

Implementation of Education for Sustainability in Turkish Pre-Service Teachers' Practicum



Brock Education

A journal of educational research and practice

2022 Vol. 31 (2) 17–39

<https://journals.library.brocku.ca/brocked>

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Abstract

In this study, we explored early childhood education pre-service teachers' (ECEPTs') understanding and pedagogical application of education for sustainability (EfS) by critically analyzing EfS implementation during ECEPTs' practicum. The study examined the challenges and critical aspects of EfS practices in the practicum, and the relationships among mentor teachers, academic mentors, and ECEPTs. A multiple case study methodology was employed involving two purposefully distinct universities with 14 participant students across the two university case study sites. Initially, 22 practicum activity plans for each ECEPT were examined via content analysis; then, the students were individually interviewed about the plans and their implications. Subsequent analysis indicated negligible differences between the two universities' student activity plans regarding quality (aspects of EfS) and quantity (frequency of EfS activities). The students self-reflected about their EfS understandings and implementation. Additionally, they remarked that academic mentors' and mentor teachers' stances influenced them either positively or negatively during their workplace-based learning. They also pointed to the absence of a whole-institution approach, not only at the practicum school but also at the university level.

Keywords: education for sustainability, pre-service teacher education, early childhood education, critical theory

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Introduction

Although some media embolden people to perceive ecological concerns as mere myth, the Earth's problems are real and point to a need for critical change. We argue that people should be aware of their collective impact on the biosphere; essentially, their doings are "disrupting the functioning of the Earth as a complex, dynamic, ever-evolving totality comprised of myriad interlocking processes" (Hamilton, 2017, p. viii). When we consider that the global population will reach 9.6 billion in the 2050s, resource consumption and degradation of ecosystems will accelerate dramatically due to increases in supply and demand (Davis, 2017). Such degradation is interlocked with climate change; for instance, we faced unexpected natural events in Turkey last year, including a sandstorm in one of the capital city's suburbs. In this increasingly dire context, an agenda for change is required for sustainability—"development that meets the needs of the present without compromising the ability of future generations to meet their needs" (World Commission on Environment and Development [WCED], 1987, p. 43).

As an agent for transformative change towards sustainability, education for sustainability (EfS) encompasses pedagogies that are "holistic, experiential, critically-reflective, collaborative, problem-based, systemic and participatory" (Davis & Elliott, 2014, p. 9). Education has long influenced agendas, with early childhood education (ECE) playing a crucial role in changing "frames of mind" that impact thoughts, decisions, and actions from an early age (Elliott, 2010). As proposed by UNESCO during its Decade of Education for Sustainable Development (2005–2014; DESD) initiative, change could be accomplished with more renovative, effective, and transformative teaching and learning practices. Transformation is a cornerstone of critical education and also essential to the current Sustainable Development Goals (SDGs; UNESCO, 2017a). Based on SDG 4 (Quality Education), teacher education plays a vital role as a change agent for enacting transformative teaching and learning practices. In this paper, we focus on ECE pre-service teachers (ECEPTs) across ECE programs at two universities, specifically examining student practice and EfS. Although EfS is not a new issue in higher education (HE; Wals & Blewitt, 2010), studies targeting ECEPTs are somewhat limited (Ärlemalm-Hagsér, 2017).

Theoretical Background

This study is informed by critical theory (CT) as commonly applied in EfS research (Wals, 2012; Wals et al., 2017). We aim to critically examine and potentially transform ECEPTs' understanding of and pedagogical approaches to EfS. We acknowledge that EfS is more than nature and ecology-oriented education; it is multifaceted across environmental, economic, social, and political pillars and aligned with a critical perspective (Davis, 2015). CT attempts to explain "why the social world is the way it is" and, what's more, "through a process of critique, strives to know how it should be" (Huckle, 1993, p. 48). In other words, CT analyzes situations to understand how social structures, perspectives, and actions work together to spawn injustice,

discrimination, cruelty, and irrationality (Kemmis, 2007). Further, Kemmis (2009) declared that research should be critical if constructed in EfS, given that it should seek to direct people's attention to solutions that hinder hegemonic human–nature and human–human relations.

Critical theorists enquire into educational knowledge and implementation to probe and discover issues related to power, justice, social class, ethnicity, and equality (Giroux, 1983; Sung, 2007). For Giroux (1983, 1988, 2003), CT supports the development of critical skills to promote affirmative change and means for autonomy, both in teacher education and HE. Giroux (2003) emphasized that social transformation is actualized if HE can “function as a vital public sphere for critical learning, ethical deliberation, and civic engagement” (p. 196). Biesta (2011) stated that HE has three related functions in this regard: (a) qualifications cover the development of knowledge, skills, and thus active citizens; (b) socialization encompasses making students adjust to social life by internalizing democratic values; and (c) subjectification includes the emancipation of students by promoting their role as independent individuals. Aspelin (2015) added one more function to Biesta's categories: “existentialization,” which focuses on students' relational response to/with others (students, lecturers) and society for the meaning of (higher) education. Considering these four functions, Ärlemalm–Hagsér (2017) later defined the categories of EfS in HE: For qualifications, students need to develop knowledge and skills about EfS, be active citizens, and be “transformative intellectuals”; and for socialization, they need to develop inquiry skills and a “critical attitude towards unsustainable structures, actions, and cultures” (p. 414). For subjectification and existentialism, students develop their own aims based on their intellectual background and debate comprehensions and dichotomies derived from distinct perspectives and worldviews between themselves and academic mentors in universities and mentor teachers in their practicum. The study's analysis and interpretation of findings were made in light of these four functions.

Education for Sustainability in Early Childhood Pre–Service Teacher Education

Attention has been directed to EfS in pre–service teacher education (PTE) through conferences and publications since the 1970s (Tilbury et al., 2005). More recently, remarkable initiatives have included the UN's DESD (UNESCO, 2005), the SDGs (UNESCO, 2017a), the green campus project (Davis & Ferreira, 2017), and various research projects (Ferreira et al., 2014). While EfS research and facilities have improved, these attempts have largely failed to enhance HE's primary role to enlighten students and transform them into active, sustainability–minded citizens with a more sustainable lifestyle (Davis & Davis, 2020). When international early childhood pre–service teacher education (ECPTe) is generally compared to the teacher education field, ECPTe falls behind the field in terms of the number of publications and best pedagogies, approaches, and content for next steps (Davis, 2015; Davis & Davis, 2020; Ferreira et al., 2009). Overall, Evans et al. (2016) emphasize that PTE courses commonly have been approved to

provide future educators with enhanced knowledge, understanding, values, and skills required to embed EfS into teaching and learning. Based on a systematic literature review, Evans et al. (2017) described four main approaches for embedding EfS in PTE: “(1) across whole curriculum areas, courses or institutions–systemic approach, (2) through dedicated core/compulsory subjects, (3) a component of a core/compulsory subject and (4) a dedicated elective subject” (p. 411). The review demonstrated that most studies foregrounded the subject–focused approach, while the systemic approach was pursued least.

When we reflected on the national ECPTe in Turkey, we noted that the 2006 ECPTe program was renewed in 2018. The 2006 ECPTe program did not include any compulsory or elective EfS courses; however, based on university educational needs and priorities, EfS may have been allocated as an elective course in some universities (Evans et al., 2017), or to a science education subject (Evans et al., 2017) if EfS was thought important and purposeful by the subject instructor (Alici, 2020).

On the other hand, the 2018 program, first implemented in the 2018–2019 academic year within the field education strand, included a new compulsory course: environmental education in early childhood (Evans et al., 2017). Even though this course focused mainly on environmental sustainability, the course instructors could target all components of sustainability. Unfortunately, we are anecdotally aware that few academics had educational backgrounds related to EfS, so such broad EfS coverage was not always guaranteed. Lastly, a new elective course entitled Sustainable Development and Education (Evans et al., 2017) has been proposed for inclusion in the pedagogical development strand of the new program (Alici, 2020); however, the present study was conducted before this revision.

The Study

As Hopwood (2007) emphasized, if we are to comprehend how learning related to EfS manifests, we must consider the role of the learner as an active agent in EfS. Årlemalm–Hagsér and Elliott (2017) proposed that there is a need to research “(1) critical studies; (2) education contexts; (3) transformational pedagogies; and (4) ECEfS theoretical concepts and understandings” (p. 268); hence, we focused on ECEPTs’ understanding of and pedagogical approaches related to EfS. We examined ECEPTs’ implementation of EfS during their practicum, both in terms of which aspects of EfS were implemented and the frequency of allocating space to EfS issues in their activity plans. Furthermore, we conducted individual interviews related to the activity plans to seek more profound insights. During the interviews, we investigated any implementation challenges, critical aspects of EfS practices, ECEPTs’ relationships with mentor teachers and academic mentors, and ECEPTs’ understandings of EfS. The following research questions guided this study:

- What are ECEPTs’ views on sustainability and EfS?

- How often are sustainability- and EfS-related topics evident in ECEPTs' activity plans?
- What challenges, if any, did ECEPTs encounter during the practicum in terms of EfS?
- What critical aspects are evident in ECEPTs' practicum process targeting EfS?
- Do ECEPTs' understanding, pedagogical approaches, and challenges related to EfS differ based on cases?

Methodology

We employed a multiple case study design, exploring connected cases (Stake, 2006) under the scope of qualitative research. While exploring ECEPTs' practicum in terms of EfS, we focused on the quality and frequency of their EfS pedagogy in relation to the Turkish ECPT program. We investigated two purposefully distinct cases: University A was a "green" campus in a large city, with initiatives to increase members' awareness of environmental protection and sustainability issues, whereas University B was a newly established campus in a small city with limited sustainability facilities.

Research Context

ECE in Turkey is not compulsory and targets 3- to 6-year-old children. However, all ECE centres follow the national ECE Program (Ministry of National Education [MONE], 2013). Teachers prepare a daily plan illustrating the schedule of routines, such as breakfast time, free-play, activity time (implementation of activity plans), and assessment of the day. Activity plans include: the learning process; materials to be used; concepts and objectives/indicators to be addressed for social-emotional, cognitive, language, motor development, and self-care skills; parent involvement; assessment; and adaptation for special needs. The curriculum invites teachers to create play-based, age-appropriate, and objective/indicator-focused activities for young children, such as drama, music, play, movement, mathematics, science, language, and literacy. Such activities might be individual, small group, or whole group, and be either singular or integrated, such as drama integrated music. There is no specific information regarding sustainability in the curriculum; however, objectives and indicators can be associated with sustainability, such as protecting others' and one's own rights, respecting diversity, and protecting aesthetic values.

Early childhood teachers must receive a bachelor's degree in ECPT. The undergraduate program offers courses about field knowledge, general knowledge, professional training, and three practice teaching courses (Higher Education Council [HEC], 2021). The 2018 update of ECPT, as previously mentioned, occurred after this study's participants had completed their undergraduate education; therefore, they had completed the older 2006 ECPT program. Each practice teaching course includes theoretical and practical parts. The theoretical part is conducted by academic mentors at the universities; the practical part is implemented by ECEPTs with the support of mentor teachers in the practicum schools, and academic mentors visit

practicum schools at least five times during each semester to observe ECEPTs' practices. The first week of the practicum included observation of pre-school settings and familiarization with the children, while the remaining weeks involved implementing practice teaching activities. During the practice teaching courses, ECEPTs must prepare one observation report and 11 daily plans, including two integrated activities as course requirements. Further, based on the academic mentors' feedback related to reports and daily plans, ECEPTs must revise and present them within portfolios for the final assignment to be graded. During the study, ECEPTs practised teaching in standalone public pre-schools 1 day per week for 12 weeks, encompassing 1 week of observation and 11 weeks of daily plan implementation. In Turkey, ECE in public pre-schools occurs as double shift schooling. Therefore, ECEPTs had the opportunity to implement a maximum of two activities per week.

Participants

A total of 14 ECEPTs (13 female and one male) participated in this study. All participants had to be senior students and enrolled in their final practice teaching course. Additionally, they were supposed to graduate from the 4-year ECPT program at the end of the semester. All volunteer ECEPTs met these criteria and offered consent to participate in the study.

Case Study University A

Seven participants were from University A, a research university with a "green" campus in a large urban location. It addresses sustainability in its mission statement and offers elective courses on sustainability and student clubs focusing on environmental protection and sustainability. All participants were familiar with the term "sustainability" during previous cross-curricular learning across different courses, such as science education in ECE. Additionally, one participant had attended a sustainability workshop, and two participants undertook an elective course about sustainability at another department. One participant had participated in both a sustainability workshop and an elective course about sustainability at another department. The courses and workshops noted above mainly aligned with ecological aspects of sustainability without an ECE focus. As for practicum, ECEPTs worked for a whole day and had the opportunity to implement a maximum of two integrated activities per week, one in each shift, and worked with two different groups of children due to double-shift schooling.

Case Study University B

The other seven participants were from the newly established University B, located in a small city. There were no elective courses regarding sustainability when the study took place. In this case, none of the participants had any prior experiences with sustainability and EfS, and most of them were introduced to the concept of sustainability and EfS for the first time as part of the study. ECEPTs were at their practicum school one a week for practice teaching, either in the morning or the afternoon.

Researcher Role

Both researchers are experienced academic mentors in ECPT. During the study, they were among the mentor group guiding participants' practicum in terms of professional development, including assessment of activity plan preparation and implementation based on developmental appropriateness, child-centredness, and content knowledge. ECEPTs were free to include any topic if it was referenced in terms of objectives/indicators of the ECE program, and the study took place after their practice teaching was graded. The researchers also took on the combined role of data collector and interpreter.

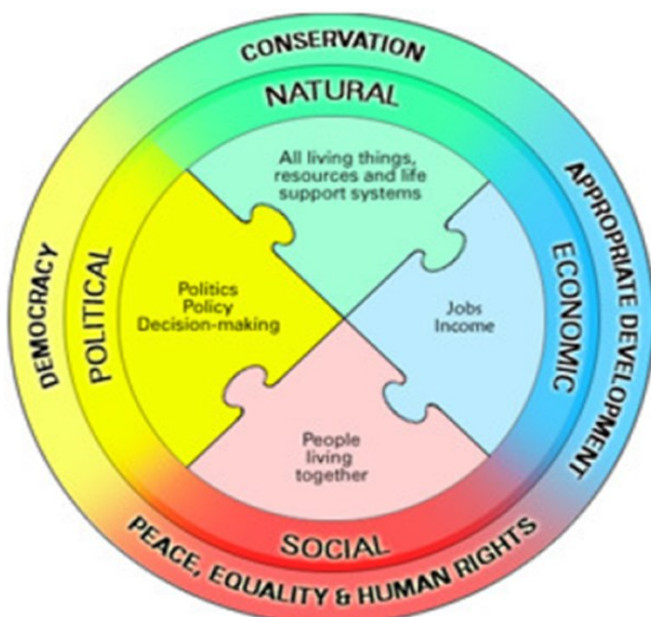
Data Collection and Analysis

The study took place at the end of the spring semester in the 2018–2019 academic year. Data collection was twofold. First, all activity plans prepared by ECEPTs throughout the spring semester (22 activity plans for each student) were collected and then examined through content analysis (Krippendorff, 2004). The activity plan included sections for objectives and corresponding indicators, materials, concepts, learning process steps, assessment, parent involvement, and adaptation of the learning process for children with special needs. All sections of the activity plan, except for adaptation of the learning process for children with special needs, were explored as a whole. A checklist prepared with the guidance of the 7R framework (Organisation Mondiale pour l'Éducation Préscolaire [OMEP], 2011; see Table 1) was employed to determine the degree to which ECEPTs' activity plans addressed the sustainability pillars (see Figure 1), such as meeting none of the pillars, one pillar, two pillars, three pillars, and all four pillars.

Secondly, ECEPTs' *most* satisfactory (associated with most of the pillars) and *least* satisfactory (associated with none of the pillars) plans based on the above-mentioned evaluation were chosen. Then, they were individually interviewed using those plans to seek in-depth information regarding their sustainability and EfS understandings and pedagogies. Further, we also examined challenges and critical aspects of EfS practices and the relationship among mentor teachers, academic mentors, and ECEPTs. The interviews were transcribed verbatim, and the derived data were analyzed via open coding. Finally, a cross-case comparison was made based on emerging themes between the University A and B cases. Two researchers worked on the data analysis process, and an inter-coder agreement was calculated as 92%.

Table 1*7Rs and Explanations* (OMEP, 2011)

7Rs	Explanation
Respect – the rights of the child	Learning to be enthusiastic about nature, and to respect nature, but also to respect children and their capabilities
Reflect – on cultural differences in the world	Presenting children an opportunity to reflect on how their peers in other countries live
Rethink – changes in people’s values over time	Trying to help children be creative
Reuse – by exploring new uses for old things	Proposing creative ways of not wasting resources
Reduce – by doing more with less	Instructing children to be aware of what they use
Recycle – converting waste materials into something usable	Sorting waste to identify materials that can be repurposed
Redistribute – to use resources more equally	Sharing opportunities with disadvantaged individuals/groups

Figure 1*Pillars of Sustainability* (UNESCO, 2005)

Findings

First, we describe a content analysis of participants' activity plans throughout 11 weeks regarding the sustainability four pillars. Second, we present the findings derived from the interviews, mostly related to participants' activity plans. Overall, six themes emerged from interview data from the two university case studies: (a) ECEPTs' understanding of sustainability and EfS; (b) place of EfS in ECE; (c) EfS pedagogy; (d) challenges of EfS practices in ECE; (e) critical aspects of EfS practices; and (f) supportive mentor teachers' and academic mentors' stance. Last, we outline a cross-case analysis of Universities A and B.

Investigation of Activity Plans Based on Sustainability Pillars

The findings indicated that the participants from University B constructed and conducted somewhat more activities, with no sustainability pillars evident at all, than those at University A. University A participants' activity plans more often incorporated one pillar of sustainability, while for University B participants, two pillars were slightly more evident. Most significantly, participants from both Universities A and B did not plan and implement activities targeting three or four pillars of sustainability. (See Table 2.)

ECEPTs Understanding of Sustainability and EfS¹

Based on the findings, ECEPTs (henceforth referred to as "participants") at University A initially associated "sustainability" mostly with the concepts of a cycle, reusability, maintenance, and non-exploitation. Additionally, *rain, sun, clothes, life, cycle, spring water, and nature* were offered as metaphors to describe sustainability. On the other hand, participants at University B explained the concept of sustainability around a need to keep going or as something ongoing and described it by using different metaphors, such as *a vehicle, project, education, the process from birth to death, river, and universe*.

Later during the interview, UNESCO's (2017b) Turkish definition of EfS was read to the participants, and they were invited to explain what the definition might mean to them. Before hearing UNESCO's (2017b) EfS definition, participants at University A described sustainability in terms of environmental (n=7), economic (n=2), and social and cultural (n=1) aspects. Later, based on their inference of the EfS definition, they also referred to the other pillars.

¹ In this study, sustainability refers to the WCED's (1987) definition in *Our Common Future* (known also as the Brundtland report); EfS refers to embedding sustainability into formal, non-formal, and informal education for all levels, as defined by UNESCO (2017b).

Table 2*Activity Plan Distribution Based on Inclusion of Sustainability Pillars*

University	Participants	No. of pillars	Pillars of sustainability				Total activity no.
			1 pillar	2 pillars	3 pillars	4 pillars	
A	P1	16	5	1 (S+E)	–	–	22
	P2	14	8	–	–	–	22
	P3	17	4	1 (S+E)	–	–	22
	P4	18	3	1 (S+E)	–	–	22
	P5	18	3	1 (S+E)	–	–	22
	P6	15	7	–	–	–	22
	P7	17	7	–	–	–	22
	Total:	115	35	4	–	–	154
B	P8	17	5	–	–	–	22
	P9	20	2	–	–	–	22
	P10	16	5	1 (P+S)	–	–	22
	P11	20	2	–	–	–	22
	P12	18	3	1 (EC+E)	–	–	22
	P13	17	5	–	–	–	22
	P14	14	5	3 (EC+E)	–	–	22
	Total:	122	27	5	–	–	154
	Overall total:	237	62	9	–	–	308

Note. E: Environmental pillar; S: Social and cultural pillar; EC: Economic pillar; P: Political pillar.

In particular, Participant 4 at University A referred to all sustainability pillars in a more holistic sense, as follows:

Actually, I mostly noticed the social dimensions [of sustainability]. I mean, when I think about sustainability, nature used to come to my mind before. And economic dimensions [of sustainability] mostly. But now I can say that I realized the social dimension [of sustainability], sociological issues.

Moreover, participants at University A mentioned the limitations of natural resources, embedding sustainability into education and daily life, experiential learning for internalization of a sustainable lifestyle, equality in education, the responsibility of everyone, reducing

consumption, respect for difference and nature, and the need to change minds and transformative aspects.

After reading the definition of “sustainability,” participants at University B mainly focused on social and cultural sustainability pillars such as rights to education and then environmental, economic, and political sustainability pillars. They emphasized that EfS should be actualized theoretically and practically to support children’s active engagement in the learning process. Moreover, they highlighted that EfS should promote children’s agency and their intellectual transformation.

Place of EfS in ECE

When questioned about the place of EfS in ECE, all participants at University A remarked on the agency of young children. Participants cited young children’s innate relation to nature, the importance of early conceptions and awareness/consciousness, and children’s roles as change agents. All were identified as codes addressing the importance of EfS in ECE. In University A, Participant 7 explained in the interview:

The place of EfS in ECE is very important. Certainly. ... Children should be exposed to this education from early years. ... The child should know that our resources are not limitless. I thought it [sustainability] was like the sun. Even the sun is not limitless. Everything has a limit. They should know what they could do for their own future to support the sustainability of resources.

Participants at University B reported that EfS has a place in ECE and should begin in the early years since it plays a crucial role in supporting children’s agency. Moreover, Participant 8 at University B indicated that “ECE in Turkey should be compulsory since every child has the right to education and thus establish new pre-schools to raise children’s knowledge, awareness, skills, and attitudes towards sustainability.”

EfS Pedagogy

During EfS practices, participants from University A reported preferring pedagogies that promote children’s active participation, provide engagement with daily life, help students internalize what they learn, and minimize misconceptions. Creative drama, experimentation, observation, visualization, and strategies including questioning, empowering, storytelling, brainstorming, and scaffolding were used during indoor and outdoor activities. Some of the participants at University A stated they intentionally chose natural materials (e.g., stones, leaves) and reusable materials (e.g., clay), or they reused materials (e.g., plastic bottles) and avoided shopping for new materials for their activities.

On the other hand, participants at University B emphasized making connections to daily life issues while constructing and conducting activity plans targeting EfS. They prioritized

pedagogies such as child-centred, play-based, and inquiry learning, but also creative drama, role-playing, storytelling, brainstorming, and experimentation. Such approaches appeared to promote children's active participation and to learn by doing in indoor and outdoor learning environments, thus supporting EfS.

Challenges to EfS Practices in ECE

The findings revealed different practicum challenges that we grouped as *personal challenges* and *practice challenges*. These challenges also indicated why participants' activity plans were distributed across the pillars, as shown in Table 2.

Personal Challenges in Practicum

The personal challenges reported by some participants from University A included limited knowledge about EfS and its practices. Participants stated that they simply could not integrate sustainability into their plans since they had misconceptions regarding the content and did not know how to enact it. Additionally, Participant 2 at University A commented on her self-efficacy, declaring she did not feel confident in teaching sustainability to young children. Another challenge that emerged was the final semester in terms of course load and graduation stress, which made it difficult for students to allocate sufficient time to prepare the activity plans. Similarly, some participants from University B stated that due to being overloaded and stressed throughout the semester, they could not spend much time planning EfS activities. In Turkey, to work as an early childhood teacher at public schools, participants must graduate from the early childhood department of the faculty of education and pass national government-mandated written and oral exams. Therefore, throughout the last academic year and during this study, the participants were preparing for these national exams. Simultaneously, they must fulfil their academic responsibilities for their university courses.

Practice Challenges in Practicum

Participants reported the mentor teachers' EfS stance and expectations, the difficulty of EfS topics, the young age group, the limited practicum time, the academic mentors' expectations, and schools' limited facilities as barriers to EfS implementation during the practicum.

Practicum Mentor Teacher's Stance

During interviews, participants from both universities mainly highlighted the impact of their mentor teacher's desires, expectations, and discouraging attitudes, particularly around innovative activity implementation and misconceptions about how to incorporate child-centred activities. For instance, Participant 11 at University B declared that

My mentor teacher told me not to exhaust myself to apply new things and to make children explore new things. She also stated that my activities are not child-centred

[However, they are child-centred]. She encouraged me to implement mainly teacher-centred art activities.

Participants at both universities believed they should follow their mentor teachers' monthly plan. For example, they should establish their activities based on special days and weeks (e.g., museum week, mothers' day) and the topics and concepts or product-based activities in response to parents' desires the mentor teacher had predetermined. Moreover, some students at University A stated that mentor teachers sometimes provided limited time or no time at all in the daily schedules for their EfS practice implementation.

Difficulty of EfS Topics

According to the participants, sustainability is a somewhat abstract construct; therefore, the difficulty of identifying suitable topics emerged as a challenge. For example, Participant 2 at University A mentioned needing to be meticulous while explaining sustainability terms such as global warming. She stated, "Since global warming was challenging even for us to understand, I paid extra attention to how to explain it to [children]."

Likewise, some participants at University B thought it was challenging to design and implement an activity on special needs in addition to an EfS focus, despite inclusive education being encouraged by ECE national curriculum. Participant 11 stated, "I was stressed in case I exposed a misconception in children's minds about special needs children while conducting the activity, or it could be a catch-22 situation, and I cannot make children aware of this issue."

Young Age Group

The age group in ECE was another challenge for participants from University A. Participant 7 mentioned she could not implement the activities dealing with soil (like composting and planting) with the younger age group but preferred storytelling. Besides, Participant 2 stated that she could not find a place for EfS in the activities owing to her lack of experience with 3-year-olds and her difficulties in simplifying the sustainability concept for very young learners.

Limited Time for Practicum

The double-shift schooling and once-a-week meeting for practicum meant participants only had a short time for implementation and observation. As a result, some participants from both universities expressed concerns that they could not find sufficient practicum time to address EfS issues. For example, Participant 2 at University A reported that when she did activities focusing on reusing waste materials, she did not know whether those materials were used again in the classroom or as a basis for other activities because she could not visit the school later the same week and that any followup was the responsibility of the mentor teacher. Also, at University B, Participant 8 stated, "to make a connection to seawater pollution, firstly, children

should be aware of the creatures living at sea. Thus, mostly it cannot be possible to touch [upon] sustainability in just one week.” However, following up on the content could occur depending on the mentor teachers’ intentions.

Academic Mentors’ Expectations

During the practice teaching course, academic mentors evaluated participants’ activity plans based on several criteria, such as whether the activities were developmentally appropriate, creative, and original, addressed misconception(s), and related to objectives/indicators of the national ECE curriculum. Some participants from University A reported that their academic mentors asked them to prepare plans about various topics and warned them not to repeat the same topics, such as environmental protection. Moreover, participants reported the expectation of designing an integrated activity as another obstacle in addressing sustainability.

Limited Facilities of the School

A handful of participants from University A mentioned school opportunities as a challenge for EfS implementation in ECE. Some stated that the schools had no schoolyard at all or children had limited opportunities to explore nature in schoolyards, while some reported a lack of sufficient materials and equipment for composting, sorting waste, or reusing activities. High child-to-adult ratios and large group size were also mentioned as compounding the above constraints leading to difficulties in implementing outdoor EfS activities, such as planting and composting.

Critical Aspects of EfS Practices

The findings revealed three aspects indicative of critical strategies regarding participants’ EfS practices: critical thinking and implementation, critical self-reflection, and absence of a transformative whole-institution approach.

Critical Thinking and Implementation

The findings indicated that the participants were generally determined to think critically about their practicum observations and then conduct EfS activities based on them. These observations identified unsustainable things/situations occurring at the practicum school, children’s needs and/or knowledge gaps, and how these needs could potentially be met via connections to daily school life and behaviours. For example, in University A, Participant 6 mentioned her observation of children’s overconsumption of paper, toilet rolls, electricity, and water and addressed this issue during the practicum through activities such as fingerplays and songs. She also actively encouraged and praised children’s sustainable behaviours within the daily schedule.

As for University B, Participant 8 observed that the children were not aware of the need to respect individuals who were physically and/or mentally different from themselves. Thus, she implemented an activity about respect for differences using the children’s book *Pezettino*

(written by Leo Lionni) as a provocation, followed by brainstorming, questioning, discussions, and drawing.

Moreover, some participants from University A stressed their critical attitude regarding sustainability by referring to resource limitations, underestimating the importance of EfS in Turkey, and young children's lack of consciousness regarding sustainability and unsustainable behaviours.

Critical Self-Reflection

Most participants appeared to critically reflect on their lack of knowledge and misconceptions regarding sustainability through an intense examination of their activities and practices.

Participant 3 at University A said

I had no awareness [about EfS]. The environment comes to my mind when I refer to sustainability. Like I should do a science activity, something related to recycling to target sustainability. And I was not conscious regarding how to embed it [EfS]. So that's why I could not make it.

Also, Participant 1 at University A noted that "I had unwittingly supported EfS in [my] daily plans." Some shared their desire to learn and teach sustainability for ECE. For example, Participant 6 at University A said, "you made me realize another point of view [about EfS]. I wrote plans about sustainability, but I did not inquire about what I did. I have gained consciousness, at least. I will pay more attention to this [EfS] in the future." Furthermore, the same participant expressed self-criticism by adding: "during our discussion about our practices, my classmates and I realized that we underestimated the importance of social and cultural sustainability while designing our activities. Thus, we determined we should prepare much more activities on this issue."

Although all participants at University B reported that they had no university course experience in EfS, they enquired about EfS when they heard UNESCO's definition of EfS during their interview. Hence, during the interview, participants reanalyzed their practicum experiences, making critical self-reflections about their EfS knowledge, awareness, and perspectives as reflected in their pedagogy and learning activities. At the end of the interviews, the participants stated that they intended to research EfS and aimed to be more knowledgeable about EfS and how to implement EfS activities with children. Moreover, they asked the interviewer to suggest EfS resources.

Absence of a Transformative Whole-Institution Approach

Some participants from University A critically questioned the inconsistencies within pre-schools and academia, and thus advocated for a transformative whole-institution approach. For example, Participant 4 identified the lack of coordination between school staff and EfS awareness in pre-schools. She observed that assistant teachers instructed the children to throw

used paper into the dustbin, while recycling boxes were evident in the school. Moreover, at the same school, plastics and paper cups were purchased to make artwork, even if it was one of the recognized Eco-schools. Participant 1 at University A mentioned the absence of a transformative whole-institution approach as a criticism of her institution. She referred to her lack of EfS knowledge and lack of opportunity to identify EfS in her courses. She said she received no feedback regarding EfS when the academic mentors evaluated her activity plans. She further recommended that academic mentors introduce EfS within their professional training courses.

Supportive Mentor Teachers' and Academic Mentors' Stance

This theme emerged based on formal and informal dialogues between participants from University B and mentor teachers or their academic mentor. The sharing between participants and the academic mentor was reportedly more beneficial and supportive than that of participants and mentor teachers. Only one participant stated that the relationship between him and his mentor teacher was encouraging and guiding. On the other hand, the academic mentor generally positively impacts participants regarding how activity plans are constructed and effectively implemented. For instance, Participant 14 expressed that:

My mentor teacher encouraged me to prepare activities supporting EfS. And during our weekly meetings, you want us to prepare integrated and child-centered activities. Before this semester, we have not had such an experience. Through these meetings, I understood how to implement my child-centered activities and how to play a guiding role during the activities. ... I mean I combine my mentor teachers' help and your [academic mentor's] contribution.

Cross-Case Analysis of University A and University B

Through cross-case analysis of the two case studies outlined here, five primary themes emerged: (a) ECEPTs' understanding of sustainability and EfS, (b) place of EfS in ECE, (c) EfS pedagogy, (d) challenges about EfS practices in ECE, and (e) critical aspects of EfS practices. In addition, a new and different theme—supportive mentor teachers' and academic mentors' stance—emerged from the findings. Finally, although mutual themes were found in both cases, there were distinct nuances between the subsidiary categories and codes.

For instance, under the *ECEPTs' understandings of sustainability and EfS* theme, while University A participants interpreted UNESCO's EfS description from a holistic perspective, University B participants explained sustainability primarily through the social-cultural pillars (i.e., children's right to education).

When it comes to the *place of EfS in ECE*, all participants highlighted that EfS should start in the early years to promote children becoming environmentally responsible citizens in the future. While University A participants pointed out the longer-term impact of EfS on both children's and society's transformation, University B participants focused only on children's

transformation. Moreover, participants at University A emphasized that children's innate relatedness to nature played a crucial role in their early nature awareness.

For the *pedagogical knowledge about the EfS* theme, participants in both cases utilized child-centred teaching pedagogies to encourage children's active involvement. On the other hand, participants in University A preferred more tangible suggestions to use natural and/or reusable materials (e.g., clay) while conducting their activities.

The cross-case analysis of *EfS practice challenges in ECE* indicated that being overloaded was a common finding for both University A and B participants. Other mutual findings were the practicum mentor teachers' unsupportive stance, limited practicum time, and EfS being a difficult topic. Notably, participants in University A more frequently stated both personal and practicum challenges and also a sense of self-efficacy and limited EfS knowledge. Sub-themes unique to University A participants also included concerns about the physical school facilities, the academic mentor's stance, and the children's age group.

Lastly, when we looked at the *critical aspects of EfS practices* theme, critical thinking, implementation, and self-reflection were common findings, while advocacy for a transformative whole-institution approach emerged from University A participant data.

Discussion

In this research study, we sought to examine ECEPTs' understandings of sustainability and EfS through their practicum experiences. The ECEPT participants were drawn from two university sites, comprising the two case studies. University A, established in the 1950s, was a "green" campus with recycling facilities and student clubs such as biking, scouting, and hiking to support social-cultural learning among students. However, University B was founded in 2006, and its newly constructed campus did not yet appear to provide the same on-campus opportunities. Although the ECEPTs came from two different universities, the undergraduate programs and practicum regulations were mainly similar. In the Turkish 2006 ECPTE program, practicum occurs over one and a half years of workplace-based pre-school experience. ECEPTs work with assigned academic mentors, mentor teachers, and pre-schools during the practicum. In other words, they do not self-select their own mentors and practicum pre-schools.

Comparison of ECEPTs' activity plans across the two universities revealed negligible differences between the two cases, although University A participants were more familiar with sustainability and EfS. This might stem from University A participants' understandings being mainly environmental based. This understanding might also lead them to focus on sustainability in a singular aspect rather than holistically, as reflected in activity plans content analysis; however, in-depth cross-case analysis pointed out that University A participant data offered more detailed explanations of sustainability and EfS; rich and diverse EfS pedagogies; and insightful

critical reflection about themselves, their mentors, and practicum school perspectives. This might be a result of the differences between cases in terms of research tradition and academic background of universities, although both conducted 2006 undergraduate programs.

We now elucidate these findings based on Biesta's (2011) three categories—qualifications, socialization, and subjectification—Aspelin's (2015) category of existentialization, and Årlemalm-Hagsér's (2017) explanations, which are reinterpreted in terms of how these categories applied to EfS in HE. Finally, the roles of HE in teacher education for EfS can be seen explicitly:

- a) For the *qualifications category*, although both universities followed a similar ECPT program, University A presented some course opportunities (such as elective courses, subjects in a course, or cross-curricular activities) and physical facilities. Therefore, all participants from University A had heard about sustainability and EfS; however, they looked at sustainability mostly from an environmental pillar. After sharing UNESCO's description, they may have become aware of other sustainability pillars. Not being aware of other sustainability pillars except the environmental can result from the ineffective integration of EfS in the undergraduate programs and/or course instructors' viewpoints about EfS (Alici, 2020; Evans et al., 2017). At University B, the participants did not have any opportunities like the University A participants; when the definition was shared, the University B ECEPTs primarily focused on the social-cultural pillar, perhaps because they had no prior course experience related to EfS or misconceptions/misinterpretations about sustainability as being environmental only. Despite these differences, all participants believed that EfS should start from the early years to provoke transformative ways of being for children and thus society.
- b) For the *socialization category*, participants were aware of EfS issues (e.g., respecting others, being sustainable and wise consumers, maintaining sustainable actions) at their practicum schools based on their informal observations. They had noticed children, teachers, school managers, and other staff demonstrating awareness, attitudes, and behaviours around these issues. Based on their observations, most participants demonstrated in their interviews critically reflective values and attitudes towards unsustainable ways of being. University A participants especially illustrated this in their focus on nature through repurposed and reusable materials.
- c) Concerning the *subjectification category*, participants detected critical aspects of EfS practices based on their observations of children. Therefore, they constructed and conducted activities targeting these critical aspects to transform children's attitudes and behaviours toward sustainability. However, participants declared some practicum challenges with EfS implementation at the practicum schools, and due to these challenges (e.g., mentors' stance, limited practicum time, limited school facilities), they could sometimes not actualize what they planned.

- d) Regarding the *existentialization* category, some ECEPTs could discuss their understanding of EfS with mentor teachers and classmates. Moreover, half of them highlighted their dialogues with an academic mentor about child-centred approaches, children's active participation, and agency. Some participants in both cases shared their informal observations about the pre-school practices not promoting children's active and transformative engagement in the learning process. Årlemalm-Hagsér (2017) also reached similar findings; she noted that the pre-service teachers in her study questioned children's active participation and agency. Although children's agency in ECEfS was emphasized by Davis (2010), it still needs to be well understood and recognized by educators. However, as Davis (2014) has emphasized, global transformation can be possible when educators and children work together for sustainability and play a vital role as change agents.

Beyond these categories, we noted that the ECEPTs critically self-reflected about their EfS understandings, awareness, and activities, as demonstrated by the depth of activity plan analysis during the interviews. The ECEPTs also intended to seek more knowledge about EfS by researching various sources. Similar to Årlemalm-Hagsér's (2017) study, some participants were concerned about the absence of a whole-school approach at the practicum schools and the universities. For EfS transformation to be achieved in educational settings, whole-school approaches are much needed at all educational levels, from early childhood to HE.

Conclusion and Implications

The outcome of this study indicated that the 2006 undergraduate program needed to be revised to integrate EfS holistically. Although the new undergraduate program changed in Turkey in 2018 and added a new compulsory course on EE and an elective course on EfS, this change, we argue, is still inadequate. As Evans et al. (2017) proposed, EfS can be embedded in HE across whole curriculum areas, courses, or institutions as a systemic approach. To use this approach, universities first need to undergo a mindset change about EfS and, in turn, provoke ECEPTs' mindset change. This societal transformation must incorporate all education stakeholders, including pre-schools, governmental and non-governmental organizations, ministries of education, HE councils, policymakers, and others (Ferreira & Davis, 2015). Thus, establishing a collaboration between pre-schools and universities offers a starting point, and this interaction may lead to transformative change for not only pre-school children but also ECEPTs, academic mentors, and teacher mentors. As informed by CT, such an approach could actualize the university's four functions (Aspelin, 2015; Biesta, 2011).

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