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Fostering Diversity and Participation with School Gardens: Examining Possibilities and Challenges under Different National Educational Policies

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Abstract

Background/purpose. Despite progress in inclusive education policies, research has largely neglected the analysis of learning environments that are adjustable for all students. School gardens are learning environments that emphasize the broader view of participation on current perspectives of inclusion. This article discusses the possibilities and limitations of using school gardens in inclusive learning environments and their relations with different inclusive education national policies.

Materials/methods. We performed a content analysis of inclusive education national policies and 16 learning activities tested and implemented in four schools from Slovenia, Spain, Greece, and Portugal participating in an exchange project which promoted teaching with school gardens supported by digital tools.

Results. The study revealed illustrations of how activities that combine the use of school gardens with digital tools can emphasize collaboration and participation in inclusive learning approaches. However, fostering inclusive practices was found to be either constrained or promoted by each country's view of inclusion in educational policies.

Conclusion. Integrating teacher collaboration and project-based learning with garden-based school activities fosters student collaboration and participation, while offering enriched sensorial experiences that benefit the learning and development of all students. School gardens also foster inclusion through deepening intercultural understanding and stronger student interactions that heighten awareness and normalization of diversity.

1. Introduction

Several international organizations and guidelines have been pressing for public and systemic policies and practices to draw upon a common education ground for all. The World Conference on Special Education held in Salamanca, Spain, in 1994 pioneered the idea of the right of all students to be part of the regular education system and pushed for their reorganization accordingly. However, an important milestone was reached when the United Nations (2015) set up inclusion as a central feature of education for a sustainable present and future in its Goal 4 of today's unavoidable Agenda 2030 by stating that countries should "Ensure access to inclusive, quality and equitable education, and promote lifelong learning opportunities for all." In Europe, the European Agency for Special Needs and Inclusive Education (EASNIE, 2016) recommended increased participation of the educational community in school life. This broader view emphasized a more diverse interaction among students with different profiles within common learning environments and stronger collaboration between teachers and other educational agents within schools, such as those from local authorities and community organizations (Flecha, 2015). Consequently, teachers are required to ensure learning experiences for all students (Gudiño et al., 2022). As a result, international institutions have expressed their ethical and social responsibility (Martínez-Usarralde, 2021) and turned their attention to clarifying views of inclusive education, strengthening its connections with diversity and participation. Meanwhile, despite the progress in the policy views of inclusive education (e.g., Carvalho et al., 2023), research has been overly focused on specific groups of learners, contradicting the very principle of education for all (Messiou, 2017). One way to avoid such contradiction is to base research on inclusive education more in learning environments and practices and less on specific learners, emphasizing collaborative and transformative approaches (Monteiro et al., 2024) that join practitioners, researchers, and learners in bringing about effective changes in schools.

School gardens are examples of learning environments with considerable potential to emphasize the broader view of participation that current perspectives of inclusion defend. Johnson (2012) highlighted the enduring nature of the ethos of school gardening, justifying its integration into formal education with various arguments. Connections between school gardening and aspects of nature conservation, sustainability, land use and livelihoods, nutrition, health, and well-being have been repeatedly supported with theoretically and empirically defended benefits (Austin, 2021; Blair, 2009). However, its benefits in tackling diversity challenges in schools and forwarding inclusive learning environments and practices have remained relatively unexplored. Johnson (2012) built the case for a framework and thematic structure for a contextualized curriculum and a place-based learning pedagogy to sustain school gardening in more authentic and inclusive learning experiences linked with community involvement in "education for sustainability." Austin (2021) highlighted how primary school teachers perceive school gardens as places of inclusion where often marginalized children can participate fully with stronger social and environmental connections. However, how school gardens can foster or impede inclusive learning environments has remained insufficiently unexplored as a topic of study. Moreover, forwarding school and classroom-level inclusive practices using school gardens can be either constrained or promoted by the ways in which equity challenges are addressed at the national educational policy level. As such, the aim of the current study was to extend the literature on the contributions of environmental education to fostering inclusion and participation in schools by analyzing the relatively unexplored potential of school gardens in designing inclusive learning environments.

Diversity and inclusion were at the heart of an international exchange project (2018-2021) aimed at developing students' competencies towards diversity, sustainable development, and citizenship through a transversal integration of digital technology at all levels of schooling around the use of school gardens in authentic and place-based learning experiences. The learning activities involved 35 teachers and 331 students aged between 8 and 15 years old from four schools in Greece, Portugal,

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Slovenia, and Spain (Autonomous Community of Valencia [ACV]), working under different policy frameworks of inclusive education and having differentiated experiences with the use of school gardens.

The current study discusses the possibilities and limitations of using school gardens to foster inclusive learning environments, examining how national policies on inclusive education influence learning activities in various schools. We performed an explorative qualitative study of 16 learning activities' plans and reports from participating teachers, considering each country's perspective on inclusion in education policies. The research aims to answer two key questions: How do policy approaches facilitate or hinder students' access to schooling experiences through school gardens, particularly for those who face barriers to learning and participation (BLP)? What possibilities and challenges arise from using school gardens to promote diversity and participation in learning environments?

2. Theoretical Framework

2.1. Development of Policy Approaches to Inclusive Education in Europe

The influence of the Salamanca Statement (UNESCO & Ministry of Education and Science, Spain, 1994) in the educational policies of the EU is evident regarding the inclusion of students with SEN in mainstream schooling (European Agency for Development in Special Needs Education [EADSNE], 2003).

The processes for such inclusion in school curricula have been organized differently across Europe, leading the EADSNE (2003) to classify these policies into three categories: one-track, two-track, and multi-track.

In the one-track approach, the education system is composed of a single school model that includes all students, and there is a legal framework with measures to support learning and inclusion for all students; through this approach, all students are expected to attend the same schools. In the two-track approach, the education system consists of regular and special schools; there are different legal frameworks for regular education and special education; in this approach, students with a clinical diagnosis requiring more specialized educational support are integrated into a special school. In the multi-track approach, the education system is composed of regular and special education, which can exist either together (coexist within the same school) or separately (mainstream and special schools); the type of school chosen depends on the features and services best suited to the needs of each student; in this approach, there is a specific legal framework for special education.

According to the EADSNE (2003), it is difficult to classify a country according to this proposal because the educational policies for inclusion are under permanent transformation. Aware of this situation, the current study aims to show which approach to inclusive education seems close to each participating nation based on our interpretation of the data collected.

The process of inclusion of students with SEN strongly contributed to the increase in the heterogeneity of the school population and to the expansion of the scope of inclusion in education policies. For this reason, the concept of inclusive education may still be understood as and associated with an inclusion policy for students with SEN, when in fact, it currently means creating conditions to guarantee access to education for all students in the same schools (Rodrigues, 2001), guaranteeing respect for principles of equality of opportunity and social justice. In line with this idea, Booth and Ainscow (2002) introduced the concept of BLP in their guide called "Index for Inclusion," which is adopted to represent all difficulties in accessing national curricula (Carrington et al., 2021). UNESCO also supported this concept in its 2020 Global Education Monitoring Report. Following this recommendation and laying on the assumption that educational policy is also elaborated discursively (Fischer, 2001), for the current study we chose to use the concept of BLP to refer to the difficulties of curricula access (regardless of the origin of the causes) of the students participating in the study.

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Regarding the idea that discourse constitutes and feeds politics, we noted the name change from the European Agency for Development in Special Needs Education (EADSNE) to the European Agency for Special Needs and Inclusive Education (EASNIE). As discourse surrounding education and inclusivity in Europe was broadening to encompass a more comprehensive commitment to providing educational opportunities for all students, regardless of their individual needs or backgrounds, the EADSNE recognized the importance of aligning with this changing landscape. The shift to the EASNIE mirrored the agency's dedication to fostering inclusive education practices. It signified its responsiveness to the dynamic interplay between discourse and policy, ultimately reflecting the broader societal values and priorities of a more inclusive educational system.

2.2. Inclusive Education with School Gardens

Research has shown that school gardens offer significant educational benefits, such as promoting diversity, encouraging participation, fostering social connections among students and engaging students with socially relevant issues (Austin, 2021; Blair, 2009). However, Johnson (2012) presented a comprehensive and explicit proposal for leveraging school gardens as a powerful tool in inclusive education for sustainable development. According to Johnson, effective pedagogical approaches for promoting inclusion through school gardening are closely tied to contextualization. Johnson introduced a contextual framework and thematic structure for school gardening to operationalize her proposal with three pedagogical goals: knowledge content, developing learning skills, and fostering values and ideas. Within each dimension, she proposed specific areas of activity, skill development, and competence building (Johnson, 2012).

Regarding knowledge content, Johnson's (2012) proposals encompassed personal matters, such as the relations between food and health, and civic concerns, such as local planning, community engagement, and waste management. Additionally, she emphasized addressing global issues like pollution, crop variations across regions, and commercial trade.

For the development of learning skills, Johnson (2012) underscored the significance of information gathering, which involves searching for information from diverse sources, observing, measuring, and questioning. Problem solving was another highlighted skill, encompassing critical assessment of perspectives, alternatives, and solutions, and encouraging questioning. Furthermore, decision making was emphasized, for example, in activities promoting individual and collective actions through active engagement and decision-making processes.

In developing values and ideas, Johnson (2012) emphasized the significance of actively involving students in engaging with and reflecting upon their values, beliefs, public policies, and cultural perspectives. Reflecting upon personal values and beliefs can be achieved, for example, when students reflect upon their eating habits and those of their social groups (e.g., family, colleagues, school, cultural community) and explore how these choices impact various aspects of the environment. Engagement with public policies can be fostered by challenging students to question and debate policymakers at different levels or by encouraging critical analysis of policy documents and initiatives. This enables students to develop a deeper understanding of the complexities and implications of public decision-making processes. Furthermore, addressing cultural perspectives entails providing opportunities for students to engage in cross-cultural comparisons and analyses. This can be achieved through intergenerational discussions or by studying historical traditions, enabling students to gain a broader perspective on different cultures and traditions.

By incorporating these dimensions into the learning process, students can actively reflect upon personal values, critically analyze public policies, and appreciate diverse cultural perspectives.

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3. Methodology

The current study draws upon learning activities conducted with students aged 8 to 15 years old from schools in four European countries: Greece, Portugal, Slovenia, and Spain-ACV. These activities were designed, implemented, and monitored as part of an international cooperation and interchange project.

3.1. Participants

Four schools with distinct characteristics participated in the project, with one Portuguese public school and a Spanish private school affiliated with prominent educational organizations encompassing numerous teachers and educational levels, and two small public schools, one in Slovenia and one in Greece, that solely provided primary education.

The four schools had a rich educational background, and the teachers involved were highly motivated to engage in training and exchange experiences facilitated by the project since they had been building the partnership since its inception. All four schools had adequate access to digital integration in the classroom, with sufficient hardware available to support teachers in utilizing digital resources for activities. In terms of school gardens, only the Spanish school had prior experience with its establishment and use, while the other three schools developed their gardens as part of the project. The opportunity to create and execute a school garden with the support and resources offered by the project was considered a major motivator for the schools and teachers to participate. Furthermore, the Portuguese school and team integrated the consortium with the crucial role of bringing their expertise to address diversity and inclusion challenges. With a longstanding history of fostering inclusive learning environments for a diverse student population facing various BLPs, such as low academic expectations, disabilities, migrant backgrounds, and socioeconomic disadvantages, the Portuguese school assumed increased responsibility knowledge sharing with the other schools taking part in the project.

The participants of the project consisted of four teachers from Portugal, seven from Spain, six from Greece, and six from Slovenia. As for the students, there were 66 from Greece, 21 from Portugal, 68 from Slovenia, and 176 from Spain.

3.2. Design and Implementation

The consortium of schools and teachers was challenged to design learning activities that fostered students' skills in cultural diversity, sustainable development, and citizenship. This was achieved by seamlessly integrating digital technologies with the practical application of school gardens, creating an authentic and engaging learning experience.

The design of the learning activities commenced in late 2019, following a workshop on school gardening and multiple interactions with experts. These interactions provided valuable support and feedback on various aspects, including gardening techniques, digital integration, curriculum alignment, and pedagogical approaches to promote inclusion.

Initially, each school formulated a strategic plan that included selecting and justifying the student cohorts to participate in the project and identifying the curricular insertion for the learning activities to be developed and implemented over a 2-year period. The teachers devised their distinct learning activities following collaborative exchanges and discussions within the project consortium. These activities were subsequently reviewed by experts actively involved in the project who were specialized in agriculture and gardening, educational technology, curriculum, and environmental education.

Following multiple iterations and revision phases, implementation of the learning activities took place in the schools from mid-2020 to late 2021, albeit with significant challenges imposed by the COVID-19 pandemic, including school closures. Based on data from the UNESCO Institute for Statistics

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(2022), schools in Slovenia experienced 21 weeks of complete closure, Greece had 18 weeks, Portugal faced 12 weeks, and Spain encountered 10 weeks of closures. In response, these countries relied primarily on online distance learning tools, with television used as a supplementary resource in exceptional cases.

Nevertheless, certain schools continued operating in each country to cater to exceptional circumstances. These included children of essential workers, students from disadvantaged households, and individuals requiring specialized support. Moreover, despite the challenging conditions of school closures, the participating schools and teachers found inventive solutions to sustain their school gardens. They actively involved other school personnel, engaged students' relatives, and adjusted crop selections to align with periods when schools reopened and classes resumed their regular routines.

3.3. Data Collection and Analysis

We performed a qualitative study based on document analysis and participant observation (Patton, 2015) with three types of data collection to address our research questions.

The first collection focused on key texts on national policies on inclusive education. To examine the participant countries' inclusive education policy approaches, we performed an interpretative content analysis (Bardin, 2011) of the legal texts that guided the development of inclusive education policies in Portugal, Spain-ACV, Greece, and Slovenia. The co-authors collaboratively identified these legal texts with the support of teachers from the four teams of schools/countries. These texts were analyzed using the EADSNE (2003) classification of inclusive education approaches as a categorical structure for analysis. Following an interpretative content analysis, it was possible to identify clues in each text that pointed to one of the three categories.

A second data collection consisted of the learning activities' plans and reports completed by the teachers participating in the projects' team. A total of 16 plans and an equivalent number of reports were collected, with four obtained from each school/country, representing one plan and one report per learning activity. The learning activities plans followed a template (Canva) negotiated and agreed upon between the project's consortium, which was afterwards completed by the teachers of the projects' team. The plans each required information about curricular subjects, content, competencies to be promoted, pedagogical methodology, and relation with the garden. The reports consisted of an online form (Google Forms) as a template with a mixture of closed and open-ended questions collecting information on the participants in the activity (students, teachers, families, others), how the school gardens were used, what digital tools were used (if any), collaboration events, adaptations to different target groups, and a reflection upon the successes, difficulties, and constraints of the activity. Each team of teachers completed the online form for each learning activity at the end of the project in order to provide a comprehensive overview of the learning activity implementation.

A content analysis (Bardin, 2011) was conducted on these documents in order to explore possibilities and challenges arising from the use of school gardens to promote diversity and participation. As such, we focused on the dimensions of diversity and student participation in the learning activities, and also on the dimensions of knowledge content, learning skills, and values and ideas according to Johnson's (2012) contextual framework as a means to promote inclusive education for sustainable development through school gardening. Table 1 summarizes the predefined coding frame used in the analytical scheme.

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Table 1. Analytical scheme of the learning activities' plans and reports

Analytical dimensions	Categories	Coded fields
Diversity and participation	Who participated in activities? • Students • Teachers • Families • Other school community members How were participants brought together? • Interaction • Collaboration	**Plans** • Student ages targeted • Inclusion issues **Reports** • Schooling level and additional info • Age range of participant students • Number of total students and female students • Students with functional diversity or special needs (number, types) • Foreign students (number, country of birth) • Number of total teachers and female teachers (age range, subjects taught) • Other participants (number: total and female, age range, type of participation)
Contextual framework to promote inclusive education for sustainable development through school gardening	• Integrating knowledge content, learning skills development, and values/ideas • Relating knowledge to personal matters, civic concerns and global issues • Fostering information gathering, problem solving, and decision making • Reflecting and acting upon personal values and beliefs, public policies and cultural perspectives	**Plans** • Content • Curricular subjects involved • Competences to be promoted • Pedagogical methodology • Relation with the garden • Relation with society • Inclusion issues **Reports** • Activity adaptation due to transition to distance/online education • Direct use of school garden (tools used, frequency of visits to garden) • Use of which digital tools (if any) • Student group work/collaboration (specific method/strategy) • Adaptations applied for special needs students • Successes: What did you/students most appreciate? • Difficulties and constraints: What were your main constraints or difficulties experienced? • Overcoming: How did you overcome experienced difficulties/constraints, or what changes would you suggest for the future?

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A final data collection focused on the experiences of the student cohort from the Portuguese school since it was the only one with students integrated that had diagnosed intellectual disabilities. For this purpose, an observation grid was designed to support the monitoring of the students' progress throughout their participation in the project. The grid directed the observation to dimensions of school climate regarding relations with peers and teachers, engagement with gardening and sustainable production, and consumption issues, interactions with digital technologies and other personal achievements as learners. The grid was completed by the special education teacher who closely accompanied the group of students (and co-author of the current study) after discussing it with other teachers who also worked with the same student group. Records were also collected to support the teacher's observation, including photos, videos, dialogues with students and between students, portfolios and other students' work, and feedback from parents, staff, and other teachers. This material was then subjected to interpretative content analysis (Bardin, 2011).

4. Findings and Discussion

This section presents and discusses the study's findings organized according to research question. We first explore the policy guidelines that framed inclusive education at each of the participant schools in the four European countries. Then, we discuss analysis of the learning activities that were designed and implemented in the project.

4.1. Inclusive Education Policies and Opportunities for Participation in Schooling Experiences

We analyzed the education systems of the four countries involved in the project in light of the EADSNE (2003) proposed classification of inclusive education approaches in order to assess how policy approaches helped facilitate or hinder students' access (particularly for those whose education system presents barriers to learning and participation) to schooling experiences through school gardens.

Our findings revealed that the policy framework for inclusive education in Portugal has gradually moved to meet the one-track approach. Decree-Law No. 54 was enacted in 2018, which places inclusion as a basic principle of the whole Portuguese educational system, unlike previous legislation (Abrantes, 2021), in which the focus is on the education of all children (Messiou et al., 2020) instead of specific groups (Messiou, 2017). As such, it established a legal regime of inclusive education, determining three levels of educational measures to support learning and inclusion – universal, selective, and additional – to be applied according to the profile of each student, which blends together the traditional views of both regular and special education. Thus, any student is able to benefit from one of these educational measures, temporarily or permanently, and for the whole school curriculum or just a part of it. A multidisciplinary team then determines the most suitable educational measures for inclusive education required at each school, where all students attend the same educational facility, and everyone tries to participate within the same learning environment.

Regarding Spain, specifically the Autonomous Community of Valencia where the participant school was located, the analysis was limited to the legal framework of the ACV region. Our findings revealed characteristics of the one-track approach category, whereby Decree-Law 104/2018 established four levels of educational response with actions planned to eliminate barriers identified in the various contexts in which educational processes take place for all students. These levels are progressive, complementary, and interrelated, representing a holistic educational action approach (García-Lastra & Sierra, 2021) that contributes to the personalization of the learning process according to the profile of each student (Messiou et al., 2020).

In Slovenia, the legal framework of the educational policy for the inclusion of students with BLP is constituted by two legal norms: 1) Placement of Children with Special Needs Act (2011); and, 2) Rules on additional professional and physical assistance for children with special needs (2013,

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2021). Among the several educational programs provided, two offer adapted provision and additional specialized assistance aimed at students able to achieve mainstream elementary curriculum goals. A single school can offer multiple programs simultaneously; however, specialized educational institutions often provide such programs for students with a higher barrier level. The legal framework for inclusive education in Slovenia, which is far from a policy of universal inclusion for the diversity of students (Lesar, 2017), is associated with the inclusion of students with SEN (Opertti et al., 2014), and provides for the integration of these students in either mainstream schools or within special schools according to their diagnosis (Ermenc, 2020). This framework suggests that the policy for inclusive education in Slovenia is closer to the multi-track approach, despite resorting to the categorization of students which is a common element seen in the two-track approach (Lesar & Žveglič, 2018).

In Greece, Law No. 3699 (2008) enacted the legal framework for developing inclusive education, and which is exclusively related to the special care and education of students with disabilities or those who have been medically diagnosed with SEN. According to this legal text, access to mainstream schools for students with disabilities and/or SEN takes place in the following contexts: 1) in regular groups with the support of the teacher; 2) in regular groups with parallel individualized support provided by special education teachers; and, 3) in separate customized groups with specialized professionals. These three educational measures were conceived to operate within mainstream schools and to meet the needs of most students with disabilities and/or BLP. When support for these students becomes problematic within mainstream schools, the following measures can be taken for students with multiple and serious disabilities (Pappas et al., 2018): 1) attend special education schools; 2) attend schools or departments that operate as autonomous units or extensions of other schools within certain hospitals; or 3) receive tuition at home if unable to attend school due to health-related issues. This framework has helped to improve the development of inclusive education policies, especially concerning continuous professional training for teachers. However, it still promotes separate learning environments for students with difficulties and/or serious levels of impairment (Fyssa & Vlachou, 2015). Based on these findings, the policy framework for inclusive education in Greece seems to fit the multi-track approach category.

Regarding the contextualization of the diversity of the school population of each of the four participant countries, Table 2 summarizes data on the study's participants, including the number of teachers and some of the characteristics of the students involved.

Table 2. Data on participants in the learning activities per school

Country	Grade	Students' ages	No. of participating students	No. of students with BLP	Types of BLP	No. of teachers involved in activities
Greece	4	10-12	27	3	Learning difficulties (2)	4
	6	12	39	2	Non-native speaker (2)	1
Portugal	6	11-12	21	13	Intellectual disabilities (8) Learning difficulties (5)	10
Slovenia	4	9-10	26	4	Diabetes type 1 (3) Non-native speaker (1)	4

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Country	Grade	Students' ages	No. of participating students	No. of students with BLP	Types of BLP	No. of teachers involved in activities
Spain (ACV)	8; 9	13-15	42	11	Non-native speaker (7) Learning difficulties (4)	2
	5	10-12	59	11	Dyslexia or high-level capacity (11)	1
	7	12-13	30	12	ADHD[a] or dyslexia (9) Non-native speaker (3)	5
	9	14-15	87	20	ADHD[a], dyslexia, or other learning difficulties (17) Non-native speaker (3)	15

[a] Attention Deficit Hyperactivity Disorder

Concerning the diversity of students with BLP, the key distinctions across the four countries stem from variations in the student numbers and characteristics, the teachers involved in the project, and their respective policy approach shaping the educational system. As can be seen from Table 2, the four schools each include students with BLP, although most have only minor limiting barriers.

The Portuguese school had 21 students in total, with 13 having BLP, and the only school to openly include students with intellectual disabilities, and also was shown to have the highest teacher-student ratio. The school located in Spain-ACV only increased teacher involvement where students with learning difficulties were included, whilst the Slovenian school also followed suit where students with special health needs were present. In short, the greater the class diversity, the greater the level of teacher involvement in educational activities.

However, it must also be acknowledged that a differentiated strategy of curricular insertion of the projects was noted between the participant schools, which may influence the engagement of distinct student cohorts. In Portugal, the option was to design activities for a single cohort of students but engage in multiple curricular subjects. In contrast, the option in other countries was for diverse learning activities across cohorts of students of various schooling levels with fewer curricular subjects. Consequently, the activities implemented with the ninth graders in Spain-ACV and all the activities implemented with the students in Portugal involved most of their teachers. This practice supports the one-track approach to developing inclusive education identified in policy documentation related to the respective educational systems. Recent curriculum flexibility and autonomy reforms in Portugal have emphasized collaborative working among teachers (Mouraz & Cosme, 2021) through pedagogical teams. As such, the learning activities in the Portuguese school consisted of whole-class projects covering learning goals from all the curricular subjects, promoting effective student engagement and collaboration, and with school gardens as the focal point for the curricular content. The participation of teachers from different disciplinary fields enabled the integration of content from various fields of knowledge and with different levels of learning. Additionally, in-person learning was blended with remote learning (e.g., videos watched simultaneously by students at school and those

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at home). Similarly, a whole-class activity involving all 15 participating teachers promoted collaboration between students with interdisciplinary learning.

In summary, our analysis suggests that in Portugal and Spain-ACV, which both lean towards a one-track approach to inclusion within their education policies, participation in schooling experiences enables access to education for a greater diversity of students with BLP and with a higher level of teacher involvement and collaboration.

4.2. Promoting Diversity and Participation in Learning Environments with School Gardens

We also examined inclusive practices within the context of school gardens to determine possibilities and challenges arising from the use of school gardens to promote diversity and participation in learning environments. Our analytical focus was directed towards the pedagogical implementation of a contextualized curriculum framework proposed by Johnson (2012). Specifically, we scrutinized how educators employed this framework in orchestrating activities that stimulated students to undertake exploratory endeavors, engage in substantive dialogues, and cultivate knowledge that holds personal, local, or global relevance.

Most school garden-related activities addressed nutrition, sustainable planting, gardening practices, and water usage. Nearly all activities were conducted on the school garden premises, except for three instances in different schools due to the restricted practices related to the COVID-19 pandemic. Despite this, various forms of curriculum contextualization were employed, including searching, sharing, and exchanging information about global agricultural and food traditions, and collecting and analyzing local weather data, an activity that often involved the students' families.

Students from various schools participated in remote collaborative activities, with teachers noting that their students valued connecting with peers from other countries in order to enhance their language skills and to explore diverse gardening and nutrition-related traditions rooted in each respective culture, thereby strengthening the intercultural exchange aspect of inclusion.

During periods of pandemic-related school closures, activities involving the direct use of the school gardens was significantly limited, although certain creative alternatives emerged. Some of the students experimented with seeding, planting, and the use of water at home and then shared their experiences during the class, fostering personal contextualization and promoting engagement while raising awareness of social and cultural differences within their community. Others engaged in online videoconferencing, connecting students at home with those still attending school (separation usually due to special vulnerability), as exemplified in the Portuguese school activities discussed later in this section.

In terms of using school gardens to contextualize the curriculum being taught, some teachers emphasized the significance of experiential learning outside of the classroom. This approach aligns with Johnson's (2012) advocacy for the use of school gardens in teaching, which offer opportunities to observe natural processes and changes in real contexts over time. Furthermore, the teachers stressed the importance of incorporating hands-on tasks with gardening tools, citing their benefits in fostering a stronger connection to the natural environment, developing motor skills, and promoting student teamwork. These benefits provide a wide range of physical and sensory experiences that can resonate with students' circumstances, regardless of their physical, intellectual, ethnic, or cultural backgrounds. Consequently, students' learning experiences are enriched, and they develop a stronger sense of belonging to their environment. As Blair (2009) noted, students develop a sense of ownership and experience joy and pride as they witness the ecological progress of the gardens they nurture daily.

The teachers highlighted the exchange of information among students from different countries about local traditions, language, culture, and economic matters. These exchanges happened

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specifically between students from Portugal and Greece and between students from Slovenia and Spain.

The different contexts offered by the use of school gardens have expanded the scope of learning, enhancing the connection between time and space in the same environment and thus increasing the opportunities for all students to participate, thereby promoting diversity as an added value. This aligns with the notion that comprehensive learning involving unpredictable situations can thrive outside of the classroom (Giddens, 2005).

The Portuguese school played a crucial role in sharing their preexisting knowledge and experience on inclusion issues, given their extensive experience working with diverse students with BLP, particularly those with intellectual disabilities. Portugal's inclusive education policy adopts a one-track approach, necessitating a curriculum and pedagogical approach accommodating a wide range of students in Portuguese public schools. As a result, the team of four teachers from the Portuguese school who participated in the project included teachers of science, English, visual education, and a special education teacher. This special education teacher played a vital role in planning meaningful activities for all of the students and provided ongoing support for those with more severe learning difficulties. The school participated with a group of 21 students, ranging from those in their fifth grade (aged 10-11 years old) to those at the end of their sixth grade (aged 11-12 years old). Among them, 13 of the students at the school in Portugal had BLP: five had learning difficulties and required additional support measures from their regular teachers, some of whom were also part of the project team; and eight had intellectual disabilities due to various conditions, such as cognitive development delay, spastic quadriplegic cerebral palsy, trisomy 21, Rubinstein Taybi syndrome, and West syndrome. These students received continuous support from the special education teacher and closely engaged in learning activities with their classmates.

The impact of the implemented activities on the inclusion of students with BLP was particularly evident and significant during the COVID-19 pandemic school lockdowns. As such, these activities formed a vital bridge between the eight students with significant curricular adaptations, who continued to attend school in person, and the rest of the group, who had switched to remote learning only during lockdowns. The eight students were able to remain active in the school garden, documenting their experiences with photographs and live videos they shared with their classmates who were at home and unable to attend the school in person during that period. These eight students actively participated in tasks including watering, garden maintenance, and harvesting. The recognition of these eight students with BLP for their ongoing contributions to the project activities during the lockdown period played a pivotal role in boosting their self-esteem and self-perception. Simultaneously, it led their classmates (with whom they maintained frequent online contact) and other stakeholders such as their teachers, therapists, and families to focus on their abilities rather than their limitations, fostering a more positive and inclusive perspective.

In a discussion between the study's co-authors, which included a teacher from the school and the team of monitoring researchers, we reflected on the student changes that resulted from the project's learning activities. Notably, there was a significant increase seen in the level of interaction amongst all of the students in the class, as in both those with BLP and those without. The students without BLP not only recognized the abilities of their peers with BLP, but also gained a much deeper understanding and respect for their characteristics, allowing them to better design solutions tailored to their peers' needs. This transformation was especially evident during the pandemic's lockdown periods, when the class was divided as only the eight students with the most significant BLP continued to receive in-person education, whereas the rest connected remotely to continue their learning. The teachers' restructure of the project activities, making the in-person students the link between those at home and the project, fostered the active participation of these eight students, enabling their peers to recognize their skills more and to gain a more deeper appreciation of the uniqueness of

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individualized learning. This approach promoted a view of "difference" within a relational model (Stoer & Magalhães, 2005), where "difference" is also "us," depending on our perspective and context.

Throughout the project, collaboration among all the professionals involved (teachers and project monitoring researchers) increased, especially when adapting activities for distance learning to maintain interaction among all the students. The pandemic's effective division of the class, with some students with significant BLP who continued to attend in-person schooling whilst the rest were educated at home via distance/online means, necessitated heightened attention from the teachers in order to ensure the appropriate digital access and engagement for everyone. In terms of the implemented strategies, the routine changes introduced in reaction to the COVID-19 pandemic prompted more collaborative problem solving and fostered increased discussion and knowledge production among the students.

5. Conclusion

This study aimed to discuss the possibilities and limitations of using school gardens to foster inclusive learning environments based on a cross-analysis of national policies on inclusive education and learning activities implemented in schools from four countries within an international exchange project. The study's analysis demonstrated how differences in legislation, assessment procedures, and education system configurations can shape inclusive education through variations in policy approach. In the highlighted project, the approach to inclusion was heavily influenced by policies that resulted in significant variations in student diversity, teacher involvement, pandemic response, and contributions to social cohesion within school communities across the four countries. The diverse student profiles affected the project's inclusion ambitions, closely aligning with each country's national inclusive education policies and their capacity to facilitate comprehensive education in mainstream schools. Notably, the Portuguese school was more effective in including students with severe BLP due to its progressive educational policy, leading to closer scrutiny of their case. However, educational policies that may not explicitly prioritize inclusion can still contribute to the education-for-all movement. Curriculum and pedagogical reforms that promote teacher collaboration and project-based learning, breaking down disciplinary boundaries, play a vital role in fostering student collaboration, participation, and transformative approaches to learning.

By integrating these principles with school gardens, inclusion efforts can be bolstered for diverse student profiles through activities that offer enriched physical and sensory experiences. Additionally, these activities foster a deep intercultural understanding of various agricultural, family, and food traditions intertwined with students' personal and social lives. Consequently, these experiences promote stronger student interactions, heightened awareness, and normalization of school diversity. In effect, students engaged in environmental education learning activities in which they gained awareness of their schools' communities' cultural history and environmental challenges. Moreover, they accessed different national contexts, namely different farming traditions and food diets. This was experienced through face-to-face exchanges and online sharing between the participating schools. Such engagements exposed the multiculturality present of modern-day Europe. They gained a more significant awareness of their European identity that embraces multiple characteristics that frequently share common roots despite differentiated political and socioenvironmental challenges. As such, we also conclude that environmental education using school gardens has the potential to contribute to fostering intercultural understanding and dialogue in connection to responding to sustainable development goals (SDG). It enhances the appreciation of cultural diversity and culture's contribution to sustainable development (target 4.7 of SDG) while also expanding inclusive and effective learning environments for all (target 4.8 of SDG). We also highlight how the learning activities resulted from extensive joint reflection on how to foster learning environments that ensured the participation of all students, regardless of their profile (e.g., low academic expectation,

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migrant origin, high ability, special health needs, intellectual disability, learning difficulty, or socioeconomic disadvantage).

The one-track approach to inclusion that currently characterizes the Portuguese education system meant that the students selected to participate in the current project reflected a very diverse school demographic, such as students with and without intellectual disabilities within the same group. Thus, the country's political approach to inclusion has been shown to facilitate access for all students (regardless of their BLP) to schooling experiences through school gardens. This aspect, from Portugal's national inclusion policy, added value to the project by explicitly demonstrating how school gardens can create inclusive learning environments. This ensured that diversity was recognized in its broadest sense and highlighted unique opportunities for collaboration and mutual learning between students with different abilities.

Therefore, we recommend that further studies be carried out that replicate the use of school gardens in environmental education in other countries whose education systems follow a similar one-track approach to inclusion and that explicitly foster collaboration between students with different abilities, namely students with intellectual disabilities, thereby contributing to the broader literature on inclusive education practices.

As for the limitations of the current study, we must acknowledge that the project primarily focused on policy development and knowledge sharing rather than monitoring actual student progress in academic terms, which limited our access to a deeper understanding of its impact. Moreover, due to the project's limited duration and the significant impact of the COVID-19 pandemic's restrictions, it was not possible to observe significant academic improvements in participating students, since such improvements often require extended time and effort. However, it is noteworthy that some of the participant students, particularly those with specific severe levels of disability, showed improvements in their social interactions with peers and adults, which appeared attributable to certain project activities. Furthermore, the project increased awareness among all students regarding their peers with BLP limitations and their potential. Inclusion entails helping individuals reach their full potential and appreciating diversity. The potential of school gardens to unite learners from diverse backgrounds, both socially and culturally, as well as bring together students with various barriers to learning and participation in enriched learning environments, deserves further exploration in various educational contexts.

Declarations

Author Contributions. **A.E.C.:** Conceptualization, literature review, methodology investigation (data collection and analysis), writing the original draft; **S.B.:** Conceptualization, funding acquisition, project administration, methodology, review and improving the original draft; **M.A.:** Investigation, review and improving the original draft; **A.C.T.:** Conceptualization, literature review, methodology, investigation (data collection and analysis), writing and reviewing the original draft. All authors have read and approved the published final version of the article.

Ethical Approval: The work complies with the principles of respect for participant anonymity and confidential data preservation.

Data Availability Statement: The data supporting the results presented in this study are derived from the public project reports. Access to primary data is restricted.

Conflicts of Interest: The authors declared no potential conflicts of interest.

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