

A Collaboration Project on Education for Sustainability: A Qualitative Evaluation of Professional Development Program for Turkish Preschool Teachers

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Abstract

This article is dedicated to examining a bilateral project established between South Korea and Türkiye with the overarching objective of elevating awareness and endowing preschool teachers with the capacity to embed education for sustainability within their classroom practices seamlessly. For this purpose, a professional development (PD) program was developed regarding the three pillars of sustainability and the 7R themes. Fourteen preschool teachers attended the PD program. Three teachers participated in this case study to reveal teachers' transformations regarding sustainability and early childhood education for sustainability. The data were collected through pre- and post-follow-up interviews and classroom observations. Thematic content analyses were conducted. According to the results, the PD program enhanced and deepened teachers' sustainability knowledge. In addition, teachers could transfer the knowledge from the PD program on education for sustainability into their practice not entirely but acceptably, and they have a chance to reconsider their lifestyle habits regarding sustainability in many areas.

Keywords: Sustainable development, Sustainable development goals, Education for sustainability, Professional development, Preschool teachers

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Introduction

The world is burdened with natural disasters, pandemics, overpopulation, increasing levels of carbon dioxide, poverty, social inequality, pollution, and other environmental problems more than ever before. While the situation brings disquieting future prognoses and uncertainty, it demands a shared commitment to education, empowering the next generation for change (UNESCO, 2009). Sustainable development (SD) can be vital in addressing these complicated issues. SD is rooted in concern for and recognition of environmental, economic, and social problems (UNESCO, 2005; 2006). Education for sustainability (EfS) could contribute to a sustainable future and transform societies for all generations (UNESCO, 2014). For all ongoing EfS, early childhood is accepted as a “natural starting point” since early learning is vital for developing attitudes, shaping knowledge, and taking actions (Akyol et al., 2018; Centre for Environment and Sustainability, 2009; Elliott & Davis, 2009; Engdahl et al., 2023; European Panel on Sustainable Development, 2010; Siraj-Blatchford et al., 2010). As informed and active citizens, children could contribute to SD while actively transforming their homes and preschools (Davis, 2015). Transformative EfS learning could be supported naturally in the classrooms, aligning with current early childhood pedagogies as interdisciplinary learning and participation in communities of action (Robinson & Vaealiki, 2010). Transformative learning, which emphasizes the guidance of past experiences on future behaviors, is a theory that is frequently emphasized in adult education, especially in terms of sustainability (Balsiger et al., 2017; Feriver et al., 2019; Thomas, 2009). The theory developed by Mezirow has various stages, emphasizing the importance of developing awareness of an individual’s environment and developing decision-making behaviors that include future cognitive processes due to their experiences (Mezirow, 1996). Transformative learning is often used as the theoretical framework for sustainability in educational research. The main reason for this is that sustainability expresses a philosophy of life and a cognitive change process. The necessity of raising awareness and critical thinking in addition to acquiring knowledge is one of the reasons why transformative learning is a practical approach to ensuring sustainability.

It has previously been established why early childhood EfS is needed (e.g., Davis & Elliott, 2014; Davis et al., 2008; Engdahl & Rabušicová, 2011; Hirst, 2019; Ji, 2015; Kahrirman-Öztürk et al., 2012). The existing body of research on EfS suggests that preschool teachers should offer opportunities for children to actively engage in issues about the pillars of sustainability (Choi & Kang, 2019; Davis, 2014; Inoue et al., 2016). Preschool teachers are “significant others” and role models for children, so they should reconsider their capabilities in empowering sustainability principles (Davis et al., 2009; UNESCO, 2008). They are to challenge, inspire, encourage children, organize, and design the environment to reveal children’s interests and raise their awareness (Bautista et al., 2018; Sommer et al., 2010). Thus, there is an unambiguous relationship between teachers and dissemination in EfS practices (Inoue et al., 2016; Panatsa & Malandrakis, 2018). Preschool teachers’ viewpoints and comprehension of EfS have been shown to influence how they continue their activities in the classroom (Kahrirman-Öztürk & Olgan, 2016; Sandell et al., 2005; Višnjić-Jevtić et al., 2022). Teachers are expected to have reflexivity, commitment, and genuine participation while provoking developmental values in children through their actions, attitudes, and models based on EfS (Pamuk et al., 2022; Višnjić-Jevtić et al., 2022). Therefore, teachers’ professional development (PD) is an essential aspect of EfS practices to be achieved effectively in early childhood classrooms (Årlemalm-Hagsér & Sandberg, 2011; Bautista et al., 2018; Nicholls & Thorne, 2017). Moreover, teachers must commit and be motivated to improve EfS practices over time (Boyd, 2020). However, teachers and scientific studies focus on the environmental pillar of sustainability. Davis et al. (2009) mentioned earlier that no intervention studies were conducted in early childhood education towards EfS, and research in the field was related to the environmental pillar of sustainability. Few studies involving interventions have been performed even after many years, which may be one of the barriers to developing effective practices (Alici & Sahin, 2023; Boyd, 2020).

Inoue et al. (2017) argue that each country’s national guidelines and targeted PD strategies enhance the implementation of EfS in the early years. Few researchers have been able to draw on the PD of in-service preschool teachers on EfS (e.g., Boyd, 2020; Dymont et al., 2014; Feriver et al., 2016). Changes in habits, practices, and EfS are achievable and depend on PD’s structure, content, and sequencing (Feriver et al., 2016). The PD is based on Clarke and Hollingsworth’s (2002) model of professional growth (Dymont et al., 2014), and the transformative approach has changed the teachers’ confidence, knowledge, and understanding (Borg & Gericke, 2021). The PD characteristics, like the conceptual framework, content, design, and practice process, are crucial to improving teachers’ awareness, understanding, and practices on EfS. Although extensive research has been carried out on this perspective, limited studies are interventional, such as action research or experimental studies on EfS conducted with preschool teachers to develop practices on EfS (Güler Yıldız et al., 2021).

The Professional Development Program (ECESDP) Design and Content

The PD program was part of a joint research project on EfS for early childhood education between Türkiye and South Korea. The project aims to boost preschool teachers' awareness and empower them to integrate EfS into their classroom practices. The Turkish and South Korean teams worked together to create a PD program. As expected, SD and EfS are not highlighted in the “National Preschool Education Curriculum” in Türkiye (Ministry of National Education, 2013). Turkish preschool teachers’ PD needs were determined by Pamuk et al. (2021) before preparing the PD program. Pamuk et al. (2021) state that most preschool teachers have limited SD knowledge to act. Besides, challenging tasks included creating outdoor learning environments, organizing learning centers, and generating parent involvement activities focused on EfS.

The PD program consists of seven modules with 7R themes (reduce, reuse, respect, reflect, rethink, recycle and redistribute) related to the three pillars of sustainability. The framework provides teachers with guidelines to boost children’s positive attitudes, knowledge, and behaviors (Bautista et al., 2018). Two-phase cycle development was used to revise the PD program and the modules. Twenty-eight preschool teachers (14 each) were enrolled in the first two cycles. The study group comprised 14 preschool teachers in the third and main implementation. Teachers followed and discussed the topics, shared their ideas, saved solutions for the sample cases, attended the activities, and answered the assessment questions in the PD sessions. Moreover, they created their action plans on the 7Rs and pillars of sustainability in a peer-learning environment and then shared the products in the final part of the PD program (Figure 1). All three PD programs were executed online due to the COVID-19 pandemic.

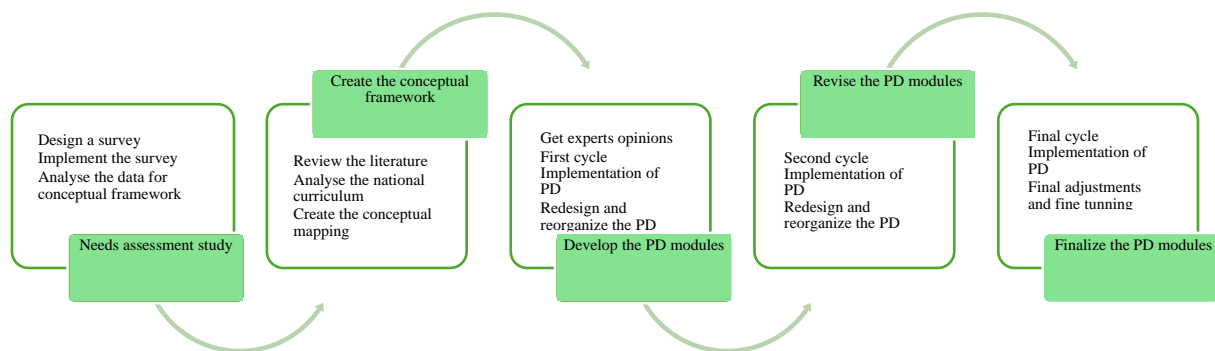


Figure 1. The development process of the PD

The PD's content was divided into five days and 14 sessions when planning the learning process. The PD content is presented above.

Table 1. The PD content.

| |
|--|
| DAY 1 |
| Session 1 |
| <ul style="list-style-type: none"> • Meetings and warm-up activities • General information about the project • Principles and rules of online education implementations • General environmental problems and consequences of them • The importance of sustainable development |
| Session 2 |
| <ul style="list-style-type: none"> • Sustainable Development • Pillars of Sustainable Development • The Sustainable Development Goals |
| Session 3 |
| <ul style="list-style-type: none"> • Education for Sustainability • Preschool Education for Sustainability |
| DAY 2-Environmental Pillar (Reduce and Reuse) |

Session 1

- Beginning time of the day
- Changing areas of our lives
- Definition of reduce and reuse
- Practices related to reducing and reusing

Session 2

- Relationship between MoNE 2013 Preschool Education Curriculum and themes of EfS
- Activity plans related to themes
- Parent involvement activities related to the themes
- Arrangements can be made in the classroom and school
- Usage of outdoor learning environments

Session 3

- Activity samples
- Practices samples
- Selected resources
- Sharing experiences

DAY 3- Socio-cultural Pillar (Respect, Rethink, and Reflect)

Session 1

- Beginning time of the day
- Definitions of respect, rethink, and reflect themes
- The relationship between MoNE 2013 Preschool Education Curriculum and themes of EfS
- Arrangements can be made in the classroom and school

Session 2

- Usage of outdoor learning environments
- Activity plans related to themes
- Parent involvement activities related to themes

Session 3

- Activity samples
- Practices samples
- Selected resources

DAY 4-Economic Pillar (Recycle and Redistribute)

Session 1

- Beginning time of the day
- Definitions of recycle and redistribute themes
- Practices related to recycle and redistribute
- The relationship between the MoNE 2013 Preschool Education Curriculum and the themes
- Arrangements can be made in the classroom and school
- Usage of outdoor learning environments

Session 2

- Activity plans related to the themes
- Parent involvement activities related to the themes

Session 3

- Activity samples
- Practices samples
- Selected resources

DAY 5

Session 1

- Beginning time of the day
- General assessment

Session 2

- Action plans of the three groups as environmental, socio-cultural, and economic pillars of sustainability

Research questions are presented below.

- What did preschool teachers learn from the PD?
- How have the preschool teachers' perspectives about EfS changed after the PD?
- How do preschool teachers' EfS practices develop or evolve after finishing the PD?

Method

This case study focuses on the qualitative results of a sustainability-focused PD program. The needs of teachers in Türkiye (Pamuk et al., 2021) and South Korea have been identified separately, and PD content has been created independently for each country. Researchers from both countries have collaboratively developed PD content, while the PD processes have been conducted independently. While we acknowledge the collaborative nature of the project, this study focuses on Turkish preschool teachers' experiences with the PD. This design helps explore the teachers' views and experiences toward the PD program and EfS practices in their classrooms (Creswell & Plano Clark, 2007).

Participants

Purposeful sampling was implemented in two steps to identify the participant teachers (Creswell, 2015; Johnson & Christensen, 2014).

First Step

The researchers announced the PD program via social media and the project website. After an initial 456 applications, the team selected fourteen participant teachers based on three main criteria: a) being a teacher in a public school; b) having an e-mail address, a computer, and an internet connection; and c) having no previous training on EfS.

Second Step

Four volunteer teachers were determined among the 14 PD participants. The researchers explained their roles as participants in this research to the teachers. Teachers were told that they were expected to participate fully in the PD, that they would be required to produce an example of learning during the PD, that researchers would observe them in the classroom following the PD, and that they would be interviewed three times. Following that, the procedure was explained to the families and the principal of the school. Principals of the schools and volunteer families were chosen in accordance with the volunteer teachers. At this moment, three preschool teachers were selected, and one was eliminated because of not getting consent from parents. These three teachers have worked in different neighborhoods of public preschools in Ankara (Table 2).

Tablo 2. Information about the participant teachers

| Teachers | Gender | Occupational Experience | Classroom Size |
|----------|--------|-------------------------|----------------|
| T1 | Women | 10 years | 16 children |
| T2 | Women | 22 years | 14 children |
| T3 | Women | 14 years | 15 children |

Data Collection Tools and the Process

Semi-Structured Interviews

Three semi-structured interviews were conducted. The interview questions were developed to explore teachers' existing knowledge and experiences on EfS, effectiveness, evaluation, and the long-term effects of the PD. Before the PD training, a pre-interview was conducted with three teachers to investigate their knowledge, views, perceptions, and practices of EfS, motivations, expectations, and rationale for attending PD. One of the questions, "Could you please explain what you are doing in the context of recycling?" is from the pre-interview. After the PD training, a post-interview was conducted to examine their experiences with PD. One of the questions, "What are your thoughts on transferring the knowledge, experience, and skills you gained through the PD in your classroom?" is from the post-interview. Later, researchers visited these teachers' classes six times over the course of six weeks to conduct random observations. After observations, follow-up interviews were conducted to investigate their views on the effectiveness of PD and how they transfer the PD into their classroom practices and their daily lives. One of the questions is, "What do you recall as the strengths of the professional development program?" from follow-up interviews. All interviews were conducted via the video conferencing software Zoom due to social distance measures at the time of the study (Archibald et al., 2019). The interviews ranged from 14 to 48 minutes, with a mean of 27 minutes.

Classroom Observations

Observations were conducted weekly for six weeks to gather data on the transformational effect of PD. Three different researchers observed the three teachers' classroom practices. Each observation took approximately 3.5–4 hours. The researchers observed interactions between teachers and children, as well as activities, resources, and environmental arrangements, without intervening. As expected, the educational approach to sustainability will be used in versatile and diverse situations, such as the language used in the educational process, the activities implemented, and the educational environment organized. Therefore, researchers who are experts on EfS carried out unstructured observations, considering the elements of interaction, activity processes, environment arrangement, and educational materials. They noted in detail all EfS-related observations throughout the training process.

Thematic Content Analysis

The research team followed Braun and Clarke's (2006) six phases (familiarizing with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report) to analyze the data. Thematic analysis is an appropriate and powerful method for understanding a set of experiences, thoughts, or behaviors in a dataset (Braun & Clarke, 2012). In this study, data were analyzed with thematic content analysis, considering what teachers had known in EfS and original ideas that emerged from the teachers' reflections and shared experiences (Fereday & Muir-Cochrane, 2006). The current study investigates three teachers' views and experiences with different data sources. Braun and Clark's (2006) six phases (familiarizing with data, generating initial codes, searching for themes, reviewing themes, defining, and naming themes, and producing the report) were followed by the research team. Teachers' interviews and observation notes were digitally transcribed verbatim and uploaded to MAXQDA 2022. Three researchers read all the data twice and took notes, and then expressions in the data were coded as relevant to common themes. Codes were collated into potential themes, and data pertinent to the theme was gathered. Finally, three researchers checked internal consistency and discussed, revised, and organized the themes and codes. Based on their shared and different views on content analysis, the final decision was made to name each theme and code.

Ethical Considerations and Trustworthiness

The research has been approved by the ethics committee of the University Ethical Review Board and the MoNE. Each teacher was informed about the research process and consented to attend. The researchers were susceptible to the children and the teachers during the observation process. Each interview and class were numbered to maintain anonymity, and all data was stored in a locked folder on the researchers' computers. For trustworthiness, all data were analyzed independently by the researchers. The codes were compared and discussed to reach an agreement on codes. The researchers revisited the data several times to clarify the codes (Braun & Clarke, 2006). The biases were monitored by considering alternative explanations in the peer debriefing meetings, the

characteristics of the PD program, the participants, and the procedure described in detail for transferability (Creswell, 2015; Patton, 2002).

Results and Discussion

Pre- and Post-Interviews

The pre-post interviews conducted with participant teachers reveal both what they learned from the PD and how the PD changed their perspectives on EfS. Although all teachers reported that they were familiar with the concept of sustainability, their definition was limited to reuse, recycling, or connection with nature at the baseline. After PD, their definitions were detailed and included the three pillars of sustainability.

“Sustainability can be defined as minimizing the materials we use daily and using enough to meet our needs at minimum, not only consuming less but also protecting nature for future generations and transferring these skills to future generations.” (T3, post-interview)

Although teachers believed they were familiar with sustainability while defining it, they had limited knowledge and misconceptions, as Effeney and Davis (2013) mentioned. T3’s post-interviews shared above can explain the transformation and expanding knowledge of teachers. In the pre-interviews, the teachers stated that they felt sufficient about implementing all the themes except the reflection theme. However, instead of educational practices for sustainability, they mostly referred to daily life experiences. While exemplifying these experiences, they mentioned what could be done rather than what they did. After the PD program, teachers could relate their previous classroom practices to the 7Rs as a sign of transformation.

“Reuse is being able to re-evaluate something that we repeatedly use as a material, and when it loses its functions, we should put it into our daily lives. For example, to create flowerpots by cutting the bottom of our used plastic bottles.” (T3, post-interview)

Before the PD, although most of the teachers shared their excitement, some had concerns. These concerns were mostly related to how to transfer the knowledge into practice and convince parents to collaborate on EfS. The factors that motivate teachers to participate in the PD were mainly associated with enhancing their expertise and practices regarding EfS. In addition, the quality of the PD trainers, the familiarity with the concept of sustainability shared by colleagues, and the motivation to empower children, combined with the inspiration drawn from nostalgic memories, collectively encouraged the teachers to participate.

The PD process requires teacher interaction and some tasks in which teachers cooperate in groups, and their views were asked about the planned process in the pre-interview. All the teachers stated they were compatible with group work; they respected different ideas, expressed the importance of peer learning, and defined themselves as cooperative. Indeed, they reported, and it was observed that they learned different ideas and experiences from others and could easily express their feelings and thoughts during training. On the other hand, they said they sometimes had difficulties working with the group synchronously. Especially while preparing an action plan, they could not determine a standard timetable.

Their expectations of PD were to reconsider their lifestyle, expand their knowledge, disseminate what they learned in PD, and evaluate themselves in terms of their daily life behaviors. In the post-interview, all the teachers said that the training fulfilled most of their expectations and would transfer them to their classroom practices. Nonetheless, their recommendations for expanding the PD were that each theme could take a long time and be discussed more comprehensively. It has been seen that some of the teachers still needed to figure out how to involve parents in the EfS process.

“In theory, you learn many things, but how do I use that knowledge in practice? Even if I transfer it to the implementation, how do I ensure parent involvement? These issues make me a little nervous.” (T1, post-interview)

They narrated the PD’s effects on them, the practical sides, and their thoughts about the activities presented. The beneficial sides of the PD were sharing their ideas and interacting with colleagues, boosting the motivation of teaching, having an action plan with group members, and having an opportunity for self-assessment. Just as Sheridan et al. (2009) articulated, educators articulated that the PD had a discernible impact not solely on their instructional practices but also on their personal lives. They started reconsidering their habits, sharing their new

learnings and experiences with family, friends, and colleagues, and thinking about how they transferred what they learned about EfS into practice. As can be seen, teachers' changes in their EfS perspectives were not only about their educational practices but also about their daily life behaviors.

"I think what I felt and did was just a small part of it (sustainability). It is more than I knew. So, did PD affect me? It really impressed me. Before getting it, I wondered whether something was a want or a need. I realized that if I decorated with this perspective, I would save a lot of money. So, I hope that if a teacher raises a teacher's awareness, if s/he raises another's, we will go through such a chain." (T1, post-interview)

Presenting PD as practice-oriented was adequate for their learning. When they assessed the process of PD, they expressed that including multiple assessments and being practice-oriented were strengths of PD.

"As a process, I think that the first evaluation, last evaluation, and the training process in between is a very effective planning process in terms of both our self-evaluation and your evaluation of us, or more precisely, in terms of seeing what the PD contributes to us." (T3, post-interview)

Teachers expressed that the activities about the 7 Rs were feasible, educational, enriching the context, and effective. Some activities became their favorites from PD content that they could not wait to practice, such as composting, water harvesting in school, and the material used to choose the learning centers with children's preferences in class.

Follow-Up Interviews and Observations

Follow-up interviews and observations in teachers' classrooms reveal a deeper and broader understanding of how their EfS practices evolved after PD. Teacher follow-up interviews revealed that PD produced broader effects and transformations over time. Teachers shared that PD impacted not only their lives or classroom practices but also their family members.

"As a mother, I see many effects on my son. So, he started sorting bottles at home. He started using it, saying let us not throw it away because I would put something in the toy box. Believe me, I can see the reflections very clearly in my classroom, at home, and around me. I can say it." (T1, follow-up interview)

The teachers stated that they developed many good habits and that their responses mainly included the PD's impact. Self-regulation, enhancing classroom practices, parent involvement, reuse, reduce, rethink, respect, and redistribute were coded as their positive gains.

"The PD affected the children in my class and the parents. I am getting a couple of complaints from the parents right now. They say they could not throw anything at home because of me (laughing). A parent said I used to buy less in order not to carry heavy weights; thanks to you, now I buy two kilograms of tomato paste. Frankly, I think there is such awareness among parents... After working with children on recycling, sustainability, and upcycling, they noticed the recycling symbol on the water bottle." (T1, follow-up interview)

Like T1's views, classroom observation showed that she put the recycling symbols on the board and discussed them with the children. She prepared the classroom environment, using the resources of ÇEVKO (Environmental Protection and Packaging Waste Evaluation Foundation) and TEMA (Turkish Foundation for Combating Erosion, Afforestation, and Conservation of Natural Assets), about the recycling signs and what can be done for zero waste (Figure 2). Children shared their opinions about the recycling signs on the board and whether the waste was garbage or not. They talked about appropriate behavior for sustainability in the zero waste alphabet, for example, the "A" letter as not throw away, reuse ("A"tma, değerlendir in Turkish) (Figure 1; December 20, 2021). T1 explained to the researcher that "I always cared about nature activities, but it was good to learn that sustainability consists of such interrelated issues." It stated that their practices developed in line with PD.



Figure 2. Recycle activity observed on December 20, 2021

Like the post-interview as personal effects of PD, it helped to expand their awareness and knowledge about sustainability, share with colleagues what they learned in PD, and reconsider sustainability-related lifestyles, such as reusing materials and reducing consumption.

“I mean, you experience it in person... My colleagues were constantly asking me about the project. I caught their attention by explaining sustainability to them. I think we have created awareness. Personally, my perspective on the environment has changed a bit. I mean, I realize how many recycling bins or how many clothing bins I pass by. I started seeing them.” (T2, follow-up interview)

Some teachers mentioned the potential development zone of PD, as they did in post-interviews. Different from the post-interviews, one of the teachers emphasized that all teachers who participated in the PD would be observed with these words.

“For example, three teachers' classrooms in Ankara were observed, but more teachers participated in this project. Maybe it would be better to examine whether others could transfer to their practice or not.” (T3, follow-up interview)

It was found that the teachers were impressed mainly by the participants' and trainers' shared memories. The teacher explained her memory from the PD as follows:

“For example, a good practice was shared by a PD participant. She has worked on reducing the paper usage method as an activity. I think I would use it in my class in the future.” (T3, follow-up interview)

The teachers remembered the content they received in the PD and planned to integrate the 7R themes with the program in their practices. Teachers stated their favorite activities as persona dolls, compost, and Pilkelet (a skeleton made of dead alkaline batteries) in the context of PD. During the classroom observations, one of the teachers implemented a Pilkelet activity with children (Figures 3 and 4; December 17, 2021). The dialogue between the teacher and the children during the observation followed as follows:

*“T1: What do you think we should do with empty batteries?
Child: We throw it in the battery box, then we use a new one.
T1: Yes, we should not throw it away. There should be a separate box for the batteries; then, we can take them to municipalities or shopping malls and throw them in the big battery box. Then, let us do an activity as battery collectors at home. Let us make a Pilkelet; instead of a skeleton, let us use dead batteries. Everyone should bring their dead batteries; let us stick them on the skeleton we will make.”*



Figure 3. Pilkelet (skeleton) activity observed on December 17, 2021



Figure 4. Posted by T3 on December 28, 2021

The teachers stated that the 7Rs, which reflect the themes, and the three pillars of sustainability were the remaining conceptual structures of the PD. It was said that respecting and loving all creatures and behaving respectfully with their lives, needs, past, and future is essential.

“Love of nature, love of people, love of animals, loving ourselves, loving children, leaving a more liveable world to future generations, meeting their needs while meeting our own needs without consuming them, meeting the needs of future generations without consuming them, I saw that the most important of them is human.” (T2, follow-up interview)

It was observed that the teachers transferred the content of PD to their educational process and embodied it in their activities. In T2's classroom, it was noted that the teacher repaired the broken wooden chair with the children (reuse), the protection of the living rights of living creatures in nature (respect) was often emphasized, and the importance of using water resources carefully (reduce) was discussed. They (the teacher and children) went to an acorn tree. The teacher put the “Meşe Palamudu (Acorn)”-named book into the tree (Figure 5; November 3, 2021). Brief dialogues with the teacher and children as given:

“T2: Look at how they are like each other.

After that, the children collected the acorns from the ground and brought them to the detected area by the teacher.

C: We found mushrooms.

Then, all the children and the teacher went to the spot to explore the mushrooms.

T2: Yes, mushroom! It could be poisonous. Be careful not to step on them so that they sustain their existence and lives.

T2: What you see is a tiny acorn tree. Fallen acorns become seedlings. That is why it is not appropriate to take acorns from their habitat.

After, one of the children saw the dog poop.

C: It is so bad.

T2: This is natural. Children! Animals have basic needs like us. Be careful not to step up. They become fertilizer for the soil and blend with nature.”



Figure 5. Acorn Activity Observed on November 3, 2021

Discussion

We will discuss how the teachers' experience with PD enabled them to enhance their classroom practices and their EfS perspectives. In the last decade, significant numbers of studies have revealed that teachers' PD needs are enormous in EfS (Pamuk et al., 2021; Sheridan et al., 2009; Tolstikova et al., 2021). It is known that teachers' knowledge and practices about a subject are highly related to their professional competencies (Neuman & Cunningham, 2009; Arrow & McLachlan, 2014). The current study mainly aimed to understand the effect of transformative PD on teachers' knowledge and classroom practices on EfS because effective PD provides teachers with opportunities to enhance their pedagogical knowledge, professional confidence, and educational practices (Darling-Hammond et al., 2017).

Previous studies demonstrated that preschool teachers are unfamiliar with EfS while having familiarity with concepts of environmental or natural education (Årlemalm-Hagsér, 2017; Inoue et al., 2016). In this study, in pre-interviews, most teachers assumed they were familiar with sustainability, but their definitions did not include the sociocultural and economic pillars of sustainability. We realized teachers' knowledge and practices were limited to the environmental pillar. The fact that most of the studies on EfS have focused on the environmental pillar of sustainability for years (Güler Yıldız et al., 2021) can be an indication that the concept of sustainability is mainly associated with environmental issues. After the PD, it was explicitly presented that teachers' definitions started to include three pillars of sustainability from a holistic perspective. Borg and Gericke (2021) reveal that teachers' understanding was focused on the environmental perspective before training, and the teachers' knowledge was extended similarly to this study. The content of PD holistically includes three pillars of sustainability that contribute to its effectiveness, and teachers' views on PD also support this. Previous studies demonstrated that preschool teachers are unfamiliar with EfS while having familiarity with concepts of environmental or natural education (Årlemalm-Hagsér, 2017; Inoue et al., 2016). On the other hand, this study's finding contradicts the previous study, which suggested that a few teachers are familiar with EfS after training, workshops, and so on (Park et al., 2016).

Besides the concept and definition of sustainability, teachers were also enlightened about the 7R themes recommended in early childhood EfS by OMEP (Duncan, 2011). Our interview results indicated that teachers have an example of the 7 Rs from their daily lives, and most felt sufficient in the "recycle" theme while none felt sufficient in the "reflect" theme. After PD, like the findings of Wang et al. (2019), teachers developed their own understanding of each theme and planned and implemented practices about the 7Rs in their classes. Before PD, they mostly implemented "recycling" in class, and it became varied. Implementing each theme of the 7Rs can be difficult in early childhood education (Kahrman-Öztürk et al., 2012). Especially the socio-cultural pillars ("respect," "reflect," and "rethink") can be more difficult due to being more abstract than other themes (Borg & Gericke, 2021; Wang et al., 2019). Observations showed us that teachers integrated their classroom practices with

all the pillars. Teachers implemented activities about the 7Rs in their daily schedules because the PD contained various practice examples for each 7R and prepared activity assignments about the pillars of sustainability. EfS PD programs aim to transfer knowledge, making them naturally more “transmissive” (Popova et al., 2016), and we consider PD to be a driving force for EfS (Choi & Kang, 2019).

At the end of professional support, it is expected to sustain positive change in knowledge, practices, and daily life routines (Welch-Ross et al., 2006; Sheridan et al., 2009). This lifestyle change is one of the most valuable findings of this study because teachers are also learners of PD. Teachers reported a shift in their consumption habits, with increased consideration for sustainability in their daily routines. Some took the initial step of reducing consumption, while others planned to compost. Teachers evaluated their behaviors and became aware of actions or thoughts that could potentially harm the environment. They felt responsible for sharing their knowledge with their families, friends, colleagues, children, and parents. According to Goleman’s study (2010), most teachers think that what they can do individually will not be effective in solving global problems, and their knowledge about how to make a difference in sustainability is insufficient. In the PD, teachers were also learners. EfS education could increase learners’ behaviors, values, and emotions (Birman et al., 2000; Mogensen & Schnack, 2010). It should not be forgotten that adults who grew up in a more democratic, natural, and environmentally sensitive atmosphere in their childhood have higher awareness, sensitivity, and social-emotional skills on sustainability issues (Charatsari et al., 2022; Hill et al., 2014; Louv, 2008).

PD could also occur in an informal context, such as peer observations and collegial dialogues (Mizell, 2010). In this study, preparing an action plan is a struggle for the teachers as group work. It can be the reason for not finding a common time to work together due to online training, or maybe they did not have enough experience preparing an action plan. Teachers pointed out that they learn different classroom practices from other participants. It could be said that discussions and sharing ideas were more useful than preparing an action plan. Notably, they used all the pillars of sustainability in their expressions in classroom practice. In the study of Summers et al. (2003), it was concluded that teachers’ knowledge about sustainability and self-confidence in planning and implementing EfS improved after PD. We could say that PD plays an essential role in teachers’ EfS practices while considering the teachers’ interventions in the routines.

Conclusions, Recommendations, and Limitations

The current study reports on the results of a research project that investigated the effectiveness of teachers’ participation in a PD program. In the PD, classroom practices are purposefully linked to EfS, bridging theory and real-life learning practices and allowing open discussions and exchanging ideas and thoughts. It can be concluded that PD has shown the potential of a well-designed teacher PD program to introduce EfS. Well-designed and holistic PD could improve teachers’ knowledge and classroom practices about EfS. Mitchell and Cubey (2003) suggest the characteristics of an effective PD that incorporate participants’ understandings of the context, help change participants’ beliefs and practices, develop their critical thinking and self-assessment skills, and investigate pedagogy within their own early childhood settings. In this regard, the developed PD in this study encouraged participants to share their beliefs, knowledge, and experiences; transformed their way of thinking and their practices; had multiple assessments; and was practice-oriented. Researchers believe all these characteristics promote the effects of PD on teachers.

Although this study offers valuable insight into PD programs and EfS, it has some limitations. This study was limited to a semester, and the observations provided a snapshot of teachers’ practices due to the nature of the research project. Fullan (2004) pointed out that the expected outcomes of PD not only included short-term but also long-term effects. Future studies might be designed as a time-series design or longitudinal design to justify the effectiveness of PD. Another limitation is that preschool teachers who have shown their commitment to EfS through voluntary participation in PD might be more likely to pay attention to EfS practices. The findings must be examined with this commitment in mind. A significant limitation is that the study only addresses changes in teachers’ knowledge and classroom practice. Guskey (2000; 2002) points out that higher levels of PD evaluation consider the impact on children’s learning in the classroom. However, we do not know the effect of PD on children. In future studies, children’s outcomes might be considered to enhance the findings and evaluation of PD. The MoNE 2013 Preschool Education Curriculum in Türkiye has been recently updated. Based on the revised curriculum, training that will support teachers in integrating EfS practices with the program can be provided extensively.

The international literature on EfS inspired the PD program's content and framework, even though this study was carried out in a Turkish context. The PD program and the current study's findings are timely, particularly in addressing achieving the SDGs (UNESCO, 2019). EfS in Türkiye, which suggests all preschool teachers receive a PD program to embed EfS principles and pedagogy in their program and classroom practices in an integrated manner.

Authors Contribution Rate

Rıdvan Elmas: Design of the research, Consulting, Audit, Data Analysis, Writing and Editing (%20)

Naciye Öztürk: Data collection, Data analysis, Writing and Editing (%18)

Deniz Kahriman Pamuk: Design of the research, Consulting, Review and Editing (%16)

Hazal Begüm Ünal Çubukçuoğlu: Data collection, Data analysis, Writing and Editing (%13)

Savaş Pamuk: Design of the research, Review, and Editing (%10)

Yekta Koşan: Data collection, Data analysis, Writing and Editing (%10)

Tülin Güler Yıldız: Design of the research, Consulting, Review and Editing (%8)

Gelengül Haktanır: Design of the research, Consulting, Review and Editing (%5)

Ethical Approval

Ethical permission (Day: May 28, 2019; No: 35853172-600) was obtained from the Hacettepe University Ethical Review Board for this research.

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