



## Investigating Good Practices for Implementing the 17 SDGs in Greek Secondary Schools by 2026



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**Abstract:** The integration of the United Nations' 17 Sustainable Development Goals (SDGs) into secondary education systems has been recognized as a critical strategy for promoting global sustainability. In the Greek context, a mixed-methods investigation was conducted to identify and evaluate effective practices for embedding the SDGs in secondary school settings by 2026. Drawing upon the theoretical frameworks of Education for Sustainable Development (ESD) and Experiential Learning Theory (ELT), the study sought to examine the extent to which institutional leadership, teacher preparedness, curriculum design, and stakeholder collaboration contribute to the establishment of sustainability-oriented education. Quantitative data were collected through surveys administered to 286 secondary school teachers, while qualitative insights were derived from semi-structured interviews involving educators, school administrators, and external stakeholders such as NGOs and local community representatives. The findings indicate that leadership support constitutes the most influential predictor of successful SDG implementation, particularly when accompanied by strategic planning and the provision of targeted resources. Teacher training initiatives were found to significantly enhance the instructional capacity for sustainability-focused pedagogies, especially in the context of project-based and participatory learning models. Furthermore, partnerships with non-formal educational actors were shown to facilitate access to additional expertise and learning materials, thereby enriching both curricular and extracurricular initiatives. Programs such as sustainability clubs and interdisciplinary projects were identified as effective mechanisms for fostering critical thinking and applied problem-solving among students. Nonetheless, several systemic constraints—most notably institutional rigidity and limited resource allocation—were observed to impede widespread adoption. It is therefore proposed that by addressing these structural challenges and drawing upon international best practices, Greek secondary schools may achieve more robust alignment with the 2030 Agenda for Sustainable Development.

**Keywords:** Sustainable Development Goals (SDGs); Education for Sustainable Development (ESD); Experiential Learning Theory (ELT); Leadership Support Teacher Training; Curriculum Integration; Greek Secondary Schools

### 1. Introduction

The United Nations embraced the 2030 Agenda for Sustainable Development in 2015, consisting of 17 SDGs that seek to tackle challenges like poverty, inequality, climate change, and access to quality education. Out of these, SDG 4 focuses on ensuring inclusive, equitable, quality education and promotes education as a key enabling factor towards the rest of the SDGs (Martinis et al., 2024; Tomazinakis et al., 2021). Schools across the world are being appreciated as essential spaces for developing sustainability consciousness and preparing learners for tackling various issues affecting society (Alam, 2023; Cebrián et al., 2015). It was found that attempts made towards the implementation of SDGs in education systems have had different levels of effectiveness, but lack of resources, lack of proper training for teachers, and lack of stakeholders' involvement have proven to be barriers to implementing the action plans (Filho et al., 2024). As demonstrated by models like the Beijing Green School Program, it is possible to consider systemic changes in order to incorporate SDG themes into education successfully (Yuan et al., 2024). In this regard, integration of the SDGs in education systems depicts how regions

have embraced and implemented this process across the world (Suklun & Bengü, 2024; Ydo, 2022). Sustainable education in Africa emphasizes concerns that can be seen as priorities, such as poverty and inequality. In order to promote sustainability in education, curriculum development has been underpinned by collaborative approaches to SDG integration (Lekaba et al., 2022). Global frameworks such as Curriculum for Development and Sustainability (CDS) and specific country frameworks like the ones developed in Japanese senior high schools have been found to be effective for the consideration of SDGs in secondary education in Asia (Okubo et al., 2021). Nevertheless, issues like weak implementation of modern curricula and inadequate teacher training continue to be experienced in areas like the Middle East and North Africa (Öztürk, 2022; Vyas et al., 2019). Using the example of Brazil, initiatives such as the 2030 Agenda underline the opportunities of SDG-oriented policies in alleviating disparities between education and society (Scott et al., 2017).

Europe has developed clear policies to mainstream ESD, with a majority of countries including the competency-based approach and committing to reach the SDG goals (Osman et al., 2017; Valor et al., 2020). The EU has highlighted the importance of preparing students to solve environmental and social issues; Sweden and Finland, for example, have effectively integrated sustainability into teacher education and schooling (Fredriksson et al., 2020; Mulholland, 2018). Differences between Western and Southern Europe are still visible at the present time. Industrialized nations like Germany and the Netherlands show positive results in the application of SDG principles, while in the southern European nations like Greece, the challenges include fragmented policy implementation and lack of capital (Goad, 2020). Some of the proposed solutions that can improve these disparities are collaborative learning models and remote sensing technologies (Tassopoulou et al., 2019).

SDG implementation in general, and especially in secondary education in Greece, is still in its early stages. Despite the growing recognition of SDGs among teachers and policymakers, the barriers include inadequate financing, inadequate training for teachers, and inadequate involvement of other stakeholders or parties (Kefalaki, 2023; Meleti, 2021). These challenges are further compounded by strict operational procedures in Greek schools, as Kougias & Efsthathopoulos (2020) noted. There are challenges considering the integration of SDG into education systems, including cultures of bureaucracy, territorial egotisms that hinder international partnerships, and lack of structural support from some nation-states (Angelidou, 2024). Partnerships between Greek universities and international organizations demonstrate the possibility of implementing the principles of SDG in education. The case studies by Masuda et al. (2022) also revealed that pilot programs that included collaborations with NGOs and local communities yielded positive results in improving students' interactions with sustainability topics. These efforts can be sporadic and do not possess the systemic consistency needed for the change to be effective. For example, although Greece has adopted the 2030 Agenda, schools often fail to provide financial support and professional development to turn such commitments into practice-based interventions (Angelaki et al., 2024). Furthermore, students often do not treat sustainability questions as real-life problems that directly impact their lives and experiences (Kioupi & Voulvoulis, 2019). It is argued in current literature that it is crucial to incorporate SDGs into education in order to enhance the development of global citizenship and sustainability consciousness, but there is a lack of systematic perception on the strategies for the incorporation of these principles in Greek secondary schools. Studies have mainly concentrated on tertiary or primary schooling, leaving secondary schooling a relatively under-researched domain (Angelidou, 2024; Cembranel et al., 2024). Moreover, essential levers like leadership support, teacher professional development, and stakeholder engagement are still under-researched in the Greek setting (Lazaridou & Thomaidou, 2025; Ponce & Escudra, 2024). To fill these gaps, the present research focuses on exploring effective strategies for the integration of the SDGs in Greek secondary education. Its objective is to offer practical recommendations regarding leadership, teacher training, and stakeholders' engagement for successful integration of SDGs.

## 1.1 Objectives

The major aim of the study was exploring the good practices promoting the process of SDGs in the context of Greek secondary schools. The specific objective of the study includes.

1. To investigate the effect of leadership support on the implementation and continuity of SDG-centered activities in Greek secondary educational settings.
2. To understand and identify the effectiveness and impact of teacher training programs in promoting the implementation of SDG themes in educational practices.
3. To examine the contributions of collaborations with external stakeholders, such as NGOs and local communities, in advancing SDG implementation.
4. To understand the effect of integrating both curricular and extracurricular strategies in fostering adoption of SDGs in learning.

The research questions and hypotheses are as shown in Table 1.

**Table 1.** Research questions and hypotheses

Research Questions	Hypotheses
1. What specific practices are currently being implemented in Greek secondary schools to integrate the 17 SDGs?	H1: Structured SDG practices in schools are positively associated with the development of sustainability-focused education strategies that promote student engagement and critical thinking.
2. How does leadership support influence the success of SDG implementation in schools?	H2: Leadership support is a significant factor in ensuring the success and sustainability of SDG-related practices in schools.
3. How does teacher training impact the delivery and integration of SDG themes in classrooms?	H3: Teacher training programs directly improve the delivery and integration of SDG-related content into curricula.
4. What role do collaborations with external stakeholders play in advancing SDG initiatives?	H4: Partnerships with stakeholders, such as NGOs and local governments, positively influence the implementation of SDG-focused programs.
5. How can schools effectively combine curricular and extracurricular approaches to integrate SDGs?	H5: Schools that blend curricular and extracurricular SDG activities achieve greater alignment with the 17 SDGs.

## 2. Literature Review

### 2.1 Theoretical Framework

In this research, ELT is used to examine best practices for educating the 17 SDGs in the Greek secondary schools by 2026. Nonetheless, ELT fosters learning as a process of concrete experience, observation, reflection, and experimentation, as conceptualized by Kolb (2000). This theory can be applied to this study as it falls under ESD since it fosters the active participation of learners and teachers in addressing sustainability issues (Cebrián et al., 2015; Yuan et al., 2022; Yuan et al., 2024).

The integration of ELT helps establish the link between theory and practice in learning environments, which is important when implementing the ideas of sustainability and the SDGs within curricula for schooling. Experiential learning, including project-based learning, sustainability-focused workshops, and case analysis, can help students learn skills that foster the achievement of the SDGs in the future, such as problem-solving, critical thinking, and teamwork (Fredriksson et al., 2020; Goad, 2020). For instance, the Beijing Green School Program reveals how educational activities can enhance SDG knowledge among learners and encourage them to act in accordance with their goals. Similarly, Cebrián et al. (2015) noted that if students were involved in sustainability projects on their campus, they were able to improve on sustainable practices. ELT also embraces the systematic and transformative learning approaches that are effective in implementing the SDGs in Greek secondary education. Kioupi & Voulvoulis (2019) also pointed out that the use of ELT to create various base frameworks facilitates interdisciplinary learning and the development of critical thinking skills, both of which are necessary to accomplish the purposes of sustainable development. Constructionist teaching paradigms that are inclusive of ELT also stress purposeful involvement and learning within contexts that make it possible for learners to manage various sustainability issues (Filho et al., 2024; Lazaridou & Thomaidou, 2025). Therefore, ELT becomes a theoretical framework useful for examining best practices regarding SDGs in education.

Nonetheless, implementing ELT-based practices in Greek secondary schools has its challenges, which include the following. Teachers may need training to create and facilitate engaging learning experiences towards accomplishing the SDGs (Culala & De Leon, 2020; Suklun & Bengü, 2024). Furthermore, a lack of flexibility and a failure to engage stakeholders—especially schools—can present another barrier in the implementation of experiential methods (Kougias & Efstathopoulos, 2020; Meleti, 2021). To overcome these challenges, there is a need to engage institutions, quality training, and quality teaching aids (Masuda et al., 2022; Zabaniotou, 2020). Public schools, NGOs, and local government must integrate their efforts to address these barriers. For instance, Ho et al. (2023) stress that partnerships may contribute to more resources and ideas that can help to enhance the effectiveness of schools making sustainable changes. In the Greek context, such collaborations could complement the strategies for integrating both curricular and co-curricular SDG programs in educational settings, thus providing a more pervasive and integrated approach (Manioudis & Meramveliotakis, 2024; Meleti, 2021). In this study, ELT is employed as a theoretical framework to examine how experiential learning can be used to integrate the SDGs into the Greek secondary education system. This study explores how, through the work of leadership support, teacher training, stakeholder engagement, and curricular and co-curricular interventions, the process of experiential learning contributes to sustainability literacy and the development of sustainable solutions. In conclusion, the research offers understanding on the ways of developing a coherent and integrated procedure for organizing the promotion of the SDGs in Greek secondary schools by 2026 within the context of the 2030 Agenda for Sustainable Development (Kalogiannidis et al., 2024; Papaevangelou et al., 2024; Zournatzidou, 2024).

## 2.2 Global Efforts in Embedding SDGs into Education Systems

The process of adopting and implementing the SDGs into the education systems of the world is an indication of a collaborative effort towards the realization of the 2030 Agenda (Cembranel et al., 2024; Tassopoulou et al., 2019). At the global level, SDG 4 focuses on inclusive and equitable quality education for all, acknowledging its importance to sustainable development (UN-DESA, 2020). Alam (2023) points out how to emerging nations this makes secondary education exclusive and undermines the tenets of equity and access stipulated in SDG 4. In response, it has been possible to universalize these gaps through ESD that targets critical thinking and problem-solving skills.

Some structures in education, like the ones implemented in Japan and Sweden, illustrate the concept of systemic integration of ESD. Fredriksson et al. (2020) focus on comparative achievements, such as the capacity of these countries to integrate curricula with national sustainability goals. In the same way, Reyers et al. (2017) have suggested that ESD should incorporate certain variables into sustainability-oriented systems for education to facilitate the monitoring and improvement of its practices. The appearance of these challenges is owed to the fact that there are no set standards when it comes to implementing sustainability management in global contexts. For example, Nousheen et al. (2020) explains the clear differences in readiness for sending pre-service teachers to developing nations and developed nations, showing the requirement for integrated instructions at the global level. In this process, technological advancements are essential to supporting ESD worldwide. Yuan et al. (2022) elaborate on how EdTech tools, as exemplified by e-learning platforms and virtual simulations, have democratized quality education. These tools also support extensive cooperation across faculties; schools from different parts of the world can share experiences and examples of successful practices. Secondly, Vyas et al. (2019) have recommended the implementation of green building designs in educational institutions as a practical way of incorporating the SDGs.

International collaborations also reinforce the collaborative nature of this process. For instance, Ho et al. (2023) underscore the need for cross-jurisdictional partnerships in advancing the cause of sustainability-centered education. Ponce & Escudra (2024) pointedly analyze how multi-stakeholder collaborations in the Asia-Pacific region promoted the integration of regional agendas with global sustainability goals. With these efforts in place, there are still issues of aligning the educational policies within a country with international standards. According to Okubo et al. (2021), it is not easy to integrate SDGs into existing educational systems, as cultural and socioeconomic factors vary across the world.

Europe is already in the process of implementing SDGs in its educational structures and has made vast progress in doing so, making it an ideal region to use for this analysis. ESDN describes strategies to integrate sustainability into policy and education in Europe (Mulholland, 2018). The credibility of integrating sustainability principles, remains high in Scandinavian countries, as supported by an example of Fredriksson et al. (2020), illustrating the systematic integration of Sweden's curricula with SDGs. Likewise, Norway's reliance on field-based practicum activities within teacher training programs highlights the importance of the practical application of ESD (Ferrari et al., 2018).

Challenges to SDG-centered education vary significantly across regions, and particularly in Southern Europe, they are confronted with economic limitations and a fragmented policy-making framework. Manioudis & Meramveliotakis (2024) explain the challenges facing Greece, where inadequate funds and administrative issues hinder development. Nonetheless, there are actions such as the Operational Program for Human Resources Development to align policies and promote inclusiveness in educational systems (Kailis, 2024). Secondly, Goad (2020) highlighted that Greece, Malta, and Cyprus are already implementing ESD in their primary and post-primary curricula to a greater or lesser extent. There is also a rising interest in ESD practices in extracurricular activities. According to Díaz-Iso et al. (2019), they include possibilities for reflective learning and community engagement. In Greece, Angelidou (2024) has highlighted the presence of student-led sustainability in schools that has instilled environmental consciousness and activism among the youths. As noted by Sepetis et al. (2020), despite the application of corporate social responsibility principles, there is a gap that can potentially align more with the SDGs in higher education.

Technology integration has also been incorporated within the context of Europe's ESD strategies. Tassopoulou et al. (2019) synthesize this literature by discussing how Greek educational organizations have employed remote sensing technologies for reporting environmental sustainability initiatives. Likewise, in their study, Angelaki et al. (2024) explain how integrating sustainability into ICT curricula contributes to better digital literacy and dissemination of sustainable practices. Nonetheless, it is crucial to note that some difficulties remain in expanding effective practices across the European region. Potential barriers such as cultural resistance to change, as highlighted by Zabaniotou (2020), require specific escalation to counter resistance originating from institutions. As Kefalaki (2023) has pointed out, there is still a lack of professional development for teachers on how to infuse the principles of SDG in the curriculum. To respond to these challenges, pan-region collaboration efforts must be made to enhance the policies coherently and to distribute the financial and human resources adequately, focusing on teacher professional development (Kalogiannidis et al., 2023; Zournatzidou, 2025).



## 2.3 Higher Education Institutions in Advancing SDGs

According to Cembranel et al. (2024), HEIs have vast potential to foster sustainable behaviours and mindsets due to the resources, knowledge, and authority with which they are endowed. According to Filho et al. (2024), contributing to SDG initiatives as a student contributes to developing both academic and practical skills to tackle the complexities of the world for graduates. Curriculum integration is a crucial stage that enables the implementation of SDGs in higher education. In a related study, Damigos et al. (2021) explored how raw material engineering programs at universities in Europe have incorporated sustainable development approaches that are relevant to the market. In the same vein, Aktas et al. (2015) note that interdisciplinary courses that blend content knowledge with sustainable development aspects should be encouraged.

Another important aspect that has to do with engagement is the engagement of the teachers. Cebrián et al. (2015) also underscore the role played by the academic staff in ESD to show that the engagement of the academic staff in such programs determines the success of the programs. In Greece, Platitsa et al. (2024) found that there has been an increase in faculty training by institutional support to make the teachers competent in implementing sustainability themes in their practices. However, Kefalaki (2023) points out that these activities are still sporadic, while many teachers are still lacking the appropriate means or knowledge.

Structured co-curricular activities provided by HEIs help to support the key objectives of sustainability. According to Rushton & Batchelder (2020), it is reasonable to consider how non-academic environments, including community service learning, enable learners to transfer gained knowledge into practice. In Greece, Angelidou (2024) indicates programs where university students work with municipalities to solve sustainable development issues.

## 2.4 Review of Literature on Dependent and Independent Variables

### 2.4.1 Dependent variable (DV): SDG implementation practices

The dependent variable in this study is the extent of implementing practices relating to the UN SDG in Greek secondary schools. This idea covers a broad spectrum of efforts and initiatives that aim to integrate the 17 SDGs into education processes. SDG implementation success is assessed through the depth of curriculum incorporation, the collaboration with various stakeholders, the endorsement of teachers, and funding adequacy. Previous works emphasize the systematic approach and framework implementation in realizing the SDG goals in education (Damigos et al., 2021; Manioudis & Meramveliotakis, 2024; Masuda et al., 2022).

Difficulties such as fixed structures and scarce funding create barriers to effective practice implementation, common in Greek and other contexts regarding Southern Europe (Kefalaki, 2023; Meleti, 2021). Nonetheless, there are examples of programs that encourage structured instruction around sustainability, including Beijing's Green School Initiative, whose success is detailed in Yuan et al. (2024). Integrating the SDGs into the school culture also holds significant potential given the comparative successes in countries such as Sweden and Japan (Fredriksson et al., 2020; Okubo et al., 2021). These case studies provide hope, the Greek context demands specific solutions for particular barriers (Kougias & Efstathiopoulos, 2020; Zabaniotou, 2020).

### 2.4.2 Independent variable 1: Leadership support

Management is a critical aspect of achieving the SDGs, as it determines policies, resource allocation, and culture in the continuum of sustainable development (Cembranel et al., 2024; Lough et al., 2024). SDGs can be integrated into educational policies in a strategic manner, and this has been found to have a positive impact on how schools function (Manioudis & Meramveliotakis, 2024). This is seen in increased efforts where leadership commitment fosters resource dedication, improving the extent and quality of sustainability efforts (Damigos et al., 2021; Masuda et al., 2022).

In the Greek context, disruption in leadership engagement continues to be an issue (Kailis, 2024; Kefalaki, 2023). Cross-sectional analysis shows that active management, as demonstrated by Japanese high school leaders, contributes to better compliance with SDG goals (Okubo et al., 2021). Also, the leaders' involvement in training teachers, developing infrastructure, and supporting student initiatives improves the sustainability model (Ho et al., 2023; Rushton & Batchelder, 2020). These outcomes support the observation that participation and resource-based leadership enhance the pursuit of SDG-centered learning (Mulholland, 2018; Supising et al., 2024).

### 2.4.3 Independent variable 2: Teacher training programs

Professional development for teachers is crucial since it prepares the educators for the implementation of the SDGs into their lesson plans. Experiential training increases teachers' self-confidence and effectiveness in teaching sustainability-related content, as noted by Kefalaki (2023) and Gudonienė et al. (2021). Usually, training initiatives engage learning through experience and cross-disciplinary thinking, as these strategies allow educators to translate abstract knowledge to applicable skills (Cebrián et al., 2015; Culala & De Leon, 2020).

As the case of Japanese training programs proves, localized and context-specific training programs have been

especially beneficial in tackling regional issues (Nousheen et al., 2020; Okubo et al., 2021). Nonetheless, there are several challenges, including variations in the accessibility and quality of teacher training programmes across various geographical locations (Fredriksson et al., 2020; Zabaniotou, 2020). Such gaps can be addressed, inter alia, through partnership with NGOs and academic institutions to develop new tools and approaches (Ho et al., 2023; Piza et al., 2018).

#### 2.4.4 Independent variable 3: Implementation of SDG in the curriculum

Integration of SDGs into the curriculum is essential in enhancing the sustainability crusade among the students. Research indicates that integrating SDG concepts within lectures and assignments promotes higher-order learning abilities and problem-solving skill acquisition (Rushton & Batchelder, 2020; Yuan et al., 2024). As such, adopting the SDG principles as theory and practice improves the execution of critical elements of teaching. Research done on the educational systems of Sweden and Japan shows how students are prepared to address global issues through an interdisciplinary approach (Fredriksson et al., 2020; Lazaridou & Thomaidou, 2025). However, in the context of the educational system in Greece, there is a lack of flexibility when incorporating SDGs (Kougias & Efstathopoulos, 2020; Zabaniotou, 2020). There are more contextualized approaches like project-based learning and extracurricular activities like sustainability clubs that can foster participation (Díaz-Iso et al., 2019; Platitsa et al., 2024). It has also made sustainability education more accessible and informative by integrating technology tools like simulations and remote sensing (Masuda et al., 2022; Tassopoulou et al., 2019).

#### 2.4.5 Independent variable 4: Interacting with external stakeholders

When education programs incorporate partnerships with other stakeholders, including non-governmental organizations, local governments, and civil society organizations, the achievement of SDGs is boosted. These collaborations offer more resources, knowledge, and practical solving through applications of sustainable practices (Ho et al., 2023; Masuda et al., 2022). Local governments have a significant role in enacting sustainability programs and giving them direction in relation to general policies (Manioudis & Meramveliotakis, 2024; Supising et al., 2024). Greece has made preliminary attempts to engage stakeholders in pilot stages, yet overall sustainability is still an issue (Meleti, 2021; Zabaniotou, 2020). As seen in Beijing's Green School Initiative, community participation allows different stakeholders to establish sustainable behaviors and attitudes (Lough et al., 2024; Yuan et al., 2024). Based on these conclusions, it is crucial to strengthen intersectoral collaborations to address organizational constraints and increase the effectiveness of SDG-oriented education (Fallah Shayan et al., 2022; Ponce & Escuadra, 2024).

### 3. Methodology

#### 3.1 Research Design

This research used a mixed-methods research approach where both quantitative and qualitative methods were used to examine general guidelines regarding the management of the 17 SDGs in secondary schools in Greece. The decision to use mixed methods was informed by the need to collect both statistical data and qualitative context. The quantitative subset relied on a cross-sectional survey to collect data from the key informants, while the qualitative portion employed semi-structured interviews aimed at eliciting additional insights and information. This design helped with triangulation of results, ensuring consistency of the findings with different sources of data. For instance, mixed methods are ideal when studying practices within the larger educational system since they focus on both quantitative and qualitative contexts (Creswell & Plano Clark, 2017; Sammons & Davis, 2017).

#### 3.2 Study Area

The research was carried out in the Greek secondary schools in both city, town, and country schools or communities. Though the authors did not differentiate the results based on geographic region or country type, it was crucial for identifying how variations in socioeconomic and contextual factors impact SDG implementation practices. Greece was selected as the study area because it is increasingly engaged with the 2030 Agenda while confronting the execution of policies with scarce resources and disparate policymaking structures (Meleti, 2021). With regard to resources and funding, schools in urban areas were assumed to have a higher chance of implementing the SDGs compared to rural schools, although the implementation barriers observed in the study could help capture the experiences of low-resource contexts.

#### 3.3 Target Population and Sample Size

The target population for this research comprised secondary school teachers, school administration officials, and other outside parties like NGO representatives and local governments. Teachers were the primary respondents

since they are the ones charged with the responsibility of implementing education that is sensitive to the SDGs. This is because of their closer working relationship during the course of implementing curriculum and day-to-day class activities.

To calculate the sample size, Cochran's formula (Eq. (1)) was applied:

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

where,  $n$  = Sample size;  $N$  = Population size (1000);  $e$  = The level of significance to be tested was set at 5% (alpha level of 0.05).

$$n = \frac{1000}{1 + 1000 (0.05)^2} = 286$$

### 3.4 Sampling Technique

The study adopted the stratified random sampling technique to help ensure that the sample included participants from urban, suburban, and rural environments. In the meantime, random sampling was adopted in each stratum to ensure that any participant was chosen randomly and independently. Teachers were the largest group sampled since they are the key players in the implementation and incorporation of SDG principles in secondary education. Members from the administration ensure that informed views on policy support for implementation, resources such as funds and collaborations with other organizations are incorporated. To achieve sufficient variability in the participants' view, the study adopted stratified sampling, which also helped to generalize the results effectively (Bryman, 2016).

Urban, suburban, and rural strata were defined based on national census designations. Within each stratum, random sampling was applied using school lists provided by regional education offices, ensuring representative and unbiased participant selection. The sample of 286 teachers was selected using a stratified random sampling method. Regional strata were defined based on Greece's official classification into urban, suburban, and rural areas, following census and administrative boundaries. Within each stratum, schools were randomly selected, and participants were randomly chosen from staff lists to ensure proportional and unbiased representation across regions.

### 3.5 Data Collection Methods

Questionnaires were administered in a structured format to the teachers, administrators and other stakeholders of the FET institutions. The questionnaire used Likert scale items that focused on the level of leadership support, teacher training, curriculum incorporation, and stakeholder involvement. It also captured perceived difficulties and good practices regarding SDG implementation.

In the qualitative research, questionnaires in the form of interviews were administered to a select group of teachers and administrators and officials from non-governmental organizations and local governments. The interviews offered additional information about systematic prejudice, successful practices, and circumstances related to SDG projects. In the collection and analysis of data, ethical conduct was followed and upheld, such as the anonymity of participants. Subjectivity was avoided throughout the process of analysis, and attention was paid to the fact that interpretations made were based purely on the data gathered.

### 3.6 Variables and Measures

The variables and measurement indicators used in this study are summarized in Table 2.

**Table 2.** Variables and measures

Variable	Type	Measure/Indicator
SDG Implementation Practices	Dependent	Scope of SDG-related activities and stakeholder engagement
Leadership Support	Independent	Policy involvement and resource allocation
Teacher Training	Independent	Frequency and perceived quality of training programs
Curriculum Integration	Independent	Number and scope of SDG-related classroom activities
Stakeholder Collaboration	Independent	Frequency and effectiveness of partnerships with NGOs and local communities

The dependent variable, SDG implementation practices, includes all efforts and initiatives that target learners

for sustainable development. This corresponds to Piza et al. (2018) assertion that mainstreaming sustainability into education systems is necessary to deliver tangible outcomes. One of the independent variables is leadership support, which means that a leader is responsible for providing resources and ensuring that existing and future policies incorporate references to the goals of sustainable development. Ponce & Escuadra (2024) note that leadership enhances partnerships to adopt international and continental sustainability policies in specific settings. Teacher training is another important factor, as it aids educators in effectively supporting program goals and themes relating to sustainability. As highlighted by Reyers et al. (2017), concentrating on what matters most, for instance, professional development, improves the implementation and performance of SDG-related outcomes. Additionally, curriculum integration, which refers to the extent to which classroom practices engage with the SDGs, represents another important curricular strategy. In a paper by Rushton & Batchelder (2020), it is argued that sustainability in curricula promotes both a reflective cognitive aspect as well as application. Stakeholder management enhances partnerships with NGOs and other communities for the promotion of sustainability. In this regard, Scott et al. (2017) posit that such partnerships entail closing resource gaps and enhancing the local execution of tasks. Altogether, these variables enable broad and inclusive SDG measures – in correspondence with Ferrari et al. (2018)’s viewpoint on global citizenship education for sustainability.

### 3.7 Data Analysis

The study incorporated both quantitative and qualitative methods of data analysis in order to have a holistic approach when identifying good practices of the 17 GSEs in Greek secondary schools. Using both approaches enabled triangulation of findings, which improved the overall validity and reliability of the results. Data collected from the structured questionnaires were quantitative in nature and were analyzed using descriptive and inferential statistics. First, we employed frequencies, percentages, means, and standard deviations to describe the participants’ profile and the overall patterns regarding the implementation practices of the SDGs. Such descriptive findings offered a snapshot of leadership support, teacher professional development, curriculum activities, and stakeholders’ involvement in the Greek secondary education context. To test the hypotheses that postulated the positive correlation between independent variables such as leadership support, teacher training, curriculum integration, and stakeholder participation with the dependent variable of effective SDG implementation, the multiple regression analysis was employed (Kalfas et al., 2024; Kalogiannidis et al., 2022). The regression Eq. (2) used was:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad (2)$$

where,  $Y$  = SDG implementation practices;  $X_1$  = Leadership support;  $X_2$  = Teacher training programs;  $X_3$  = Implementation of SDG in the curriculum;  $X_4$  = Engagement with other actors outside the immediate network;  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\beta_4$  = Coefficients of the variables;  $\varepsilon$  = Error term.

Descriptive and statistical analyses were done using the Statistical Package for the Social Sciences (SPSS ver. 23) software. The p-value test results were used to assess the significance of the predictors, while the R-square ( $R^2$ ) value was used to establish the variance of the independent variables in explaining SDG implementation. The level of significance was set at 0.05 to determine the significance level of the results. Semi-structured interviews were conducted with the participants, and the data collected were analyzed using thematic analysis.

## 4. Results

### 4.1 Demographic Characteristics

Table 3 shows the demographic information of the primary respondents, who are 286 teachers.

**Table 3.** The demographic characteristics of teachers

Characteristic		Frequency	Percentage (%)
Gender	Male	172	60.1
	Female	114	39.9
Age Bracket	20–29 years	76	26.6
	30–39 years	104	36.4
	40–49 years	62	21.7
	50+ years	44	15.4
	1–5 years	92	32.2
Experience	6–10 years	110	38.5
	11+ years	84	29.3

Demographic data of the subjects offer useful information that helped in interpreting the results of the study.



The teachers included in the sample were 286, out of which 60.1% were male teachers. This gender distribution represents the teaching workforce in the region and implies some gender realities that may affect the adoption of SDG initiatives. Indeed, female teachers comprised 39.9% of the respondents, which affirmed their presence in the study but in a slightly lower proportion than male teachers. The distribution according to age showed that the greatest number of teachers consisted of individuals who were 30-39 years old, accounting for 36.4%, while the second largest group was 20-29 years old, comprising 26.6% of the total. This supports the involvement of Year 2 and above educators in advocating for SDG-centred education, which may be because they embrace the use of innovative instructional techniques and are more conversant with sustainable development concepts. Regarding experience, 38.5% of the respondents had taught for 6-10 years, which makes this group the largest. This implies that mid-level professionals involved in SDG-related activities are possibly individuals who combine innovation in teaching with experience and application of such techniques in the classroom. The teachers with experience of more than 11 years (29.3%) have enhanced knowledge and skills that help alongside young teachers to support the integration of the SDG principles into education practices.

## 4.2 Descriptive Results

Table 4 summarizes teachers' perceptions of leadership support, highlighting widespread agreement on leadership's role in resource allocation and policy alignment.

**Table 4.** Leadership support

Statement	%	SD	D	N	A	SA
I believe school leadership provides adequate resources for SDGs.	%	5.8	11.7	16.5	39.6	26.4
I think leadership actively integrates SDGs into policies.	%	7.1	12.5	19.3	38.4	22.7
I know that leadership prioritizes SDGs in planning decisions.	%	6.9	14.2	17.8	37.2	23.9
I believe school leaders promote SDG awareness among teachers.	%	6.4	13.0	18.2	38.7	23.7
I think school management involves teachers in SDG planning.	%	8.3	14.7	19.6	37.0	20.4
I know leadership provides incentives for SDG initiatives.	%	7.7	12.9	18.8	38.2	22.4

Note: SD = strongly disagree, D = disagree, N = neutral, A = agree, and SA = strongly agree.

The findings presented in Table 4 provide insights into perceived leadership support by teachers on SDG-driven initiatives in Greek secondary education contexts. A particularly high 66% of respondents either agreed or strongly agreed with the statement: school leadership offers sufficient support for the integration of SDGs. This infers that leadership is playing a proactive role in nurturing a supportive environment by providing key resources required for SDG implementation, a key facilitator of SDG implementation. Furthermore, 61.1% of the respondents affirmed that leadership also incorporates the SDGs in policies, suggesting the overall ESP alignment of policies in school with the sustainability goals. Another 61.1% thought that school leaders address the importance of SDG in decisions concerning the planning of the school activities, which underscores that leadership is an essential factor in the effective implementation of sustainability practices at the school level. On self-rated awareness, the level of support from respondents was high, with 62.4 % agreeing or strongly agreeing with leadership being instrumental in ensuring teachers were aware of the SDGs. Meanwhile, only 57.4% of the respondents said that school management includes teachers in SDG implementation planning, an indication of a possible lack of effective participatory decision-making. In addition, 60.6% strongly agreed with the statement that leadership-initiated incentives have helped to increase the teachers' participation in the SDG by acknowledging the role of recognition and rewards in enhancing participation.

Qualitative feedback also supported these observations. An employee conducting research at a school stated: "I was surprised to find that even the leadership in schools was supporting SDGs in the way that they supply the resources as well as the focus placed on publicizing awareness campaigns." An external stakeholder contributed and said, "When it comes to strategies in partnerships with schools, leadership plays a key role in committing resources and time to ensure the process is sustainable, hence engaging teachers and the community at large." The results reveal the definitive leadership stake not only in resource mobilization but also in organizational culture in support of SDG pursuits.

Teacher training was broadly perceived as effective, particularly in equipping educators with methods to integrate sustainability into classroom practice (Table 5).

As can be seen in Table 5, the respondents have emphasized the need for the training of teachers in order to facilitate the incorporation of the SDGs into the education system in Greek secondary schools. Most respondents (69.6%) were either in agreement or strongly agreed with the statement that training helps teachers develop proficiency in teaching the SDGs. This goes to support the argument indicating that teachers' professional development can impart content knowledge and confidence in delivering SDG content. Additionally, the results showed that 67.3% of the participants recognized that training offers the framework on how to include the SDGs in the curriculum, while 67.3% of the participants were aware that sustainability themes are incorporated in the

training to engage students. Such responses imply that effective structures of training programs can equip educators with strategies for designing effective learning experiences that bridge the knowledge–practice divide. Workshops aimed at improving the extent and quality of SDG-related cocurricular activities were received positively, with 65.4% of the respondents agreeing or strongly agreeing with the statement. Likewise, 66% of the respondents stated that improving the knowledge on SDGs and the ways of explaining them should address the question of experienced trainers, which is critical for the training of teachers.

**Table 5.** Teacher training on SDGs

Statement	%	SD	D	N	A	SA
I believe training equips teachers to teach SDGs effectively.	%	4.4	9.2	16.8	41.7	27.9
I think training provides strategies for integrating SDGs.	%	5.1	10.1	17.5	42.4	24.9
I know training helps teachers engage students with SDGs.	%	4.7	9.7	18.3	43.6	23.7
I think workshops improve SDG-focused extracurriculars.	%	6.2	11.3	17.1	40.5	24.9
I believe experienced trainers enhance SDG knowledge transfer.	%	5.6	10.4	18.0	39.2	26.8
I think continuous training fosters sustainable SDG practices.	%	4.9	11.0	17.7	42.1	24.3

Note: SD = strongly disagree, D = disagree, N = neutral, A = agree, and SA = strongly agree.

The qualitative feedback collected from the participants also corroborated these findings. One teacher remarked, “I attend several SDG workshops, most of which have provided useful teaching methods on how to implement sustainability themes in lessons and activities properly.” An external stakeholder emphasized the need for continuous training, stating, “Regular teacher training means that SDG principles do not become a one-off or marginalized issue, but instead are kept in the forefront and integrated into academic and co-curricular programs.” These insights emphasize the potential of training aimed at developing educators who can promote sustainable practices and engage students in sustainable decision-making in Greek secondary schools.

The results in Table 6 illustrate the value teachers place on collaborations with NGOs and local communities in supporting SDG implementation.

**Table 6.** Teacher’s perception of collaborations with NGOs and local communities

Statement	%	SD	D	N	A	SA
I believe NGO collaborations provide valuable SDG resources.	%	5.3	9.4	18.6	40.3	26.4
I think community partnerships enhance SDG awareness.	%	6.1	11.0	17.7	39.5	25.7
I know collaborations improve SDG project outcomes.	%	4.8	8.9	19.1	41.8	25.4
I believe local government partnerships support SDG activities.	%	5.7	10.7	9.8	70.6	3.2
I think stakeholder engagement sustains SDG initiatives.	%	6.5	9.8	18.0	42.1	23.6
I know external collaboration ensures wider SDG reach.	%	5.9	10.5	13.2	51.4	19.0

Note: SD = strongly disagree, D = disagree, N = neutral, A = agree, and SA = strongly agree.

The results presented in Table 6 stress the importance of engaging stakeholders such as NGOs, local government, and community partners in enhancing SDG activities in Greek secondary schools. As to the engagement with NGOs, 66.7% of teachers admitted that collaborations with NGOs are useful for providing teaching materials and expertise for SDG education. Likewise, 65.2% agreed that relevant communities support awareness of SDGs, indicating the need to engage stakeholders in promoting the cause of sustainability. Most importantly, 67.2% of respondents agreed to the positive impact of collaborations on the enhancement of project outcomes and the role of external input in improving SDG-specific activities. Support from local government ranked high; 70.6 % of the teachers affirmed its significance in pushing forward the SDG activities, emphasizing the significance of policies and funds that are in tandem with the school-based strategies. Moreover, regarding external collaborations, 70.4% saw the importance of engaging stakeholders outside the institutions in order to widen access to SDG initiatives, pointing at the idea of synergy in partnerships.

The above quantitative findings are supported by the following qualitative feedback. Further, one of the school administrators stated that, “The partnerships that we have established with NGOs have been useful as they have availed essential support, including learning resources and professional services that enable us to pass lessons on sustainability in an interesting and meaningful way to students”. An external stakeholder concurred with this by saying that “Partnerships between schools and the community enhance the impact of SDG activities and expand them from the classroom to real life”. These ideas highlight the importance of stakeholders’ involvement in making the SDG programs effective, efficient, and viable. These partnerships not only supplement teaching materials but also locate schools within a global context and thus help to extend the reach of SDG education. The inclusion of qualitative feedback supports the quantitative results, showing how collaboration drives present and future success in sustainability education.

Table 7 shows positive teacher perceptions regarding the integration of curricular and extracurricular approaches, suggesting their role in enhancing practical SDG skills and student engagement.

**Table 7.** Curricular strategies and extracurricular strategies

Statement	%	SD	D	N	A	SA
I believe combining approaches deepens SDG understanding.	%	5.6	10.3	17.4	40.7	26.0
I think extracurricular activities improve SDG awareness.	%	4.9	9.9	18.1	41.6	25.5
I know classroom projects enhance practical SDG skills.	%	5.2	10.0	18.4	42.3	24.1
I think SDG themes in lessons engage students effectively.	%	6.0	9.7	17.8	40.9	25.6
I believe extracurricular SDG clubs foster collaboration.	%	5.3	10.1	19.5	39.4	25.7
I know integrating SDGs into lessons improves critical thinking.	%	5.4	9.8	18.7	42.1	24.0

Note: SD = strongly disagree, D = disagree, N = neutral, A = agree, and SA = strongly agree.

The findings provided in Table 7 underscore the importance of embedding both curricular and co-curricular practices to promote SDG education in Greek secondary schools. Teachers' perceptions of the effectiveness of using these approaches in enhancing understanding and appreciation of the SDGs were generally positive, with 66.7% of the teachers agreeing or strongly agreeing that integration of the identified approaches enhances students' understanding and appreciation of the SDGs. This resonates with the notion that employing both didactic techniques in the classroom and extracurricular activities fosters a better learning environment. Respondents particularly appreciated extracurricular activities: 67.1% of respondents pointed to the fact that such initiatives enhance awareness of the SDGs, and 65.5% noted that clubs with a focus on the SDG themes enhance collaboration between students. Likewise, 66.4% responded that classroom projects helped in enhancing practical SDG skills, which is consistent with the findings regarding the applied perspective of effective teaching strategies aimed at achieving the SDGs. Teachers also stressed that lessons related to SDGs contribute to students' interest (66.5%) and enhance their cognitive abilities (66.1%).

Qualitative responses support these results. One head teacher noted, "Discussions in class followed by outside projects add a synergy in which students are not only being taught about the SDGs, but they are also able to see how they can change something." An external stakeholder once said, "As students participate in clubs and work on practical assignments, they are more conscious of their responsibilities and how to collaborate, which is one of the core principles of sustainability."

As evidenced by these results, implementing curricular and extracurricular aspects of learning offers students an enhanced experience by using actual examples and provides an added level of practical thinking by working collaboratively for the common goal of understanding the importance of the SDGs. The qualitative feedback supports the notion that this dual approach is central to achieving quality, contextually relevant SDG education.

Figure 1 presents the distribution of the good practices stated by teachers regarding the comprehensibility of SDG implementation in Greek secondary schools.

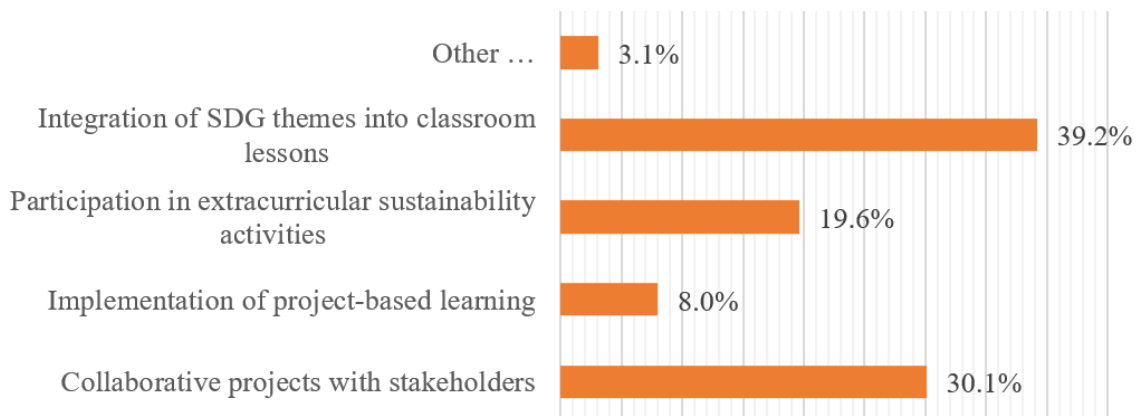
**Figure 1.** Aspects of good SDG implementation practices

Figure 1 shows the results of the presented study, which encompasses a variety of best practices for SDG implementation in Greek secondary schools. The strategy of integrating the themes of SDG into classroom lessons (39.2%). Therefore, the strategy that was identified as the most frequently used one is curriculum integration. This practice makes certain that students come across SDG principles in a more structured manner via educational content, which aligns with the observation made in Fredriksson et al. (2020). Stakeholder collaboration (30.1%) was the second most reported practice, as stakeholders can help in providing support in terms of materials and adding the applicability factor to the coursework. This concurs with Masuda et al. (2022), where partnerships have been identified as vital to enhancing sustainability projects in schools. Extracurricular involvement in sustainability matters (19.6%) supports the availability and effectiveness of hands-on sustainability learning aided by TT

interventions. This approach helps students hone their critical thinking skills and develop teamwork skills in addition to the concepts given in the lectures. The 3.1% other practices comprise awareness campaigns and other related activities, school sustainability policies, research activities by teachers, and mentorship programs for students. These practices are additional responses from respondents and depict various approaches that schools are using to achieve the intended SDG goals.

### 4.3 Regression Analysis

#### 4.3.1 Model fitness

Regression analysis was conducted to determine the extent to which the regression model accounted for the variance in implementation of SDGs. The model fitness statistics are presented in Table 8.

**Table 8.** Model fitness

<b>R</b>	<b>R-Square</b>	<b>Adjusted R-Square</b>	<b>Std. Error of Estimate</b>
0.681	0.628	0.612	0.243

Dependent variable (DV): SDG implementation practices

From Table 8, 62.8% of the implementation of SDGs can be explained by leadership support, teacher training, collaboration with stakeholders, and both single and combined factors, as evidenced by the R-square value of 0.628. This enhances the overall viability of the model.

#### 4.3.2 Regression coefficients

To determine the individual contributions of each independent variable, regression coefficients were computed. Table 9 presents the results.

**Table 9.** Regression coefficients

<b>Variable</b>	<b>Coefficient (B)</b>	<b>Std. Error</b>	<b>Beta</b>	<b>t-Value</b>	<b>p-Value</b>
(Constant)	0.512	0.198		2.585	0.015
Leadership Support	0.298	0.067	0.412	4.448	<0.001
Teacher Training	0.263	0.073	0.328	3.603	<0.001
Stakeholder Collaboration	0.210	0.079	0.275	2.658	0.009
Combined Approaches	0.285	0.070	0.386	4.071	<0.001

Dependent variable (DV): SDG implementation practices

The results of the regression analysis provided valuable information regarding the factors that contributed to the enhancement of SDG-related initiatives in Greek secondary schools. The analysis revealed that leadership support had the largest coefficient estimate ( $B = 0.298$ ,  $p < 0.001$ ), which underscores the importance of executive-level endorsement of sustainable behavior and resource commitments. A standardized beta coefficient of 0.298 for leadership support indicates that for each unit increase in perceived leadership involvement, SDG implementation effectiveness increases by approximately 30%. This underlines the practical value of prioritizing leadership engagement as a strategic focus.

The results show that schools that were most effective in developing the leadership of their teachers were also the schools that were most effective in sustaining structured SDG practices, thus supporting the second hypothesis (H2) of the study. Teacher training emerged as another important predictor ( $B = 0.263$ ,  $t(571) = 20.298$ ,  $p < 0.001$ ), thus supporting its role in the successful implementation of SDG aspects to lesson planning and organization of learners' activities. Previous teaching practice and training also enhanced the teacher's capability to teach with passion and effectively impart knowledge on sustainability, hence supporting H3. Stakeholder collaboration was another strongly supported factor ( $B = 0.210$ ,  $p = 0.009$ ) that highlighted the significance of partnerships with NGOs and local communities. Such partnerships augmented resources and competencies of schools in pursuing SDG-related agendas and nurturing H4. The integration of curricular and extracurricular interventions ( $B = 0.285$ ,  $t = 6.720$ ,  $p < 0.001$ ) showed a substantial improvement in the level of SDG integration, thus confirming H5. These integrated strategies enabled the establishment of an environment that enhanced students' understanding of sustainability issues, consistent with the project goal of enhancing students' knowledge and understanding of issues related to the SDGs.

Notably, the regression model explains 62.8% of the variance in SDG implementation practices—a substantial  $R^2$  value in educational research. This underscores the robustness of the selected predictors and suggests that leadership, teacher training, stakeholder engagement, and curricular strategies collectively offer a strong explanatory framework.

## 5. Discussion

The study examined good practices for implementing the 17 SDGs in Greek secondary schools, focusing on four key factors: The implementation of effective strategies such as leadership support, training teachers, engaging stakeholders, and using curriculum and co-curriculum. This paper identified leadership support as a key factor affecting SDG implementation in Greek secondary schools. This research explored leadership as a resource allocation mechanism that has a positive impact on the achievement of SDGs. While overall leadership support was positively perceived, the comparatively lower agreement (57.4%) regarding teacher involvement in SDG planning highlights a potential gap in participatory decision-making. This may reflect hierarchical structures common in Greek schools, where strategic planning often remains centralized. Addressing this could enhance teacher ownership and improve implementation consistency.

These are consistent with Lough et al. (2024) and Manioudis & Meramveliotakis (2024), who found that increased organizational leadership engagement in policy formulation strengthens sustainability strategies. This is in agreement with Damigos et al. (2021), who also observe that leadership plays a critical role in creating an environment that allows for SDGs support, and the availability of resources as a key enabler of program success. In Greek schools, leadership has a direct stake in the promotion of SDG awareness, as has been pointed out in Yuan et al. (2024), where school leaders were directly involved in the promotion of sustainability principles. However, it was found that gaps in participatory decision-making exist; this supports Zabaniotou (2020)'s claim that institutional rigidity hampers sustained adoption of the SDGs. New ways of bridging these gaps are needed, as Alam (2023) has pointed out, and the focus should be placed on collective leadership that involves educators and communities.

The study also identified the teacher-training programs as useful in preparing the educators to effectively teach the sustainability curriculum. The study's results align with Kefalaki (2023), who noted that adequate teacher readiness underlines the efficiency of SDG education. As suggested by Gudonienė et al. (2021) and Aktas et al. (2015), the primary training programs that have been found effective are the programs that focus on experiential training and that incorporate interdisciplinarity. Okubo et al. (2021) have also identified the effectiveness of the localized training targeted at specific issues in the given region.

The fact that training programs are not offered in all the schools as enumerated by Nousheen et al. (2020) is because it has been implemented in a phased manner, globally. These discrepancies highlight the importance of cooperating with local NGOs and governments to improve training, as Ho et al. (2023) pointed out. Cebrián et al. (2015) and Díaz-Iso et al. (2019) also pointed out that teacher training benefits from such collaborations when it comes to delivering new approaches and tools for teacher training and thus supports the multi-stakeholder approach to reaching the SDGs in education.

Stakeholders' engagement enhanced the organizational support for the SDGs in Greek secondary schools through the provision of different resources, perspectives, and knowledge. Cooperation with NGOs, local administrations, and other community-based organizations was useful, which was supported by Masuda et al. (2022) and Ho et al. (2023) when discussing the positive impacts of multiple sector engagement. The involvement of the local governments in supporting sustainability programs, as cited by Manioudis & Meramveliotakis (2024), was clearly observed in the current study. Hurdles like bureaucracy and culture were pointed out as barriers, which is consistent with the barriers outlined by Kougias & Efstathopoulos (2020). Successful partnerships, as exemplified by community-oriented programs highlighted by Yuan et al. (2024), proved that engagement contributes to the achievement of learning outcomes as well as the understanding of sustainable community development. These findings provide further evidence to the assertion made by Rushton & Batchelder (2020) that collaboration enhances the dissemination and enrichment of sustainability education.

Curricular and extracurricular strategies for the implementation of SDG principles were also noted as a common approach for the integration of goals into education. Class observations further revealed that blended teaching, with formal instruction accompanied by concrete activities, improved student involvement and problem-solving, both of which support Yuan et al. (2024) and Fredriksson et al. (2020) results. These blended approaches are consistent with the experiential learning paradigms discussed in Kolb (2000)'s work. Sustainability clubs, communities, and projects were quite useful in supporting students in collaborating and developing their practical skills in extracurricular activities, as noted by Díaz-Iso et al. (2019). Nonetheless, narrow hierarchical structures and the restricted availability of resources in the Greek educational system, as pointed out by Kougias & Efstathopoulos (2020), prevented the extensive use of these integrated methodologies. These barriers, as highlighted by Kefalaki (2023), may be overcome through policy change to foster a more comprehensive approach to implementing SDG principles in education.

### 5.1 Implications for SDG Implementation in Greece

The findings emphasize the necessity of using the system approach and addressing systemic factors regarding the implementation of the SDG in Greek secondary schools. Particularly, school leadership, teacher education,



participation of other stakeholders including caregivers, and overall incorporation of the integrated approach to education should promote change for refuting systemic challenges and be in tune with the international norm. The effectiveness of initiatives in other parts of the world is apparent, including the localized SDG frameworks in Japan (Okubo et al., 2021) and the Green School Program in Beijing (Yuan et al., 2024), highlighting the possibility of expanding identical strategies in Greece. Furthermore, as pointed out by Filho et al. (2024) and Cebrián et al. (2015) on the subject of sustainability competencies in higher education, the steps taken offer a guideline on how gaps in the teacher training and resources can be closed. It would be possible to advance the attainment of the 2030 Agenda faster if these lessons were incorporated into the Greek secondary education system.

## 5.2 Limitations and Recommendations

The study has some limitations in terms of self-reported data used in the research as well as the fact that it covers only the secondary schools. Therefore, future research should assess the integration of SDG in not only primary but also higher education to give a more informed perspective on learning for sustainability. Furthermore, there is a need for longitudinal research to look into the effects of SDG-centric activities on students, as pointed out by Zabaniotou (2020) and Reyers et al. (2017). Addressing these gaps would provide Greece with a stronger foundation of sustainable education to develop students who are capable of responding to the challenges of the world for the 2030 Agenda.

## 5.3 Implications for International Contexts

Although this study focuses on Greece, the findings are applicable to other countries facing comparable challenges—such as limited funding, centralized educational systems, or fragmented stakeholder engagement. Nations in Southern Europe, the Balkans, and parts of the Middle East or Latin America may particularly benefit from adopting integrated approaches that emphasize leadership commitment, targeted teacher training, and partnerships with local actors. The emphasis on experiential and context-sensitive strategies may support broader SDG localization efforts globally.

## 6. Conclusions

The purpose of this study was to identify best practices that support the integration of the 17 SDGs in the context of Greek secondary schools, leadership, teacher training, collaboration with stakeholders, and curricular and co-curricular activities. Leadership support emerged as the antecedent of the SDG initiative, with strategic resource commitment and policy congruence for cultivating sustainable thinking. The study throws light on leadership support as the key to effective SDG programs that promote strategic resource management and policy integration of SDGs. Teacher training courses were found to be crucial to providing educators with the necessary knowledge and skills to teach and promote sustainability effectively; it was also identified that constant professional development of the teachers plays a significant role in the process. From the study, the engagement of stakeholders like NGOs, local government, and community-based organizations was crucial in offering support as well as expanding the outreach and quality of SDG-related activities. Furthermore, incorporation of both curricular and co-curricular approaches was pinpointed as a deliberate tactic that allows linking of theories to practice as well as development of thinking and activity skills. Some of the result highlights include positive changes in interpreted communication, verbally expressed patient expectations and instructions, timely initiated communication, and coordinated behaviors that include changes in posture and seating arrangements.

Mitigating these barriers calls for innovative approaches that synthesize global practice with local contexts, such as Japan's contextualized SDG frameworks and Beijing's Green School Program tailored for the Greek context. In conclusion, this research highlights how the methods of leadership, teacher education, and stakeholder engagement can be connected to transform SDG education through experiential learning. Thus, secondary schools in Greece shall further enhance their results and devote efforts to developing a generation with competencies in sustainability, which will ensure the achievement of the 2030 Agenda. It is suggested to carry out more detailed studies to identify further long-term effects and apply these findings to other levels of education in order to follow the principles of sustainable learning.

## Author Contributions

Conceptualization, A.P., S.K. and G.K.; methodology, S.K. and D.K.; software, O.P. and D.K.; validation, S.K. and D.K.; formal analysis, A.P., S.K. and G.K.; investigation, A.P., O.P. and G.K.; data curation, O.P. and D.K.; writing—original draft preparation, A.P., S.K., D.K. and G.K.; writing—review and editing, A.P., S.K. and G.K.; visualization, O.P. and D.K.; supervision, G.K. and S.K.; project administration, S.K. and D.K.; funding acquisition, O.P. and A.P. All authors have read and agreed to the published version of the manuscript.

## Informed Consent Statement

The protocol of the current study was approved by the University of Western Macedonia and received all the necessary permits for its preparation (University of Western Macedonia Research Ethics Committee No.: 216/30-05-2024). The questionnaire used in the study ensured voluntary participation, participants' consent, and the provision of information regarding the purpose of the survey, as well as confidentiality and anonymity.

## Data Availability

The data used to support the research findings are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare no conflict of interest.

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