Scientific Research Publishing

# Building a Collective School Culture to Achieve Education for Sustainability: The Contribution of Teachers' Perceptions

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## Abstract

Our current educational reality is often devoid of an encompassing vision of Education for Sustainability (EfS) that involves all stakeholders and invites them to take coordinated action towards an equalizing goal. Many educators in their schools take a lonely trajectory; they are limited in their classes or within perceived disciplinarian confinements of their cognitive expertise. In their attempt to explain how an all-encompassing vision of "sustainable education" can be promoted, nine in-service teachers involved in European environmental protection programmes were asked to reflect on their experience, explain possible reasons behind each challenge and make recommendations for improvement. Based on empirical studies and participants' responses, we argued that sustainable education policies and innovative scholarships should not be standing alone, isolated from other programmes, policies, institutions or even education theories. EfS researchers and practitioners should establish clear links between EfS teacher education theory, approaches, curricula and implementation before policies are formulated or pursued.

## Keywords

Education for Sustainability, Sustainability in Education, Sustainable School, School Culture, Professional Development, Participatory Planning, Inclusivity, Teacher Education, Policy

## 1. Introduction

Education for Sustainable Development was not the result of pedagogical reform. Public awareness followed the United Nations (UN) World Commission on En-

vironment and Development report "Our Common Future", also known as the Brundtland Report (RWCED, 1983) and it was not officially introduced until 1987 at the UN General Assembly. Sustainability in Education emerged as a vital policy-driven goal following international organizations conferences, deliberations and declarations, whose initial mission was environmental protection. Originally, the best way to ensure accrued accountability of all stakeholders was to disseminate its principles and values across educational systems around the world encouraging citizen participation through social activities. Yet, although sustainable education did not stem from a need for educational reform, it seems to be the driving force behind educational reform (Wamsler, 2020; Evans et al., 2017; Kioupi & Voulvoulis, 2019). Under the auspices of UNESCO (2005, 2014a, 2014b, 2017) and the Sustainable Development (SD) Committee, the first conferences were organized and the connection between environmental protection and sustainable development served as "the breeding ground" for what we now perceive as Sustainable Education. Yet, nowadays, sustainable education is not just synonymous with Environmental Protection (Dimitriou, 2009) or Education for Peace, Human Rights Education, Environmental Education, Prevention of Racism and Violence (Sterling, 2001).

Upon its introduction to schools, sustainability has gradually evolved into a rather idiosyncratic form of education whose core values were embraced by educators or policy makers, and is currently implemented in diverse ways by a growing number of teachers around the world. Despite their common ground, sustainable education has now evolved into a dynamic strategic educational policy that evangelizes prosperity and innovation through ethical, political, economic and environmental dimensions of life in this infinite planet. Education for Sustainable Development (ESD) is the term that is now adopted by most, yet the elusive and often controversial notions associated with sustainability still persist (Liarakou & Flogaiti, 2007) mainly due its multi-dimensional participatory applications in the educational system (Evans et al., 2017). This may explain why that although EfS is not yet modularized in the curriculum, it can direct and prevail within a curriculum as a new educational dimension, a new umbrella term that embraces all innovative 21st century practices. The question that needs to be addressed is what potential changes could render the participatory EfS model more effective in terms of involving the whole school community and enhance current education systems and stakeholders' practices so as to ensure inclusive and equitable quality education that promotes lifelong learning opportunities for all (United Nations, 2015).

In this work, we report on targeted international and Greek empirical studies to provide the context for our study and we present the results of a qualitative study examining the perception of nine Greek in-service teachers in understanding "education for Sustainability" (EfS) and discuss possible ways of professional development and policy changes and subsequent implementation in the school community.

## 2. Theoretical Background

## 2.1. Education for Sustainability: Origin, Evolution and Challenges

EfS focus has evolved since the 2005 UNESCO report. The focus was initially on content dissemination and awareness raising. The fundamental principles of Education for Sustainability according to UNESCO (2005) entailed:

- Becoming aware of and protecting biodiversity.
- Becoming aware of and tolerating diversity.
- Becoming aware of the benefits of open dialogue/ participatory practices.
- Making the most of the local knowledge.
- Fostering practices and traditions that are conducive to sustainability.
- Becoming aware of diverse cultural approaches within society.
- Exploitation of local communication modes i.e. local dialect/language.

The aforementioned principles often expanded by UNESCO (2005) to include:

- Respecting human rights and treating all people with dignity worldwide.
- Being committed to social and financial justice for all people on Earth.
- Respecting human rights of future generations and being committed to inter-genetic responsibility.
- Respecting and caring for the community of life in all variable forms by protecting and restoring diverse or endangered ecosystems on Earth.
- Respecting cultural diversity and being committed to constructing a civilization that is tolerable, peaceful and devoid of violence on a local and global level.

Since then, UNESCO (2014a, 2017) embraced the key characteristics of EfS including inter-disciplinarily, trans-disciplinarily, holistic approaches to learning, focusing on values rather than content, fostering critical thinking and problem solving skills, applying various pedagogical methods, fostering participatory decision making models and applying the principles of EfS locally and globally. However, these aspects are not always well integrated within education systems, despite the explicit recognition of Sustainable Development (SD) goals and official documentation of learning objectives and cross-cutting competencies learners need to develop to achieve such SD goals. With the new focus now being on key competencies includes competencies that cannot be taught but fostered so that the learning objectives can be met, the need for collective participatory and inclusive approaches adopted by educators is pressing. Despite the recognition of teachers as "powerful change agents" towards the implementation of SD goals (UNESCO, 2017) education for sustainable development teacher education programmes may not be conducive to this reform as more emphasis should be given on the importance of democratic educational processes and practices instead of just focusing on competence acquisition (Van Poeck & Vandenabeele, 2012) or content of teacher education interventions (Varela-Losada et al., 2019) or content of EfS courses (Glavic, 2020).

As one of the calculated indicators of the Human Development Index (HDI), a key dimension of sustainable development assessment (Korsakienė et al., 2011), EfS aims to resolve current local problems in a complex multi-dimensional world. Digital transformation, increased connectivity and rapid speed of change render EfS teacher education alignment urgent and a prerequisite to achieving other SDGs (Kioupi & Voulvoulis, 2019; Lewin, 2019). EfS focus pedagogies, practices and methods gave rise to the need for active learning and student-centred learning that embrace participatory and inclusive approaches to learning. Sustainable pedagogies are interactive, learner-centred and action-oriented (Green Office, 2019) and transformational (Slavich & Zimbardo, 2012). However, there is a pressing need for deeper evaluation of the effectiveness of current EfS pedagogies as very few empirical studies have actually evaluated the efficacy of such pedagogies and interventions and they often limit themselves to very general descriptions of their pedagogical approaches (Evans et al., 2017).

The evolving nature of EfS itself as it adopts more innovative pedagogical practices and strives to foster 21st skills may pose some threats without the provision of systematic teacher education. Many researchers contend that education for sustainability is not a priority for teachers in most parts of the world (Jucker, 2002, Chatzifotiou, 2006, Spiropoulou et al., 2007) mainly due to their difficulty to comprehend this educational approach or due to lack of awareness. Chatzifotiou (2006) points out that the term is confusing for several educators due to lack of concrete or universal definitions, relative fluidity of boundaries and absence of discrete features that characterise it. Chatzifotiou (2006) also points out that there is no clear link between EfS education and EfS curriculum. It is often for these reasons that EfS is not clearly depicted and elucidated to educators as a teaching approach or practice. This lack of theoretical detail may have rendered EfS conceptualisation, contextualisation and adoption even more difficult. In this vein, Burbules et al. (2020) stated that teacher education is crucial for sustainable development as new technologies in education are changing our ideas, conceptions, our aims and our methodologies in education adding that education reforms need to take into account not only the possibilities but also the risks involved in all the new education and technology trends.

As it is expected, promoting EfS through education constitutes a complex procedure (Barrett & Sutter, 2006) requires guidance and scaffolding, which seems to be rare (Witta et al., 2012). In this context, EfS directors advertising strategies cannot compensate for insufficient guidelines and support material for teachers who wish to implement EfS in their classes and, as a result, EfS still remains a riddle for many educators (GHK & Danish Technology Institute, 2008). Its inclusion in educational practices does not always take the form of a specific module and is not expressed with a focus on a particular discipline. Educators are expected to disseminate the EfS premises (UNESCO, 2005) across all aspects of an already overloaded modularized curriculum. Not surprisingly, educators manage to highlight only part of the sustainability aspects that are requisite for

the overall understanding of a subject at hand (Martins et al., 2006). This often explains why most educators tend to identify the ecological and bio-physical dimensions of a sustainability issue and highlight its environmental sustainability aspects. This practice is often associated with how educators perceive "sustainability" (Summers et al., 2004). Likewise, 87 percent of teachers participating in the previous survey perceive the environmental aspects of sustainability as the core of EfS.

Recent publications call for the need to monitor and align teachers' thinking processes and action processes that seem to influence behaviours and self-efficacy (Kioupi & Voulvoulis, 2019; Faham et al., 2017; Lozano et al., 2013; Barth et al., 2007). More and more researchers nowadays express concerns regarding the potential discrepancy between embracing the theoretical principles of EfS and the actual processes followed in teacher education (Evans et al., 2017). With initial teacher education being driven by the state, the lack of thorough appraisal of EfS teacher education applications and the fact the EfS is seldom a compulsory module in teacher education programmes, EfS applications resemble "patches of isolated activity" (Evans et al., 2017), patches of green (Elliott, 2003) one-off curriculum development projects (Summers et al., 2005) or segregated within discipline-specific modules related to science (Van Petegem et al., 2005). Based on empirical research, EfS research is far from constituting a consistent or systemic approach (Evans et al., 2017; Ferreira et al., 2006; Steele, 2010; Tilbury et al., 2005).

Despite the EfS focus on pedagogical approaches, competences and easily adapted topics i.e. environmental problems and social matters such as equality, justice, non-violence, public awareness and participation, population control (Glavic, 2020), the goals that were stimulated by the UN documents were not followed by an rapid uptake in higher education institutions (Christie et al., 2015) possibly due to discipline specificity or the silo transmission pedagogy of HE institutions. Barrett & Sutter (2006) advocate that EfS cannot be promoted and sustainable unless it is monitored and improved though the very complicated teacher education processes. Teachers need to be educated not only regarding the principles and the competencies of EfS but they need to be empowered to meet the learning objectives by taking appropriate action and implementing interdisciplinary EfS programmes. This tallies with the conceptual framework of Sustainability literate teachers proposed by Nolet (2009). In fact, it indicates that being aware of sustainability related issues and goals is not synonymous with being willing or equipped to take action in order to be an agent of change. According to Nolet (2009), sustainability literacy: entails more than simply knowing things about the environment, economics, or equity and social justice issues, but rather involves a willingness and ability to engage intellectually and personally with the tensions that are created by the interconnectedness of these systems (Nolet, 2009).

Teacher preparation and competence for the challenges of EfS implementa-

tion at the school level, universities and teacher-education programs presupposes embracing pedagogies that foster capacity-building competencies of teachers as competent change agents (Howlett et al., 2016). Learning objectives achievement in teacher education for sustainability can be established if gaps in the required knowledge of sustainability issues, i.e. Content Knowledge (CK) are addressed, if effective competences in teaching and learning design formats, i.e. Pedagogical Content Knowledge (PCK) are fostered, and if adequate willingness and motivation is fostered to determine a teacher's attitude is (Brandt et al., 2019). However, a consensus regarding what the most relevant EfS development teacher competences are and how they should be addressed has not been reached at yet (Brandt et al., 2019) as PCK evaluation instruments could not be identified.

## 2.2. Education for Sustainability in Greece

The template is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin in this template measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire journals, and not as an independent document. Please do not revise any of the current designations. Greece is one of the first countries that officially introduced EfS in its school curriculum and established support systems including numerous Regional Environmental Education Centres (Nomikou, 2016). Yet, in Greece, there is little sound empirical research that evaluates the efficacy of EfS interventions. The few studies that exist are not longitudinal or not rigorous and they focus on evaluations of student and teacher perceptions. In the Greek context, most teachers interpret sustainability as interlinked with the natural environment (Spiropoulou et al., 2007). Yet, unless the values and premises of EfS are disseminated across all aspects of the curriculum and unless they involve all aspects of school community, a school cannot be tagged as "sustainable" (Sfakianaki & Papastefanaki, 2020). The educational programmes that are designed under the sustainability umbrella need to expand their repertoire to include all eight pillars of an EfS school and embrace all learning aspects and all stakeholders in the school community. These include: Democracy and Participation, Learning Framework, Culture and Arts, School building and school yard, Energy and Transportations, Water and Waste management, Health and Nutrition, from the Local to the Global. In other words, the sustainable school is often synonymous with a visionary mindset that allows its students to act as equal members of a community. It is based in communication and cooperation of all members in the school community inside and outside school touching upon matters of everyday life. It provides opportunities for all stakeholders to get involved i.e. students, educators, administration, parents, local community) with public affairs, financial matters or matters pertinent to waste and water management. An EfS school promotes democracy in all aspects, encourages diversity

and inclusion, and fosters active, responsible and creative citizens.

EfS in Greece also serves as an umbrella term that incorporates and integrates a wide range of pedagogical innovations as EfS schools organise and plan its present and future activities through participatory processes that take into account the views of all community members. In this context, EfS schools are expected to act as active self-regulated autonomous communities whose members, despite age, race, expertise or background, can be equally involved in and take ownership of the schools activities, decisions, strategic plan, and impact (Sfakianaki & Papastefanaki, 2020). However, most studies in Greece, like the previous one, focus on determining which EfS pillars i.e. economy, environment, society, culture, Greek teachers prioritise, or focus on after implementation. Yet, there are no studies focusing on the efficacy of the EfS implementation and transformational change with regards to teachers' actions or practices. To our knowledge, there are no studies evaluating detailed teacher education EFS training interventions.

Within the framework of innovative European programmes, students are expected to follow research-led and analytical processes in line with a participatory plan of action that take into account all stakeholders in the school community (Nomikou, 2016; Flogaiti, 2006). The transition to a sustainable school is often the outcome of an established culture of cooperation and inclusion that few teachers are aware of or trained for (Nomikou, 2016). Nevertheless, an EfS school that has embraced its true sustainable nature implements its visionary mindset by re-modifying it school culture involving students, teachers, administrators, neighbours, local citizens and/or the city council so that it can actively and effectively contribute to the solution of existing problems in a target local community. Within this framework, teachers ought not to be segregated and take up initiatives that concern only their module and class but allow themselves and their students to participate in a collective culture where the transition of the goal to be attained from local to global seems feasible (Flogaiti, 2006). To this direction, there is an urgent need to train the member of pedagogical team members and teacher are in grave need of training with regards to the design and implementation of the educational programmes.

Focusing on EfS content, Greek researchers argue that the most important values to be promoted are respecting others, democratic outlook and a strong sense of justice (Liarakou & Flogaiti, 2007); they contends that EfS prioritises the need to avoid imposition of imposition of external ideas and that ideas should be embraced through a participatory collective processes and planning (Flogaiti, 2011). Moreover, the notion of EfS is successful through all-rounded open minded realisations of the status quo, through analysis of how systematic ecological, social, financial approaches interrelate (Flogaiti, 2011). This often explains why inter-disciplinarily is also fostered within wider pedagogical contexts. This may also shed light to how our outlook on life may be affected due to the prevailing values, ideologies and attitudes (Flogaiti, 2011).

Within a reflective framework of training practices, teachers should consider the parameters and the reasons that may hinder an EfS approach in schools and improve their pedagogical practices. The teachers need to contribute to a democratic dialogue in order to elucidate the causes of: a) itemised units in modules and segregated modules in classes, b) lack of inter disciplinarily that allow functional associations of itemised knowledge or input, c) lack of vision and continuity of EfS projects and failure of involvement of all stakeholders in a school community.

However Greek teachers are working alone in a school environment that is not really supportive or encouraging school environment, adding that any attempts they may make are hardly embraced by the rest of the school community and they hardly involve other stakeholders in or outside school. The purpose of the present study was to explore in-service teacher perceptions of EfS in Greece, specifically their understanding of the definition of EfS, arguments for and against it, implementation challenges, and views about EfS, and compares them with those in the literature. The research was guided by the following research questions:

1) How is EfS conceptualised by in-service teachers in Greece?
2) When do teachers understand EfS as a segregated practice?
3) How do teachers assess the effects of EfS programmes?
4) What are the challenges in implementing EfS programmes?

## 3. Methodology

Following the description of the sample and the study design this section aims to outline the context in which the data collection took place.

### 3.1. Participants

The target group of this study consisted of in-service teachers from primary (3), secondary (3) and tertiary (3) levels, who were involved in different European programmes relevant to sustainability principles and environmental issues. This demographic was chosen for two reasons; a. To check whether there is possible variability in the views of the participants and whether these potentially diverse data could be attributed to contextual differences and expectations in primary, secondary and tertiary education and b. All the teachers involved in the study were highly experienced and their involvement with such programmes was part of their routine and they had attended at least one EfS "training" session in the field.

### 3.2. Data Collection

In-depth recorded 30 min interviews were conducted in an informal conversational context in order to clarify issues pertinent in the following open-ended questions:

- How do you define/understand EfS?

- Give an example of how you implemented it. What did you focus on?
- What kind of instructional practices or pedagogical approaches were you expected to employ?
- Who else was involved in your EfS activities? Did you work alone or in cooperation with others? Why?
- What were the positive effects of EfS?
- What were the negative effects of EfS? Why?
- What were the challenges you faced while implementing EfS? Why?
- What recommendations would you make so that the participatory EfS model involves the whole school community? Why?

### 3.3. Study Design

Following an exploratory research study model (Mathews and Ross, 2010), we encouraged participants to reflect on their own experiences and express themselves freely about the topic (Cohen et al., 2017) while at the same time we prompted them to explain further their reflections. Contextual factors were taken into account when this qualitative research methodology was conducted so that the idiosyncratic nature of each set of insights elucidated by each participant did not just lead to generalisable conclusions but it could also contribute towards formulating new hypotheses regarding the implementation processes of EfS.

The qualitative data from the interviews were analysed using thematic analysis outlined by Braun and Clark (2012). While allowing theoretical freedom, thematic analysis also provides a highly flexible approach that can be adopted in order to meet the needs of many studies, providing a detailed, yet rich account of data (Braun & Clarke, 2012) through five main phases; data familiarization and coding, identification of themes, a visual representation of thematic networks and writing up.

### 3.4. Data Analysis

Content theme analysis was conducted so as to ensure that emerging themes are indeed suggested by the responses of the interviewees to our open-ended questions. The interviews were not only recorded but also transcribed and translated prior to being analysed, coded and categorised based on themes emerging in the literature. The teachers' perceptions of education for sustainability became clearer when compared to previous well-known interpretations.

## 4. Results

We created a visual summary of the information elicited at interview as can be seen below in Table 1, as suggested by Attride-Stirling (2001).

Following the responses from the semi-structured interviews, teachers agree that there are major challenges in their implementation despite the universal benefits of EfS as well as active learning opportunities but there was not significant variability identified across the three education sectors.

Table 1. Visual representation of a thematic network of the data corpus as a whole.

| Thematic network of the data corpus | |
| --- | --- |
| **Challenges** | **Emerging Themes** |
| | Action-oriented learning (active learning) |
| | Cooperative learning, team work, peer feedback |
| | Problem-based learning |
| | Students taking ownership |
| Lack of adequate teacher training | Level-Appropriate Activities |
| Lack of teacher/researchers | Ed for sustainable development |
| Unclear link between EfS curriculum and Education theories | IBSE (guided or open inquiry) |
| Not-applicable in my University module | Experiential learning |
| Student - centred learning not promoted in regular classes | Student agency |
| | Inclusive education |
| | Innovative pedagogies Student-centred learning |
| | Inter-disciplinarily |
| | Projects - Experiments |
| **Recommendation** | **Teacher Training for Innovation pedagogies and action research linked to EfS** |
| | Activation of student experience - personalisation |
| | Awareness-raising activities |
| Lack of transparency | Transparency and motives for all stakeholders |
| Lack of motivation: Students, Teachers, Colleagues, Principals, Authorities | Student engagement/Cooperation and team work |
| | Critical thinking (being open-minded, dealing with bias, stereotypes) |
| | New technologies |
| | Acting local & Thinking global |
| **Recommendation** | **Teacher training in motivation strategies and inclusivity via digital technologies** |
| Lack of time due to School curriculum limitations | |
| Unrealistic bulk of deliverables | |
| Teacher exhaustion /work load | EfS goals should be linked with teacher evaluation |
| Organisation issues | EfS goals should be linked with promotion prospects in education |
| School principals not facilitating EfS programmes due to lack of finances or promotional prospects | EfS goals should be linked to school performance/ranking |
| Lack of recognition - Authorities - promotional purposes/ personal fame | EfS goals should be linked to University ranking |
| Lack of vision - School principals not facilitating EfS programmes due to lack of finances or promotional prospects | |
| **Recommendation** | **Coding and establishing sustainability goals within a hierarchical system across schools and universities** |
| Segregation: | Modules vs Inter-disciplinarily |
| Discipline-specific deliverables | EfS should be incorporated in each module |
| Cognitive dissonance | EfS should be included in all Science-related modules |
| Lack of inclusivity | Students and teachers should be more tolerable to subjective norm |
| Modularised curriculum | School visits strict protocol = delays or prohibition of school visitors |
| Disparate outreach: Lack of sustainable networks | |
| | **Incorporate EfS in all modules all levels** |
| **Recommendation** | **Integrate disparate implementations into a coherent EfS data system** |

## 4.1. Positive Teacher Attitudes despite Feelings of Segregation

Following the analysis of their responses, the study found that teachers had good knowledge of the European programmes framework, administrative guidelines, EFS development goals and pedagogical documents designed to promote EfS despite all the challenges mentioned.

Respondents mentioned that good rapport was established between teachers and students before student engagement increased, social interactions and relationships improved and academic, social and behaviour skills were fostered. Generally, respondents mentioned enhanced skill acquisition, positive experiences from school staff collaboration and parent participation.

In fact, when most teachers asked about possible negative effects of EfS implementation stated that there was none. However, one participant reported:

"[*I felt*] *I was* [*quite*] *alone. Despite the programme's expectations, there was little co-operation with parents and colleagues, no explicit guidance regarding specific tasks in specific modules, time was limited and the extra work-load was not timetabled. I don't really know why* […] *it took this on but in the end, it was worth it.*"

## 4.2. Institutional and Professional Support

Teachers also identify that implementing EfS with students is very challenging when they lack institutional support, accessibility and funds or other professionals that would support them in their daily work. Some participants stated that:

"*The school directors and some teachers-colleagues were against the EfS initiatives that were away from their interests, studies and understandings, their perspectives*".

"*More often than not, our principals did not make it easier if we were to ask for more resources to conduct experiments, when we asked for more field trips or when we asked for experts to visit our schools* […] *due to bureaucracy.*"

"*It's difficult to find colleagues to collaborate with because of the work-load and the fact that most of us already struggle with the amount of what needs to be taught in each module.*"

"*My colleagues saw this as a chore at first. They were exhausted and were not willing to participate*".

"*When we asked for help, we would have to pitch it in such a way so that they* [*authorities*] *could see some prospects of promotional and advertising benefits of their own. Otherwise, we felt we wouldn't stand a chance of any, let alone, extra support*".

*When we asked participants to elaborate on these views and explain why this might be the case, they said that there is minimal extrinsic motivation no prospects of promotion. Two of the participants also added:*

"*There are little chances of promotion, credit or positive evaluation of what you do well in EfS. We need a value point system that can make discernible how EfS learning outcomes were achieved or if they were met at all. Unless there are*

*prospects of credit bearing recognition in the teaching profession, EfS practices will be either random or disparate*".

"*If there was some kind of link between school or university rankings with EfS goals and objectives in each of the programmes that is about to be implemented, the path would be well-trodden by now*".

### 4.3. Teacher Training That Facilitates Goal-Directed Transition towards EfS

The majority of teachers also mentioned that they did not receive targeted training regarding instructional approaches or pedagogic innovation related strategies that are conducive to EfS. They stated though that they were all well-informed of the programme deliverables and the instructional practices that go along with them without prior EfS training. One participant stated:

"*I was familiar with how the programme should be realised although I did not receive pedagogical training in PBL and IBSE*".

"*I knew what I had to do when the programme deliverables were presented and explained to me.* […] *Training was not part of it. They just expected me to deliver*".

According to findings extracted from the interviews, teachers generally consider it positive that the materials and administrative instructions drafted are aligned with relevant EfS expectations and promote EfS in their context. Yet, although their attitude towards EfS was positive overall, several barriers in the implementation of EfS were identified which may have a direct effect both on the academic performance of their students and their overall development. Respondents identified aspects like lack of knowledge and training on EfS, stereotypical expectations of parents regarding what student class work and homework should involve, negative parent and teacher attitudes towards curriculum differentiation, limited teaching strategies, few supporting systems (principals, authorities), overcrowded classes and inadequate infrastructure.

Although the inclusion of EfS in every module is generally seen with some skepticism, according to the respondents involved in the research, more training in interdisciplinary teaching practices and strategies were deemed to be more of benefit to teachers. Some of the participants also stated:

"*If my school and the Local Education Board were committed to EfS goals, all challenges could be overcome. Adequate training for dealing with unexpected issues or issues not well explained on paper would improve the chances of time-efficient practices and more successful implementation of EfS*".

"*Creating EfS materials is time-consuming because they need to be aligned with our curriculum. Every module is different and students are not often asked to make connections between or across disciplines. It took me years of experience to be able to find the right balance*".

Teachers also reported that supportive environments and adequate training towards adaptable teaching practices that specifically aim at the diversity, student agency, differentiated learning and differentiation of the curricula content:

what is taught and learned, and the student-centred action-oriented processes that may foster content comprehension and higher order cognitive learning. They also reported that using authentic tasks that involve real and relevant problems including resources (e.g., ICT, realia, student labs, equipment, field experts, visitors) should not only be taken into account during the assessment of EfS implementation but they should also be used for training purposes so that good practices are well-established in advance.

## 5. Discussion

The literature draws on the positive attitudes of teachers involved in EfS programmes worldwide. The present study found that the positive effects of EfS implementation are clearly stated by teachers. From the analyses of literature and empirical studies, as well as from the results of the present study, it is evident that despite the positive attitudes, some secondary education teachers in Greece still perceive it as an "add-on" or a "chore" and some professors consider it inapplicable in their field. Although these responses are consistent with research (Evans et al., 2017; Christie et al., 2015; Dawe et al., 2005) that shows academics not often embracing EfS innovations due to specialised focus on their own discipline or closely related discipline, rather than a broader focus on other disciplines (Dawe et al., 2005), it is not consistent with the UNESCO report that states: "*ESD is transformative education in that it aims at reorienting societies towards sustainable development. This, ultimately, requires a reorientation of education systems and structures as well as a reframing of teaching and learning. ESD concerns the core of teaching and learning and cannot be considered an add-on to existing educational practices.*" Taking this incongruence into account, we may infer that curriculum and material integration has not advanced sufficiently and that "transformation" has not really taken place when it comes to school teachers even after implementation of EfS programmes. As such, EfS teacher education reform and evaluation is crucial in order for such endeavours to be successful.

Respondents in this study were aware of key instructional approaches that are essential for EfS implementation. They stated that they were expected to employ innovative pedagogies such as action-oriented learning (active learning), cooperative learning, team work, use of peer feedback, experiential learning, problem-based learning, students taking ownership of their own learning and actions, student agency, inclusive education, level-appropriate activities, student-centred learning through projects or experiments, guided or open inquiry, and inter-disciplinarily. This is not consistent with Spiropoulou et al. (2007) findings that claim teachers were not familiar with EfS.

Nevertheless, participants drew on issues pertinent to feelings of segregation and lack of training. This incongruence seems particularly problematic as in Greece, by 2014 "*the Ministry of Education established 46 Centres for Environmental Education and Sustainability under the Regional Directorates of Educa-*

*tion all over the country. The projects these centres are running aim at training teachers in order to implement projects related to ESD in their schools. During the* 2011 *school year*, 184 *seminars for* 8745 *teachers of primary and secondary education took place*" (UNESCO 2014b: p. 92, 97). A possible explanation for this may be that such teacher responses may be indicative of a sustainability literacy gap (Nolet, 2009) of current teach education interventions. The question that needs to be addressed is what is the focus of these seminars and workshops, whether participatory reflective models for teacher training purposes are used and whether evidence-based learning is taking place during these teacher training workshops. In line with this, this may be due to an external focus on ecosystems and ecologies while neglecting the inner dimensions of individuals (Ives et al., 2019) and ensuing holistic pedagogies.

According to UNESCO reports, many declarations and partnerships have been signed by universities in an attempt improve the effectiveness of ESD (Lozano et al., 2013). However, Reid & Horvanova (2016) state that supportive official documentation that accompanies broader education goals is not sufficient and go on to compare how three countries that have not fully addressed the teacher training requirements regarding gifted education with a focus on sustainability. A study by Varela-Losada et al. (2019) propose the use democratic participatory and experiential learning through role-play activities and real close-to-home problems that expose adopted models of action, and foster critical thinking and ethical considerations as a means of teacher training arguing that this could be the basis of new reflective models of Environmental Education for Sustainability. Their educational intervention showed increased awareness of the environmental issues at hand, increased motivation, engagement and critical reflections of participants involved. Such training models tally with the UNESCO Report Learning: The Treasure within (Delors, 1996) in P. C (2013):

-"Learning to learn" fosters understanding the challenges to be taken (both at global and local level).

-"Learning to do" promotes the development of practical skills and action-oriented practices.

-"Learning to live and work together" enhances our understanding of the importance of collaboration, interdependence and networking.

The Erasmus + (2016) report stated that many European countries lack formal EfS professional development opportunities and initiated a scheme which prioritises understanding potential applications of new pedagogies, linking special literacies (science, reading, and mathematics) with EfS pedagogies, delineating EfS quality learning outcome, and investigating how to achieve education change in their workplace. According to Evans et al., (2017) teacher education interventions seem to be "embedding SE at the micro level, enacting change within their own spheres of influence". This seems to agree both with the Greek and international literature and the responses in this study. Systemic large scale interventions are not fully attempted possibly due to discipline specificity or "the silo de-

livery of disciplinary programs within universities" (Dawe et al., 2005; Evans et al., 2017).

Regarding teacher training, participant attitudes are similar to those found in other research studies as teachers in this study asked for better alignment between curriculum and EfS theoretical and practical training and they mentioned that they were expected to deliver without concrete prior training. In line with this, to attain transformation, an evidence-based link between educational theories and practice must be established (Evans et al., 2017).

Teacher education interventions should conduct evaluation studies that go beyond student perceptions of the learning context, results and individual approaches to learning. EfS needs to go beyond "green patches" (Evans et al., 2017) and towards a sustainable development strategy that does not rely on official declarations but it entails personally and socially sustainable teacher education policies (Chen et al., 2020).

Moreover, EfS policies should not include students first in the hope that systemic change will be evident in the future. EfS policies need be based on effective teacher education interventions and policies and not vice versa. EfS policies should include effective teacher education practices and sustainable and effective educational methods in order to fulfil the potential of measurable and evidence-based transformation of teachers as "competent change agents" (Howlett et al., 2016) (Figure 1).

## 6. Conclusion

Summing up, the present study shed light to enlightening answers to its driving research questions. What emerged is that in-service teachers understand EfS in ways that are similar to those found in the published literature. On the other hand, while this study provided important new insights, we acknowledge that it was limited in breadth (number of participants and context) and depth. The implications of this study, however, call for targeted teacher education programmes that aim at transformational mindful education, inclusive and equitable quality education with lifelong learning opportunities for all (United Nations, 2015) and entail capacity building efforts across all levels of education (Howlett et al., 2016).

In this study, despite their training or experience, teachers ask for more hand-on workshops that model how they can facilitate and foster innovative pedagogies and democratic participatory approaches to learning and how students can learn via guided inquiry based activities, interactions, coordinated actions and collaborations with all stakeholders in the school community, not just their peers. Practical training is required in addition to more theoretical approaches to understanding EfS. Yet, as this study focused on the experiences of only nine teachers, we suggest more rigorous studies be conducted to explore the relationship between practical EfS applications in more inclusive settings that can potentially foster reflective and mindful culture change through teamwork, modeling, decision making and critical reflections through role play.

**Figure 1.** Efficacy of teacher education interventions as one of the key EfS priorities.

Although social and academic gains for students through EfS applications have been widely acknowledged, we recommend that future research, both quantitative and qualitative, be conducted in order to evaluate the quality of teacher education and establish links between education theory and expected EfS practice. Such studies should explore how different instructional methodologies, techniques and innovations can be associated with improved academic achievement in more inclusive EfS settings in Greece and ESD goal attainment.

Although this study was based on experienced in-service teachers with training in the field of education in general, it is not representative of a wide range of participants. This study aimed to identify the gaps of the existing EfS institutional and implementation teacher education studies and practices in the hope that it can shape future teacher education and training interventions and inform the policies of EfS education locally and globally. Participating teachers in this study agree that effective cooperation between relevant agents and stakeholders, along with sustainable institutional support for teachers, parents and children, could make EfS education successful in Greece. Now more than ever, it is necessary to develop community programmes that strengthen collaboration between local educational boards, schools, families and children, as well as initiatives that bring together regional councils and policymakers to increase institutional support for the implementation of a more inclusive EfS education throughout Greece through teacher education.

## Acknowledgements

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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