous feedback from the teachers enriched the sessions, incorporating new perspectives. All of this, as reflected in the teachers’ responses to the evaluation questionnaire, made it possible to specify a way of working on sustainability in the classroom while improving the teachers’ skills and boosting their interest and motivation.

Some results of the research carried out are the following:

- Regarding the reasons that motivated the participation of teachers in this work, the majority, 76.2%, of teachers alluded to their interest in the general theme in which this proposal is contextualised—education for sustainability (ESD) and the SDGs.

- Three-quarters of the teachers stated that they had not taken part in training courses related to sustainability. Those who had, 26%, referred to initiatives of the school to which they belonged.
- A majority of the teachers surveyed considered sustainability a priority objective in education that can and should be addressed together with the specific subjects of each teacher, and that institutional help may be necessary to ensure that its treatment is adequate.
- The design of the teaching itinerary and its implementation, to address sustainability and climate change in secondary education, was very well received; the involvement of teachers from the beginning of the process was key to the different work sessions responding to their particular interests and circumstances. It was also possible to resolve issues that needed to be reoriented for the participating students as they arose.
- A 75% portion of the participating in-service teachers stated that the project had met their expectations; they very positively valued the topics covered, the materials used, the duration, and, in particular, the support provided by the research team.
- Almost 80% of the 37 teachers who answered the questionnaire positively rated the active and participatory methodology implemented, considering it very appropriate and useful.
- Practically all the teachers who collaborated and completed the questionnaire considered that participation in this research will have an effect on their future classes, as well considering including the topics addressed in subsequent courses and having gained confidence and competence when responding to the demand for curricular sustainability.
- After the work of reflection, design, and implementation around curricular sustainability, the teachers acquired a more holistic view of the current socioenvironmental crisis in a way that considers that all the problems and their possible measures can be tackled in education.

According to the results obtained in the experimental designs focused on working with teachers, it can be affirmed, in convergence with hypotheses H1 and H2, that secondary education teachers do not consider themselves capable of including sustainability in their teaching practice, given that they have received insufficient training to carry out this task, which would require greater attention. On the other hand, the training–collaborative work carried out can contribute to improve the motivation and interest of teachers and provide them with the necessary tools and competences for their involvement in education for sustainability.

The conclusions described above provide a basis for further work and deepening in relation to the inclusion of sustainability and climate change in teaching practice and teacher training.

The initiative is currently ongoing in some of the involved schools, with the addition of new schools to the project. We consider it essential to establish a network of engaged teachers for continuous exchange and collective reflection, which is crucial for their active role in teaching activities.

Specifically, we are working with secondary school teachers in training, involving them in the development of materials to address sustainability and climate change within secondary school classrooms. The objective is to implement these materials, assess the outcomes, and, if necessary, refine them. Furthermore, we have broadened the scope of our work to include vocational education and adult education.

The work presented here focuses on the decisive role of teachers and the need for their training in the transition to sustainability. Initial teacher training has wide range for improvement when it comes to enabling teachers to take on this responsibility. In-service teachers report being unprepared due to their lack of knowledge of sustainability

and, additionally, its didactics. This research highlights the crucial role that teachers play in this process and analyses the impact of a collaborative intervention between a university research team and secondary school teachers with the aim of responding to the needs of their students, as well as improving their competences, interest, and motivation when dealing with education for sustainability. The results show how a programme that incorporates teachers and connects research with their teaching practice during a whole academic year is effective for this purpose.

Author Contributions: Conceptualisation, R.d.R., A.V. and O.M.; methodology, R.d.R., A.V. and O.M.; validation, R.d.R., A.V. and O.M.; formal analysis, R.d.R.; investigation, R.d.R. and O.M.; data curation, R.d.R.; writing—original draft preparation, R.d.R.; writing—review and editing, R.d.R., A.V. and O.M.; supervision, A.V. and O.M.; project administration, O.M.; funding acquisition, O.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research was partially funded by the Chair of Scientific Culture for Climate Emergency (CCC Chair) of the University of Valencia and the Generalitat Valenciana. Grant “Educación para el Cambio Climático y la Sostenibilidad, un estudio longitudinal de aprendizaje intergeneracional” PID2020-114358RB-I00 funded by MCIN/AEI/10.13039/501100011033 ERDF A way of making Europe.

Institutional Review Board Statement: This research complies with the ethical guidelines established by the Committee of Ethics and Human Research (CEIH) of the Universitat de València. According to the institutional policy and the guidelines of said committee, no specific ethical approval is required for this study, as it does not involve research on human beings from a physical perspective, the use of human biological samples, or the collection of sensitive personal data.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data are contained within this article.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A Initial Questionnaire for Participating Teachers

1. Indicate what were the main reasons for participating in this project.
2. Have you previously attended courses or other initiatives related to sustainability, Sustainable Development Goals (SDGs) or education for sustainability (ESD)? Please specify if so.
3. In your opinion, what training aspects would be of interest to enrich or improve teacher training on Sustainability and SDGs? Cite them.
4. In relation to the subjects you teach, to what extent do you consider that sustainability is explicitly addressed in the curriculum? Please give details of your answer.
5. What contents of the curriculum do you think could be used to influence education for sustainability? Specify your answer.
6. Do you consider that the contents directly or indirectly related to sustainability are relevant and close to the students? Why? Explain with an example.
7. In your opinion, do secondary school students have enough knowledge about the problems of the planet? What could be done about it?
8. Indicate your degree of agreement with the following statements/premises. Please rate from 1 to 5 (1: Don't agree at all–5: Strongly agree)
Reason your answers.
 - a. I see education as a transformative process that drives the development of individuals/professionals who are to contribute as members of society.
 - b. Sustainability in education should not be optional but should be part of the whole teaching process.
 - c. Addressing Sustainability is not an objective that is directly related to my discipline.

- d. The focus on sustainability in my discipline distracts from the acquisition of other fundamental knowledge and competences.
 - e. I am not clear about my responsibility to educate for sustainability.
 - f. I need institutional help and proposals for materials to address sustainability in my subject.
 - g. There is a clear relationship between my role as a teacher of a subject and my role as a citizen educator.
 - h. It is my responsibility to teach for sustainability, regardless of whether I have institutional or school support.
9. What socioenvironmental issues (both social and environmental) do you think should be addressed through education?

Thank you very much for your participation.

Appendix B Teacher Participant Evaluation Questionnaire

1. Indicate what were the main reasons for participating in this project.
2. Rate from 1 to 5 the usefulness and interest of the work in which you have participated in terms of the following aspects:
(1: I was not interested at all–5: I was very interested)
 - a. Topics addressed
 - b. Supporting materials
 - c. Accompaniment of the teachers involved
 - d. Duration
 - e. Satisfaction of your expectations
 - f. Other (please specify)
3. Assess the methodological aspects of the intervention. Explain your opinion on the proposed itinerary.
4. What contents did you find most interesting of those addressed in the intervention? Why?
5. What contents would you have liked the intervention to have included but it did not? Reason your answer
6. What contents should the intervention not have included? Why?
7. From now on, what repercussions do you think that taking part in the intervention may have on your teaching activity? Will you include some of the topics covered in your classes? In what way?
8. In general, what socioenvironmental issues do you think should be addressed through education?
9. Indicate suggestions, opinions, etc.

Thank you very much for your participation.

Appendix C Extract from Programme of Activities—Session on the SDGs

The 2030 Agenda and the Sustainable Development Goals (SDGs)

In the preliminary session, as you will recall, the SDGs have already been discussed. We will now take a closer look at their meaning and importance as well as their possible limitations. To do so, first of all, each team should select one of them. To make this task easier, you can use the information on the UN SDG website (<https://www.un.org/sustainabledevelopment/es/>, accessed on 4 November 2024). Once you have accessed the website and familiarised yourself with all the SDGs, each team should choose one of the SDGs that we now intend to explore in greater depth; the following activities will then be carried out:

A.1. With the support of an in-depth visit to the exhibition on the SDGs in the centre, carry out a group work on the selected SDG, indicating problems and challenges, as well as the necessary actions linked to their achievement.

Comments: Work around a document on the SDG that has been selected by each working group. With the support of the presentation, each team has to identify the different problems and challenges related to that particular SDG, as well as actions and/or measures to address them, applied to two different contexts: family/social and educational. The teams write down their proposals, so that they can then be shared with the rest of the working groups, in a final part of the session, aimed at promoting interactions, debates and reflections. In order to facilitate the task, students fill in a worksheet to guide their work.

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