Exploring Scientific Minds in Early Childhood: Environment, Rights, and STEM Integration

Editors: Prof. Dr. Bahattin Aydınlı
Doç. Dr. Adem Yılmaz

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15 Temmuz Mah. 148136. Sk. No: 9 Şehitkamil/Gaziantep
+90.850 260 09 97
+90.532 289 82 15
www.ozguryayınlari.com
info@ozguryayinlari.com

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Preface

Early childhood represents the moment in human development when the mind first attempts to construct systematic meaning out of experience—when curiosity is unfiltered and the desire to explore remains boundless. The questions a child directs toward nature, the sky, living beings, objects, and social life are not merely indications of cognitive maturation; they are also the earliest signals of scientific reasoning. This volume seeks to illuminate the ecological, cultural, and pedagogical contexts in which these signals emerge and take form.

Approaching scientific thinking together with environmental awareness, children's rights, and STEM integration underscores the fact that early learning can no longer be conceptualized as a single-dimensional process. A child's sensory, emotional, and cognitive interactions with the environment simultaneously shape sustainability consciousness, democratic participation, and creativity-based technology literacy. This holistic framework enriches children's learning experiences while expanding the responsibilities and interpretive roles of adults within the educational ecosystem—teachers, families, policy makers, and the wider community.

This book brings together three domains that are often discussed separately in contemporary educational discourse: environmental sensitivity, rights-based pedagogy, and STEM-oriented learning. In doing so, it highlights that the child's relationship with science carries not only a cognitive dimension but also ecological, ethical, and sociocultural significance. Nature exploration, sky observations, environmental education, democratic classroom participation, family engagement, and STEM activities should therefore be understood as interconnected components of a coherent pedagogical whole.

The world of tomorrow will be shaped by the seemingly small steps taken in today's early learning environments. Nurturing children's curiosity, strengthening their environmental consciousness, cultivating their rights awareness, and fostering scientific thinking are no longer optional educational ideals but global imperatives. By compiling contemporary research and perspectives, this work aims to provide educators, researchers, and policy designers with a comprehensive conceptual guide.

Contents

Chapter 5

Chapter 6

Chapter 1

Astronomy Education in Preschool: Foundations of Early Scientific Thinking[1]

Cihan Gülgün[2]

Çağrı Avan[3]

Kamil Doğanay[4]

Abstract

This section examines the role of astronomy education in the preschool period in establishing the foundations of scientific thinking within a theoretical and pedagogical framework. Astronomy education contributes to the development of scientific literacy by supporting children's curiosity, observation, and inquiry skills at an early age. The study presents a constructivist learning ground based on Piaget's cognitive development, Vygotsky's sociocultural, and Papert's constructivist approaches. In line with these theoretical foundations, astronomy education has been integrated with concrete materials, games, storytelling, drama, and design-oriented activities. The interdisciplinary application of astronomy themes through the STEAM approach supports the development of creativity, aesthetic awareness, and problem-solving skills in children. Within the context of the Turkey Century Education Model (TCEM), astronomy teaching is directly linked to the field of science; pedagogical practices consistent with discovery, observation, production, and value-based learning processes are proposed. The chapter also details observation-based assessment tools, family involvement strategies, and teacher guidance processes. In conclusion, astronomy education in early childhood is defined as an interdisciplinary and holistic learning area that contributes to children's scientific identity and curiosity development.

1 This section draws on the experiences and outputs of the project "Overcoming Barriers with STEM-2" (Project No. 125B567), supported by TÜBİTAK under the 4008 – Inclusive Society Practices Support Program for Individuals with Special Needs.

2 Dr., Kastamonu Measurement and Evaluation Center, cihangulgun@hotmail.com, 0000-0001-5188-9303

3 Dr., Kastamonu Measurement and Evaluation Center, cagriavan@gmail.com, 0000-0002-4068-7631

4 Dr., Şehit Mehmet Yılmaz High School, kamildoganay_37@hotmail.com, 0000-0001-5027-4163

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1. Introduction

Astronomy is a field that nurtures children's fundamental curiosity about nature and the universe and holds strong potential for building scientific thinking in the early years. The preschool period is a critical stage of development when individuals form their first mental models of the phenomena around them. During this period, children develop explanations based on their own observations of concepts such as the sky, the Sun, the Moon, and the stars (Bryce & Blown, 2013; Jones et al., 1987). However, these explanations are often intuitive and may also involve misconceptions that conflict with scientific knowledge (Vosniadou & Brewer, 1992). Therefore, starting astronomy education at an early age is critically important for the development of children's scientific thinking, observation, and inquiry skills. Science education in early childhood has been promoted since the 1960s with the goal of scientific literacy, and especially since the 1990s, astronomy themes that support children's curiosity-based learning processes have begun to be included in education programs (Worth & Grollman, 2004; Lelliott & Rollnick, 2010).

Astronomy education in early childhood not only imparts knowledge but also supports children's curiosity, discovery, observation, cause-and-effect reasoning, and problem-solving skills (French, 2004). It also contributes to the holistic structuring of science and nature-based learning processes. In this context, astronomy education enables the integration of science, technology, engineering, art, and mathematics (STEAM) fields in the preschool period. While observing celestial movements, children can experience mathematical concepts such as time, direction, numbers, measurement, and spatial awareness; in activities such as telescope construction, they can experience engineering and design-oriented thinking processes (Patrick et al., 2009).

Furthermore, it has been determined that early astronomy education contributes to the development of scientific identity and epistemic curiosity in children (Cheryan et al., 2017). Small observation activities, sky models, storytelling, and game-based experiences in learning environments increase children's tendency to produce explanations for natural phenomena. When evaluated within the framework of Vygotsky's (1978) social interaction-based learning theory, this shows that children construct scientific meaning through social and linguistic tools.

Recent studies have shown that astronomy education in early childhood supports not only conceptual development but also emotional and aesthetic awareness (Lelliott & Rollnick, 2010; Trundle, 2010). Sky observations enable children to gain awareness of their place in the universe and develop

a sense of wonder and conservation towards nature. This demonstrates that astronomy education has gained importance as a value-based learning area in the context of sustainability education.

The Science, Nature, and Environment area included in the Turkish Century Education Model (TCEM) aims to develop children's environmental awareness and love of nature in early childhood, and astronomy concepts are a direct part of this area. Therefore, astronomy education in preschool must be approached in a way that is both consistent with the national curriculum and integrated with contemporary learning approaches.

2. Theoretical Framework

The theoretical basis for astronomy education in early childhood is built on children's developmental characteristics, cognitive structures, and social learning processes. During this period, children produce intuitive explanations to make sense of the natural phenomena they observe in their environment; these explanations shape both their ways of thinking and their scientific understanding. Therefore, astronomy education requires the creation of constructivist learning environments based on children's existing mental models (Fleer, 2009).

2.1. Piaget and the Cognitive Development Approach

Piaget's cognitive development theory proposes that learning in early childhood occurs through children's active mental constructions. According to Piaget (1952), children between the ages of 2 and 7 are in the preoperational stage, and thinking at this stage is based on perceptual characteristics and intuition. In the context of astronomy, children tend to explain their observations, such as the Sun "moving across the sky" or the Moon "following them," through egocentric thinking (Vosniadou & Brewer, 1992). Therefore, teaching astronomy concepts should aim to discover children's existing mental models and reconstruct these models with scientific concepts.

The Piagetian approach argues that early learning should be supported through concrete experiences, manipulative materials, and experimental activities. For example, scaled models of planets or sky simulations can help children transform abstract astronomy concepts into concrete experiences (Piaget, 1970).

2.2. Vygotsky and the Sociocultural Approach to Learning

Vygotsky's (1978) sociocultural theory emphasizes that learning occurs through social interaction and language. According to this perspective, the learning of astronomy concepts takes place within children's zone of proximal development; that is, children can understand complex sky events with the guidance of adults or peers.

For example, a teacher observing the night sky with a child and asking guiding questions ("Where do you think the Sun went?", "Why might the Moon change shape?") triggers cognitive discovery in the child. Such social interactions support meaning construction through language. Therefore, astronomy education in early childhood is not only a cognitive process but also a linguistic, social, and cultural process (Fleer, 2022).

Vygotsky's theory emphasizes the guiding role of teachers while also placing children's active participation at the center. During astronomy activities, methods such as group discussions, storytelling, or drama encourage children to develop scientific discourse and share their thoughts.

2.3 Papert and Constructionism

Papert's (1980) constructionism approach is based on Piaget's constructivist theory but defines learning as "learning by creating concrete products." This approach directly links early childhood astronomy education with STEAM environments. Children can integrate both engineering and science concepts by designing their own telescopes, rocket models, or planetary systems.

The constructionist approach enables children to "think by touching" and supports them in understanding abstract scientific concepts through doing and experiencing. For example, a child who designs the Solar System with simple cardboard models also learns concepts such as scale, rotation, and orbit experientially. This directly corresponds to design-oriented thinking in STEM-based early childhood education (Resnick, 2017).

2.4 Inquiry and STEM/STREAM Approaches

Astronomy education is naturally compatible with the inquiry-based learning approach. When children make observations about the sky, they ask questions such as "why," "how," and "when," which form the basis of scientific thinking (Trundle, 2010). The inquiry- e approach allows children to generate their own hypotheses, make observations, and develop explanations.

Furthermore, the STEAM approach brings astronomy education into an interdisciplinary context. For example, the "Phases of the Moon" activity integrates science, mathematics, art, and literacy, while the "Designing My Own Telescope" activity offers a learning experience that incorporates engineering and technology dimensions (Doğanay et al., 2024).

The STEAM approach also supports language development and creative thinking processes in early childhood. Children's verbal expression of their observations and narration of their sky experiences through stories or poetry enriches learning on both cognitive and affective levels (Brenneman et al., 2019).

2.5 Theoretical Approach in the Context of the Turkey Century Education Model (TCEM)

The Turkey Century Education Model (TCEM) aims to develop children's awareness and sensitivity to natural phenomena by focusing on science learning in early childhood (MONE, 2024). TCEM's constructivist and integrative philosophy links astronomy teaching to children's curiosity and observation skills.

The model centers on the processes of "discovering, observing, questioning, and creating," anticipating the laying of the foundations of scientific literacy at an early age. In this context, astronomy education helps children perceive celestial events not only as information but as life experiences. Furthermore, since TCEM emphasizes the emotional, value, and aesthetic dimensions in learning processes, astronomy-based activities have the potential to foster respect for nature, curiosity, responsibility, and awareness of the universe in children.

During early childhood, children develop a natural curiosity about astronomical concepts because they observe celestial events directly. However, this curiosity, when combined with intuitive thinking processes, often leads to the emergence of mental models that differ from scientific explanations (Vosniadou & Brewer, 1992). Therefore, astronomy education in preschool should aim to bridge the gap between children's existing cognitive structures and scientific concepts.

3. Children's Approach to Astronomy Concepts

Children interpret the sky according to their own experiences. For example, explanations such as the Sun "following them," the Moon "appearing at night," the Earth being "flat," or stars being "small stones that emit light" are concept patterns frequently observed at an early age (Sharp,

1996). These explanations arise from children's observational experiences but stem from their inability to fully grasp abstract spatial relationships (e.g., the spherical shape of the Earth or orbital movements) due to their cognitive development level (Blown & Bryce, 2010; Hayati & Asbi, 2025).

Research shows that children aged 4–7 typically perceive the relationship between the Sun, Moon, and Earth in a geocentric (Earth-centered) manner, meaning they believe the Sun revolves around the Earth (Plummer & Krajcik, 2010). This is a typical reflection of the "intuitive thinking" stage defined by Piaget (1952). When explaining their observations, children rely on their direct perceptual experiences rather than logical reasoning.

The Sun, Moon, and Earth form the core of children's conceptual system of astronomy. Children's understanding of the relationships between these concepts is fundamental to their ability to perceive the universe systematically. Sun: Children generally think that the Sun moves, "rises," and "sets." These observations are not sufficient to explain that the Sun's changing position in the sky is caused by the Earth's rotation (Hannust & Kikas, 2007; Nobes et al., 2003).

Moon: The phases of the Moon are a complex concept for children. Most children think that the Moon "changes shape" or "appears in different places in the sky." The understanding that the Moon becomes visible due to the light it receives from the Sun requires a level of abstract thinking and is not fully established in the preschool period.

Earth: Children generally perceive the Earth as "flat"; knowledge that it is round remains an abstract statement unless based on experiential foundations. Concrete materials, balls, or sphere analogies are quite effective in teaching the global model (Vosniadou, 2013).

3.1 Conceptual Misconceptions and Conceptual Change

The misconceptions observed in children's astronomical concepts stem not only from a lack of knowledge but also from the nature of cognitive models. Vosniadou and Brewer (1992) state that children develop "hybrid models" about the Earth; for example, they produce explanations such as "it is round, but there is a flat area on which we live." Such explanations show that scientific and intuitive knowledge coexist in the child's cognitive system.

Therefore, the goal in the teaching process is not to directly correct children's misconceptions, but to understand why they produce these explanations and to help them develop alternative, more consistent models (Land & Jonassen, 2012). Conceptual change is possible when children

reorganize new information without creating conflict with their existing cognitive structures (Posner et al., 1982).

3.2 Teaching Strategies and Supporting Conceptual Development

Astronomy instruction in early childhood should be conducted using discovery-based and play-based strategies rather than direct instruction. Teachers should create environments that maintain children's curiosity and encourage observation. Effective teaching strategies are summarized below:

- Learning with concrete models: Models of the Solar System made from materials such as cardboard, clay, and light sources help children grasp spatial relationships more easily.
- Storytelling and dramatization: Stories such as "The Journey of the Moon and the Sun" help children internalize concepts in an emotional context.
- Observation-based learning: Observing changes in shadow length during the day or the Moon's position in the sky provides children with direct experience.
- Inquiry-based activities: Open-ended questions such as "Why does night fall?" and "Why is the Sun hot?" develop children's hypothesis-generating skills (Siry et al., 2023).

3.3 Family Participation and Environmental Interaction in Conceptual Learning

Families play a significant role in children's lasting learning of astronomy concepts. Experiences such as observing the sky at home, reading simple astronomy books, or visiting museums support conceptual development (Patrick & Mantzicopoulos, 2016). Furthermore, teacher-family collaboration facilitates children's transfer of what they learn at school to their daily lives.

Family involvement not only reinforces learning but also strengthens children's scientific self-efficacy and epistemic curiosity (Siry et al., 2023; Vosniadou, 2008). Thus, astronomy education not only transfers knowledge but also lays the foundations for the development of scientific identity in children.

3.4 The Instructional Position of Astronomy Concepts in TCEM

The Turkey Century Education Model (TCEM) aims to develop children's observation and inquiry skills regarding natural phenomena in

the "Science, Nature, and Environment" field in preschool (MONE, 2024). In this model, astronomy themes are included under subheadings such as "day-night difference," "weather events," "seasons," and "sky observation." TCEM's value-based learning approach requires that astronomy concepts be addressed not only cognitively but also emotionally and aesthetically.

In this context, a teaching approach that makes children aware of their place in the universe, nurtures their curiosity and sense of wonder, and integrates observation and inquiry processes should be adopted. Astronomy education enables children to connect with nature, develop observations-based thinking, and gain an open-minded attitude toward scientific explanations.

4. Pedagogical Approaches and Teaching Practices

The effectiveness of astronomy education in the preschool period depends on selecting pedagogical approaches that are appropriate for children's cognitive levels, curiosity, and play-based learning tendencies. During this period, learning is shaped around play, observation, experience, and interaction. Therefore, instead of traditional knowledge transfer, active, integrated, and constructivist teaching strategies that encourage children's active participation should be adopted in astronomy education (Fleer, 2022; O'Connor et al., 2021).

4.1. Play-Based Learning Approach

Play is the natural context for learning in the preschool period. Astronomy-themed games enable children to develop both scientific concepts and social-emotional skills. For example, in the "Space Adventure Game" activity, children take turns visiting "planet stations" on a simple planet course set up in the classroom. At each station, a task (e.g., "Find the planet closest to the Sun," "Model the shape of the Moon") is completed.

In such games, children learn scientific knowledge indirectly while also acquiring social skills such as waiting in line, teamwork, and communication (Brenneman et al., 2019). Furthermore, the game context provides internal motivation for learning by maintaining the child's curiosity.

Here, the teacher is not a "knowledge provider" but a "guide who facilitates the flow of the game." The symbols, gestures, and conversations children use during the game can be evaluated through observation; this provides important clues for understanding both the cognitive and affective dimensions of learning.

4.2. Storytelling and Astronomy with Language Development

Astronomy is an extremely suitable learning area for storytelling. Stories give children the opportunity to make sense of abstract concepts within concrete storylines (Kapsala & Mavrikaki, 2020). For example, a story titled "The Sun's Tired Day" can describe how the Sun rises every morning and goes to rest in the evening. This story helps children intuitively grasp the day-night cycle.

Storytelling activities support scientific thinking and awareness of causality along with language development. After the story, the teacher can ask questions such as:

"Why might the Sun be tired?"

"What else do you think changes when night falls?"

Such questions develop children's ability to produce explanations, establish cause-and-effect relationships, and verbally express their observations (French, 2004). In addition, astronomy activities supported by stories ensure the integration between the "language and cognitive development areas" of the Turkey Century Education Model (MONE, 2024).

4.3. Drama and Role-Playing Approaches

Drama supports learning through physical expression in early childhood. Astronomy-themed dramas allow children to discover abstract concepts through "thinking with the body" (Lobman, 2018).

For example, in an activity called "Sun, Moon, and Earth Dance," children are selected in groups of three: one is the Sun, one is the Earth, and one is the Moon. While the Sun remains stationary, the Earth revolves around it; the Moon revolves around the Earth. This dramatic enactment concretizes concepts such as the Earth's rotation and the Moon's orbit.

Drama activities develop children's scientific awareness and empathic thinking skills. They also support communication within the group, movement coordination, and emotional expression skills.

4.4. Integration of Art, Design, and Creativity

Art allows children to internalize the aesthetic aspects of astronomical concepts. Children can express their observations of the sky through drawing, painting, collage, or three-dimensional model design. These activities can develop children's observation skills, attention to detail, and creativity.

For example, in an activity called "My Galaxy," children are given black cardboard and glitter paints. Children draw their own galaxies, name their planets, and describe them. This develops both spatial awareness and original expression skills (Varelas et al., 2010; Walan & Enochsson, 2019).

From a STEAM perspective, art acts as a bridge connecting the disciplines of science and engineering. Children can experience both visual design and scientific modeling processes together.

4.5. STEAM-Based Applications

Astronomy is, by its very nature, an interdisciplinary field of science. Therefore, when integrated with the STEAM approach, it can produce powerful learning outcomes.

Below are examples of STEAM activities that can be implemented at the preschool level:

Activity 1. Finger Rocket **Objective:** To help children recognize that movement is created by air pressure. **Materials:** Pipette, A4 paper, tape, scissors, felt-tip pen. **Process:** 1. Children draw and cut out small rockets from A4 paper. (A ready-made rocket model can also be provided.) 2. The bottom of the rocket is sealed with tape, leaving enough space for the straw to fit through. 3. The rocket is placed on the pipette and blown to launch it. 4. A discussion is held: "Whose rocket went farther?" **Developed Skills:** Motor skills, measurement, establishing cause-and-effect relationships, observation. **Evaluation Questions:** 1. Why did the rocket move? 2. What could be changed to make it go farther? 3. What happened when you blew?	**Activity 2. Water Rocket** **Objective:** To experience the relationship between pressure and force. **Materials:** Plastic bottle, water, water rocket kit, pump. **Process:** 1. The bottle is shaped into a rocket and decorated as desired. 2. The bottle is filled halfway with water. 3. The bottle is placed on the rocket ramp and air is pumped into it. 4. When the pressure increases, the trigger is pulled and the rocket is launched upward. 5. The rocket flight is observed and the results are discussed. **Developed Skills:** Scientific process, cause and effect, attention, problem solving. **Assessment Questions:** 1. Why did the rocket take off? 2. What can be done to make it fly higher? 3. What would happen if there were no air?	**Activity 3. Astronaut Mask** **Objective:** To introduce astronauts and raise awareness about life in space. **Materials:** Paper plate, aluminum foil, string, paint, scissors. **Process:** 1. Cut the center of the cardboard plate to form a mask shape. 2. Cover it with foil and tie the string. 3. Children act out a drama themed "If I were an astronaut...". **Developed Skills:** Language skills, social-emotional development, creativity. **Assessment Questions:** 1. Why do astronauts wear special suits? 2. What might they encounter in space? 3. If you were an astronaut, what would you discover?

Activity 4. Planet Necklace **Objective:** To learn about the solar system and develop sequencing skills. **Materials:** Beads, string, planet images. **Process:** 1. Each bead represents a planet. 2. Children string them in order on the string to create "planets moving away from the Sun." 3. The necklace is worn, and the names of the planets are said aloud. **Developed Skills:** Sequencing, visual matching, color–size awareness. **Assessment Questions:** 1. Which planet is closest to the Sun? 2. Which was the largest planet? 3. If you were an alien, which planet would you want to live on?	**Activity 5. My Own Telescope** **Objective:** To learn about observation tools and understand the principles of a telescope. **Materials:** Cardboard or plastic tube, plastic lens, paint, tape, **Process:** 1. Children connect two cardboard tubes. 2. A thin-edged lens is placed on the front, and a thick-edged lens is placed on the back. 3. The telescope is painted and decorated. 4. A "Sky Observation Hour" is held, and children observe the sky from the window. **Developed Skills:** Observation, hand–eye coordination, creativity, science awareness. **Evaluation Questions:** 1. What did I see with my telescope? 2. What is a real telescope used for? 3. What did I notice while observing?	**Activity 6. Journey Through the Sky at the Planetarium** **Objective:** For children to observe stars, planets, and the sky in a professional planetarium environment in three dimensions **Materials:** Planetarium **Process:** 1. The teacher explains to the children what a planetarium is. 2. They spark curiosity by saying, "There is a place where we can observe the sky even during the day." 3. Concepts such as stars, planets, and the Moon are introduced to the children with pictures. 4. The children are taken to the planetarium. 5. A related film is watched. **Developed Skills:** Cognitive: Observation, attention, establishing cause-and-effect relationships. **Evaluation Questions:** 1. What did you see in the planetarium? 2. How did the stars appear to you? 3. Which planet interested you the most? 4. What would you like to do if you were in space?

Activity 7. Moon Phases with Biscuits **Objective:** To identify and sequence the phases of the moon. **Materials:** Chocolate-filled cookies (e.g., Oreos), plastic knife, cardboard, pen. **Process:** 1. The cookies are split in half, and the cream is carved into different shapes to form the phases of the moon (New Moon, Crescent, First Quarter, Full Moon, etc.). 2. Children arrange the phases in the correct order and glue them onto the cardboard. 3. The teacher identifies which phase it is at each stage. **Developed Skills:** Fine motor skills, Sequencing, Science awareness, Attention development **Assessment Questions:** 1. Which cookie represents the Full Moon? 2. What shape is the crescent moon? 3. What do we call it when we see the entire moon?	**Activity 8. Star Hunt** **Objective:** To introduce the concept of constellations. **Materials:** Black cardboard, needle, flashlight. Process: 1. Punch holes in the cardboard and create a star pattern. 2. The flashlight is held from behind, and the stars are projected. 3. Each child names their own constellation. **Developed Skills:** Visual perception, pattern recognition, creativity. **Evaluation Questions:** 1. How do the stars appear? 2. Do the stars move? 3. What name did you give your own constellation?	**Activity 9. Observing the Sun with a Telescope** **Objective:** To help children understand the structure of the Sun, its ability to emit light, and its importance in the sky. **Materials:** A telescope with a safe solar filter for observing the Sun (special solar filter) **Process:** 1. The teacher explains to the children that the Sun is a star and a source of light. 2. It is emphasized that one should never look directly at the Sun for the sake of eye health. 3. The children take turns approaching and observing the reflected sunspots and the corona. **Developed Skills:** Science awareness: Concepts of light, heat, and stars. **Assessment Questions:** 1. What did you see through the telescope? 2. How did the Sun appear to you? 3. Why was the Sun so bright? 4. Why is it dangerous to look at the Sun with the naked eye?

Such activities develop children's scientific thinking, creative problem-solving, and interdisciplinary connection skills (Doğanay et al., 2024).

4.6. Teacher Role and Learning Environment Organization

Astronomy education is based on the teacher's guiding role. The teacher should be a "learning designer" who guides children's questions, helps them make sense of their observations, and continuously enriches the learning environment (Broström, 2015; Ravanis, 2017).

An effective astronomy learning environment:

- Includes experimental materials (globe, flashlight, mirrors, posters) in different corners,
- Encourages documenting learning with reflective tools such as observation journals and sketchbooks,
- Deepens children's thinking through open-ended questions,
- Includes group activities that support collaboration among students.

4.7. Family Participation and Astronomy Activities at Home

Families can support astronomy learning at home with reinforcing activities. For example, in a "Sky Observation Night" activity, families observe the evening sky with their children, draw the shape of the Moon, and bring it to school the next day. This activity strengthens both home-school collaboration and the child's sense of ownership of learning (Blanco-Chamborro et al., 2023).

Families can also read simple space-themed books with their children, organize trips to science centers, or use sky mobile applications together. In this process, teachers' guidance to families ensures the continuity of learning.

4.8. The Benefits and Applicability of Astronomy Activities in Special Education

Astronomy-themed STEM activities in early childhood provide rich learning environments that keep children's scientific curiosity alive and integrate learning with hands-on experience. These activities not only serve science education but also support children's cognitive, affective, social, and motor development domains. Particularly for children with special educational needs, astronomy themes offer multisensory, constructivist, and interactive learning processes that facilitate participation and meaning-making (Çakabay & Mete, 2025; Kaplan & Tekinarslan, 2020).

According to constructivist learning theory, children do not acquire knowledge directly but construct it through experience. Astronomy themes concretize this process of construction through observation, modeling, experimentation, and drama. The Türkiye Yüzyılı Maarif Model (MoNE, 2024) emphasizes the importance of holistic and inclusive learning environments that foster scientific inquiry in early childhood. In line with this approach, the astronomy activities developed within the "Overcoming Barriers with STEM" project have emerged as exemplary practices ensuring equal participation of children with special needs in learning processes.

The most significant contribution of astronomy-themed activities to special education is their ability to make abstract concepts tangible through multisensory experiences. Regardless of visual, auditory, attentional, or intellectual impairments, each child can actively participate in learning by engaging their most effective sensory channels. For example, the "Finger Rocket" and "Water Rocket" activities teach the relationship between air pressure and force while enhancing cause-and-effect reasoning. Children with visual impairments can feel different rocket surface textures, while those with hearing impairments can be guided through color cards. Such adaptations strengthen attention and motor coordination skills (Trundle, 2010).

The "Phases of the Moon" and "Moon Phases with Biscuits" activities support sequencing and classification skills. Children with visual impairments perceive the cream patterns on biscuits through touch, while those with intellectual disabilities engage with a simplified version of the model with fewer phases. For children on the autism spectrum, the phases are linked to daily life routines ("when the sun rises – when evening comes"), making learning more predictable, safe, and meaningful (Brenneman et al., 2019).

Activities such as the "Astronaut Mask" and drama-based practices significantly contribute to children's social and emotional development. By embodying a scientific role, children enhance empathy and identification skills. Children with visual impairments decorate their masks through touch, while those with hearing impairments express themselves through gestures, facial expressions, or sign language. For children on the autism spectrum, short and structured dramatic roles increase focus and communication skills (Lobman, 2018; Carr & Lee, 2012).

Art- and design-based activities also hold high potential in the context of special education. In "Planet Necklace" or "My Galaxy" activities, children develop awareness of color, size, and order. Children with visual impairments distinguish bead sizes by touch, while those with attention

difficulties benefit from high-contrast colors. Through these processes, children's creative thinking, expression, and planning skills are strengthened (Varelas et al., 2010; Walan & Enochsson, 2019).

The "Journey Through the Sky in the Planetarium" activity provides children with a three-dimensional observational experience that brings abstract astronomical concepts to life. Children with visual impairments benefit from audio descriptions; those with hearing impairments are supported by subtitles and visual content. Light and sound levels can be adjusted for children on the autism spectrum. This activity not only conveys scientific knowledge but also fosters curiosity, attention, and emotional security (Blanco-Chamborro et al., 2023).

One observation-based activity, "Observing the Sun Through a Telescope," helps children develop scientific awareness. Using safe observational tools, children experience and understand the concepts of light and heat. For children with visual impairments, temperature differences are introduced through tactile experiences; for those with hearing impairments, explanatory subtitles accompany the video demonstrations.

When implemented under teacher guidance in individualized and multisensory ways, all these activities create inclusive learning environments for children with special educational needs. Family involvement further reinforces learning permanence. Small home tasks such as "Sky Diary" or "My Star" can extend curiosity beyond the classroom (Siry et al., 2023).

In conclusion, astronomy-based STEM activities in early childhood special education serve not only science teaching but also the development of social participation, communication, self-confidence, and creativity. Findings from the "Overcoming Barriers with STEM" project demonstrate that such activities enable each child to participate in scientific processes according to their capacities, making learning genuinely inclusive. In this sense, astronomy themes act as a strong educational bridge that embodies the idea of "science for every child" in early childhood education.

5. Assessment and Observation Processes

For astronomy education to be effective at the preschool level, it depends not only on children's participation but also on the systematic observation and evaluation of learning processes. In early childhood, evaluation focuses more on understanding how children's thinking, observation, questioning, and curiosity behaviors develop rather than measuring cognitive gains (Shepard et al., 2018).

Therefore, the assessment process in astronomy education should be conducted using an observation-based, qualitative, child-centered, and process-oriented approach. This approach provides a holistic picture of the child's learning process and strengthens the teacher's pedagogical guidance (Worth & Grollman, 2003).

5.1. The Philosophy of Assessment Approaches

Astronomy education in preschool focuses on the process of discovery, curiosity, and explanation as much as on conceptual accuracy. Therefore, assessment should aim to understand "how the child thinks and learns" rather than "what the child knows" (Fleer, 2009).

In this context, three fundamental assessment approaches come to the fore:

Observation-Based Assessment: Systematic observation of the child's behavior during play, drama, storytelling, or activities.

Performance-Based Assessment: Examining the child's process of creating a product (e.g., making their own telescope, creating a model of the phases of the moon).

Reflective Assessment: Providing the child with the opportunity to express their own thoughts verbally, through drawings, or dramatically.

These approaches reflect not only the extent to which children understand astronomy concepts, but also how they develop scientific awareness in their learning processes (Trundle, 2010).

5.2. Key Components of the Observation Process

In early childhood astronomy education, observation is both a learning tool and an assessment strategy. The teacher systematically records how children make their observations, what clues they pay attention to, and how they construct their explanations.

An effective observation process includes the following steps:

Planning: Pre-determining the behaviors, concepts, and learning objectives to be observed.

Observation: Recording the child's behavior in their natural learning environment (during play, drama, storytelling).

Interpretation: Comparing observations with children's cognitive development level and teaching goals.

Reflection: Reorganizing teaching strategies based on the observations.

This process is consistent with the formative assessment approach; it provides continuous feedback throughout the learning process (Black & Wiliam, 2009).

Some key behavior categories that can be observed in astronomy-themed learning processes are as follows:

Table 1. Observation categories

Category	Examples of Behaviors to Observe	Assessment Indicator
Curiosity and Exploration	Asking questions about the sky, wanting to observe	Asks cause-and-effect questions such as "Why does night fall?"
Observation Skills	Carefully examining objects, noticing changes	Notices that the length of shadows changes over time
Questioning and Prediction	Formulating hypotheses, proposing explanations	Provides logical explanations to questions such as "What would happen if there were no sun?"
Communication and Sharing	Expresses observations verbally, through drawings, or dramatically	Can explain the results of their observations to their friends
Creativity and Production	Creating astronomy-themed products	Defines the characteristics of their own "planet" by designing it
Scientific Attitude	Patience, attention, open-mindedness, cooperation	Behaves carefully while observing, respects others' ideas

This table enables teachers to systematically monitor children's astronomy-themed learning processes through qualitative indicators.

The tools used to assess astronomy learning in preschool are tools that reflect the child's active participation and document the observation and production processes. The tools highlighted in the literature are as follows:

Observation Forms: Short notes or checklists where the teacher systematically records their observations during the activity.

Anecdotal Records: Short, descriptive notes taken by the teacher when the child exhibits a specific behavior.

Portfolios: Personal development files that bring together the child's drawings, models, stories, and observation records.

Video/Photographic Evidence: Visual documentation of the observation process facilitates subsequent analysis by teachers.

Child Journals or "Sky Journals": Tools in which children record their own observations through drawings and brief explanations (Patrick & Mantzicopoulos, 2015).

These tools can be used not only for assessment purposes but also to help children develop self-assessment and reflective awareness (Carr & Lee, 2012).

Table 2. Sample Observation Form: "Exploring the Sky"

Observation Area	Behavioral Indicator	Observation Note / Example Situation
Curiosity and Exploration	Asks questions about celestial objects	Asks, "Why do stars twinkle?"
Observation Skills	Notices changes in the sky	Shares the observation, "The moon was bigger yesterday."
Communication	Shares his observations with his peers	Tells about their own observation drawing in the story corner.
Creativity	He creates original drawings related to the sky.	"There are purple clouds on my planet," he says.
Scientific Attitude	He observes patiently and carefully.	He watches the sky for 5 minutes, observing quietly.

This form visualizes both the teacher's individual observation notes and the child's progress in the learning process.

The collected observation data should be interpreted not only for quantitative scoring purposes but also to help the teacher reorganize the learning environment. For example, if the majority of children think that shadows are fixed, the teacher can reinforce this concept with a new experimental activity.

Thus, assessment functions not as an "outcome" but as a "process that guides learning" (Worth & Grollman, 2003). This approach is also directly aligned with the TCEM values of "discovering, observing, and creating."

The Turkey Century Education Model (TCEM) emphasizes that assessment in preschool should be a process that documents and supports the child's development, not one that ranks them (MONE, 2024). This understanding shifts teachers in astronomy education into the role of "observer-researcher."

According to TCEM, the teacher:

- Personalizes each child's observation process,
- Organizes learning environments based on observation data,
- Designs differentiated learning paths that support children's curiosity.

This approach enables children who develop scientific awareness at an early age to acquire lifelong learning skills.

6. Conclusions and Recommendations

Early childhood is a critical developmental stage where the foundations of children's perceptions of their environment, curiosity, and thinking patterns are laid. Astronomy education provided during this period not only helps children acquire knowledge about the sky, but also supports the development of fundamental cognitive skills such as scientific thinking, observation, questioning, and explanation (Plummer, 2015). Astronomy enables children to view the natural phenomena they observe in their environment through a scientific lens, which forms the cornerstone of scientific literacy at an early age.

The theoretical and practical framework presented in this book chapter demonstrates that astronomy education in early childhood is shaped around four fundamental axes: (1) developmental appropriateness, (2) constructivist learning, (3) interdisciplinary integration, and (4) pedagogical creativity.

Astronomy stimulates children's natural curiosity and makes learning meaningful. Children encounter phenomena such as the Sun, Moon, and stars at an early age. These observations trigger questions of "why" and "how" in them. Therefore, astronomy themes provide an ideal context for preschool science education (Ampartzaki & Kalogiannakis, 2016; French, 2004).

Conceptual development requires concrete experiences as well as abstract thinking. Children may struggle to grasp concepts such as the shape of the Earth, the phases of the Moon, or the day-night cycle in the abstract. At this point, modeling, observation, storytelling, and play-based activities are effective tools that support conceptual change (Vosniadou & Brewer, 1992; Trundle, 2010).

Integration plays a key role in pedagogical approaches. The STREAM approach (Science, Technology, Reading, Engineering, Arts, Mathematics) enriches astronomy education not only with science learning but also with

dimensions of art, language, and engineering. Thus, children develop both creative and analytical thinking skills (Doğanay et al., 2024).

The assessment process is part of learning. In astronomy-based activities, the use of observation, portfolio, and story-based assessment tools are important elements that document the child's learning process and provide pedagogical feedback to the teacher (Black & Wiliam, 2009).

TCEM provides a strong national framework for astronomy education. The Turkey Century Education Model (MONE, 2024) centers curiosity, observation, production, and value-based learning in science, nature, and the environment in early childhood. This philosophy supports both the scientific and aesthetic aspects of astronomy themes.

Consequently, astronomy education in the preschool period contributes not only to children learning scientific concepts but also to them becoming individuals who discover, observe, and question themselves. The cognitive and emotional bond established with the sky at an early age nourishes children's awareness of nature, their power of curiosity, and their creativity.

Therefore, astronomy education is a learning area that directly aligns with the principles of the Turkish Century Education Model: "scientific curiosity, aesthetic sensitivity, and value-based learning." Early childhood astronomy education, which combines interdisciplinary approaches (STEAM) with pedagogical creativity, will lay the foundation for raising future scientifically literate generations.

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Chapter 2

The Effect of an Environmental Education Program Module Based on Nature Experience on the Environmental Awareness of Preschool Children

Kübra Yildiz Şen[1]

Bahattin Aydinli[2]

Abstract

This study investigates the impact of a nature experience-based environmental education module program on preschool children's environmental awareness. A mixed-methods design was employed, incorporating a case study as the qualitative component and a one-group pretest–posttest experimental design as the quantitative component. The study group consisted of ten children (four girls and six boys) aged 60–72 months, enrolled in a kindergarten and previously not received any formal environmental education. The program was implemented over nine weeks, with weekly one-day sessions conducted in a designated forest area. Data were collected through a semi-structured interview form developed by the researcher and the Children's Environmental Scale developed by Koçak Tümer and Temel (2021). Qualitative data were analyzed using content analysis, while quantitative data were examined using a paired-samples t-test to compare pretest and posttest results. The findings revealed that, following participation in the program, children demonstrated increased knowledge and awareness regarding concepts such as the environment, environmental pollution, environmental protection, living beings, and recycling. Moreover, the posttest mean scores were found to be significantly higher than the pretest mean scores. These results indicate that the nature experience-based environmental education program positively influenced preschool children's environmental awareness, suggesting

1 Bilim Uzmanı,

2 Prof. Dr., Kastamonu University, baydinli@gmail.com, 0000-0002-6525-4162

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that nature-based learning activities can effectively foster environmental consciousness in early childhood education.

In an era where children are increasingly disconnected from nature and tend to perceive the environment as an abstract concept, there is a pressing need for experiential learning environments that enable direct interaction with nature and nurture both environmental affection and awareness. Therefore, environmental education should extend beyond classroom walls, providing children with opportunities to explore, experience, and appreciate their surroundings. The nature-loving child of today will become the environmentally responsible adult of tomorrow, thereby laying the foundation for a sustainable future.

1. Introduction

Nature has held an important place in human life throughout all ages. However, humankind has often perceived nature as an inexhaustible resource and has exploited all living and non-living elements of the natural environment without hesitation. With the increasing human population, urbanization, and industrialization, the extent of environmental damage has grown, and environmental problems have become more visible (Bozkurt & Cansüngü-Koray, 2002). As environmental problems intensify, societies are increasingly affected by them (Baykal & Baykal, 2008). While environmental problems diminish current quality of life, they simultaneously threaten the living conditions of future generations. As the impacts of environmental degradation have become more apparent, human concerns have increased, and various solutions have begun to be proposed. In this context, environmental declarations and conventions have been signed, and environmental conferences have been organized.

For previous generations, outdoor experiences were not considered a significant issue, as children naturally spent most of their time outdoors. "However, children today are unable to spend sufficient time in nature. It has been shown that children of today are approximately 40% less active than children thirty years ago" (Civelek & Uyanık, 2021, p. 251). Early childhood experiences shape future attitudes; therefore, a child who grows up interacting with trees, animals, and soil develops a sense of affinity toward nature later in life. Froebel emphasized that children should grow up in close contact with nature. Conversely, Rousseau (1762, as cited in Akagündüz, 2005) argued that correcting improper behaviors acquired during early childhood becomes increasingly difficult in later years. In this regard, nature-based experiential activities provide an opportunity for children to engage closely with nature and strengthen their connection with

it. Early environmental education stimulates children's curiosity toward nature and the environment (Gülay & Önder, 2011). This curiosity helps children understand the environment, develop environmental awareness, and sustain environmentally responsible behaviors throughout their lives. The earlier environmental education begins, the sooner correct environmental behaviors develop and the sooner these behaviors yield positive outcomes (Grodzinska-Jurczak et al., 2006). For this reason, developing children's understanding of nature and the environment should be an integral part of preschool education. Monroe et al. argued that effective environmental education is possible only through close contact with nature (Monroe et al., 2013, as cited in Ahi & Alisinanoğlu, 2016). Learning about the environment through direct experience in nature is more effective than learning about it through screens or from teachers.

In line with these considerations, the central problem addressed in this study is: What is the effect of nature-based environmental education on preschool children's environmental awareness? From this main problem, the following sub-problems were identified:

* Does a nature-based environmental education program have a significant effect on preschool children's environmental awareness?

* Do children's views on the concepts of environment, environmental protection, environmental pollution, and recycling change after the nature-based environmental education program?

1.1. Nature-Based Environmental Education and Environmental

The environment encompasses all elements that influence human life, while humans constitute one of the most significant factors affecting the environment. Gore (1993) defines the human–environment relationship as follows: "To believe that we are separate from nature is to misunderstand our place in the natural cycle of life and to fail to comprehend the natural processes that affect us and that we, in turn, affect" (p. 156).

In the literature, various terms such as nature education, nature-based education, outdoor education, environmental education, field-based education, and outside-the-classroom education are often used interchangeably or with similar meanings. Priest (1990) describes outdoor education as experiential learning that activates all senses. In several studies, nature education has been used synonymously with environmental education (Ozaner, 2004; Kalender, 2010). However, Erdoğan (2011) argues that nature education and environmental education are distinct concepts that are often confused with one another. Özdemir (2010) emphasizes that nature-

based environmental education is a unique educational program supported by activities conducted in natural settings, differing from formal environmental education, which does not necessarily require nature-based implementation. While environmental education can be carried out indoors, nature education must take place outdoors—within designated time frames—and it enhances active participation through nature experiences, enabling close observation and understanding of the natural environment. Accordingly, this study employed nature-based environmental education to explore the role of nature experiences in fostering environmental awareness.

Environmental education provided during early childhood is crucial for promoting positive environmental attitudes later in life. Thus, the preschool period is critical for the development of environmental knowledge, awareness, attitudes, and behaviors. As in many domains, direct instruction on environmental issues is often insufficient during early childhood (Chawla & Hart, 1995). A substantial portion of environmental knowledge and awareness is acquired through outdoor, experience-based learning (Gülay Ogelman & Önder, 2011). Learning begins with curiosity, and nature experiences foster curiosity, encouraging exploration and facilitating learning. Nature is in a constant state of change—trees that transform with the seasons, migrating birds, ants building new nests, puddles formed after rain, drying flowers, sprouting plants, and various mushroom species offer children continuous opportunities for observation and discovery. In this sense, nature serves both as a unique educational environment and as a teacher that continually renews itself.

Nature-based environmental education programs enhance children's ability to empathize with nature (Atasoy, 2006). They enable children to develop meaningful experiences related to nature and foster responsible attitudes and behaviors toward the environment. There is a strong relationship between the amount of time children spend in nature and their attitudes toward the natural world. Children who regularly interact with nature tend to develop more positive attitudes toward protecting it.

Experiences in nature allow children to observe ecological balance and encourage behaviors that avoid disrupting natural systems. These experiences help children understand the value of resources, appropriate usage, and the importance of conservation. Encouraging the responsible use of natural resources supports movement toward sustainable living. In 1978, Theimer investigated the factors influencing environmentally conscious behaviors among adults and concluded that the most significant determinant—by far—was childhood experiences in natural environments. The solution to

environmental problems lies in fostering a strong emotional connection to nature, and this bond begins when children physically interact with the earth.

2. Methodology

This study employed a mixed-methods research design, incorporating both qualitative and quantitative approaches. Mixed-methods research involves the use of both qualitative and quantitative data within a single study (Creswell, 2005). In this research, an embedded mixed-methods design was preferred, in which quantitative data were supported by qualitative findings.

The qualitative dimension of the study was designed as a case study. In this context, a holistic case study design was adopted to conduct an in-depth examination of the environmental awareness of the participating children.

The quantitative dimension of the study was based on a one-group pretest–posttest experimental design. In this design, the effect of the intervention is examined by comparing the pretest and posttest scores obtained from a single group.

2.1. Study Group

The study group consisted of 10 children (4 girls and 6 boys) aged 60–72 months, all of whom were attending an independent preschool. None of the children had previously received environmental education, and all demonstrated normal developmental characteristics. A convenience sampling method, one of the non-random sampling techniques, was used to determine the study group.

2.2. Data Collection Tools

To assess preschool children's nature-based environmental awareness, a semi-structured interview form was developed by the researcher. The form was designed to explore children's environmental awareness and consisted of eight open-ended questions addressing the concepts of environment, environmental pollution, environmental protection, conservation of living things, air pollution, water pollution, soil pollution, and recycling.

For quantitative data collection, the "Environmental Scale for Children," developed by Koçak Tümer and Temel (2021), was administered. This scale was designed to measure preschool children's level of environmental awareness and had undergone validity and reliability testing. Necessary permissions for use were obtained from the developers.

2.3. Data Collection Process

After obtaining consent from participating children and their families, the semi-structured interview form was administered as a pretest. The qualitative data collection was followed by the administration of the "Environmental Scale for Children" as the quantitative pretest.

The nature-based environmental education program was implemented over a period of nine weeks, consisting of half-day sessions based on planned activities. Following the intervention, the semi-structured interview form and the environmental scale were administered again as posttests.

2.4. Nature-Based Environmental Education Program

The primary aim of the nature-based environmental education program was to enhance children's environmental awareness and promote positive attitudes and behaviors toward the environment. The program was developed through a review of the literature related to "environment," "environmental education," and "nature experience," and was modeled after the Minik TEMA program and the Ministry of National Education (MoNE) Preschool Activity Book. It was aligned with the cognitive, language, social-emotional, motor, and self-care developmental goals and indicators of the MoNE 2013 Preschool Education Program.

The program was planned as a nine-week process. The researcher identified nine themes and included one theme each week. Each week, an activity plan was implemented, and all activity plans were designed as a half-day learning plan. The activity plans generally included a starting point for the day, free time, two main activities, and a final evaluation. Each activity plan included free time activities, allowing children to spend time freely in nature, play in nature, and explore nature on their own. The implementation process involved implementing the researcher's weekly theme and activities planned to align with that theme in a designated forest area. The researcher's role during the implementation process was to implement environmental activities based on nature experiences and to guide the children during this implementation.

Table 1. Environmental education activity production based on nature experience

Weeks		
1	Getting to Know the Forest	Activity 1: Forest Rules Activity 2: Forest Walk
2	Getting to Know the Plants	Activity 3: Tree Snatching Activity 4: Colors of the Forest
3	Getting to Know the Animals	Activity 5: Feeding the Birds Activity 6: Where Are the Insects?
4	Getting to Know the Soil	Activity 7: What Hide in the Soil Activity 8: What is Erosion?
5	Clean Soil	Activity 9: What Dissolves in the Soil Activity 10: Composting
6	Clean Air	Activity 11: Where is the Air? Activity 12: What Does a Tiny Sapling Want?
7	Clean Water	Activity 13: Is This Water Clean? Activity 14: Rope Bridge
8	Recycling	Activity 15: What is Recycling? Activity 16: What Can You Make from Wood?
9	Sustainability	Activity 17: Making Natural Paint Activity 18: Making Stick Men

2.5. Data Analysis

The qualitative data consisted of interview transcripts. Content analysis was employed to analyze these data in detail. All audio-recorded interviews were transcribed verbatim. The researcher checked the accuracy of the transcripts by re-listening and re-reading them. Once accuracy was ensured, coding began. Codes were generated after multiple readings, compared for similarities and differences, and organized into themes.

To determine whether pretest and posttest scores followed a normal distribution, the Shapiro–Wilk test was conducted. Since the scores showed normal distribution, a paired-samples t-test was used to examine whether the difference between pretest and posttest scores was statistically significant. The KR-20 internal consistency coefficient was calculated for the reliability of the scale.

3. Findings

3.1. Children's Definitions of the Environment

Two of the children were unable to provide a meaningful response to the question "What is the environment?". As shown in Table 2, the children's answers to the question "What is the environment?" were categorized as "Botanical elements," "Forest/Nature," "Habitat," "Animal elements,"

"A place that should be clean," and "Aesthetic," respectively. In the initial interview responses, the most frequently mentioned themes were Botanical elements and Forest/Nature.

Table 2. Children's Responses to "What is the Environment?" Before the Activities

Theme	Codes	n	Sample Expressions
ENVIRONMENT	Forest/ Nature	4	*S2 "Environment forest means"* *S8 "Our nature means."* *S9 "For example forests."* *S10 "Forest, animals lived in place."*
	Plant Elements	5	*S2 "Trees means."* *S4 "Lawn means."* *S6 "Garden."* *S7 "Bushes coming. Trees coming. Trees provide us with oxygen gives."* *S9 "Nature It means. Trees means."*
	Habitat	3	*S5 "We live in place. It means world."* *S8 "So the weather to take for outside to travel."* *S10 "People picnic like can do."*
	Animal Elements	2	*S9 "About animals One place."* *S10 "Animals lived in place."*
	Place that needs to be clean	1	*S2 "The World clean to be, to the world rubbish not to throw away."*
	Aesthetic	1	*S6 "People will look after One place. View."*

Table 3. The answers given by the growing children to the question "What is the environment?" in the last interview constituted the codes "Habitat", "Forest/Nature", "Plant elements", "Animal elements", "Place that needs to be clean" and "Aesthetics".

Table 3. Children's Responses to "What is the Environment?" After the Activities

Theme	Codes	n	Sample Expressions
ENVIRONMENT	Forest/ Nature	6	*S2 "Environment forest means."* *S4 "Environment nature means."* *S8 "Our nature."* *S10 "Environment It is nature. Forest, nature well forest is coming."* *S9 "Nature, Nature animals is friendly."* *S7 "Clean air, beautiful air trees breath takes."*
	Plant Elements	5	*S5 "There are fruits and trees."* *S7 "Bad weather trees breath takes."* *S8 "There are flowers too."* *S9 "Trees, leaves, flowers."* *S10 "Trees there is."*
	Animal Elements	5	*S5 "Animals live well.and animals damage Don't let him see."* *S7 "Birds house of giraffes house. environment to animals respect to give and to love"* *S8 "There animals lives. Dog cat live."* *S9 "Nature animals is friendly."* *S10 "Animals, trees there is."*
	Place that needs to be clean	5	*S2 "Environment It is clean. The environment not to pollute."* *S5 "And the world trashy absence necessary."* *S6 "Dumps to collect, not to give off a bad smell."* *S7 "In humans rubbish if he throws Animals eat too. That 's why rubbish Let's not throw it away."* *S8 "And people outside when it comes out rubbish He throws and we collect."*
	Habitat	5	*S1 "Environment for example our workplace, our homes."* *S3 "For example Turhal means there Beautiful things okay, game park, playground They have their places."* *S4 "Environment children will play One It is the place. Children income plays."* *S5 "Environment World means. People is place."* *S6 "So people One family's children will play One place for example parks It's happening."* *S8 "Very big One place. Everywhere There are children in the houses. interest there games They play."*
	Aesthetic	1	*S3 "Environment Beautiful One is something."*

The number of responses given in the final interview was generally similar. In the final interview, the children's responses varied considerably, and they responded to multiple codes. The code " Place that needs to be clean " showed the largest increase in response numbers between the first and last interviews. Comparing the number of responses from the first and

last interviews, there was an increase in the number of responses for the majority of the codes. In the first interview, the number of responses for the plant elements code was 5, while the number of responses for animal elements was 2. In the final interview, the children included plant and animal elements (n=5) at equal levels.

3.2. Factors That Pollute the Environment

When Table 4 is examined, it is seen that all children responded "Garbage" to the question "What pollutes the environment?" in the interview. Other codes generated from the children's responses are "Dust/soil/mud," "Recyclable Waste," "Organic Waste," "Animals," and "Smoke."

Table 4. Children's Responses to "What Pollutes the Environment?" Before the Activities

Theme	**Codes** n		**Sample Expressions**
ENVIRONMENTAL POLLUTION	Trash	10	*S2 "Garbage, biscuits garbage, water bottle, ice cream garbage, lemonade garbage."* *S3 "Garbage inside One things when it spills gets dirty."* *S4 "Garbage throw, for example garbage they overthrow."* *There is garbage everywhere if we throw gets dirty."* *S8 "Garbage. And people Sometimes rubbish throw away " can pollute."*
	Dust / soil / mud	5	*S3 "Soil. Soils when it dries."* *S4 "Soil. Soil in our hands If we take it, it will scatter everywhere and dust It is possible."* *S10 "Mud"*
	Recyclabe Waste	5	*S7 "Paper"* *S9 "Bottles, plastic well"* *S10 "The bottle is broken windows."*
	Organic Waste	3	*S7 "Banana peels, apples, potatoes shell"* *S8 "Throwing food on the floor"* *S9 "Leaves"*
	Animals	1	*S5 "Chickens pollutes. poop what he did for."*
	Smoke	1	*S4 "Smoke also pollutes. Houses smoke etc."*

In the final interview, the children were given five codes: "Garbage," "Recyclable Waste," "Smoke," "Dust/soil/mud," and "Chemical Waste." As in the first interview, all children responded with garbage. While the "Organic Waste" code from the first interview was not present in the final interview, the code for "Chemical Waste," which was among the codes from the first interview, was present. This code referred to children's pesticides and batteries.

Table 5. Children's Responses to "What Pollutes the Environment?" After the Activities

Theme	Codes	n	Sample Expressions
ENVIRONMENTAL POLLUTION	Trash	10	*S2 "Garbage if we throw becomes dirty."* *S4 "People to our world rubbish when you throw."* *S6 "Garbage for example People rubbish if he throws gets dirty."* *S7 "Garbage And unnecessary things pollutes."*
	Recyclable Waste	9	*S7 "Plates, paper, plastics, napkins, bags, glass"* *S8 "Plastics, boxes"* *S10 "Plastic bottles, glass bottles."*
	Smoke	5	*S4 "Smoke is everywhere like this covered from houses from cars."* *S5 "Cars smoke pollutes. Smoking smoke pollutes."* *S7 "The car engine (…) smoke It turns out either " behind his back."*
	Abiotic Elements Dust / soil / mud	2	*S1 "Soil, mud"* *S2 "Mud if we throw stone if we throw and water if we pour mud It is possible becomes dirty ."*
	Chemical Waste	2	*S9 "Plants bad maker drugs"* *S4 "Finished batteries when you throw the environment is also very filthy " It's happening "*

While five children mentioned the code "Recyclable Waste" in the first interview, this number increased to nine in the last interview. Similarly, the number of "Smoke" responses from one child in the first interview increased to five in the last interview. Furthermore, while five children in the first interview stated that dust, soil, and mud pollute the environment, in the last interview, only two children believed that dust, soil, and mud pollute the environment. The decrease in the number of responses related to this code indicates a shift in children's perceptions of the environmental pollution caused by soil and mud

3.3. Ways to Protect the Environment

The first interview codes for the question "What can we do to protect our environment?" were " We should clean," "We must not pollute," " We should protect plants," " We should plant plants," " We should protect animals," and " We should recycle." The most common response in this theme was for the code " We should clean." Children believed that to protect our environment, We should clean it the most.

Table 6. Children's Responses to "How Can We Protect the Environment?" Before the Activities

Theme	Codes	n	Sample Expressions
ENVIRONMENTAL PROTECTION	We should clean	6	*S1 "We must clean the garbage everywhere, wherever it is dirty."* *S3 "We need to wash our environment (…)."* *S8 "We have to clean it. We have to collect and throw away the garbage."* *S9 "We must clean up nature. We'll each take a broom and clean up all the garbage."*
	We should not pollute	4	*S2 "We have to throw it into nature, throw it in the trash, or if we cannot throw it away, we have to give it to uncles."* *S6 "We should not throw garbage, otherwise everywhere will get dirty."* *S7 "I throw garbage in the trash, I never throw it on the ground."*
	We should protect Plants	1	*S9 "We can water the environment. Trees, grass, (…)."*
	We should plant plants	1	*S3 "We should always plant flowers."*
	We should protect Animals	1	*S9 "We can give water to the environment. (…), to animals."*
	We should Recycle	1	*S5 "We need to throw it in the recycling bin."*

The final interview responses included 10 codes: "We Shouldn't Pollute," "We Should Clean," "We Should Protect Plants," "We Should Protect Animals," "We Shouldn't Recycle," "We Should Protect Our Air," "We Should Protect Our Water," "We Should Plant Plants," "We Should Compost," and "We Should Prevent Fires." The code with the highest number of responses under this theme was "We Shouldn't Pollute."

Table 7. Children's Responses to "How Can We Protect the Environment?" After the Activities

Theme	Codes	n	Sample Expressions
ENVIRONMENTAL PROTECTION	We should not pollute	6	*S1 "We should not pollute, we should collect what we pollute, otherwise our environment will be polluted and bad.* *S4: "We need to stop them together with our parents. We tell people not to throw them."* *S5 "We need to take good care of our environment and our world. It is not okay to pollute everywhere with garbage."* *S9 "We should take care, not pollute."*
	We should clean	4	*S4 "That 's why we need to clean the nature and the environment."* *S6 "Collecting the garbage, (..) cleaning the house and outside."* *S8 "We must clean up the garbage"*
	We should recycle	5	*S2 "We should also recycle plastics."* *S5 "We need to throw it in the recycling bin."* *S10 "We can recycle. For example, you will recycle the water bottle."*
	We should protect plants	3	*S5 "And it should be grassy, We should not mistreat the grass."* *S7 "Trees should not be cut down because trees breathe."* *S9 "We should water the flowers."*
	We should protect animals	2	*S10 "We must build homes for animals"* *S4 "For example, when they throw gum, birds come and stick it in their beaks and they cannot eat, so they die."*
	We should protect our air	2	*S8 "Factories should operate without smoke."* *S10 "Not installing exhaust engines in cars"*
	We should protect our waters	2	*S5 "If the water is cut off, we will be left without water. We should not waste too much water."* *S9 "We should not pollute the water, we should take good care of it"*
	We should plant	1	*S3 "We should plant a lot of flowers because it looks very beautiful."*
	We should compost	1	*S8 "We should bury the peels of the fruits so that the soil is healthy."*
	We should prevent fires	1	*S8 "We should not throw away bottles and glass because they can sometimes burn with the heat of the sun and cause fire."*

When comparing the data from the first and last interviews, there was a decrease in the number of responses to the code " We should clean" while there was an increase in the number of responses to the code " We should not pollute." Before the implementation, there was only one response to the code " We should recycle," but after the implementation, five children stated that we should recycle to protect our environment. In the first interview, there was only one response to the code " We should protect plants," while

in the last interview, there were three responses. In the final interview, the codes " We should protect our air," "We must protect our water," " We should prevent fires," and " We should compost," which were not included in the first interview, were added.

3.4. Children's Understanding of Recycling

In the first interview, one of the children could not provide a meaningful answer to the question, "What is recycling?" The children's definitions of recycling were coded as "Turning into Something New," "Throwing Garbage in the Trash," and "Putting It in a Different Box."

Table 8. Responses to "What Comes to Mind When You Hear 'Recycling'?" Before the Activities

Theme	Codes	n	Sample Expressions
RECYCLE	Producing something new	6	*S2 "Toy cars sometimes breaks back transformation goes. For example wrinkled paper If I find it back transformation I can throw it, then it back " it transforms."* *S4 "Them back transforming well back " He gives us bottles and papers."* *S5 "Garbage again bottle to do. In recycling melted down and reused transformation " it's happening."* *S6 "Garbage back transformation to the box We throw away. Recycle We empty again we throw (…) they give us new paper like " gives."* *S8 "Some things One in the box or else to something put back transformation We take it. For example One empty paper We distorted One thing we drew that back pure white " is coming."* *S10 "Papers thrown, irons thrown away, glasses It is thrown away. It is also thrown away by the garbage collectors. Then he takes it They melt metal they transform ."*
	Throwing trash in the bin	2	*S3 "Garbage trash throw to the ground like not to throw away."* *S7 "Garbage means. In the trash when you throw rubbish car is coming " is taking."*
	Put in a different box	1	*S9 "For example This bottle, chocolate garbage. Them Another One to something We put later back transformation men It's coming but I don't know To where " they are taking away. "*

In the final interview, the codes " Producing something new" and " Throwing trash in the bin " were created for the question "What is recycling?" The majority of children defined recycling as producing and transforming something new.

Table 9. Responses to "What Comes to Mind When You Hear 'Recycling'?" After the Activities

Theme	Codes	n	Sample Expressions
RECYCLE	Producing something new	9	S1 "We threw things They take by truck They take away And They renew. Paper, plastic, cardboard. S2 "Recycling plastics to the new thing to transform. For example bottles, paper." S4 "Our environment to protect for old our belongings back transformation We throw it away. Then we take it back. turns into again our use for." S5 "We throw away our garbage waste box again We throw away our bottles. back transformation from the box take again We do it to school too again This " We are bringing." S6 "It is paper box, bottle box, glass box, cardboard box, bottle box. Because all mixes them. back Transformers again They are doing to the factory " they are taking away." S7 "Recycling to the machine expense glass It happens, flower It's okay. It's clean. whether back we will take it glass, flower " It will happen, we will package it." S8 "So the bottle produce paper produce cardboard produce, bag to produce." S9 "In the trash we shouldn't throw it away back transformation we must throw it back let it be glass etc. Recycling if we throw our nature protected let it be." S10 "Plastic bottles, metals again renew They can. Glass bottles They can do it. I waste I won't throw it away just nowhere back transformation " I'll throw it."
	Trash bin	1	S3 "In the box put. When finished rubbish " we will put it."

However, in their statements, S4 and S9 stated that recycling is important for the environment, unlike the first interview. S4 said, "We recycle our old items to protect our environment. Then they are recycled so we can use them again." S9 said, "We shouldn't throw them in the trash; we should recycle them so they can be returned, like cups. If we recycle, our nature will be protected."

S7's response in the first interview, "It means garbage. When you throw it in the trash, a garbage truck comes and picks it up," changed to "It goes into the recycling machine and becomes cups or flowers. It comes back clean and then becomes cups or flowers and is packaged" in the last interview. While S1's response in the first interview, "We come back and go back," did not provide a meaningful answer about the concept of recycling, his response in the last interview, "They take the things we throw away, take them away by truck and renew them," suggests that he has gained knowledge and awareness about recycling.

3.5. Quantitative Findings

To assess the impact of nature-based environmental education activities on preschool children's environmental awareness, the Shapiro-Wilk test was conducted to examine the normal distribution of the data before the test to examine the significance of the difference between the pre-test and post-test scores. The results of the analysis are presented in Table 10.

Table 10. Results of normality tests

	Shapiro-Wilk		
	Statistics	SD	p
Pre-test	0.868	10	0.094
Post-test	0.897	10	0.201

p <0.05

An examination of Table 4.22 indicates that the pretest and posttest scores have a normal distribution according to both normality tests, indicating that parametric tests can be used. Therefore, to assess the impact of nature-based environmental education activities on preschool children's environmental awareness, a dependent-samples t-test was conducted to examine the significance of the difference between the pretest and posttest scores. The results of the analysis are presented in Table 11.

Table 11. Dependent sample t-test results for the significance of the difference between pre-test and post-test scores

Environmental Awareness Levels	Measurements	n	Average	Ss	SD	t	p
	Pre- Test	10	12.88	2.29	9	-8,204	,000
	Post-Test	10	19.30	1.18			

****p<.001***

When Table 11 is examined, according to the dependent sample t-test result conducted to evaluate the effect of environmental education activities based on environmental nature experience applied to children for eight weeks on the environmental awareness of preschool children, it was concluded that the post-test mean scores of the children (X= 19.30) were significantly higher than the pre-test mean scores (X= 12.88) ($t = -8.204$, $p < .001$).

4. Discussion

4.1. Environment

The findings of this study demonstrate that preschool children most frequently defined the concept of the environment in terms of forests, nature, and plant-based elements, both before and after the intervention. Their perception of the environment largely revolved around green spaces. This aligns with the findings of Atabek-Yiğit et al. (2019), who similarly reported that children most commonly identified the environment with trees, flowers, and green areas. Likewise, Sahimi (2012) and Gür (2022) found that children tended to associate the environment with open, natural spaces.

Following the intervention, children more frequently incorporated animal-related elements into their definitions of the environment. Moreover, they increasingly described the environment as a living space, indicating an expanded and more integrated understanding. Before the intervention, some children perceived the environment as something separate from humans—an external place that humans visit. After the nature-based experiences, however, children began to recognize the environment as a system in which humans play an active role. This suggests that the educational program helped children move from a detached observer perspective to an understanding of humans as integral components of the environment.

Although children frequently identified living and natural elements, their references to non-living components were limited. This indicates an incomplete understanding of the environment as an interconnected system comprising both living and non-living elements. Çetin and Badem (2015) similarly found that primary school students tended to perceive the environment as a place rather than a system of interconnected biotic and abiotic components.

In the pre-intervention phase, some children were unable to define the environment meaningfully, whereas in the post-intervention phase, all children were able to articulate a definition—often with greater elaboration and specificity. Notably, many children added that the environment is "a place that should be clean," indicating increased awareness of environmental responsibility. This finding supports the conclusion that nature-based environmental activities contribute meaningfully to children's understanding of environmental concepts and the importance of maintaining environmental cleanliness.

4.2. Environmental Pollution

Before and after the intervention, all children identified trash as the primary environmental problem. Similar findings were reported by Yılmaz et al. (2016) and Erten (2003), who found that children commonly associated environmental problems with litter.

Half of the children initially stated that dust/soil/mud pollute the environment, reflecting an egocentric misconception—equating what dirties the child with what dirties the environment. Preschool children's developmental stage, characterized by egocentric thinking, may explain this association. After the intervention, however, the frequency of this misconception decreased markedly. This shift may be attributed to the hands-on activities encouraging children to touch soil and engage with natural materials, helping them understand that soil and mud are natural components of the environment and not pollutants unless misused.

Children demonstrated a substantial increase in identifying recyclable waste as a factor in environmental pollution after the program. This suggests that the intervention improved their ability to differentiate between ordinary trash and recyclable materials. Furthermore, children began mentioning chemical waste—including pesticides and batteries—for the first time, reflecting a broadened and more accurate understanding of environmental hazards.

These findings echo those of Gray et al. (2016), who reported that environmental education enhanced children's ability to identify more complex and specific environmental issues, such as water and soil pollution or deforestation.

Before the intervention, children focused almost exclusively on land pollution, with little awareness of air or water pollution. This pattern was similarly observed by Saz et al. (2020) and Yurttaş (2023). After the nature-based program, children increasingly recognized air pollution as an environmental issue, particularly citing smoke emissions. However, awareness of noise pollution remained absent—likely because noise pollution was not directly addressed in the program's thematic activities.

4.3. Environmental Protection

Both before and after the intervention, children most frequently stated that protecting the environment required not polluting it or cleaning it. Before the intervention, children emphasized cleaning; after the intervention, they more strongly emphasized prevention—an important conceptual shift.

This indicates an improved understanding that preventing pollution is more effective than cleaning it afterward.

Children also noted the importance of watering plants, planting new ones, helping animals, and recycling. Kanat et al. (2023) reported similar findings, where children emphasized avoiding pollution and caring for living things as means of environmental protection.

After the intervention, children provided more detailed and diversified responses, including references to air protection, water conservation, composting, and forest fire prevention. Before the intervention, only one child mentioned recycling, while after the program, half of the children emphasized its importance—consistent with findings by Akbayrak and Kuru-Turaşlı (2017).

These results suggest that the program effectively increased children's environmental awareness, particularly regarding littering, conservation of living things, and recycling. However, children still lacked a fully integrated understanding of the environment as a system encompassing air, water, soil, and sound.

Children frequently recognized the critical role of humans in environmental degradation and protection. Similar findings indicating children's awareness of human–environment interactions have been reported by İstanbullu (2008), Atabek-Yiğit et al. (2019), and Ayvacı et al. (2021).

4.4. Recycling

Children initially described recycling primarily as "creating something new," while some confused recycling with "throwing things into the trash." This indicates an underdeveloped ability to distinguish between recyclable waste and general waste. After the intervention, nearly all children accurately defined recycling as converting waste materials into new products.

Children also expanded their understanding of recyclable materials, increasingly identifying paper, cardboard, glass, plastics, metal, and batteries. These findings are consistent with Çimen and Yılmaz (2012), who reported that children commonly associated recycling with reprocessing paper and plastic products.

Before the intervention, children displayed a limited understanding of recycling, similar to the findings of Ada and Erdaş-Kartal (2020), who noted that younger preschool children often equated recycling with general waste disposal. After the intervention, however, children demonstrated substantial

improvements in distinguishing recyclable materials and understanding the process and purpose of recycling.

Overall, the evidence suggests that nature-based activities significantly strengthened children's conceptual and practical knowledge of recycling.

5. Conclusion

This study examined the impact of nature-based environmental education on preschool children's environmental awareness. Both qualitative and quantitative findings indicate that the nature-based environmental education program significantly improved children's environmental awareness levels. The results also show that children's conceptual understanding, attitudes, and perspectives regarding environmental issues improved across multiple domains—including environmental definitions, pollution, protection, and recycling.

These findings suggest that nature-based educational experiences can be effectively incorporated into preschool education to enhance children's environmental awareness. Moreover, the results demonstrate that an abstract concept such as environmental awareness can be meaningfully developed through hands-on, experiential, nature-centered learning.

For future research, it is recommended that studies:

* Examine the effects of such programs on children's environmental knowledge, attitudes, and behaviors;

* Extend the duration and scope of environmental education programs;

* Explore the perspectives of parents and teachers on nature-based environmental education

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Chapter 3

An Analysis of Preschool Teachers' Democratic Determinations from the Perspective of Children's Rights[1]

Mehmet Kumru[2]

Atila Çağlar[3]

Abstract

This study is a quantitative research aimed at examining preschool teachers' levels of democratic decisiveness and their attitudes toward children's rights. The study sample consisted of 230 preschool teachers working in Sakarya and its districts. The data collection instruments used were the **Attitude Scale toward Children's Rights** developed by Kepenekçi (2006) and the **Democratic Teacher Decisiveness Scale** developed by Yeşil (2010). Data analysis was conducted using SPSS 24.0, and parametric test techniques were applied.

The findings indicate that teachers' scores on democratic decisiveness and attitudes toward children's rights were generally at a moderate level. A weak negative correlation was found between democratic decisiveness scores and attitudes toward children's rights ($r = -0.321$, $p < 0.01$). When demographic variables were examined, democratic decisiveness scores showed a significant difference according to years of professional experience, while no significant differences were observed regarding gender, marital status, age, age group taught, or type of graduated institution. Attitudes toward children's rights did not show significant differences according to any demographic variable.

The results reveal that teachers possess theoretical knowledge about children's rights but do not fully translate this knowledge into classroom practices. While teachers showed positive attitudes toward the right to protection, they

1 This study was derived from the master's thesis titled " İnvestigation of Preschool Teachers Democratic Resolutions and Attitutes Regarding Childrens Rights" prepared by the first author.

2 Arş. Gör., Sakarya University, kumru@sakarya.edu.tr, ORCID ID: 0000-0003-4206-8524

3 Prof. Dr., Kastamonu University, acaglar@kastamonu.edu.tr, ORCID ID: 0000-0003-0749-2688

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demonstrated insufficient sensitivity regarding participation, development, and the best interests of the child. This indicates a need to further support teachers' awareness of children's rights in behavioral terms.

The study provides a basis for recommendations to enhance teacher education programs and in-school practices concerning children's rights and democratic decisiveness. Future studies are suggested to examine factors such as parental attitudes, children's rights awareness, and teachers' stress-coping strategies.

1. Introduction

Children, while being the younger members of society, also represent its future. In this context, it is of critical importance that children are raised as individuals who contribute positively to society—not only for their own benefit but also for that of their parents and the communities in which they live. Their ability to become beneficial citizens largely depends on the experiences and learning opportunities they acquire from early childhood onward. Indeed, experiences gained during the early years play a fundamental role in determining what kind of individuals children will become and how they will participate in social life in the future (Oktay, 2005; Schweinhart, 2017).

Democratic determination refers to believing in the principles and requirements of democracy, defending these principles, and exhibiting a voluntary attitude toward the sustainable dissemination of democratic values. Democracy is defined as "a form of state organization and a way of life shaped according to human rights" (Ersoy, 2012). In this context, for the mechanism of social justice to function properly, democratic values must coexist and be sustained within the cultural fabric of society.

In a society governed by the rule of law, it should be aimed that citizens develop and live in a civilized manner; sharing, solidarity, tolerance, and a sense of belonging should constitute the fundamental elements of social life. Democratic societies embrace humanism—a human-centered understanding—and acknowledge that rights are grounded in human dignity. Therefore, the existence of a democratic environment necessitates the establishment of a social sphere in which different opinions can be freely expressed and discussed when necessary. The level of development of a country is closely related to the meaning attributed by its society to democratic values and the extent to which these values are put into practice (Ersoy, 2012).

The theory of human rights is based on the recognition of inherent, inalienable, and inviolable rights that encompass all individuals within the

realm of humanity. The origins of this understanding can be traced back to Ancient Greece, emerging as a result of philosophical approaches toward human nature. Although these early ideas did not yet exhibit the systematic characteristics of the modern theory of human rights, they are significant in that they drew attention to the nature and intrinsic value of the human being (Donnelly, 2007).

The concept of human rights, which was initially explained through divine sources, was later freed from its metaphysical foundations under the influence of the Renaissance and Reformation movements, becoming associated with reason and science and redefined within the framework of individual rights. In the modern era, human rights have been further enriched and gained new layers of meaning under the influence of humanist thought. Rights such as freedom of thought, freedom of movement and residence, the right to a fair trial, and equal treatment in relations with state institutions are fundamental human rights that individuals often benefit from in their daily lives—sometimes without even realizing it (Sargın, 2017).

The power struggles and social conflicts throughout history have laid the groundwork for the theory of human rights to evolve into an ethical system of values. At the core of this system lie universal principles such as respect, love, friendship, brotherhood, tolerance, solidarity, equality, and freedom. Human rights possess both individual and social dimensions. In accordance with the principle of the universality of law, these rights are considered fundamental, immutable rights that transcend the boundaries of time and place and encounter no legal barriers within written law (Gülmez, 2001).

Children's rights are defined as "a universal concept encompassing all the rights that every child in the world inherently possesses by law or by moral consideration, including the rights to life, development, education, health, shelter, and protection from all forms of physical, psychological, or sexual abuse." While children's rights serve multiple purposes, one of their fundamental aims is not only to guarantee the individual rights of children but also to ensure their active participation in social life. Children are granted civil, social, and cultural rights; however, a more reserved approach is generally taken regarding political rights. This distinction represents one of the key differences between children and adults (Musayeva, 2013).

One of the most significant indicators of a society's welfare and level of development is its attitude toward children. How children are treated and the extent to which they are vulnerable to neglect or abuse are regarded as important criteria in assessing the human development of a culture. Societies that provide children with a healthy developmental environment and attend

to their physical, mental, and emotional needs tend to experience greater progress and social stability.

However, it is not possible to claim that all children around the world benefit equally from these rights. The challenges children face vary according to social, economic, and cultural conditions. At the root of these issues lie structural factors such as the lack of full inclusion of children in social life, social inequalities, and economic insufficiencies. The advancement of societies on a civilized level is directly linked to the conscious and supportive attitudes of families toward children. Positive family approaches are of vital importance for the protection and development of children. Nevertheless, in today's world, political, social, and economic crises, along with societal instability, have become some of the most serious threats to children's well-being (UNICEF, 2012).

The protection of children's rights has emerged as a critical field that has gained priority on a global scale through both international conventions and national legislations, becoming one of the fundamental building blocks of education. In this regard, fostering awareness and attitudes toward children's rights is of great importance not only for enhancing the quality of educational processes but also for promoting the democratization of school practices (Aral & Gürsoy, 2001).

Measuring attitudes toward children's rights contributes to evaluating the effectiveness of studies conducted in the field and to developing tools aimed at understanding the general attitudes of society. In the literature, various scales and measurement instruments have been developed for this purpose. These tools, used across different studies, allow for the identification of attitudes toward children's rights and the examination of their relationships with various variables. In particular, research focusing on the attitudes of parents and teachers has yielded significant findings regarding children's perceptions of rights and the behaviors associated with these perceptions (Kepenekçi, 2006; Yeşil, 2010).

The representation of children's rights in educational settings is directly related to the concept of democratic education. In the democratic education approach, children's freedom of expression and their right to participate in decision-making processes are regarded as fundamental principles (Kavan & Özdaş, 2022). It is acknowledged that the knowledge and values transmitted to children affect not only their individual development but also the future formation of a society's cultural and social structure. Raising individuals who are responsible, conscious, and well-qualified is considered a key

element for ensuring social welfare and strengthening a democratic social order (Postman, 1995; Aral & Gürsoy, 2001).

In this context, it is emphasized that for children to contribute to society as active and responsible individuals, they must be aware of their civic responsibilities. The development of such awareness is possible primarily through children's recognition and internalization of the rights guaranteed under the Convention on the Rights of the Child (CRC) (Howe & Covell, 2005).

The Convention on the Rights of the Child (CRC), adopted by the United Nations General Assembly in 1989, defines children's rights as universal rights inherent to all children from the prenatal stage onward. These rights ensure that children live in well-being and happiness, are protected from all forms of psychological, sexual, and physical exploitation and neglect, develop as independent individuals, and are prepared to become responsible adults in the future. Rights such as shelter, health, education, and protection, as outlined in the CRC, constitute the fundamental legal and moral rights of children (UNGA, 1989).

Early childhood is a critical period in which an individual's mental, social, and physiological development occurs at the fastest pace, and the foundational building blocks of life are formed. During this stage, children acquire essential social skills such as sharing, cooperating, participating in group activities, and expressing their thoughts in social settings (Washington, 2010; Demirezen et al., 2013).

Research in the literature emphasizes that, in order for individuals to effectively exercise their rights, they must first be aware of these rights. Awareness of rights is a prerequisite for transitioning to a pluralistic mindset, which constitutes one of the foundations of a democratic society. In this context, it is highly important for individuals to develop a mentality that embraces democracy and internalizes the concept of human rights. Democracy and human rights are interconnected and complementary concepts. Learning these concepts at an early age and reflecting them in daily life contributes to the early adoption of democratic values among young children (Yaşar, 2008).

Children's rights education aims not only to make children aware of their own rights but also to raise them as responsible, self-confident, and conscious citizens. In this regard, children's rights education holds great significance for democratic societies in fostering enlightened and participatory future generations (Howe & Covell, 2005; Uçuş, 2013; Yavuzer, 2006).

Teachers play a highly decisive role in shaping children into qualified adults in the future. In the educational process, teachers are expected not only to transmit knowledge but also to internalize values, embody these values in their own lives, and serve as role models for their students. Considering that education provided during early childhood shapes a child's personality development and forms the foundation for a lifelong learning process, the importance of teachers' attitudes toward children's rights becomes even more pronounced.

The primary aim of this study is to examine the level of democratic determination among preschool teachers from the perspective of children's rights. The study seeks to reveal the extent to which teachers consider children's rights in their classroom practices, how they reflect democratic values in educational settings, and the relationship between these two variables. By shedding light on teachers' attitudes and behaviors, the research aims to contribute to the strengthening of a democratic culture in preschool education and the enhancement of awareness regarding children's rights, thereby informing educational policies and teacher training programs. In this context, the present study specifically aims to investigate the relationship between preschool teachers' levels of democratic determination and their attitudes toward children's rights.

2. Methodology

2.1. Research Design, Population, and Sample

For data collection, a suitable random and unbiased sampling method was employed, comprising 230 preschool teachers working in the central and district branches of the Sakarya Provincial Directorate of National Education. The reason for using a random and unbiased sampling method during the research process was to prevent any potential bias and to ensure that the sample could be most accurately representative of the population (Canbazoğlu-Bilici, 2019). Additionally, the use of an appropriate sampling method provides the researcher with advantages in terms of time, effort, and cost efficiency. The demographic distribution of the study groups is presented in Table 1.

Table 1. Distribution According to Demographic Variables

		n	%
Gender	Female	215	93,5
	Male	15	6,5
Marital Status	Married	178	77,4
	Single	52	22,6
Age	20-25	14	6,1
	15-30	45	19,6
	30-35	69	30,0
	35-40	66	28,7
	40-45	26	11,3
	45-50	4	1,7
	50 and above	6	2,6
Age Group	3 years old	13	5,7
	4 years old	58	25,2
	5 years old	159	69,1
Years of Service in the Profession	1-5 years	34	14,8
	6-10 years	73	31,7
	11-15 years	78	33,9
	16-20 years	36	15,7
	21 years and above	9	3,9
Type of Graduated School	Faculty of Education	185	80,4
	Faculty of Science and Letters	3	1,3
	Vocational School	21	9,1
	Other	21	9,1
Workplace	Adapazarı	51	22,2
	Akyazı	10	4,3
	Arifiye	13	5,7
	Erenler	32	13,9
	Ferizli	4	1,7
	Geyve	11	4,8
	Hendek	19	8,3
	Karapürçek	5	2,2
	Karasu	6	2,6
	Kaynarca	7	3,0
	Kocaali	8	3,5
	Pamukova	8	3,5
	Sapanca	9	3,9
	Serdivan	34	14,8
	Söğütlü	9	3,9
	Taraklı	4	1,7

Analysis of the demographic characteristics of the participants revealed that 93.5% were female, 77.4% were married, 30% were aged between 30 and 35, 69.1% taught in the 5-year-old age group, 33.9% had 11–15 years of professional experience, 80.4% were graduates of a Faculty of Education, and 22.2% were employed in Adapazarı.

2.2. Data Collection Tools

During the research process, two different quantitative data collection instruments were employed. To determine preschool teachers' attitudes toward children's rights, the Attitude toward Children's Rights Scale developed by Kepenekçi (2006) was used. To measure teachers' democratic determination, the Democratic Teacher Determination Scale developed by Yeşil (2010) was utilized.

2.2.1. Attitude toward Children's Rights Scale

The scale used in this study was designed as a five-point Likert-type scale. The response options on the scale are "Strongly Agree," "Agree," "Undecided," "Disagree," and "Strongly Disagree." The scale consists of a total of 22 items addressing children's four fundamental rights: developmental, survival, participation, and protection rights. Responses are scored from 1 to 5 in the same order, with higher scores indicating a more negative attitude. Among the items, 19 are positively worded, while 3 are negatively worded. The negatively worded items are found in items 2, 14, and 15, and these were reverse-scored. The minimum possible score on the scale is 22, and the maximum is 110.

Karaman-Kepenekçi (2006), in her study on the validity and reliability of the scale, reported that it has a single-factor structure. The item-total correlation coefficients of the scale's items ranged between .32 and .61. The internal consistency coefficient (Cronbach's Alpha) was found to be .85, and the split-half reliability coefficient was determined as .77.

2.2.2. Democratic Teacher Determination Scale

The scale is a five-point Likert-type scale, with responses coded as 1—Never, 2—Rarely, 3—Sometimes, 4—Often, and 5—Always. Developed to determine teachers' level of determination in exhibiting democratic behaviors in classroom teaching practices, the scale consists of 69 items.

For the validity study of the scale developed by Yeşil (2010), KMO values and Bartlett's test statistics were calculated using the collected data. Subsequently, factor analysis was conducted, and item-total correlations as

well as discriminative power (t-test) were determined. Within the framework of the reliability study, internal consistency levels and the ability to produce stable measurements were tested. A significance level of $p < 0.005$ was considered sufficient for the analyses. As a result of the analyses, the KMO value of the scale was found to be 0.936, and Bartlett's test was significant at $p < 0.001$. The items of the scale were grouped under a single factor. Item-test correlations and discriminative powers of the items were found to be significant ($p < 0.005$). Furthermore, examining the relationships between evaluations of 139 students at two different time points revealed significant correlations for each item ($p < 0.005$), indicating that the scale is capable of providing stable measurements.

2.2.3. Research Process and Data Collection

The research process was conducted over a period of approximately four months. In the initial phase of the study, the researcher personally visited the relevant schools and, with the support of the school administrations, provided preschool teachers with a detailed explanation of the study's purpose and significance. Data were collected immediately from teachers who were available to participate, while a second visit was scheduled one week later to collect data from those who were unable to participate during the first visit, thus completing the data collection process.

Throughout the study, the voluntary participation of all participants was prioritized, and any form of coercion or guidance was strictly avoided. Prior to the implementation, the relevant Provincial Directorate's approval was presented to all teachers and school administrations, and it was clearly stated that participants could withdraw from the study at any stage without providing a reason. Additionally, during all phases of the research process, questions raised by participants were carefully addressed by the researcher, and all procedures were conducted in accordance with ethical principles.

2.3. Analysis of the Collected Data

The analysis of the collected data was conducted using SPSS 24.0. Scale scores were calculated, and skewness and kurtosis coefficients were examined to determine the suitability of the data for normal distribution. Skewness and kurtosis values between +3 and -3 are considered sufficient to indicate a normal distribution (Groeneveld & Meeden, 1984; Moors, 1986; Hopkins & Weeks, 1990; De Carlo, 1997).

Table 2. Skewness and Kurtosis Values and Reliability Coefficients

	n	Minimum	Maximum	Mean	ss
Democratic Determination Score	230	63,00	100,00	89,03	7,69
Attitude toward Children's Rights	230	22,00	42,00	26,60	4,31

Before beginning the analysis, 22 outliers and incompletely filled scales in the dataset were excluded from the study. Examination of the distribution characteristics of the data revealed that the skewness and kurtosis coefficients for each variable fell within the range of -3 to +3. Based on this finding, it was concluded that the dataset exhibited a normal distribution.

Due to the normal distribution of the data, parametric test techniques were employed during the analysis. To determine whether scale scores differed according to demographic variables, independent samples t-tests and one-way analysis of variance (ANOVA) were conducted. The t-test was used for demographic variables with two categories, while the ANOVA was applied to compare variables with three or more categories ($k > 2$).

3. Findings

3.1. Correlation Between Teachers' Democratic Determination Scores and Attitude Toward Children's Rights Scores

Table 3. Correlation Analysis Between Preschool Teachers' Democratic Determination Scores and Attitude Toward Children's Rights Scores

		Democratic Determination Score	Attitude toward Children's Rights
Democratic Determination Score	r	1	
	p		
	n	230	
Attitude toward Children's Rights	r	-,321	1
	p	0,000	
	n	230	230

A weak negative correlation was found between the democratic determination score and the attitude toward children's rights score ($r = -0.321$).

3.2. Regression Analysis to Determine the Effect of Teachers' Democratic Determination Scores on Their Attitudes Toward Children's Rights

Table 4. Regression Analysis Examining the Effect of Teachers' Democratic Determination Scores on Attitudes Toward Children's Rights

Independent Variable	Dependent Variable	Unstandardized Coefficients		Standardized Coefficients	t	p	R^2
		B	Standard Error	Beta			
Attitude toward Children's Rights	Constant	42,635	3,143		13,563	0,000	0,103
	Democratic Determination Score	-0,180	0,035	-0,321	-5,119	0,000	

Model:
F=26,202
p=0,000

The regression model established to examine the effect of democratic determination scores on attitudes toward children's rights was found to be statistically significant ($F = 26.202$, $p < 0.05$). According to the analysis results, democratic determination scores have a negative effect on attitudes toward children's rights ($\beta = -0.321$). It was determined that 10% of the variance in attitudes toward children's rights is explained by democratic determination scores.

3.3. Democratic Determination Scores and Attitudes Toward Children's Rights by Gender

Table 5. Differences in Democratic Determination Scores and Attitudes Toward Children's Rights by Gender

	Gender	**n**	**Mean**	**ss**	**t**	**p**
Democratic Determination Score	Female	215	89,05	7,77	0,152	0,879
	Male	15	88,73	6,53		
Attitude Toward Children's Rights	Female	215	26,72	4,34	1,495	0,136
	Male	15	25,00	3,64		

The analysis results indicated that there was no statistically significant difference in democratic determination scores and attitudes toward children's rights based on gender ($p > 0.05$).

3.4. Analysis of Differences in Democratic Determination Scores and Attitudes Toward Children's Rights by Marital Status

Table 6. Analysis of Differences in Democratic Determination Scores and Attitudes Toward Children's Rights by Marital Status

	Gender	n	Mean	ss	t	p
Democratic Determination Score	Female	178	89,20	7,46	0,622	0,535
	Male	52	88,44	8,47		
Attitude Toward Children's Rights	Female	178	26,57	4,25	-0,203	0,839
	Male	52	26,71	4,56		

According to the analysis results, no statistically significant difference was found in democratic determination scores or attitudes toward children's rights in terms of marital status ($p > 0.05$).

3.5. Analysis of Differences in Democratic Determination Scores and Attitudes Toward Children's Rights by Age

Table 7. Analysis of Differences in Democratic Determination Scores and Attitudes Toward Children's Rights by Age

	Age Range	n	Mean	ss	F	p
Determination Behavior Score	20-25	14	86,93	6,99	1,443	0,221
	15-30	45	88,02	7,20		
	30-35	69	89,25	7,36		
	35-40	66	88,59	8,78		
	40 and above	36	91,47	6,71		
Attitude Toward Children's Rights	20-25	14	26,71	5,06	0,271	0,896
	15-30	45	26,89	4,96		
	30-35	69	26,51	4,73		
	35-40	66	26,24	3,49		
	40 and above	36	27,06	3,79		

Age does not have a significant effect on either the democratic determination or the attitudes toward children's rights among preschool teachers. Although slight differences in mean scores are observed, they are not statistically meaningful.

3.6. Differences in Democratic Determination Scores and Attitudes Toward Children's Rights According to the Age Group Taught by Teachers

Table 8. Differences in Democratic Determination Scores and Attitudes Toward Children's Rights by Age Group Taught

	Yaş	n	Mean	ss	F	p
Democratic Determination Score	3 yaş	13	84,92	11,79	2,984	0,053
	4 yaş	58	88,07	7,75		
	5 yaş	159	89,71	7,15		
Attitude Toward Children's Rights	3 yaş	13	29,00	4,93	2,487	0,085
	4 yaş	58	26,07	3,40		
	5 yaş	159	26,60	4,51		

According to the analysis results, teachers' democratic determination scores and their attitudes toward children's rights did not show a statistically significant difference in relation to the age group they teach ($p > 0.05$).

3.7. The Variation of Democratic Stability Scores and Attitudes Toward Children's Rights by Length of Professional Experience

Table 9. Differences in Democratic Determination Scores and Attitudes Toward Children's Rights in Terms of Years of Professional Experience

	Years of Professional Experience	n	Mean	ss	F	p
Democratic Determination Score	1-5 years	34	84,79	8,30	4,994	0,002*
	6-10 years	73	89,14	7,88		
	11-15 years	78	89,51	7,51		
	16 years and above	45	91,20	6,02		
Attitude Toward Children's Rights	1-5 years	34	27,88	5,27	1,369	0,253
	6-10 years	73	26,68	4,95		
	11-15 years	78	26,23	3,58		
	16 years and above	45	26,16	3,41		

**p<0,05*

According to the analysis findings, democratic determination scores show a statistically significant difference in terms of years of professional experience ($p < 0.05$). Examination of the mean scores indicates that teachers with more than 16 years of professional experience have higher levels of democratic determination compared to those with 1–5 years of experience.

In contrast, attitudes toward children's rights do not show a statistically significant difference with respect to years of professional experience ($p > 0.05$).

3.8. Differences in Democratic Determination Scores and Attitudes Toward Children's Rights According to the Type of Graduated School

Table 10. Differences in Democratic Determination Scores and Attitudes Toward Children's Rights by Type of Graduated School

	Type of Graduated School	n	Mean	ss	t	p
Democratic Determination Score	Faculty of Education	185	89,08	7,74	0,220	0,826
	Others	45	88,80	7,54		
Attitude Toward Children's Rights	Faculty of Education	185	26,31	4,03	-789	0,07
	Others	45	27,80	5,21		

According to the analysis results, democratic determination scores and attitudes toward children's rights did not show a statistically significant difference based on the type of school from which the teachers graduated ($p > 0.05$).

4. Discussion

In this study, scales whose validity and reliability have been previously established, which have meaningful counterparts in the literature, and which were developed by two field experts were utilized. Continuity is fundamental in scientific research; conducting similar studies across different populations and samples enhances the generalizability of the findings and demonstrates an increased level of awareness among teachers regarding the subject matter. Within the context of this experimental study, reaching a sample of 230 valid teacher responses provided opportunities to engage with new teachers,

administrators, and stakeholders in Sakarya and its districts, while also yielding significant insights for discussing current issues relevant to the field.

During early childhood, teachers' democratic attitudes and determination toward children directly contribute to raising individuals who, in later life, uphold democratic values, are aware of their rights, and assume responsibility for protecting those rights. Education on rights and justice is regarded not only as a cognitive process but also as a comprehensive educational domain that fosters the development of proactive skills such as sharing, cooperation, social interaction, and collaborative abilities (Öztürk & Doğanay, 2017).

The most effective method for children to internalize the concept of rights is through experiential learning via a trial-and-error process. Education in justice aims to help children become aware of their rights within certain boundaries and to develop consciousness regarding the exercise of these rights. As children's knowledge in this area increases, the behavioral changes observed during the educational process become more pronounced and measurable (Öztürk & Doğanay, 2017).

The study conducted by Kor (2013) demonstrates that providing justice education to children in a positive and effective manner increases their awareness and engagement. Similarly, Bulut-Pedük (2015) emphasizes the importance of transparency in rights education, highlighting that granting students responsibilities within the classroom supports the learning process.

Research indicates that university students' attitudes toward children's rights are not significantly influenced by their participation in certification programs or courses (Doğan et al., 2014; Merey, 2013; Yaşar-Ekici, 2014). Similarly, Leblebici and Çeliköz (2016) found no differences in attitudes between pre-service teachers who had read the Convention on the Rights of the Child and those who had not. In contrast, a study conducted by Kepenekçi and Baydık (2009) revealed that the knowledge levels of special education students regarding children's rights had a significant and positive effect on their attitudes toward these rights. The discrepancy between these findings and other studies may be attributed to differences in sample groups and variations in participant characteristics.

Overall, it can be observed that participation in education, courses, or certification programs does not create a significant difference in teachers' attitudes toward children's rights. Attitude is defined as a psychological tendency that consistently reflects an individual's feelings, thoughts, and behaviors toward a specific phenomenon or concept (Kağıtçıbaşı, 1998). In this context, the fact that the measurement instruments used in the studies

primarily assess affective and behavioral dimensions rather than knowledge levels may explain why no significant differences are observed based on participation in educational programs.

In the study conducted by Sadıkoğlu and Topsakal (2017), it was noted that children's awareness of the concept of rights gradually increases through education and that academic research in this area shows an upward trend. It was emphasized that authentic learning experiences implemented in the early stages of basic education would be effective in developing children's awareness of their rights, and that all individuals interacting with children—including families and teachers—should be involved in this educational process.

In some studies conducted with pre-service teachers, it has been found that democratic attitudes significantly differ according to variables such as gender, university, department, maternal education level, income level, and number of siblings, whereas no significant differences were observed based on paternal education level. In the present study, however, it was determined that teachers' democratic determination scores did not significantly differ according to gender, marital status, age, or professional seniority. This discrepancy between findings may be attributed to the difference in experience levels between pre-service and in-service teachers; after entering the profession, individuals' perceptions, attitudes, and behaviors regarding democratic values are likely to change under the influence of professional experience, school environment, and institutional culture (Yılmaz & Gömleksiz, 2011).

5. Conclusion and Recommendations

5.1. Results

This study was designed based on a quantitative research approach and aims to determine the levels of democratic determination and attitudes toward children's rights among preschool teachers. A total of 252 preschool teachers participated in the quantitative phase of the study; after excluding incomplete, erroneous, or invalid responses, the final analysis included valid data from 230 teachers. The data collection instruments employed were the Democratic Determination Behavior Scale and the Attitudes Toward Children's Rights Scale. The study sought to answer the question, "To what extent do preschool teachers demonstrate positive attitudes toward children's rights?" The analysis results indicated that teachers' attitudes toward children's rights were generally at a positive level.

The research findings indicate that teachers' attitudes toward children's rights do not exhibit statistically significant differences based on demographic variables such as age, professional experience, or type of institution in which they work. Similarly, teachers' educational level was found not to have a determining effect on their attitudes toward children's rights. Teachers who graduated with a degree in the relevant field or received pedagogical training demonstrated attitudes comparable to those of teachers with vocational school or other educational backgrounds, which is consistent with previous research findings (Aral & Gürsoy, 2001; Howe & Covell, 2005).

In the study, the observed negative relationship between democratic decision-making scores and attitudes toward children's rights may be attributed to the measurement instruments being developed for the primary school level or for older age groups. Nevertheless, it was assumed that participants provided conscious and truthful responses to the scale items (Cohen, Manion, & Morrison, 2018).

Findings from the attitude scale indicate that teachers place a high level of importance on children's right to protection and hold strong beliefs regarding the necessity of safeguarding children from neglect, abuse, and various forms of violence. Moreover, teachers were observed to demonstrate sensitivity in classroom practices concerning these issues (UNICEF, 2019). However, the insufficient inclusion of children in decision-making processes related to their learning and the lack of adequate information provided about activities suggest that the principle of "education-supported participation," a crucial dimension of the right to participation, is not fully implemented in practice (Hart, 1992; Lundy, 2007).

The limited provision of information regarding activities further suggests that children's participation is insufficient in terms of the principles of transparency and informativeness, while the lack of equal opportunities for all children indicates that the principle of inclusivity is not fully upheld. Additionally, teachers' failure to provide feedback following activities and to involve children in assessment processes points to the incomplete implementation of the principle of accountability in practice.

When the findings are evaluated holistically, it is evident that teachers possess a high level of theoretical knowledge regarding children's rights; however, they experience difficulties in fully translating this knowledge into classroom practices. Nevertheless, teachers demonstrate a positive tendency toward creating child-friendly learning environments through consideration of children's opinions and decisions, as well as engagement in voluntary and respect-based practices. Furthermore, teachers' high level of engagement

with statements concerning children's right to protection, along with their sensitive behaviors in this regard, indicates that they adopt a conscious attitude toward safety, security, and risk awareness.

In conclusion, the research findings indicate that teachers place a high level of importance on non-discrimination and children's right to protection. However, they demonstrate insufficient sensitivity in areas such as the right to participation, the right to life and development, and the principle of the best interests of the child. This suggests that teachers' awareness of children's rights largely remains at the cognitive level and requires further reinforcement in behavioral and practical dimensions.

Ensuring children's active participation in decision-making processes, considering their opinions, and internalizing the principles of transparency, justice, and equality within educational environments underscore the importance of supporting teachers through continuous professional development opportunities. In this context, teacher education programs should be restructured not only to deliver theoretical knowledge but also to promote pedagogical approaches centered on children's rights, participatory classroom practices, and the establishment of rights-based learning environments. Such an approach would strengthen teachers' awareness of children's rights at the attitudinal and behavioral levels and contribute to the more effective implementation of democratic values within educational settings.

5.2. Recommendations

Examination of the attitudes and perceptions of school administrators, guidance counselors, support staff, and other school personnel regarding children's rights may contribute to a comprehensive assessment of rights-based awareness within educational institutions.

Identification of demographic, professional, and socio-cultural variables that influence educators' cognitive awareness of children's rights can provide a valuable empirical basis for the development of education policies.

Investigating the relationship between teachers' practices in upholding children's rights within the classroom and children's awareness of their rights can elucidate the impact of teacher behaviors on rights-based learning processes.

Assessing the influence of both parental and teacher attitudes on children's awareness of rights can offer significant insights into how children's rights can be supported within the context of home–school collaboration.

Analyzing the relationship between teachers' stress management strategies and their orientation toward protecting and supporting children's rights can contribute to understanding the role of emotional resilience in rights-based educational practices.

Incorporating children's rights-themed courses and content into the curricula of the Ministry of National Education and higher education institutions can support pre-service teachers in developing rights-based awareness during their professional formation.

Conducting qualitative and quantitative studies that consider the family context and evaluate children's democratic attitudes and behaviors based on parental observations can illuminate the reflections of children's rights education within the home environment.

Developing practical training and guidance programs for teachers that demonstrate how children's rights can be supported in classroom practices can facilitate the dissemination of rights-based pedagogical approaches.

Organizing seminars, workshops, and in-service training programs aimed at enhancing the awareness of all school stakeholders—including administrators, teachers, parents, and support staff—regarding children's rights can lay the foundation for the development of a holistic rights culture within the school ecosystem.

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Chapter 4

How has "Parental Involvement" Evolved in Türkiye's Preschool Education Programs (1953–2024)? A Document Analysis

Naim Ünver[1]

Abstract

The aim of this study is to reveal how the theme of "family/parental involvement" has been conceptualized, represented, and transformed over time in Türkiye's preschool education programs implemented between 1953 and 2024. Conducted within the qualitative research approach, this study employs the document analysis method. The data sources consist of the preschool education curricula published by the Ministry of National Education in 1953, 1989, 1994, 2002, 2006, 2013, 2024, and the Türkiye Century Education Model (TYEM). The findings indicate that family involvement was addressed indirectly in the 1953 and 1989 programs, while since 1994 it has been handled more explicitly, systematically, and comprehensively. With the 2002 curriculum, school–family collaboration became a structured part of the planning process; the 2006 program addressed family participation across seven dimensions, granting the concept a holistic framework. In the 2013 program, the "OBADER" guide was integrated to support family education and participation, and the 2024 curriculum introduced the "Family Education Guide," emphasizing community engagement. The TYEM program further expanded the notion of parental involvement by incorporating families into management and decision-making processes, reflecting a more participatory and collaborative perspective. Overall, the study concludes that the concept of parental involvement in Türkiye's preschool education has evolved from an indirect and supportive role into an active, holistic, and stakeholder-based collaboration model throughout its historical development.

1 Dr. Öğr. Üyesi, Kastamonu Üniversitesi Eğitim Fakültesi, nunver@kastamonu.edu.tr, ORCID ID 0000-0003-1801-5609

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1. Introduction

Parents and guardians play a fundamental role in the learning and development of young children. Their behaviors and interactions with their children exert a profound influence on children's well-being, social-emotional development, cognitive skills, and motivation to learn. In this context, parents are regarded as the most important teachers in their children's lives, since a child's social, emotional, cognitive, and physical development begins within the family environment. Given the centrality of their role, it is essential for parents to enhance both their parenting competencies and their knowledge and skills related to child care and education (OECD, 2024; Tezel Şahin & Özbey, 2007). During the preschool years, children's imagination develops rapidly, while abstract thinking emerges gradually. This period is therefore critical for the development of social and emotional competence. Early childhood offers unique opportunities to nurture social and emotional skills, and such development takes place within the context of family, community, and culture (Blewitt et al., 2021). Structural family characteristics, parental beliefs and interests, as well as educational processes, are considered to influence the development of social-emotional competence in preschool-aged children (Li, Tang, & Zheng, 2023). As can be seen, preschool education constitutes a crucial stage that shapes the child's future life. The family, as the primary institution, provides children with opportunities to explore the external world and to acquire essential habits. While children gain foundational learning experiences within the family, they also have the opportunity—when circumstances permit—to reinforce and enrich these experiences through attendance at early childhood education institutions (Cömert & Güleç, 2004). During the preschool years, children's imagination expands rapidly while abstract thinking gradually develops. This period represents a particularly critical stage for fostering social and emotional competence, as such growth occurs within interconnected family, community, and cultural contexts (Blewitt et al., 2021).

The involvement of the family in the child's educational process and the establishment of school–family collaboration refer to the concept of *family involvement*. This concept emphasizes strengthening the connection between the family and the school and highlights the active participation of families in their children's educational processes (Erkan, 2010). Family involvement refers to the integration of the knowledge, skills, and experiences of not only the family members but also other significant individuals in the child's life into the child's educational processes, in coordination with the school, teachers, and the broader community. It also implies the multidimensional

participation of these individuals—both emotionally and physically—in supporting the child's learning and development (Karaçöp, 2020).

Family involvement is defined as a process through which parents and other family members participate in early childhood education programs to contribute to children's learning and development (Morrison, 2003). Within this framework, cooperation between school personnel and family members is essential (Cavkaytar, 2000).

Early childhood education and care (ECEC) staff can engage parents and guardians in their children's learning and developmental processes through three primary means:

1. **Communication:** Staff can maintain regular information exchange with parents about the activities conducted within the center, thereby keeping them informed of their children's participation and developmental progress.
2. **Guidance:** Staff can provide parents with guidance on how to establish more effective interactions with their children.
3. **Participation:** Parents can be given opportunities to participate actively in the functioning of the institution, which may include supporting daily activities or contributing to decision-making processes (OECD, 2024).

The primary aim of family involvement is to establish coordination between home and school, enabling joint efforts in supporting children's development and education. From this perspective, family involvement not only facilitates behavioral change and skill development in preschool activities but also contributes to the growth and development of the families themselves. In this regard, family involvement practices hold great significance for both parents and teachers in ensuring and safeguarding the best interests of the child (Çamlıbel Çakmak, 2010; Toran & Özgen, 2018). Family involvement should not be viewed merely as a responsibility that lies solely with parents or as the simple inclusion of parents in the educational process. It is important to recognize that parents should be encouraged and supported in this process by schools and teachers (Kim et al., 2012). Sylaj (2013) emphasizes that it is, above all, a moral duty and responsibility for both parents and schools to do their utmost to achieve the best possible outcomes for children's success. According to Hoover-Dempsey and Sandler (1997), parents' decisions to become involved in their children's education are influenced by three key factors: (1) how parents define their parental role, (2) their sense of efficacy in contributing to their children's academic

success, and (3) the invitations, opportunities, and demands for involvement extended by the child and the school. In this context, for family involvement to function effectively, parents must first become aware of the extent of their influence on their children's lives, education, and success, while schools must offer welcoming and accessible opportunities that invite and encourage parental participation.

The primary aim of family involvement activities is to integrate learning processes in order to support children's development. This approach seeks to establish a comprehensive, child-centered learning process. Research has shown that family involvement programs positively influence children's development, attitudes toward school, and sense of belonging. Moreover, family involvement enhances parents' awareness of the educational process and strengthens their collaboration with teachers and schools. This, in turn, contributes to parents developing a more responsible and responsive attitude toward their children's education. From the teachers' perspective, family involvement provides valuable insights into children's prior experiences, enabling educators to better understand the child and tailor educational practices accordingly (Ergüden, Doğan, & Şen Hastaoğlu, 2020). As such, family involvement practices in early childhood education are highly significant and necessary for children, parents, and teachers alike.

Theories associated with family involvement in education emphasize that the family should not be considered separate from society. Research on family involvement suggests that, before inviting families to participate in educational activities or partnerships, it is essential to understand how the family reflects the broader social context. Accordingly, the concept of family involvement evolves as a reflection of constantly changing social life, developing in line with the needs of society, schools, and families, and becoming increasingly inclusive over time (Demircan, 2018).

In Türkiye, family involvement practices in early childhood education are implemented by the Ministry of National Education (MoNE) in accordance with certain standards. These standards emphasize that early childhood education should be appropriate to children's needs and individual differences; that it should be planned to support all areas of development; that educational environments should be designed to meet children's developmental requirements; and that play should be regarded as the most natural learning opportunity for children. Within this framework, it is expected that both children and their families actively participate in the educational process (Toran & Özgen, 2018). According to data presented in the OECD (2024) report, communication between parents or guardians and early childhood

education and care (ECEC) institutions in Türkiye is predominantly carried out through informal means. Compared with countries such as Japan, Germany, and Norway, Türkiye's rate of "frequent communication" with parents is at a moderate level; however, the use of formal communication channels (e.g., meetings, reports, or written notices) remains quite limited. This finding indicates that teacher–family communication in Türkiye primarily takes place through daily, face-to-face, and verbal interactions, while a systematic and structured communication framework has not yet been fully established. Although informal communication methods provide significant advantages in fostering close and trusting relationships between teachers and parents, the lack of formal communication may limit families' participation in decision-making processes related to children's learning and development. Therefore, early childhood education and care policies in Türkiye should focus not only on the frequency but also on the *quality* and *formality* of communication with parents. Supporting teachers' professional development in this area is essential for achieving a more balanced and sustainable model of parental involvement.

When the historical development of early childhood education in the Republic of Türkiye is examined, it is observed that the *Kindergarten Regulation and Program*, adopted and published in 1953, constitutes a turning point in the advancement of early childhood education during the Republican era. The fact that this regulation and program were discussed concurrently at the 5th National Education Council and subsequently approved and published by the Board of Education and Discipline of the Ministry of National Education demonstrates that the early childhood education stage was not neglected within the National Education System. Rather, it marked the first steps of a new beginning in this field (Turan, 2021). Following the implementation of the first early childhood education program in 1953, a total of eight early childhood curricula have been introduced in Türkiye — namely those of 1953, 1989, 1994, 2002, 2006, 2013, 2024, and the *Century of Türkiye Education Model* (*Türkiye Yüzyılı Maarif Modeli*, TYMM). The year 2024 witnessed a noteworthy development in this regard: while an updated version of the 2013 Program was implemented in February 2024, the TYMM Program began to be applied in kindergarten classrooms in September 2024. As of the 2025–2026 academic year (first semester), the *2024 Early Childhood Education Program* continues to be implemented in preschools (*anaokulları*) for children aged 36–68 months, whereas the TYMM Program is implemented in kindergarten classes (*anasınıfları*) for children aged 57–68 months. This study aims to reveal the historical transformation and development of parental involvement in early childhood

education by examining Türkiye's early childhood education curricula (1953, 1989, 1994, 2002, 2006, 2013, and 2024) in terms of their parental involvement components.

2. Method

This study was conducted within the qualitative research approach, as the aim was not to measure quantitative variables but to gain an in-depth understanding of how the theme of *family involvement* has been conceptualized, represented, and evolved over time in early childhood education curricula implemented in Türkiye during different periods. Qualitative research is particularly effective in revealing patterns of meaning and thematic changes in documents. It is a research strategy that emphasizes words rather than numbers in data collection and analysis and is generally used to explore how people understand, experience, interpret, and construct their social worlds (Hammersley, 2013).

2.1. Research Design

In this study, document analysis, one of the qualitative research methods, was employed to examine how the *family involvement* dimension was addressed in early childhood education curricula implemented in Türkiye between 1953 and 2024, and to explore the changes and developments over time. Document analysis is particularly preferred as a standalone research method in situations where direct interviews or observations are not feasible. This method involves the systematic examination of written and oral materials that provide information about the topic under investigation (Yıldırım & Şimşek, 2013).

2.2. Data Sources

The data for this study consist of seven early childhood education curricula implemented in Türkiye between 1953 and 2024. These curricula were published by the Ministry of National Education (MoNE) in 1953, 1989, 1994, 2002, 2006, 2013, and 2024.

Each curriculum document was obtained from the Ministry of National Education's open-access official archives as well as the researcher's personal document collection. The selected documents represent all major revisions of early childhood education curricula in Türkiye and provide a comprehensive opportunity to examine how the concept of parental involvement has been addressed across different educational and socio-cultural contexts.

3. Findings

Table 1 presents the definition and emphasis of parental involvement in early childhood education curricula implemented in Türkiye from 1953 to 2024.

Program Year/Name	Definition/Emphasis of Parental Involvement	Mode of Inclusion in the Curriculum
1953	The family is defined as a supporter of the child's education.	Indirect
1989	Emphasis on school–family communication.	Indirect
1994	Highlighted as practices important for ensuring the permanence of the provided education.	Direct
2002	Emphasis on the importance of school–family collaboration to develop desired behaviors in children in early childhood education.	Direct
2006	Parental involvement in early childhood education is emphasized under seven main headings: family education activities, family communication activities, parents' participation in educational activities, home visits and activities at home, individual meetings, and participation in management and decision-making processes.	Direct
2013	Parental involvement in early childhood education is emphasized through family communication activities, parents' participation in educational activities, individual meetings, home visits, and raising awareness among families regarding individuals with special needs.	Direct + Supplementary Guide
2024	"Parental involvement is defined as a process and a set of organized activities in early childhood institutions, in which families participate to contribute to children's development, education, and the educational program."	Direct + Supplementary Guide
TYMM	"Parental involvement is defined as practices in which parents and other family members contribute to the school-based educational program and actively participate in management and decision-making processes, taking on roles and responsibilities."	Direct

An examination of Table 1 indicates that in the 1953 and 1989 curricula, the concept of *parental involvement* was included indirectly rather than explicitly. For instance, in the 1953 Program (MEB, 1953), parental participation in education was addressed under the heading "School–Family Relations" (Appendix 1) across 11 items. These items outlined principles aimed at strengthening collaboration between families and schools,

encompassing various dimensions: the child's physical health and hygiene (a, c), collaboration to understand the child (b), support for adjustment to home and school environments (d, e), development of responsibility and cooperation (f, g), emphasis on communication and guidance with the child (h, i), support for socio-emotional development (j), and fostering a love of nature while removing barriers to outdoor play (k). Collectively, these principles aimed to establish a continuous, conscious, and affectionate collaboration between families and schools, supporting the development of children as healthy, balanced, responsible, and socially adapted individuals. In the 1989 Program (MEB, 1989), although parental involvement was not explicitly mentioned, it was indirectly reflected in the seventh goal of early childhood education, which emphasized "informative activities for families regarding early childhood education," and in the twelfth principle, which highlighted "school–family cooperation" (Appendix 2).

An analysis of Table 1 shows that in the 1994, 2002, 2006, 2013, 2024, and TYMM curricula, the concept of *parental involvement* is addressed directly. In the 1994 Program (MEB, 1994), under the heading "Points to Consider in Early Childhood Education" (Appendix 3), the importance of active parental participation for ensuring the permanence of education was emphasized. Parents were encouraged to be informed about school activities, to support learning at home, and to participate periodically in school-based activities. Moreover, active parental participation was highlighted as particularly beneficial in the education of children exhibiting problem behaviors.

In the 2002 Program (MEB, 2002), under the heading "Ensuring Parental Participation in the Child's Education" (Appendix 4), the significance of school–family collaboration for fostering desired behaviors in children was stressed. Teachers and administrators were advised to plan parental involvement at the beginning of the academic year, with at least one parent meeting and one home visit per semester, alongside opportunities for individual consultations. Additionally, household routines were suggested to be considered as learning experiences, with parents encouraged to plan activities and play with their children, observe them at home, and actively participate in the educational process.

The 2006 Program (MEB, 2006), in its fourth section titled "Parental Involvement" (Appendix 5), underscored the critical role of families in maintaining the continuity of education. It emphasized that the child's learning process should be addressed together with the family, taking into account parents' knowledge and experiences, while teachers should

adopt a democratic and empathetic approach toward families. Parental involvement was proposed across seven main dimensions: family education, family communication, participation in educational activities, home visits, individual meetings, and involvement in management and decision-making. An "Parent Participation Form" was also included in the program to facilitate engagement.

The 2013 Program (MEB, 2013) explicitly highlighted the importance of family education and participation as a core feature. It introduced the *Integrated Family Support Education Guide (OBADER)*, designed to reinforce continuity between school and home and ensure the permanence of acquired knowledge, skills, and attitudes. The guide comprises two main sections—family education and family participation—and provides detailed explanations of communication techniques, parental involvement in educational activities, individual consultations, home visits, and awareness-raising regarding individuals with special needs. An *"Parent Participation Preference Form"* was included in the appendices (Appendix 6).

In the 2024 Program (MEB, 2024a), parents were recognized both as children's educators and partners. One of the program's main features emphasized the importance of family and community participation. The *Family Education Guide (2024)*, integrated into the program, focuses on family education and family–community participation, detailing the purpose, benefits, and practices of parental involvement. An *"Activity Participation Preference Form"* was provided in the appendices (Appendix 7).

Finally, the TYMM Program (MEB, 2024b) defines parental involvement as practices in which parents and other family members contribute to school-based educational programs while actively participating in management and decision-making, assuming responsibilities and roles. The program includes detailed explanations of the significance, objectives, and benefits of parental involvement, along with a corresponding *"Parent Participation Preference Form"* in the appendices (Appendix 8).

Overall, these findings demonstrate a progressive shift from indirect references in early curricula toward structured, comprehensive, and participatory approaches in later programs, reflecting an increasing recognition of families as essential partners in early childhood education in Türkiye.

Tablo 2. The relationship between early childhood education principles and parental involvement

Program Year/Name	Inclusion of Parental Involvement in Early Childhood Education Principles	Relevant Principle Number(s)	Total Number of Principles
1953	No	No	No
1989	Yes	12	12
1994	Yes	12	12
2002	Yes	1, 15	15
2006	Yes	14, 15	17
2013	Yes	14, 15	18
2024	Yes	7, 21	25
TYMM	Yes	17, 25	26

An analysis of Table 2 indicates that in the 1989 and 1994 curricula, parental involvement was referenced in one principle, while in the 2002, 2006, 2013, 2024, and TYMM curricula, it was reflected in two principles. The 1953 Program (MEB, 1953), did not include explicit principles for early childhood education. In the 1989 Program (MEB, 1989), which comprised 12 principles, parental involvement was indirectly emphasized in Principle 12: "Early childhood education should be provided in cooperation with families." Similarly, in the 1994 Program (MEB, 1994), also consisting of 12 principles, Principle 12 highlighted parental involvement indirectly: "Education should be delivered in cooperation with families."

In the 2002 Program (MEB, 2002), which included 15 principles, parental involvement was directly emphasized in Principle 1: "Ensuring the active participation of the child and family in education is essential," and indirectly in Principle 15: "Programs should take into account the characteristics of families and the surrounding environment." The 2006 Program (MEB, 2006), with 17 principles, repeated this pattern, with direct emphasis in Principle 15 and indirect emphasis in Principle 14. Likewise, the 2013 Program (MEB, 2013), containing 18 principles, maintained similar wording, indicating consistency in how parental involvement was addressed despite changes in the total number of principles.

In the 2024 Program (MEB, 2024a), which comprised 25 principles, parental involvement was directly emphasized in Principle 21: "Development and learning occur in numerous social and cultural contexts, which influence the child. Teachers should consider the impact of socio-cultural environments

and family experiences on children's learning. Active participation of children, families, and the community should be ensured in the educational process." Indirect emphasis appeared in Principle 7: "Planning should consider the interests and needs of all children, as well as the resources of families, communities, and schools." Similarly, the TYMM Program (MEB, 2024b), with 26 principles, directly emphasized parental involvement in Principle 25 and indirectly in Principle 17, maintaining the focus on family and community participation while considering socio-cultural contexts and providing support to families.

Overall, these findings reveal a gradual shift from indirect and limited references to parental involvement in early curricula toward more explicit, structured, and contextually integrated recognition of families as active participants in the educational process in later curricula.

Tablo 3. The relationship between teacher plans in early childhood education and parental involvement

Program Year/ Name	**Plan Type**	**Inclusion of Parental Involvement in Teacher Plans**
1953	One-Day Activity Chart	No
1989	Annual Plan, Unit Plan, Daily Plan	No
1994	Annual Plan, Unit Plan, Daily Plan	No
2002	Annual Plan	Yes
	Daily Plan	No
2006	Annual Plan	Yes
	Daily Plan	Yes
	Monthly Plan	Yes
2013	Daily Educational Flow	No
	Activity Plan	Yes
2024	Monthly Plan	Yes
	Daily Plan	Yes
TYMM	Monthly Plan	Yes
	Daily Plan	Yes

An analysis of Table 3 reveals that in the 1953, 1989, and 1994 curricula, no specific sections were allocated to parental involvement within the various plan categories. The 1953 Program (MEB, 1953), included a "One-Day Activity Chart," the 1989 Program (MEB, 1989), provided examples

of "Daily Activity Schedules" and "Unit Plans" for full-day and half-day preschools, and the 1994 Program (MEB, 1994), featured specification tables, topic analysis tables, and daily plan examples. However, none of these early curricula included dedicated sections for parental involvement in the sample plans. It should be noted that this does not indicate the absence of parental involvement in these programs, but rather that the planning documents did not explicitly reserve sections for it.

With the 2002 Program (MEB,2002), the unit plan was removed, and teachers were required to prepare annual and daily plans. The program included examples demonstrating parental involvement in the annual plan, indicating "how families should participate in the program according to the monthly objectives" (Appendix 9), whereas daily plan examples still lacked a dedicated parental involvement section. In the 2006 Program (MEB, 2006), teachers continued preparing annual and daily plans, and both plan formats incorporated specific sections for parental involvement (Appendices 10 and 11). The activity format included a note stating, "Parental involvement may not be required for every activity."

The 2013 Program (MEB, 2013) introduced monthly plans, daily educational flows, and activity plans. The daily educational flow outlined the teacher's routine for the day, including start time, play, activity, assessment, and rest and meal periods. Parental involvement was explicitly included in the monthly and activity plan formats (Appendices 12 and 13), with the same caution that "Parental involvement may not be required for every activity." The 2024 Program (MEB, 2024a), eliminated the daily educational flow and activity plan, requiring teachers to prepare only monthly and daily plans, each containing a dedicated section titled "Family and Community Participation" (Appendix 14). Similarly, the TYMM Program (MEB, 2024b), continued the practice of monthly and daily plans, with parental and community involvement explicitly incorporated as dedicated sections in both plan types (Appendix 15).

Overall, these findings demonstrate a clear progression from the absence of specific parental involvement sections in early curricula toward structured, explicit inclusion of family and community participation in teacher planning in more recent programs.

4. Discussion and Conclusion

This study examined how the concept of parental involvement has been defined in Turkish early childhood education programs implemented between 1953 and 2024, and how this understanding has evolved over

time. The findings indicate that parental involvement has transformed historically from an indirectly conceptualized notion to a systematic, holistic, and participatory framework. In the 1953 and 1989 programs, the family was considered merely as an external support element for the educational environment. However, starting with the 1994 program, parental involvement was explicitly defined as a direct component of the instructional process. With the reforms implemented in the 2000s, the family shifted from a passive observer supporting the child's development to an active stakeholder participating in educational planning and assessment processes.

In the literature, researchers such as Epstein (1995) and Hoover-Dempsey and Sandler (1997) emphasize that parental involvement strengthens children's cognitive and socio-emotional development and that school-family partnerships contribute to children's success both at school and later in life. The developments observed in Turkish early childhood education programs align with this international perspective. Specifically, the 2006, 2013, and 2024 programs supported parental involvement through multidimensional structures, including family education, home visits, individual meetings, and participation in decision-making processes. The Turkey Century Maarif Model (TYMM), in particular, defines the family not only as a supporter of education but also as an active participant in governance processes, thereby adopting a more democratic and collaborative approach.

In conclusion, Turkey's early childhood education programs have transformed the concept of parental involvement from a formal requirement into one of the fundamental principles of the education system. This transformation reflects a paradigm shift that strengthens family-teacher collaboration in early childhood education, promotes social participation, and supports a sustainable learning culture.

5. Recommendations

The findings of this study indicate that parental involvement in early childhood education in Turkey has evolved over the years into a systematic, multidimensional, and participatory structure. To ensure the sustainability of this transformation, several practical and research-oriented recommendations can be proposed.

First, the competencies of early childhood teachers in planning, implementing, and evaluating parental involvement should be enhanced. In this regard, in-service training programs can be organized, and pre-service

teacher education curricula can include mandatory, practice-based courses focused on family engagement.

Flexible and inclusive participation models that consider the socioeconomic and cultural diversity of families can be developed through collaboration between the Ministry of National Education (MoNE) and non-governmental organizations, thereby facilitating all families' access to the educational process.

Developing measurement and evaluation tools to monitor school-family cooperation by MoNE will make the effects of related policies more visible. The effectiveness of the new parental involvement approaches implemented under the Turkey Century Maarif Model can be evaluated through field studies based on systematic monitoring.

Finally, continuously updating family engagement guides integrated with the current early childhood education program, and supporting them with interactive content through digital platforms, can promote contemporary forms of participation and increase the level of parental involvement.

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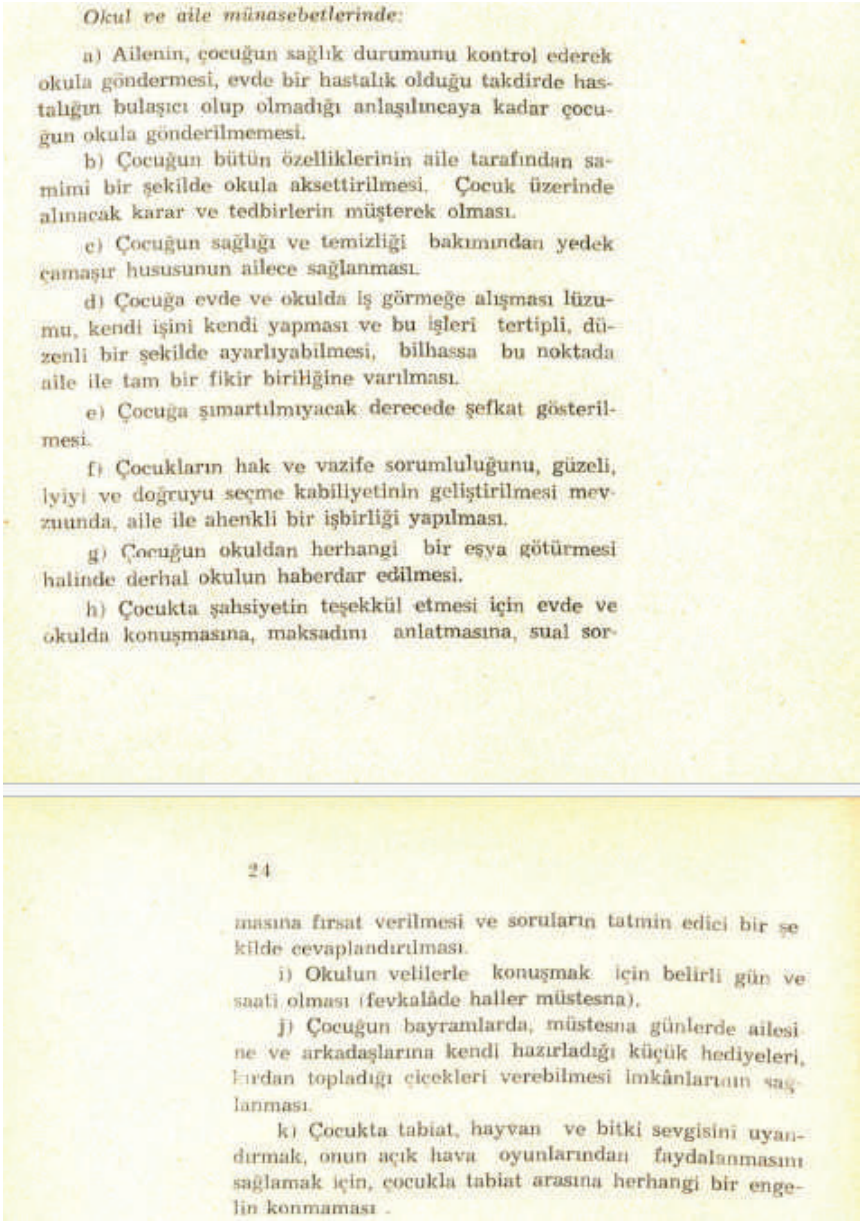
7. Appendices

Appendix 1: 1953 Early Childhood Education Program



Okul ve aile münasebetlerinde:

a) Ailenin, çocuğun sağlık durumunu kontrol ederek okula göndermesi, evde bir hastalık olduğu takdirde hastalığın bulaşıcı olup olmadığı anlaşılıncaya kadar çocuğun okula gönderilmemesi.

b) Çocuğun bütün özelliklerinin aile tarafından samimi bir şekilde okula aksettirilmesi. Çocuk üzerinde alınacak karar ve tedbirlerin müşterek olması.

c) Çocuğun sağlığı ve temizliği bakımından yedek çamaşır hususunun ailece sağlanması.

d) Çocuğa evde ve okulda iş görmeğe alışması lüzumu, kendi işini kendi yapması ve bu işleri tertipli, düzenli bir şekilde ayarlıyabilmesi, bilhassa bu noktada aile ile tam bir fikir birliğine varılması.

e) Çocuğa şımartılmıyacak derecede şefkat gösterilmesi.

f) Çocukların hak ve vazife sorumluluğunu, güzeli, iyiyi ve doğruyu seçme kabiliyetinin geliştirilmesi mevzuunda, aile ile ahenkli bir işbirliği yapılması.

g) Çocuğun okuldan herhangi bir eşya götürmesi halinde derhal okulun haberdar edilmesi.

h) Çocukta şahsiyetin teşekkül etmesi için evde ve okulda konuşmasına, maksadını anlatmasına, sual sor-

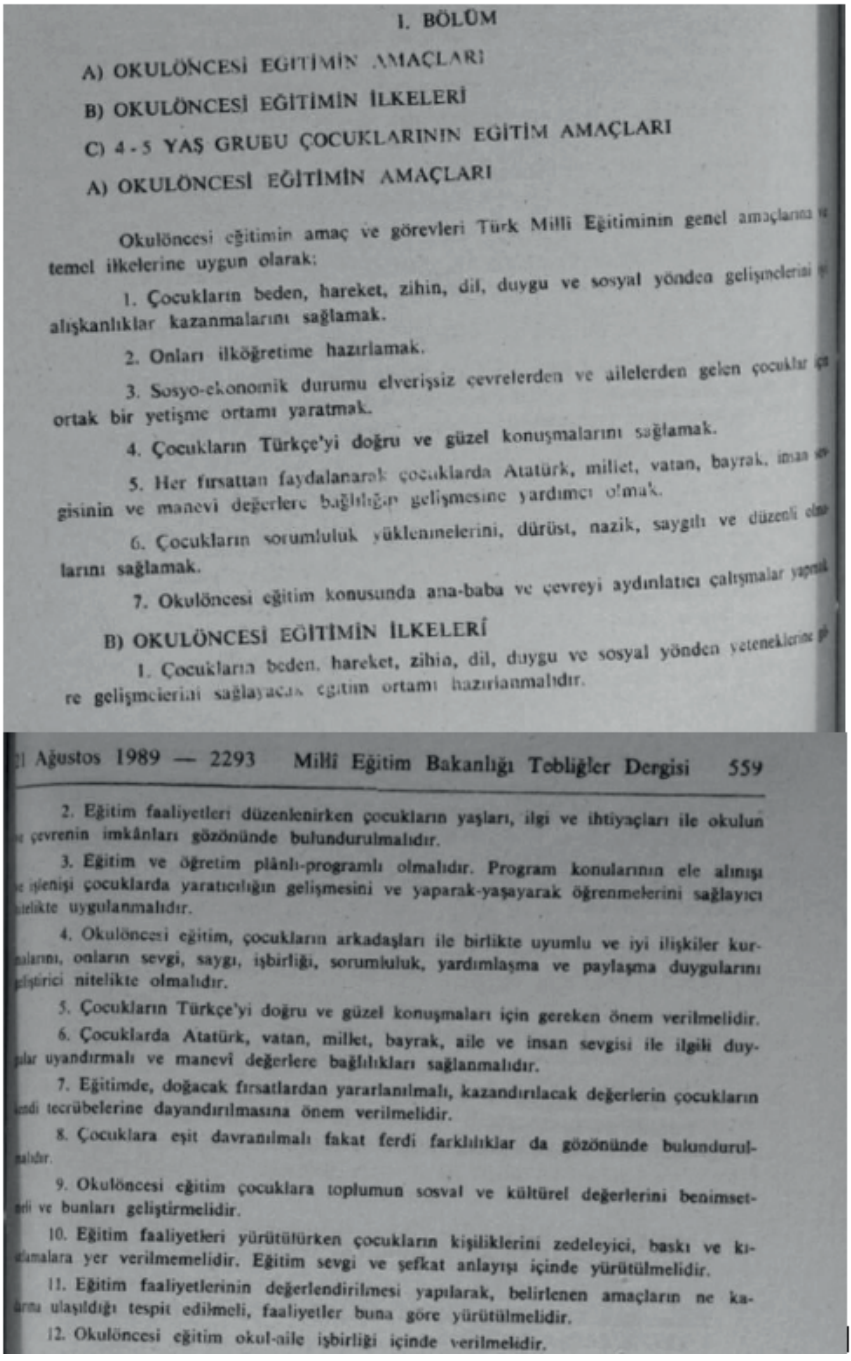
masına fırsat verilmesi ve soruların tatmin edici bir şekilde cevaplandırılması.

i) Okulun velilerle konuşmak için belirli gün ve saati olması (fevkalâde haller müstesna).

j) Çocuğun bayramlarda, müstesna günlerde ailesine ve arkadaşlarına kendi hazırladığı küçük hediyeleri, bahçeden topladığı çiçekleri verebilmesi imkânlarının sağlanması.

k) Çocukta tabiat, hayvan ve bitki sevgisini uyandırmak, onun açık hava oyunlarından faydalanmasını sağlamak için, çocukla tabiat arasına herhangi bir engelin konmaması.

Appendix 2: 1989 Early Childhood Education Program



I. BÖLÜM

A) OKULÖNCESİ EĞİTİMİN AMAÇLARI

B) OKULÖNCESİ EĞİTİMİN İLKELERİ

C) 4 - 5 YAŞ GRUBU ÇOCUKLARININ EĞİTİM AMAÇLARI

A) OKULÖNCESİ EĞİTİMİN AMAÇLARI

Okulöncesi eğitimin amaç ve görevleri Türk Milli Eğitiminin genel amaçlarına ve temel ilkelerine uygun olarak:

1. Çocukların beden, hareket, zihin, dil, duygu ve sosyal yönden gelişmelerini ve alışkanlıklar kazanmalarını sağlamak.

2. Onları ilköğretime hazırlamak.

3. Sosyo-ekonomik durumu elverişsiz çevrelerden ve ailelerden gelen çocuklar için ortak bir yetişme ortamı yaratmak.

4. Çocukların Türkçe'yi doğru ve güzel konuşmalarını sağlamak.

5. Her fırsattan faydalanarak çocuklarda Atatürk, millet, vatan, bayrak, insan sevgisinin ve manevi değerlere bağlılığın gelişmesine yardımcı olmak.

6. Çocukların sorumluluk yüklenmelerini, dürüst, nazik, saygılı ve düzenli olmalarını sağlamak.

7. Okulöncesi eğitim konusunda ana-baba ve çevreyi aydınlatıcı çalışmalar yapmak.

B) OKULÖNCESİ EĞİTİMİN İLKELERİ

1. Çocukların beden, hareket, zihin, dil, duygu ve sosyal yönden yeteneklerine göre gelişmelerini sağlayacak eğitim ortamı hazırlanmalıdır.

21 Ağustos 1989 — 2293 Milli Eğitim Bakanlığı Tebliğler Dergisi 559

2. Eğitim faaliyetleri düzenlenirken çocukların yaşları, ilgi ve ihtiyaçları ile okulun ve çevrenin imkânları gözönünde bulundurulmalıdır.

3. Eğitim ve öğretim plânlı-programlı olmalıdır. Program konularının ele alınışı ve işleniş çocuklarda yaratıcılığın gelişmesini ve yaparak-yaşayarak öğrenmelerini sağlayıcı nitelikte uygulanmalıdır.

4. Okulöncesi eğitim, çocukların arkadaşları ile birlikte uyumlu ve iyi ilişkiler kurmalarını, onların sevgi, saygı, işbirliği, sorumluluk, yardımlaşma ve paylaşma duygularını geliştirici nitelikte olmalıdır.

5. Çocukların Türkçe'yi doğru ve güzel konuşmaları için gereken önem verilmelidir.

6. Çocuklarda Atatürk, vatan, millet, bayrak, aile ve insan sevgisi ile ilgili duygular uyandırmalı ve manevî değerlere bağlılıkları sağlanmalıdır.

7. Eğitimde, doğacak fırsatlardan yararlanılmalı, kazandırılacak değerlerin çocukların kendi tecrübelerine dayandırılmasına önem verilmelidir.

8. Çocuklara eşit davranılmalı fakat ferdî farklılıklar da gözönünde bulundurulmalıdır.

9. Okulöncesi eğitim çocuklara toplumun sosyal ve kültürel değerlerini benimsetmeli ve bunları geliştirmelidir.

10. Eğitim faaliyetleri yürütülürken çocukların kişiliklerini zedeleyici, baskı ve kısıtlamalara yer verilmemelidir. Eğitim sevgi ve şefkat anlayışı içinde yürütülmelidir.

11. Eğitim faaliyetlerinin değerlendirilmesi yapılarak, belirlenen amaçların ne kadarına ulaşıldığı tespit edilmeli, faaliyetler buna göre yürütülmelidir.

12. Okulöncesi eğitim okul-aile işbirliği içinde verilmelidir.

Appendix 3: 1994 Early Childhood Education Program

OKUL ÖNCESI EĞITIMDE DIKKAT EDILECEK HUSUSLAR

1) Program, normal gelişim özellikleri gösteren çocuklar gözönüne alınarak hazırlanmıştır. Bu nedenle programın başarılı bir şekilde uygulanmasında çocuk veya çocuk grubunun bulunduğu gelişim düzeyinin iyi tanınması gerekir. Program uygulanırken yaş grubunun genel özellikleri kadar, bireysel özellikler, çocukların kendilerine özgü yetenek ve becerileri de dikkate alınmalıdır. Program, bu anlayış içinde uygulandığı taktirde özel eğitim ihtiyacı olan çocuklar için de kullanılabilir.

2) Programa ilişkin hedefler saptanırken, sorumlu olunan çocuk grubunun ihtiyaçları belirlenerek, hedefler programda verilen örnekler doğrultusunda yeniden düzenlenmeli, ya da yeni hedefler bulunabilmelidir. Örnek: Kırsal kesimde bulunan bir okul öncesi eğitim kurumunda meslekların tanıtımına ilişkin hedefler belirlenirken, burada en fazla bulunan mesleklere öncelik verilmeli (tarım ve hayvancılık vb.) ya da bir sahil bölgesinde deniz ve onunla ilgili konuların programa katılmasına özen gösterilmelidir.

3) Program uygulanırken bazı faaliyetler, grubun tümüne ya da küçük gruplara yönelik olabilir. Bazen de öğretmen ve çocuğun teke tek çalışması veya çocuğun tek başına faaliyette bulunması söz konusu olabilir.

4) Eğitim ortamı çocukların aynı anda farklı faaliyetlerde bulunabilecekleri dikkate alınarak düzenlenmelidir. Sessizlik ya da az hareket gerektiren faaliyet alanlarının birbirine yakın olmasına dikkat edilmesi, öğretmenin bütün çocukları aynı anda görebilecek bir konumda olması son derece önemlidir. Programın başarısı her şeyden önce çocukların temiz, aydınlık, iyi ısıtılmış, havalandırılmış ve güvenli bir ortam içinde bulunmasına bağlıdır. Oyun materyalleri, sandalye ve masalar sağlam, kolay kırılmayan, çocukların yaşına, boyuna uygun olmalıdır. Ortam; çocukların masa başı çalışmaları, yerde serbestçe oturacakları hatta yatarak faaliyet gösterebilecekleri minder, yastık vb. ile döşenmeli ve çocukların rahatça hareket edebilecekleri bir alanın bulunmasına dikkat edilmelidir. Çocukların ihtiyacına cevap verecek şekilde eşyalar sabit konumdan çok yerleri değiştirilebilir özellikte olmalıdır. Ortam, grupta bulunması muhtemel engelli çocuk veya çocukların durumuna göre de düzenlenebilmelidir.

Yaratıcılığı destekleyici bir eğitim ortamı; çocuğun doğal merakını geliştirecek, hayvan yetiştirme, bitki yetiştirme gibi araştırma ve inceleme yapmaya yöneltici köşelere de sahip olmalıdır. Hayal gücünü destekleyici kitaplar, resimler, filmler, sesli ve görüntülü malzemeler de eğitimciye destek sağlayacaktır.

4

5) Okul öncesi eğitim, yetişkin ve çocuğun birbirleri ile kuracakları olumlu ilişkiler sayesinde başarıya ulaşabilir. Tüm okul öncesi dönem boyunca çocuğun, yetişkinin sevgi ve anlayışına ihtiyacı vardır. Bu nedenle, öğretmenin çocukla konuşmalarında daima olumlu bir ifade kullanması yerinde olur. Verilen örnek programlar uygulanırken çocuğun en iyi yapabileceği, tanıdığı konulara öncelik verilmeli ve çocuk bunları yaptıkça ödüllendirilmelidir. Böyle bir yaklaşım, çocuktaki başarı duygusunu destekler ve yeni konuları öğrenme isteğini artırır.

6) Çocuklarla konuşurken veya onlardan söz ederken, belli özelliklerine göre isimlendirmekten de kaçınmak yerinde bir yaklaşımdır (uslu, yaramaz, akıllı, aptal vb).

7) Yetişkinler, çocuğa sadece ihtiyacı olduğunda yardım ederek bağımsızlığını geliştirmesini desteklemeli, yapabileceği şeylere veya yapmak istediklerine izin vermelidir.

8) Programda yer alan etkinlikler, çocukların günlük hayatları ile ilişki kurabilmelerine yardım edici nitelikte olmalıdır. Eğitim durumlarının sonunda kalıcı davranışlara ulaşılabilmesi yönünden tekrarlar ve pekiştirici etkinlikler önem taşır. Bu bakımdan zaman zaman tekrarlara da yer verilmelidir.

9) Ailenin katılımı, verilen eğitimin kalıcı olması yönünden önem taşımaktadır. Okulda gerçekleştirilenlerin aileye tanıtılması ve ailenin de evde yapabileceklerinin onlara anlatılması gerekir. Bunun için de aileler belirli aralıklarla okula davet edilerek faaliyetleri izlemeleri sağlanabilir. Ailelere tek tek veya grup halinde eğitim çalışmaları yapılabilir. Özellikle, grupta problem davranışı olan çocuklar varsa ailenin kurumda uygulanan programa katılımı ile, bu problem davranış daha kısa sürede çözüme ulaşabilir.

10) Okul öncesi eğitimde görev alacak öğretmenin çocukta yaratıcılığı ve problem çözme becerilerini geliştirecek bir tutum sergilemesi son derece önemlidir. Bu tutum, çocuğa sağlıklı iletişimin gerçekleştiği rahat ve güvenli bir ortam yaratır. Ayrıca çocuklara soru sorma fırsatı vererek, onların sorulara birlikte çok yönlü cevaplar aramalarını sağlar. Yeni ve orjinal çözümler öğretmen tarafından daima olumlu karşılanmalıdır. Çocuklar tek tip çözüm üretmek yerine, daima olası çözümler bulabilmeleri yönünde desteklenmelidirler. Yeni, orjinal, değişik çözümler eğitimci tarafından ödüllendirilmelidir.

11) Yaratıcılık ve karar verme becerisinin geliştirilmesi açısından, etkinliklerin çocuklar tarafından başlatılması ve bu yönde teşvik edilmesi uygun olacaktır.

12) Yaratıcılığın desteklenmesi, eğitimcinin kendi kendini bu konuda geliştirmesi, bilgisini artırması ve dünyaya geniş bir pencereden bakmasıyla mümkündür.

Appendix 4: 2002 Early Childhood Education Program

3.7. Ailenin Çocuğun Eğitimine Katılımının Sağlanması

Okul öncesi eğitimde çoçukta istenen davranışların geliştirilmesi için okul aile işbirliğinin sağlanması önemlidir. Bu nedenle eğitim yılı başında kurum yöneticileri ve öğretmenler bir araya gelerek, aileleri programa ne şekilde katabileceklerini kararlaştırmalıdır.

Veli toplantıları her yarıyılda en az iki keź yapılmalıdır. Ayrıca ailelerin öğretmenle bireysel görüşme yapabilmeleri için de olanak sağlanmalıdır.

Öğretmen, her çocuğun evine bir yarıyılda en az bir kez ev ziyareti yapmaya özen göstermelidir. Ev ziyaretlerinde çeşitli etkinlikler yapılabilir.

Örneğin:

- Evdeki rutin işlerin öğrenme yaşantısı olarak nasıl kullanılabileceği ailelere gösterilebilir.
- Çocuk ve ailenin birlikte oynayabileceği oyun ya da etkinlikler plânlanabilir.
- Çocuğun da görev alıp yapımına yardım edebileceği bir oyuncak yapılabilir.
- Ailenin, çocuğun gelişimi hakkında bilgi almak istediği konular varsa bu konularda bilgilendirilebilir.
- Çocuk ve ailesi ev ortamında gözlemlenebilir.

18

Ailelerle yapılan görüşmelerde, konuşmaya her zaman çocuğun olumlu ve başarılı olduğu konularla başlanmalıdır. Daha sonra çocuğun güçlendirilmesi ve desteklenmesi gereken alanlar ifade edilmeli, bunun için okulda ve evde neler yapılabileceği konuşulmalı, ailelerin plânlama ve uygulamalara etkin katılımı sağlanmalıdır.

Eğitimde okul-aile işbirliğinin sürekliliğinin sağlamak için aileler, okulda yapılanlar hakkında sürekli olarak bilgilendirilmelidir.

Appendix 5: 2006 Early Childhood Education Program

IV. BÖLÜM

AİLE KATILIMI

Günümüzde okul öncesi eğitime verilen önem tüm ülkelerde artmıştır. Ancak okul öncesi eğitimin önemi konusunda toplumsal bilinç oluşturan ülkelerde, bu bilinç sayesinde, okul öncesi eğitimdeki okullaşma oranları da artmıştır. Bu gerçekten hareketle pek çok ülkede toplumsal bilinç oluşturma konusunda çeşitli çalışmalar ve yoğun kampanyalar yürütülmektedir.

Okul öncesi eğitim alanında çocuklar üzerinde yapılan araştırmalar, aile katılımını sağlayan programlarda yetişen çocukların gelişimindeki olumlu etkinin "kalıcı" olduğunu ortaya koymaktadır. Ancak, okul öncesi eğitim kurumlarının bir çoğunda aile, programların dışında kalmakta; böylece çocuğun kazandığı becerilerin kalıcılığı sağlanmamakta ve bu becerilerin günlük yaşama aktarılması mümkün olmamaktadır. Bu nedenle okul öncesi eğitimde en iyi yaklaşım, çocuğu tek başına birey olarak değil, ailesi ile birlikte ele alan yaklaşımdır.

Ailenin eğitime katılımını sağlamak için ailelere olumlu düşüncelerle yaklaşmak önemlidir. Aile bireylerinin çocuğu daha iyi tanıdığını ve çocuk hakkında öğretmenden daha fazla deneyime sahip olduğunu, kendi çocuğunun eğitiminde geçerli olabilecek yöntemler bildiğini kabul etmek gerekir. Ayrıca aile bireylerine karşı anlayışlı, hoşgörülü, esnek ve demokratik bir tutum sergilemek, ailenin çalışmalara katılımını kolaylaştırmak açısından önemlidir.

Ailenin eğitime katılımı, aile bireylerinin okul öncesi eğitim hakkında görüş sahibi olmaları ve çalışmaların evde pekiştirilmesini desteklemeleri ve böylece eğitimde devamlılığın sağlanması için gereklidir. Eğitimde sürekliliğin sağlanması ise eğitimdeki başarıyı artırır.

Ailenin eğitime katılımı, ebeveynlerin çocuk yetiştirme konusundaki bilgi ve becerilerini artırmakta ve daha etkili ebeveynler olmalarını sağlamaktadır.

Okul öncesinde aile katılımı; aile eğitim etkinlikleri, aile iletişim etkinlikleri, ailelerin eğitim etkinliklerine katılımı, ev ziyaretleri ve evde yapılabilecek etkinlikler, bireysel görüşmeler ve toplantılar yönetim ve karar verme süreçlerine katılım olmak üzere yedi ana başlıkta incelenebilir. Öğretmen, programdaki etkinliklerin hangilerinde aile katılımına yer vereceğini yıllık planını hazırlarken belirlemelidir.Her etkinlikte aile katılımı gerekmeyebilir.

Aile Eğitim Etkinlikleri

Aile eğitim etkinlikleri çocuk sağlığı, gelişim, davranış yönetimi, iletişim, beslenme, ruh sağlığı gibi konularda ailelerin bilgi ve becerilerini geliştirmeye yönelik sistemli ve planlı çalışmalardır. Aile eğitimi toplantılar, konferanslar, bireysel görüşmeler ya da makaleler, broşür, el kitabı, dergiler gibi basılı araçlar ve eğitim panoları yolu ile yapılabilir. Çalışmalara başlamadan önce ailelerin ilgi ve ihtiyaçlarını belirlemek amacı ile yazılı bir form verilmelidir. Bu formların analizi sonucunda ortaya çıkan ihtiyaçlara göre hangi konunun hangi etkinlik yoluyla ve ne zaman yapılacağı planlanmalıdır.

Appendix 6: 2013 Early Childhood Education Program – OBADER

EK 1 / D. 7.

AİLE KATILIMI TERCİH FORMU

Anne/Baba'nın Adı-Soyadı:..... **Tarih:**...../...../.....

Değerli Aileler,

Bilindiği gibi okul öncesi eğitim sürecinde ailenin çok önemli bir rolü vardır. Çocuğun eğitimi aile ile okulun iş birliği ile gerçekleşmektedir. Okulumuzda aile katılımı çalışmaları yapmayı planlamaktayız. Aşağıda bazı katılım şekilleri sunulmuştur. Lütfen bunlardan size uygun olanı/olanları işaretleyiniz. Bunların dışında katılımda bulunabileceğiniz konular varsa ekleyebilirsiniz.

( ) Gezilerde yardım edebilirim.
( ) Okul tarafından düzenlenecek toplantılarda yardım edebilirim.
( ) Materyal ve araç hazırlamak için düzenli olarak gelebilirim (Lütfen gün belirtiniz).
( ) Öykü anlatabilirim.
( ) Çocukların oluşturduğu öyküleri kaydedebilirim.
( ) Deneylerde görev alabilirim.
( ) Müzik etkinliklerinde görev alabilirim, enstrüman çalabilirim.
( ) Tiyatro/ drama etkinliklerinde görev alabilirim.
( ) Resim, deniz kabuğu vb. koleksiyonumuzu çocuklara gösterip anlatabilirim.
( ) Meslek tanıtımlarında görev alabilirim.
( ) Yemek pişirme, dikiş dikme vb. özel ilgilerim var. Bunları çocuklarla paylaşabilirim.
( ) Öğrenme merkezleri (bakkal, postane vb.) hazırlanmasında yardım edebilirim.
( ) Evcil hayvanlarım var, okula getirebilirim.
( ) Bilgisayar etkinliklerinde görev alabilirim.
( ) Diğer (ekleyiniz):.....

111

Appendix 7: 2024 Early Childhood Education Program – Family Education Guide

Ek 3

AİLENİN EĞİTİM ETKİNLİKLERİNE KATILIM TERCİH FORMU

Değerli Aileler,

Bu form okul öncesi eğitim programındaki etkinliklere katılım sağlamanız için yapabileceğiniz çalışmaları belirlemek amacıyla hazırlanmıştır. Aşağıdaki çalışmalardan yapmak istediklerinizi, gün ve saat tercihlerinizi belirtiniz. Ayrıca yapabileceğiniz diğer çalışmaları da yazabilirsiniz.
Sizlerin katılımıyla gerçekleştireceğimiz çalışmalar için şimdiden teşekkür ederiz.

Eğitim Etkinliklerine Katılım Sağlayacak Aile Bireyinin

Adı ve Soyadı : .....

Çocuğun Adı ve Soyadı : .....

Çocuğun Doğum Tarihi : ...../...../20.....

Çocuğun Cinsiyeti : .....

Tarih : ...../...../20.....

- ☐ Hareket çalışmaları yaptırabilirim.
- ☐ Oyun oynayabilirim ve yeni oyunlar öğretebilirim.
- ☐ Hikâye anlatabilirim.
- ☐ Şarkı söyleyebilirim ve yeni şarkılar öğretebilirim.
- ☐ Artık materyallerle etkinlik yaptırabilirim.
- ☐ Deneyler yaptırabilirim.
- ☐ Mutfakla ilgili etkinlikler düzenleyebilirim; çocuklarla birlikte kek, poğaça, turşu gibi yiyecek hazırlayabilirim.
- ☐ Dikiş, kalıp çıkarma, işleme, örgü gibi el işleri gösterebilirim.
- ☐ Mesleğimi tanıtabilirim.
- ☐ Çocuklarla fotoğraf çekimi gezileri yapabilirim.
- ☐ Enstrüman çalabilirim.
- ☐ Koleksiyonumu (resim, farklı ülkelere ait objeler gibi) çocuklara gösterip anlatabilirim.
- ☐ Evcil hayvanım var, okula getirebilirim.
- ☐ Drama yaptırabilirim.
- ☐ Çalıştığım kuruma davet ederek tanıtımını yapabilirim.

Appendix 8: TYMM Program – Family Involvement Preference Form

EK 12: AİLE KATILIMI TERCİH FORMU

Anne/Babanın Adı-Soyadı:.....	**Tarih :**...../...../.....

Sevgili Ailelerimiz,

Bilindiği gibi eğitim sürecinde ailenin çok önemli bir rolü vardır. Çocuğun eğitimi aile ile kurumun iş birliği ile gerçekleşmektedir. Kurumumuzda aile katılım aktivitesi uygulaması yapmayı planlamaktayız. Lütfen bunlardan size en uygun olanını işaretleyiniz.

Aşağıdaki maddeleri inceleyiniz ve yapabileceklerinizi işaretleyerek belirleyiniz. Belirtilenlere eklemeler yapabilirsiniz.

	Gezilerde yardım edebilirim.
	Çay ve diğer özel toplantılara yardım edebilirim.
	Malzeme ve araç hazırlamak için düzenli olarak gelebilirim. (Lütfen gün belirtiniz.)
	Öykü anlatabilirim.
	Oyun etkinliklerinde görev alabilirim.
	Deneylerde görev alabilirim.
	Müzik etkinliklerinde görev alabilirim, enstrüman çalabilirim.
	Tiyatro, drama etkinliklerinde görev alabilirim.
	Resim, deniz kabuğu gibi koleksiyonumuzu çocuklara gösterebilirim.
	Meslek tanıtımlarında görev alabilirim.
	Yemek pişirme, dikiş dikme gibi özel ilgilerim var. Bunları çocuklarla paylaşabilirim.
	Eğitim ortamının hazırlanmasında yardım edebilirim.
	Evcil hayvanlarım var, kuruma getirebilirim.
	Bilgisayar etkinliklerinde görev alabilirim.
	Yardım etmeyi düşündüğünüz başka konular varsa lütfen belirtiniz.
	....

Appendix 9: 2002 Annual Plan Sample

EK 1: OKUL ÖNCESİ EĞİTİM KURUMLARI İÇİN YILLIK PLÂN ÖRNEĞİ (Eylül Ayı İçin)

OKULUN ADI :
YAŞ GRUBU :

AY	HEDEFLER VE KAZANILMASI BEKLENEN DAVRANIŞLAR	TARİH	EĞİTİM DURUMU	DEĞERLENDİRME
EYLÜL	(Öğretmen her ay için hedeflerini belirlerken tüm gelişim alanlarını dikkate almalıdır.)	(Ne zaman yapılacak?)	(Hangi etkinlik, nasıl uygulanacak?)	(Program, çocuk ve öğretmen nasıl, ne ile değerlendirilecek?)
	KAVRAMLAR (EK 3'deki kavramlar listesinden seçilebileceği gibi, gereksinim doğrultusunda kavramlar da eklenebilir.)			
	GEZİ - GÖZLEM (Seçilen hedeflere uygun olmasına dikkat edilmelidir.)			
	ÖZEL GÜN VE HAFTALAR (O ay içindeki günler ve haftalar belirtilmelidir.)			
	AİLE KATILIMI (Belirlenen hedeflere uygun olarak ailenin programa nasıl katılacağı belirtilmelidir.			

HAZIRLAYAN ÖĞRETMEN/ÖĞRETMENLER

NOT: Yıllık plân, okulun açık olduğu her ay için, örnekte yer alan tüm bilgileri kapsayacak şekilde ayrı sayfalar halinde hazırlanmalıdır.

47

Appendix 10: 2006 Annual Plan Sample

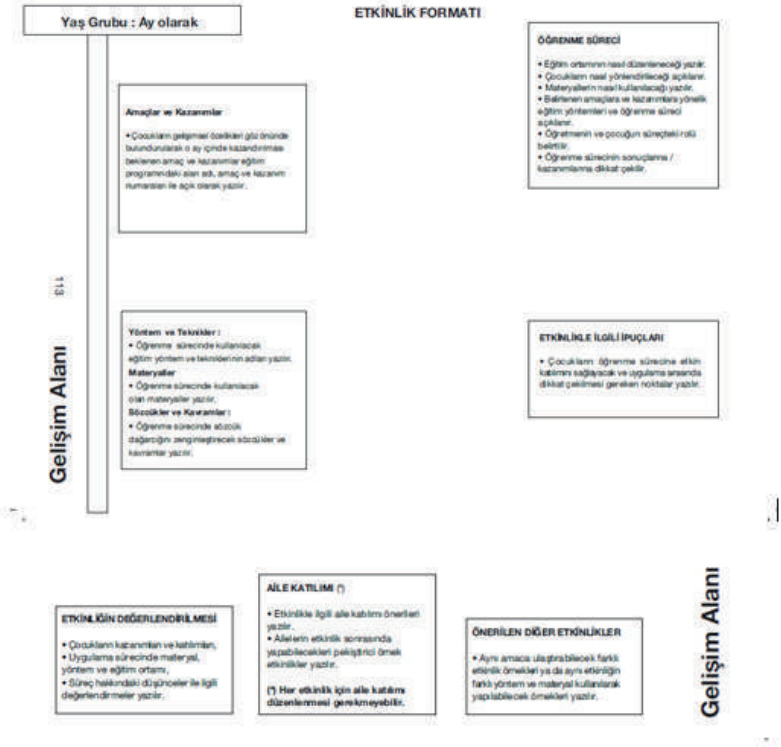
YILLIK PLAN FORMU

OKULUN ADI : **YAŞ GRUBU (AY):**

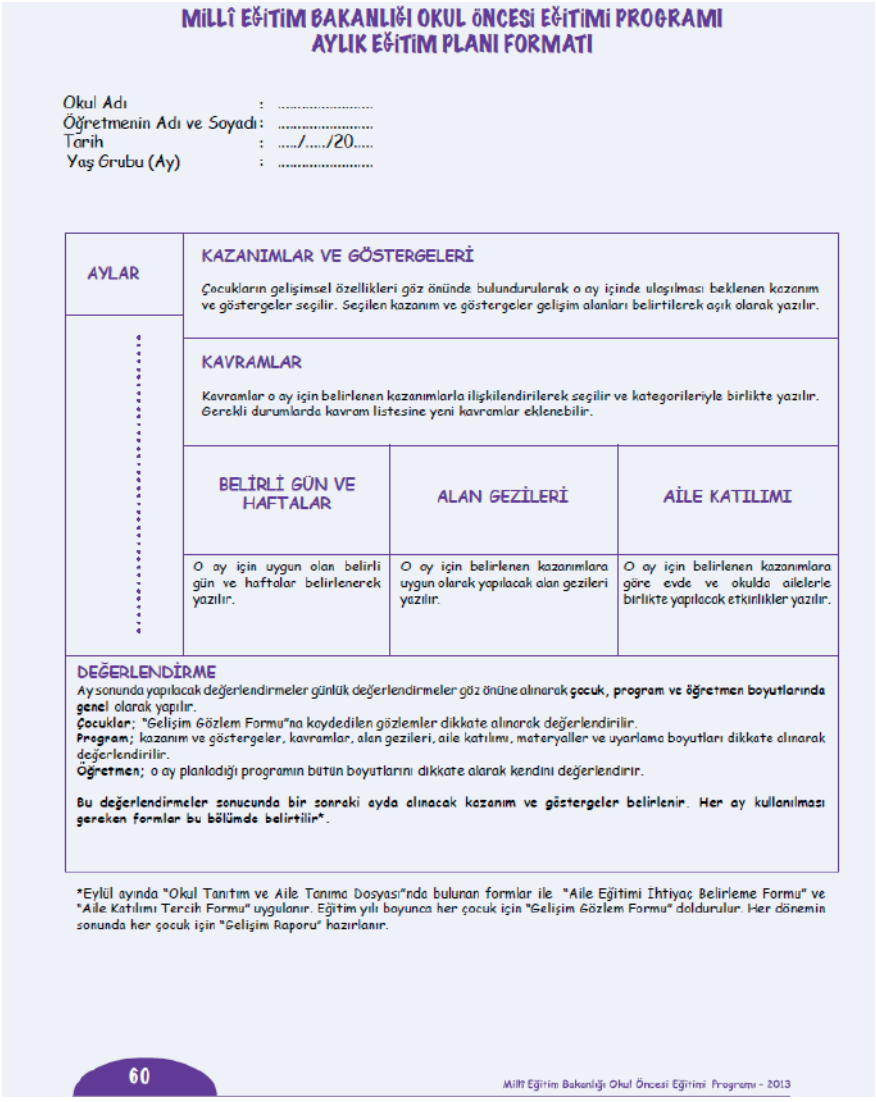
AYLAR	AMAÇLAR VE KAZANIMLAR				
	Çocukların gelişimsel özellikleri göz önünde bulundurularak o ay içinde kazandırılması beklenen amaç ve kazanımlar, her bir gelişim alanından seçilerek eğitim programındaki alan adı, amaç ve kazanım numaraları ile açık olarak yazılır.				
	KAVRAMLAR	**ALAN GEZİLERİ**	**BELİRLİ GÜN VE HAFTALAR**	**AİLE KATILIMI**	**DEĞERLENDİRME**
	O ay için belirlenen amaç ve kazanımlara uygun olan kavramlar, ilgili listeden (Bk. Program Kitabı) seçilerek yazılır. Gerekli durumlarda kavramlar listesine yeni kavramlar eklenir.	O ay için belirlenen amaç ve kazanımlara uygun olarak yapılacak alan gezileri etkinlikleri yazılır.	Belirli gün ve haftalar listesinden (Bk. Program Kitabı) o ay için uygun olan belirli gün ve haftalar seçilerek yazılır.	O ay için belirlenen amaç ve kazanımlara göre evde ve okulda ailelerle birlikte yapılacak etkinlikler yazılır.	Her ay sonunda "çocuk, program ve öğretmen" boyutunda yapılan değerlendirme sonuçları yazılır. Çocukların gelişimsel özelliklerinin değerlendirilmesine yönelik olarak "Gelişim Kontrol Listesi"nin kullanılması ile ilgili hatırlatma notu yazılır(Bk.Program Kitabı). Her bir dönem sonunda "Kazanım Değerlendirme Formu"nun (Bk. Program Kitabı) uygulanması ile ilgili hatırlatma notu yazılır.

111

Appendix 11: 2006 Daily Plan Sample



Appendix 12: 2013 Monthly Plan Sample



MİLLÎ EĞİTİM BAKANLIĞI OKUL ÖNCESİ EĞİTİMİ PROGRAMI
AYLIK EĞİTİM PLANI FORMATI

Okul Adı : .....
Öğretmenin Adı ve Soyadı : .....
Tarih : ...../...../20.....
Yaş Grubu (Ay) : .....

AYLAR	KAZANIMLAR VE GÖSTERGELERİ Çocukların gelişimsel özellikleri göz önünde bulundurularak o ay içinde ulaşılması beklenen kazanım ve göstergeler seçilir. Seçilen kazanım ve göstergeler gelişim alanları belirtilerek açık olarak yazılır.		
	KAVRAMLAR Kavramlar o ay için belirlenen kazanımlarla ilişkilendirilerek seçilir ve kategorileriyle birlikte yazılır. Gerekli durumlarda kavram listesine yeni kavramlar eklenebilir.		
	BELİRLİ GÜN VE HAFTALAR	ALAN GEZİLERİ	AİLE KATILIMI
	O ay için uygun olan belirli gün ve haftalar belirlenerek yazılır.	O ay için belirlenen kazanımlara uygun olarak yapılacak alan gezileri yazılır.	O ay için belirlenen kazanımlara göre evde ve okulda ailelerle birlikte yapılacak etkinlikler yazılır.

DEĞERLENDİRME
Ay sonunda yapılacak değerlendirmeler günlük değerlendirmeler göz önüne alınarak **çocuk, program ve öğretmen boyutlarında genel** olarak yapılır.
Çocuklar; "Gelişim Gözlem Formu"na kaydedilen gözlemler dikkate alınarak değerlendirilir.
Program; kazanım ve göstergeler, kavramlar, alan gezileri, aile katılımı, materyaller ve uyarlama boyutları dikkate alınarak değerlendirilir.
Öğretmen; o ay planladığı programın bütün boyutlarını dikkate alarak kendini değerlendirir.

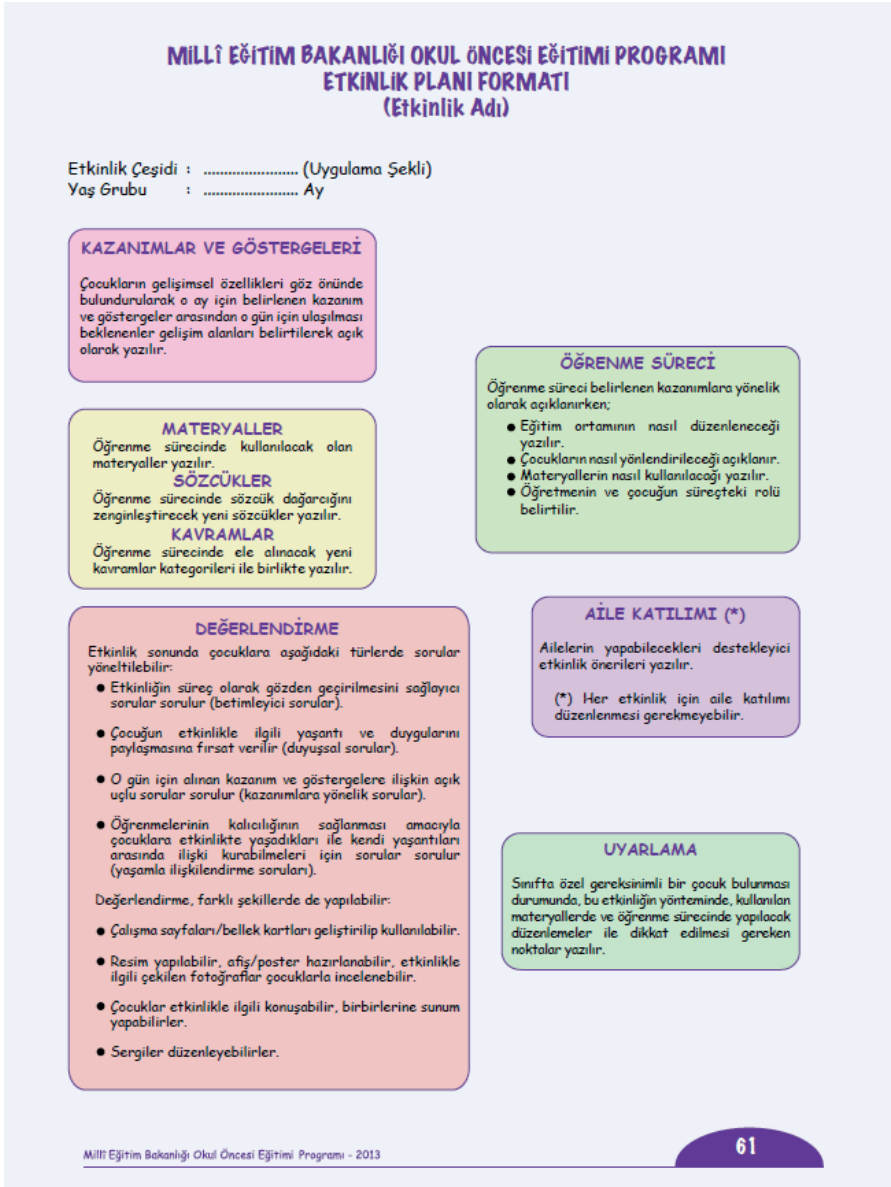
Bu değerlendirmeler sonucunda bir sonraki ayda alınacak kazanım ve göstergeler belirlenir. Her ay kullanılması gereken formlar bu bölümde belirtilir*.

*Eylül ayında "Okul Tanıtım ve Aile Tanıma Dosyası"nda bulunan formlar ile "Aile Eğitimi İhtiyaç Belirleme Formu" ve "Aile Katılımı Tercih Formu" uygulanır. Eğitim yılı boyunca her çocuk için "Gelişim Gözlem Formu" doldurulur. Her dönemin sonunda her çocuk için "Gelişim Raporu" hazırlanır.

60

Millî Eğitim Bakanlığı Okul Öncesi Eğitimi Programı - 2013

Appendix 13: 2013 Activity Plan Sample



MİLLÎ EĞİTİM BAKANLIĞI OKUL ÖNCESİ EĞİTİMİ PROGRAMI
ETKİNLİK PLANI FORMATI
(Etkinlik Adı)

Etkinlik Çeşidi : ..... (Uygulama Şekli)
Yaş Grubu : ..... Ay

KAZANIMLAR VE GÖSTERGELERİ

Çocukların gelişimsel özellikleri göz önünde bulundurularak o ay için belirlenen kazanım ve göstergeler arasından o gün için ulaşılması beklenenler gelişim alanları belirtilerek açık olarak yazılır.

MATERYALLER

Öğrenme sürecinde kullanılacak olan materyaller yazılır.

SÖZCÜKLER

Öğrenme sürecinde sözcük dağarcığını zenginleştirecek yeni sözcükler yazılır.

KAVRAMLAR

Öğrenme sürecinde ele alınacak yeni kavramlar kategorileri ile birlikte yazılır.

ÖĞRENME SÜRECİ

Öğrenme süreci belirlenen kazanımlara yönelik olarak açıklanırken;

- Eğitim ortamının nasıl düzenleneceği yazılır.
- Çocukların nasıl yönlendirileceği açıklanır.
- Materyallerin nasıl kullanılacağı yazılır.
- Öğretmenin ve çocuğun süreçteki rolü belirtilir.

DEĞERLENDİRME

Etkinlik sonunda çocuklara aşağıdaki türlerde sorular yöneltilebilir:

- Etkinliğin süreç olarak gözden geçirilmesini sağlayıcı sorular sorulur (betimleyici sorular).
- Çocuğun etkinlikle ilgili yaşantı ve duygularını paylaşmasına fırsat verilir (duyuşsal sorular).
- O gün için alınan kazanım ve göstergelere ilişkin açık uçlu sorular sorulur (kazanımlara yönelik sorular).
- Öğrenmelerinin kalıcılığının sağlanması amacıyla çocuklara etkinlikte yaşadıkları ile kendi yaşantıları arasında ilişki kurabilmeleri için sorular sorulur (yaşamla ilişkilendirme soruları).

Değerlendirme, farklı şekillerde de yapılabilir:

- Çalışma sayfaları/bellek kartları geliştirilip kullanılabilir.
- Resim yapılabilir, afiş/poster hazırlanabilir, etkinlikle ilgili çekilen fotoğraflar çocuklarla incelenebilir.
- Çocuklar etkinlikle ilgili konuşabilir, birbirlerine sunum yapabilirler.
- Sergiler düzenleyebilirler.

AİLE KATILIMI (*)

Ailelerin yapabilecekleri destekleyici etkinlik önerileri yazılır.

(*) Her etkinlik için aile katılımı düzenlenmesi gerekmeyebilir.

UYARLAMA

Sınıfta özel gereksinimli bir çocuk bulunması durumunda, bu etkinliğin yönteminde, kullanılan materyallerde ve öğrenme sürecinde yapılacak düzenlemeler ile dikkat edilmesi gereken noktalar yazılır.

Millî Eğitim Bakanlığı Okul Öncesi Eğitimi Programı - 2013

61

Appendix 14: 2024 Monthly Plan Sample

T.C. MEB OKUL ÖNCESİ EĞİTİM PROGRAMI

AYLIK PLAN FORMATI

Okul Adı : .....

Ay : .....

Yıl : .....

Yaş Grubu : ..... **Ay**

Öğretmen Adı : .....

KAZANIMLAR VE GÖSTERGELER
Çocukların gelişimsel özellikleri göz önünde bulundurularak o ay içinde ulaşılması beklenen kazanım ve göstergeler seçilir. Seçilen kazanım ve göstergeler gelişim alanları belirtilerek açık olarak yazılır.

KAVRAMLAR
Kavramlar, o ay için belirlenen kazanımlarla ilişkilendirilerek seçilir ve kategorileriyle birlikte yazılır. Gerekli durumlarda kavram listesine yeni kavramlar eklenebilir.

BELİRLİ GÜN VE HAFTALAR	OKUL DIŞI ÖĞRENME ETKİNLİĞİ	AİLE /TOPLUM KATILIMI
O ay için uygun olan belirli gün ve haftalar belirlenerek yazılır.	O ay için belirlenen kazanımlara uygun olarak yapılacak okul dışı öğrenme etkinlikleri yazılır.	O ay için belirlenen kazanımlar doğrultusunda ön hazırlık gerektiren aile/ toplum katılımı çalışmaları (yerel yönetimler/ sivil toplum kuruluşlarıyla iş birliği içersinde yardım kampanyası düzenleme, kermes düzenleme, veli toplantısı, aile buluşmaları, aile görüşmeleri, eğitim panosu, afiş, broşür vb.) genel olarak ifade edilir.

DEĞERLENDİRME
Öğretmenler aylık planlamalarını yaparken değerlendirme uygulamalarını da planlar. Aylık planda yer verilen kazanım, gösterge ve kavramlara çocukların ne derece ve nasıl ulaştıklarının belirlenmesi için o ay hangi gözlem kayıt araçlarının kullanılacağı ve değerlendirmelerin nasıl yapılacağı yazılır. Ayın sonunda yapılan gözlem ve değerlendirmeler sonucunda çocuk, öğretmen ve program açısından yapılan değerlendirmeler ayrı başlıklar halinde yazılır. Her ay kullanılması gereken formlar bu bölümde belirtilir.*

*Eğitim – öğretim sürecinde doldurulacak formlar arasından o ay hangi form doldurulacaksa belirtilir.

Appendix 15: TYMM Monthly Plan Sample

EK 7: AYLIK PLAN FORMATI

..... AYI PLANI	
ALAN BECERİLERİ	
KAVRAMSAL BECERİLERi	
EĞİLİMLER	
PROGRAMLAR ARASI BİLEŞENLER	
Sosyal-Duygusal Öğrenme Becerileri	
Değerler	
Okuryazarlık Becerileri	
ÖĞRENME ÇIKTILARI VE ALT ÖĞRENME ÇIKTILARI	
İÇERİK ÇERÇEVESİ	
Kavramlar	
ÖĞRENME KANITLARI (DEĞERLENDİRME)	Çocuklar Yönünden Değerlendirme Program Yönünden Değerlendirme Öğretmen Yönünden Değerlendirme
ÖĞRENME-ÖĞRETME YAŞANTILARI **Öğrenme-Öğretme Uygulamalar**	
FARKLILAŞTIRMA Zenginleştirme	
Destekleme	
AİLE/ TOPLUM KATILIMI	
ÖĞRETMEN YANSITMALAR	Programa yönelik görüş ve önerileriniz için karekodu akıllı cihazınıza okutunuz.

Chapter 5

A Review of Postgraduate Theses on STEM/ STEAM in Early Childhood Education

Serap Özbaş[1]

Abstract

This research examined master's theses on STEM and STEAM (science, technology, engineering, arts, and mathematics) in early childhood education published in Turkey. The data in the research consisted of master's theses on STEM and STEAM in early childhood education published in full text in the Higher Education Council (YÖK) Thesis Center database. The PRISMA method was used in reporting the theses. The research material consists of 59 graduate theses on STEM+STEAM that are fully accessible from the YOK Thesis Center database, according to the convenience sampling method. Descriptive content analysis was performed on the theses using the Paper Classification Form (PCF). The validity and reliability of the theses were checked in the analysis. According to the results obtained, most of the theses on STEM+STEAM in early childhood education are master's theses, depending on the program in which they were published. It was observed that theses on STEM+STEAM predominantly focused on the theme of scientific process skills. When examined in terms of research methodology, it was found that theses frequently used a semi-experimental design. It was determined that convenient sampling, purposive sampling, and random sampling were often preferred in sampling methods in theses. It was observed that children were frequently included in the sample group. When data collection tools were examined, it was found that theses often used activities related to the STEM+STEAM approach, as well as scales, interviews, and observation forms. In conclusion, the trend of theses on STEM+STEAM in the field of early childhood education was discussed within the scope of the literature.

1 Prof. Dr., İstanbul Beykent Üniversitesi, sozbash@gmail.com, ORCID ID: 0000-0002-3194-4018

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1. Introduction

In sustainable development, educational approaches that incorporate innovative ideas play a key role. One of these is the STEM approach (Kelley & Knowles, 2016). The first letters of the words science, technology, engineering, and mathematics make up the STEM approach. The first letters of the words science, technology, engineering, and mathematics make up the STEM approach. The United States started the STEM way of teaching (Jolly, 2009). While the STEM approach is increasingly used in education in the United States (Dugger, 2010), many countries (Australia, England, etc.) have incorporated the STEM approach into their education systems at all levels, and it is also growing globally (Bissaker, 2014). In general terms, STEM is an approach that enables learners to acquire problem-solving skills by combining disciplines (Şahin, Ayar & Adıgüzel, 2014). The STEM approach encompasses engineering design, scientific research, technological literacy, and mathematical thinking (Kelley & Knowles, 2016). The STEM approach aims to increase individuals' scientific and technological literacy and equip them with skills such as problem-solving and critical thinking. The main goal of the STEM approach, which enables individuals to use the knowledge and skills necessary to solve the complex and difficult problems they encounter, is to cultivate STEM-literate individuals (Bybee, 2013). In other words, it is emphasized that the purpose of developing STEM is to equip 21st-century individuals with the necessary skills (Sander, 2009). Studies indicate that STEM activities foster 21st-century skills such as critical thinking skills (Duran & Şendağ, 2012) and problem-solving skills (Yalçın & Erden, 2021) (Fajrina et al., 2020). Simultaneously, the benefits of the STEM approach, such as improving academic performance, are also highlighted (Khamhaenpol et al., 2021).

The STEM approach is a teaching and learning approach (Gonzalez & Kuenzi, 2012). STEM-focused teaching, which emphasizes teaching that focuses on problems and issues, enables the integrated use of two or more STEM disciplines (Dass, 2015). STEM, an educational approach based on the understanding of integrating knowledge and skills through an interdisciplinary approach, represents learning and teaching. In the STEM education approach, it is important to select appropriate teaching and learning methods (Robert & Cantu, 2012). The inclusion of appropriate teaching and learning methods in the STEM approach plays an important role. Similarly, a study examining the views of preschool teachers in Turkey on the STEM approach revealed that teachers were not knowledgeable about STEM, defined STEM education as a method, and supported scientific process skills in science activities (Abanoz & Deniz, 2021).

A literature review indicates that the STEM approach is articulated as STEAM and STEM+C. The goal of STEAM is to help students become more creative and better at design by adding art to STEM. The integration of art and the STEM approach encompasses effective learning experiences and comprehensive strategies (Wynn & Harris, 2012). STEAM offers students more skills in education, such as analytical and creative skills (Land, 2013). The STEAM approach points to effective learning based on inquiry, problem solving, and creativity, providing opportunities to establish connections between many disciplines (e.g., Keane & Keane, 2016). Programming is used with the STEM+C approach. A recently published study also proposes STEAM-X to expand the interdisciplinary foundation of the STEAM approach (Bedewy & Lavicza, 2023). According to the researchers, X is defined as a variable that can represent any discipline not included in the STEAM disciplines. In short, STEAM-X is transdisciplinary STEAM practices (architecture, culture, history).

In a globalizing world, it is crucial for countries to focus on qualified individuals in order to be competitive in the economic race. The STEM approach is considered an educational approach that can respond to the needs of the time (Arleback & Albarracin, 2019). In other words, the STEM approach aims to equip students with the knowledge and skills they will need in global competition. STEM education is provided worldwide from early childhood education to university education (Çetin & Demircan, 2020). In this context, it is deemed essential to incorporate the STEM approach into the Turkish education system to meet the need for qualified human resources. Studies show that STEM activities are conducted at a minimum, with early childhood students (Çalışkan & Okuşluk, 2021). This is because the experiences and skills individuals acquire at an early age significantly affect their future lives (Abanoz & Deniz, 2021; Uyar & Ormancı, 2016). It is also a period when the foundations of early childhood STEM education are laid (Ata Aktürk & Demircan, 2017). The growing interest in the STEM approach and teaching practices underscores the importance of conducting further studies to enhance the use of the STEM educational approach. In the field of early childhood education, the effective implementation of STEM/STEAM approaches also highlights the value of research in this area. In this context, examining the general trends in theses written on STEM/STEAM approach in early childhood education is considered important for guiding future research on STEM topics. A review of the literature reveals that there are studies examining STEM-related work in Turkey (e.g., Aydın & Yel, 2024; Batur, 2025; Çoşkun, 2021; Gökçen, 2021). Among these studies, it is seen that research examining STEM/STEAM approach studies related to

early childhood education is quite limited (Ata Aktürk & Demircan, 2017; Erol & Erol, 2022). The examination of theses concerning STEM/STEAM in early childhood is anticipated to elucidate prevailing trends in this domain and enhance subsequent research on STEM/STEAM.

1.2. The Aim of the Research

This research is to examine the general trends in terms of bibliography, subject matter, and methodology of postgraduate theses on STEM and STEAM published in the field of early childhood education in Turkey. Within this framework, the research problem and subproblems are as follows:

1. What are the general trends in postgraduate theses on STEM and STEAM in the field of early childhood education?
    - What is the distribution of postgraduate theses in terms of educational programs?
    - What is the distribution of postgraduate theses in terms of publication years?
    - What is the distribution of postgraduate theses in terms of the universities where they were produced?
    - What is the distribution of graduate theses in terms of theme?
    - What is the distribution of graduate theses in terms of research design?
    - What is the distribution of graduate theses in terms of the sample selection method?
    - What is the distribution of graduate theses in terms of the sample group?
    - What is the distribution of graduate theses in terms of data collection tools?

2. Method

2.1. The Design of the Research

The research was conducted between July and August 2025. This research was carried out within the scope of qualitative research methods. Descriptive analysis is a research methodology employed to delineate trends and advancements in extant studies (Çalık & Sözbilir, 2014).

2.2. Research Materials

The research material comprises postgraduate theses on STEM and STEAM in the field of early childhood education published in Turkey. The research data was gathered utilizing the Higher Education Council (YOK in Turkish) thesis search database. In August 2025, the simple search button in the database was used to search for the words "STEM (Turkish: FETEMM)" or "STEAM." Based on the correct sampling method, this study uses 59 theses on STEM/STEAM in early childhood education. The full text of these theses can be found in the YÖK Thesis Center database.

2.3. Data Collection Tool

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) checklist, which is a scientific standard, was used to collect data during the process of choosing the right target theses (Figure 1). The Paper Classification Form (PCF) developed by Sözbilir et al. (2012) was considered as the data collection tool in the target theses determined according to the PRISMA checklist. The theses chosen based on the PRISMA checklist were analyzed by reviewing the title, abstract, and keywords

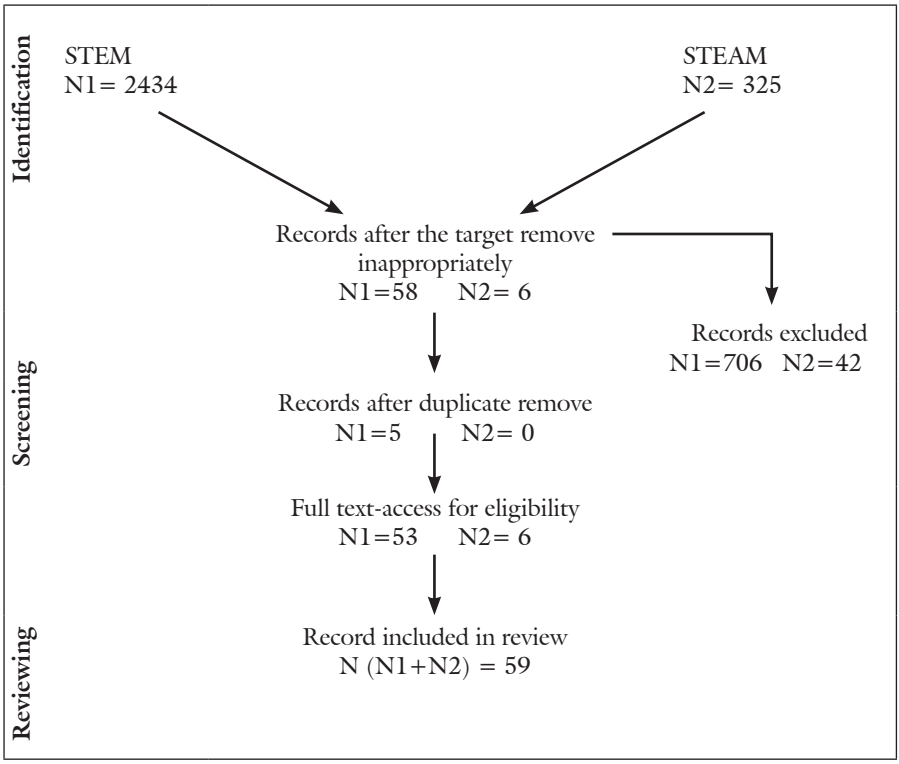

Figure 1. PRISMA (Resource: Nurhidayah et al., 2025).

2.4. Data Analysis

The theses were analyzed using descriptive content analysis. In the analysis of the theses, the bibliography, main topic, method, sampling method, sample group, data tools, and analysis information of the theses were transferred to an Excel file in order, taking PCF into account. In the transfer process, the concepts of each section were written in alphabetical order. For example, in the "analysis" section, concepts such as frequency and T-test were listed in alphabetical order. In the subject and data tools sections, STEM and STEAM concepts were only written as the first concept when written in the relevant unit, and the alphabetical order was again followed in the expressions to be written in these sections. Sections related to the design, sample, sampling method, etc., which were not specified by the author in the thesis, were left blank. For example, if the sample selection method is not mentioned, the relevant section in Excel for that thesis's sample selection method is left blank. When writing concepts, abbreviations, and/or special expressions are capitalized, while other concepts are written in lowercase.

The bibliographic information, topic, method, sample selection method, sample group, data tools, and analysis sections of the theses examined in the Excel analysis were reviewed for their frequency (f) and percentages (%). The validity of the data was examined multiple times by comparing the obtained data with the research review format. In terms of data reliability, coding accuracy was checked using the Miles & Huberman (1994) formula (Reliability = Consensus/(Consensus + Disagreement)) through a researcher working in the field of science education in preschool education (cited in Balcı, 2017). According to this formula, the reliability of the data was calculated as 88%.

3. Findings

3.1. The Distribution of theses on STEM+STEAM by Publication Type

The distribution of theses on STEM+STEAM in early childhood education according to the program in which they were published is shown in Table 1.

Table 1. Program type

Degree	f	%
MSc	42	71.2
PhD	17	28.8
Total	59	100.0

Table 1 shows that 71.2% (42) of the theses were completed in master's programs, while 28.8% (17) were completed in doctoral programs.

3.2. The Distribution of theses on STEM+STEAM by Year of Publication

The distribution of theses on STEM+STEAM in early childhood education by year of publication is shown in Table 2.

Table 2. Year of publication

Year	f	%
2018	4	6.8
2019	13	22.0
2020	4	6.8
2021	9	15.3
2022	6	10.2
2023	8	13.6
2024	12	20.3
2025	3	5.1
Total	59	100.0

According to Figure 2, early STEM+STEAM-related graduate theses were most frequently studied in 2019 (f=13, p=22.0), followed by 2024 (f=12, p=20.3).

3.3. The Distribution of theses on STEM+STEAM According to the University Where the Thesis Was Prepared

The distribution of theses on STEM+STEAM in early childhood education according to the university where the theses were prepared is shown in Table 2.

Table 3. University where the thesis was prepared

University	**f**	**%**
Aksaray University	1	1.7
Alanya Alaaddin Keykubat University	1	1.7
Anadolu University	2	3.4
Aydin Adnan Menderes University	1	1.7
Bahçeşehir University	4	6.8
Bolu Abant Izzet Baysal University	1	1.7
Burdur Mehmet Akif Ersoy University	1	1.7
Bursa Uludağ University	2	3.4
Çukurova University	1	1.7
Dicle University	1	1.7
Erzincan Binali Yıldırım University	2	3.4
Eskişehir Osmangazi University	1	1.7
Fırat University	3	5.1
Gazi University	4	6.8
Gaziantep University	1	1.7
Hacettepe University	2	3.4
İstanbul Aydın University	2	3.4
Kastamonu University	2	3.4
Kırklareli University	1	1.7
Kilis 7 Aralık University	1	1.7
Kutahya Dumlupınar University	1	1.7
Manisa Celal Bayar University	1	1.7
Marmara University	2	3.4
Middle East Technical University	1	1.7
Necmettin Erbakan University	3	5.1
Ordu University	3	5.1
Pamukkale University	1	1.7
Recep Tayyip Erdoğan University	2	3.4
Sinop University	1	1.7
Sivas Cumhuriyet University	2	3.4
Süleyman Demirel University	1	1.7
Trabzon University	1	1.7
Uskudar University	1	1.7
Usak University	1	1.7
Yıldız Technical University	4	6.8
Total	59	100.0

Table 1 shows that the highest number of theses on STEM%STEAM in early childhood education were published at Bahçeşehir University (6.8%), Gazi University (6.8%), and Yıldız Technical University (6.8%). The universities with the second highest frequency of publications are

Fırat University (5.1%), Necmettin Erbakan University (5.1%), and Ordu University (5.1%).

3.4. The Distribution of theses on STEM+STEAM According to the Themes

The distribution of STEM+STEAM-related theses according to their themes is shown in Table 4.

Table 4. Themes

Thema	**f**	**p**
STEAM, augmented reality, science learning	1	1.7
STEAM, creative thinking skills	1	1.7
STEAM, E5 Model	1	1.7
STEAM, science process skills	1	1.7
STEAM, Web 2.0 Tools	1	1.7
STEM, 21st century skills	2	3.4
STEM, academic self-esteem, Montessori education	1	1.7
STEM, action research	1	1.7
STEM, awareness	2	3.4
STEM, awareness, self-efficacy	1	1.7
STEM, awareness, opinion	1	1.7
STEM, cognitive field, science process skills	1	1.7
STEM, cognitive skill, problem-solving	1	1.7
STEM, communication skills	1	1.7
STEM, creativity	2	3.4
STEM, creativity, critical thinking skills	1	1.7
STEM, creativity, problem solving	1	1.7
STEM, critical thinking skills, science process skills	2	3.4
STEM, disaster education	1	1.7
STEM, drama, creative thinking, science process skills	1	1.7
STEM, drama, environmental awareness, science process skills	1	1.7
STEM, ecological footprint awareness	1	1.7
STEM, effectiveness	1	1.7
STEM, engineering approach	1	1.7
STEM, engineering design curriculum	1	1.7
STEM, ideas, in-class application	1	1.7
STEM, learning skills, Montessori education	1	1.7
STEM, maths and science process skills	1	1.7
STEM, metacognitive skills	1	1.7
STEM, metaphorical perception, self-efficacy	1	1.7
STEM, mobile application	1	1.7
STEM, Montessori education, science process skills	1	1.7
STEM, Montessori education	1	1.7
STEM, opinion	1	1.7

STEM, opinions	1	1.7
STEM, practicability	1	1.7
STEM, problem solving	2	3.4
STEM, problem solving, science process skills	1	1.7
STEM, program effectiveness	1	1.7
STEM, reflection	1	1.7
STEM, science, and math's implementation	1	1.7
STEM, science process skills	8	13.6
STEM, science process skills, social skills	1	1.7
STEM, self-sufficiency perception	1	1.7
STEM, social skills	1	1.7
STEM, suitability	1	1.7
STEM, teacher reflection	1	1.7
Total	59	100.0

Table 4 shows that in theses on STEM+STEAM in early childhood education, the most frequently addressed theme is scientific process skills (13.6%). The second most frequent themes are 21st-century skills (3.4%), creativity (3.4%), and problem solving (3.4%).

3.5. Distribution of theses on STEM+STEAM According to the research design

The distribution of theses on STEM+STEAM according to research designs is shown in Table 5.

Table 5. Research Design

Design	**f**	**%**
convergent parallel design	1	1.7
action research design	4	6.8
case study design	3	5.1
collaboration-based action research design	1	1.7
convergent pattern design	1	1.7
cross-sectional design, relational survey design	1	1.7
descriptive case study design	1	1.7
design based research design	1	1.7
embedded design	1	1.7
embedded mixed design	1	1.7
experimental design	2	3.4
explanatory mixed design	3	5.1
mixed design	7	11.9
mixed experimental design	2	3.4
multi-stage mixed design	1	1.7
nested embedded design	1	1.7

qualitative research design	4	6.8
quantative research design	1	1.7
quasi experimental design	19	32.2
quasi experimental design, case study design	1	1.7
survey design	3	5.1
Total	59	100.0

Table 5 shows that among theses written in the field of early childhood education between 2018 and 2025, the most frequently used research design was the quasi-experimental design (32.2%). The second most frequently used design was the mixed design and mixed design variants (28.8%). According to the table, 6.8% of the theses were qualitative research and action research designs, and 5.1% were case study and survey designs.

3.6. Distribution of theses on STEM+STEAM According to the sampling methods

The distribution of theses on STEM+STEAM according to the sampling methods is shown in Table 6.

Table 6. Sampling method

Sampling	**f**	**%**
cluster sampling	2	3.4
convenient sampling	13	22.0
convenient sampling, criterion sampling, purposive sampling	2	3.4
convenient sampling, maximum variation sampling	1	1.7
criterion sampling	6	10.2
goal-oriented sampling	1	1.7
non-probability sampling	2	3.4
purposive sampling	12	20.3
purposive sampling, random sampling	1	1.7
random sampling	8	13.6
similar sampling	1	1.7
snowball sampling	1	1.7
missing	9	15.3
Total	59	100.0

Table 6 shows that, in terms of sampling methods used in theses written in the field of early childhood education between 2018 and 2025, the most

frequently used method was appropriate sampling (22%), followed by purposive sampling (20.3%). It was observed that purposive and random sampling methods were frequently used together (13.6%) and criterion sampling was also frequently used (10.2%). According to the table, 15.3% of the theses examined did not specify the sampling method.

3.7. Distribution of Theses on STEM+STEAM According to the sample groups

The distribution of theses on STEM+STEAM according to the sample groups is shown in Table 7.

Table 7. Sample group

Sample	**f**	**%**
36 month-old boy	1	1.7
48-72 month-old children	1	1.7
5 year-old children	3	5.1
56-68 month-old children	1	1.7
6 year-old children	3	5.1
60-72 month-old children	7	11.9
60-72 month-old children, families, pre-school teachers	1	1.7
60-72 month-old children, pre-school teachers	1	1.7
families, pre-school students, pre-school teachers	7	11.9
pre-school students	13	22.0
pre-school students, pre-school teachers	4	6.8
pre-school teacher candidates	3	5.1
pre-school teachers	14	23.7
Total	59	100.0

Table 7 shows that, based on the sampling method used in theses written in the field of early childhood education between 2018 and 2025, children (approximately 45%) constitute the largest sample group. According to the table, 28.8% of the theses have a sample group consisting of preschool teachers and teacher candidates. When examining theses that addressed more than one sample group, 8.5% of the theses included children and teachers, while 13.6% included children, teachers, and families as the sample group.

3.8. Distribution of theses on STEM+STEAM According to the Data Collection Tools

The distribution of STEM+STEAM-related theses according to data collection tools is shown in Table 8.

Table 8. Data collection tools

Tool	f	%	Tool	f	%
M-STEM activity, SPS scale	1	1.7	STEM activity, Good Enough Harris test, SPS scale	1	1.7
STEAM activity, 5E learning model, interview, reports, scientific concepts and process skills scale, video, etc.	1	1.7	STEM activity, interview	2	3.4
STEAM activity, interview, PSS scale ect.	1	1.7	STEM activity, interview, lifelong learning tendency, self-managed learning skill	1	1.7
STEAM activity, interview, diary, Torrance creativity test	1	1.7	STEM activity, interview, observation	2	3.4
STEAM activity, SPS scale	1	1.7	STEM activity, interview, observation, science learning assessment test	1	1.7
STEM activity, interview	1	1.7	STEM activity, interview, PSS scale	1	1.7
STEM activity, interview, PSS scale	1	1.7	STEM activity, interview, scienti□c concepts and scientific inquiry process scale, reflection note, rubric	1	1.7
STEM activity, test	1	1.7	STEM activity, interview, Torrance creativity test	1	1.7
STEM activity, PSS scale	1	1.7	STEM activity, PSS scale, SPS scale	1	1.7
STEM activity, STEM perception scale, observation, report, rubric	1	1.7	STEM activity, social skills assessment scale	1	1.7
STEM activity, 21st century skills scale	1	1.7	STEM activity, SPS scale	6	10.2
STEM activity, academic self-esteem, interview, observation	1	1.7	STEM activity, SPS test, social skills assessment	1	1.7
STEM activity, assessment of critical thinking, hybrid creativity test	1	1.7	STEM activity, STEM attitude and efficacy, interview, self efficacy scale	1	1.7
STEM activity, Cambridgeshire independent learning, diary, observation, train track task	1	1.7	STEM activity, STEM attitude scale	1	1.7
STEM activity, cognitive field development form, SPS scale	1	1.7	STEM activity, STEM attitude scale, STEM self-efficacy scale, efficacy beliefs form, interview, self-evaluation form	1	1.7
STEM activity, communication skills scale	1	1.7	STEM activity, STEM awareness scale, interview	1	1.7
STEM activity, critical thinking skill rubric, SPS scale	1	1.7	STEM activity, STEM awareness scale, interview, observation	1	1.7
STEM activity, design sheets, interview, learning and renewal skills scale, observation, rubric	1	1.7	STEM activity, STEM awareness scale, STEM teaching questionnaire, SPS scale	1	1.7
STEM activity, diary, interview, maths education, SPS scale	1	1.7	STEM activity, STEM checklist, interview, observation	1	1.7

STEM activity, diary, interview, social product rubric	1	1.7	STEM activity, STEM self efficacy scale, metaphor form	1	1.7
STEM activity, disaster education, interview	1	1.7	STEM activity, STEM tastic adventures, mobile application, interview, observation	1	1.7
STEM activity, Drama, SPS scale, Torrance creativity test	1	1.7	STEM activity, STEM trainer education evaluation survey, assessment test, interview, observation, rubrics	1	1.7
STEM activity, early childhood creativity scale, interview, observations, reflective diaries, PSS scale	1	1.7	STEM activity, Torrance creativity test	1	1.7
STEM activity, ecological footprint awareness scale	1	1.7	STEM awareness scale, attitudes toward science teaching scale	1	1.7
STEM activity, environment scale, interview, observation, SPS scale	1	1.7	STEM view, 21st skills teaching scale	1	1.7
STEM activity, evaluation of critical thinking through the philosophical inquiry scale, SPS scale	1	1.7	STEM+A activity, suitability survey	1	1.7
Total:			**f=59, %=100.0**		

Table 8 shows that the scientific process skills scale (10.2%) is the most frequently used data collection tool in theses on STEM+STEAM in early childhood education. According to the table, data collection tools in theses on STEM+STEAM include scales, tests, interviews, and observation tools, in addition to STEM+STEAM applications.

Conclusion

This research examined postgraduate theses on STEM+STEAM topics published in the field of early childhood education in Turkey in terms of bibliography, subject, and methodology. According to the findings of the research, it was determined that a large proportion of theses on STEM+STEAM in the field of early childhood education were master's theses. Other studies analyzing postgraduate theses on STEM in Turkey have also found that the majority of theses written are master's theses (e.g., Balca, 2022; Tetik, 2021). When examined by the year of publication, the highest number of theses were published in 2019, followed by 2024. This result suggests that there was an increase in STEM+STEAM-themed theses in early childhood education in 2019. Similarly, Tetik (2021) and Demir (2022) stated that most studies on STEM were conducted in 2019. When the universities where the theses were published were examined, it was found that the most theses on STEM+STEAM were published at Bahceşehir University, Gazi University, and Yıldız Technical University. It was found that theses on STEM+STEAM included scientific process skills, problem

solving, and creativity themes. This result is parallel to the results of the study by Erol & Erol (2022). From this result, it can be said that skill-based topics are given more space in theses on STEM+STEAM.

In theses regarding STEM+STEAM in early childhood education, a quasi-experimental design is predominantly utilized. Another study examining STEM-related theses also showed that the experimental method is frequently used in theses (Tetik, 2021). This may be related to obtaining measurable evidence in line with the nature of the research. When the sampling method was examined, it was found that convenience sampling and purposive sampling methods were frequently used. Other studies examining graduate theses on STEM also concluded that appropriate sampling methods were frequently used in theses (e.g., Genç, 2022). When examined in terms of the sample group, children constituted the largest sample group in the theses analyzed. Other studies examining graduate theses on STEM topics have found that students frequently constitute the sample group in the theses (e.g., Ata Aktürk & Demircan, 2017; Balca, 2022). Teachers follow next. In some theses, the sample group consists of both children and teachers. Very few theses included children, teachers, and families together as the sample group. It was found that STEM+STEAM-based activities were frequently used as data collection tools in the theses, along with scales, interview forms, and observation forms. Similarly, other studies conducting content analysis have emphasized that scales and interview forms are frequently used in STEM studies (e.g., Demir, 2022; Tetik, 2021).

In future research, building on the results of this study, more comprehensive research on the STEM or STEAM approach can be conducted to effectively implement the STEM or STEAM approach in early childhood education. Future research should include studies on new types of the STEAM approach, such as STEAM-C, diversifying research methods, considering socioeconomically advantaged and disadvantaged child groups as research groups, enriching data collection tools, and incorporating alternative assessment tools. This is expected to enrich research on the STEM+STEAM approach in early childhood education.

Resources

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Appendix 1: List of Theses Analyzed in the Study

Abanoz, T. (2020). STEM yaklaşımına uygun fen etkinliklerinin okul öncesi dönem çocuklarının bilimsel süreç becerilerine etkisinin incelenmesi. Dokora Tezi. Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü.

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Chapter 6

A Bibliometric Overview of Early Childhood Science Education[1]

Çağatay Ergan[2]

Gülşah Uluay[3]

Abstract

The purpose of this study is to examine research trends in the field of science education in early childhood. In line with this purpose, 669 articles published between 2013 and 2023 in the Web of Science (WoS) database were analyzed according to year of publication, journal publication and citation counts, H-index impact, as well as publishing authors, countries, and institutions. During the review process, the R programming language and its bibliometrix package were used for data analysis and visualization of the analysis results. Based on the analysis of the obtained data, it was determined that the year with the highest number of publications between 2013 and 2023 was 2022 (116). Furthermore, when the studies related to science education in early childhood published over the last ten years were examined, it was found that studies published after 2017 constituted 75.81% of all publications. The countries with the highest number of publications were the United States (N = 210), Spain (N = 83), and Türkiye (N = 67). When the journals publishing in the WoS database were examined in terms of H-index impact, it was observed that the International Journal of Science Education ranked first (H = 15), followed by the Early Childhood Education Journal (H = 14), and the Journal of Research in Science Teaching (H = 13). Based on the analysis results, it can be stated that interest in science education during early childhood has been increasing at a significant pace. In this context, recommendations for future studies have been provided within the scope of current global trends.

1 This study was presented at the 1st International Congress of Integrated Social Research and Interdisciplinary Studies (ISRIS).

2 Lecturer, Ordu University, Distance Education Application and Research Center, cagatayergan@odu.edu.tr, ORCID ID: 0000-0001-7430-5753

3 Assoc. Prof. Dr, Ordu University, Education Faculty, gulsahuluay@odu.edu.tr, ORCID ID: 0000-0002-6365-5122

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1. Introduction

The National Science Teachers Association (NSTA) states that early childhood science education constitutes a fundamental element in the lifelong progression of science learning, explaining that children's curiosity about exploring their environments and their enjoyment of this sense of discovery can be enhanced through science-related learning experiences acquired during early childhood (NSTA, 2014). Science education implemented during this period supports children's observation, inquiry, and problem-solving skills, which serve as prerequisites for their future success in STEM (science, technology, engineering, and mathematics) fields (Aronin & Floyd, 2013). Indeed, due to the rapid technological developments and scientific innovation occurring today, the necessity of preparing children for future life with competencies related to STEM fields has become a topic of global concern. It is emphasized that the nature of the future workforce will differ from the present and that, for individuals to be productive in their later lives, they must be prepared for these changes and possess competencies in STEM fields (Tytler, 2020). Within this framework of global necessity and in line with the critical importance of early childhood science education, it is observed that research in this field has been increasing at a significant pace.

Early childhood science education is regarded not only as an important factor for children's future academic achievement but also as a component that shapes their worldview and promotes various higher-order thinking skills. Indeed, in today's world, which is characterized by scientific complexities, there is an increasing emphasis on the necessity of science education to help children develop the skills and understandings they will need (Sriwarthini et al., 2023; Trundle & Saçkes, 2021). This increase is attributed to the growing interest in supporting children's engagement with natural phenomena (Larimore, 2020). In addition, the learning outcomes achieved through experiences within the scope of early childhood science education contribute to the growing interest in science education. For example, it is stated that science education implemented during this period supports children's innate curiosity and scientific inquiry skills, as it enables them to interact with their environment and the world in a critical and questioning manner (O'connor et al., 2021; Raven & Wenner, 2023). Among these learning outcomes, developments related to critical thinking skills are also considered noteworthy. Through science activities that encourage participation in scientific explorations, children are guided to ask questions, make predictions, and analyze results, thereby gaining the opportunity to examine knowledge critically (O'connor et al., 2021; Uludağ & Erkan, 2023). Moreover, the skills developed through the experiences

provided by early childhood science education are regarded as predictors of future success in STEM fields, and therefore represent a significant factor influencing children's future academic achievement (Chen et al., 2024). In addition to the positive effects of children's science-related experiences on cognitive development, these experiences also support their social-emotional development. For instance, out-of-school science learning environments such as science centers enhance children's motivation and willingness to learn (Aldemir & Kermani, 2017; Eshach & Fried, 2005; Uludağ & Erkan, 2023). In line with the increasing interest in science education during early childhood, the aim of this study is to determine the research trends in the field of preschool science education. In accordance with this aim, the research questions addressed in this study are presented below:

1. How are the studies distributed across the years?
2. What are the research trends of the journals?
3. What are the research trends of the authors?
4. What are the research trends across countries?
5. What are the research trends by subject areas?

2. Method

Bibliometric analysis (mapping) is the process of visually representing and analyzing the literature in a specific research field. This method enables researchers to better understand bibliometric indicators such as publication volume, citation counts, keywords, and international collaborations within a given area. In this study, the Bibliometrix and Biblioshiny open-source libraries (Aria & Cuccurullo, 2017), implemented in the R programming environment, were utilized to analyze data related to studies in early childhood science education. While Bibliometrix facilitates the management of scientific literature analysis and data processing, Biblioshiny allows users to perform bibliometric and visual analyses through an interactive web interface. Within this framework, a bibliometric analysis was conducted on 669 studies published in the Web of Science database in the field of early childhood science education. Accordingly, by employing performance analysis and scientific mapping techniques, the study aimed to describe research trends in the field of early childhood science education.

2.1. Data Set

The data set of the study consists of 669 articles authored by 1,505 researchers, published in the Web of Science database between 2013 and

2023. For the purpose of searching the Web of Science database, the following parameters were used: "(Preschool and science) or (Early Childhood and science) or (toddler and science) or (Preschoolers and science) or (Young Children and science) (Topic) and 2013 or 2014 or 2015 or 2016 or 2017 or 2018 or 2019 or 2020 or 2021 or 2022 or 2023 (Publication Years) and Article or Early Access or Review Article (Document Types) and Education Educational Research (Web of Science Categories) and 6.11 Education & Educational". The obtained data were organized by the researchers in the Bibliometrix library of the R programming language and prepared for analysis. Information regarding the stages of the research process is presented in Figure 1.

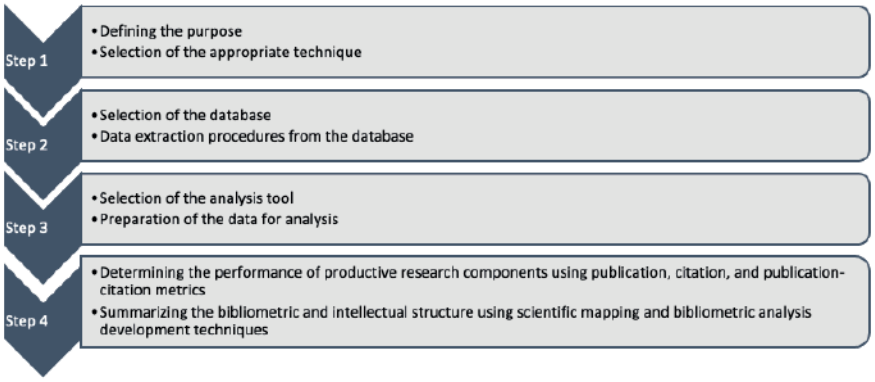

Figure 1. Bibliometric Analysis Procedure (Zupic & Čater, 2015)

3. Findings

In this section, the findings obtained from the bibliometric analysis are presented sequentially in line with the research questions. The first research question examines the distribution of studies on science education in early childhood by year. The analysis results are presented in Table 1.

Table 1. Distribution of Studies by Year

Year	Number of Article	%
2023	71	9,22
2022	116	15,06
2021	95	12,33
2020	87	11,29
2019	85	11,03
2018	67	8,7
2017	63	8,18
2016	47	6,1
2015	36	4,67
2014	59	7,66
2013	44	5,71

When Table 1 is examined, it is noteworthy that the highest number of studies on science education in early childhood over the past ten years was published in 2022 (n = 116). In addition, studies published after 2017 constitute 75.81% of all publications. The annual average citation scores are presented in Figure 2. As can be seen in Figure 2, the highest annual average number of citations occurred in 2013.

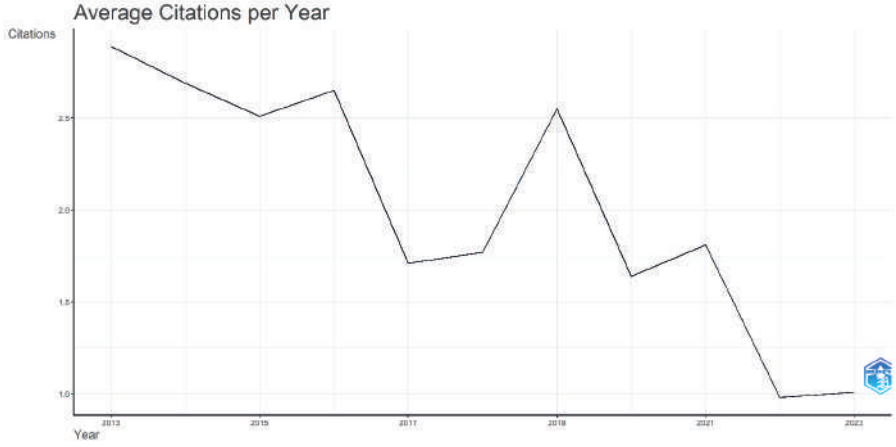

Figure 2. Average Number of Citations by Year

Within the scope of the second research question, the research trends of journals were examined. In this context, the journals indexed in the Web of

Science database were analyzed in terms of their number of publications, citation counts in the field of science education, and H-index values in order to determine their research trends in early childhood science education. Based on the findings obtained, it can be stated that the journals with the highest number of publications in the Web of Science database are, respectively, International Journal of Science Education (N = 48), Research in Science Education (N = 44), and Early Childhood Education Journal (N = 36). The findings regarding journals publishing in the field of early childhood science education in the Web of Science database are presented in Figure 3.

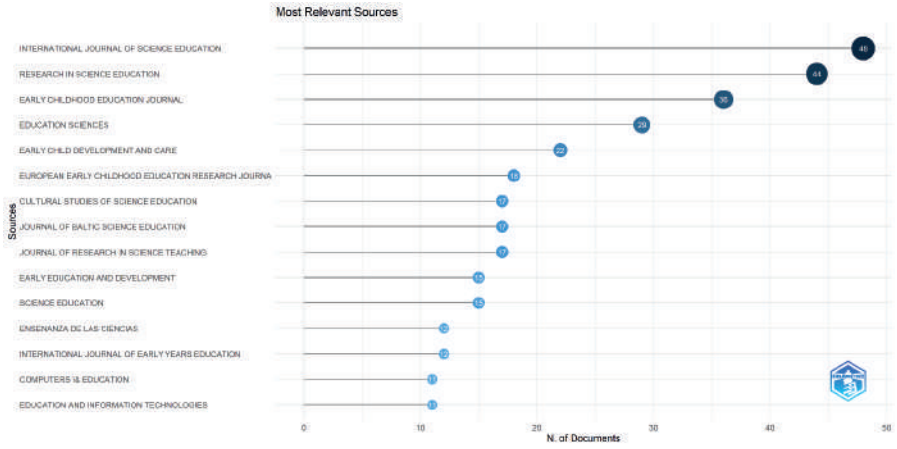

Figure 3. Journals publishing in the field of early childhood science education

One of the findings from the analysis conducted to determine the research trends of journals in the field of early childhood science education relates to the citation counts of the journals. Since citation counts form the basis of scientific productivity for journals, they can be considered an indicator that the studies are original, significant, and contribute to the relevant field. In this context, when the citation counts of journals publishing on early childhood science education in the Web of Science database are examined, it can be stated that the journal receiving the highest number of citations between 2013 and 2023 is the International Journal of Science Education (N = 1,282). The citation counts of the other journals are presented in Figure 4.

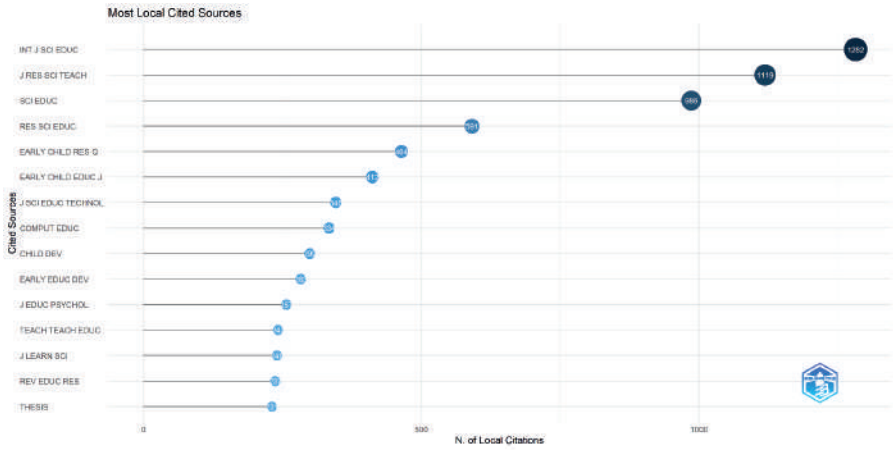

Figure 4. Citation Counts of the Most Cited Journals

When the journals in which the researchers published were examined in terms of impact factors, it was observed that the journals with the highest H-index values are the International Journal of Science Education (H = 15), Early Childhood Education Journal (H = 14), and Journal of Research in Science Teaching (H = 13). The impact factors of the journals are presented in Figure 5.

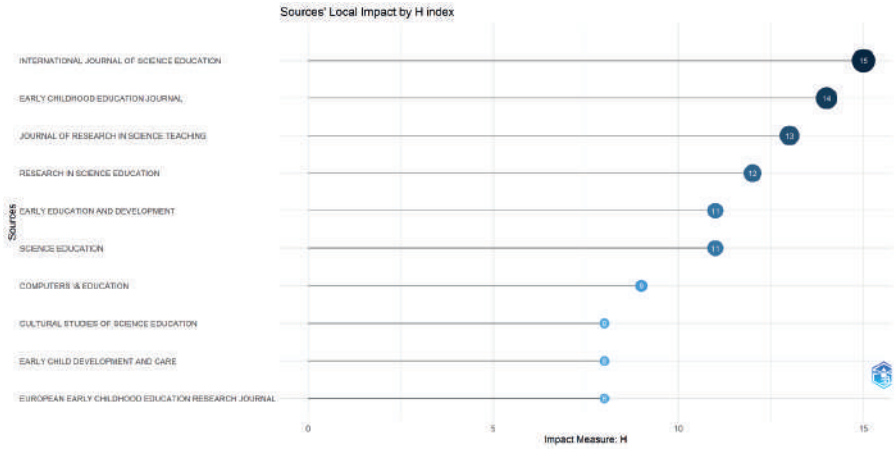

Figure 5. Impact Factors of Journals (H-Index)

One of the fundamental elements of the scientific community is the researchers and their perspectives. Determining the research trends of researchers in a given field is important for understanding the development

of that field, identifying future research topics, and understanding how scientific knowledge progresses. In this context, the third research question focuses on the research trends of authors. To examine these trends in the field of early childhood science education, the most prolific researchers publishing in the Web of Science database between 2013 and 2023 were identified, and their production trends over time, countries, impact factors, and journals of publication were analyzed. In this context, it was found that Marilyn Fleer from Monash University, Australia, is the most prolific researcher in the field of early childhood science education in the Web of Science database. The most prolific researchers and their publication counts are presented in Table 2.

Table 2. Most Prolific Researchers

Authors	**Articles**
Fleer M.	19
Bers M.	15
Dewitt J.	9
Kalogiannakis M.	9
Ravanis K.	9
Sackes M.	9
Thulin S.	9
Archer L.	8
Areljung S.	8
Fragkiadaki G.	8

The H-index is an international metric used to monitor the performance of scientists and evaluate their productivity. As a decisive criterion in determining academic achievements and assessing researchers, the H-index holds significant importance for both academics and the articles they produce. Based on searches in the Web of Science database, among researchers publishing in the field of early childhood science education, Marina Bers, with an H-index of 9 and 789 citations, and Marilyn Fleer, with an H-index of 9 and 211 citations, can be considered the most influential researchers in terms of impact in this field (WoS database). Information on the H-index, G-index, M-index, and total citation counts of the researchers is presented in Table 3.

Table 3. Researchers' Impact Factors and Citation Counts

Authors	H-index	G-index	M-index	Total Citations
Bers M.	9	14	0,818	789
Fleer M.	9	14	0,818	211
Archer L.	7	7	0,636	645
Dewitt J.	7	8	0,636	649
Ravanis K.	7	9	0,636	112
Kalogiannakis M.	6	9	0,75	140
Sackes M.	6	9	0,545	94
Fragkiadaki G.	5	7	0,556	53
Osborne J.	5	5	0,455	532
Papadakis S.	5	7	0,833	102

To determine research trends, based on the results of the Three-Factor Analysis examining the co-occurrence network of the most prolific authors' keywords and the journals in which they published, it was found that most authors used the keywords "early childhood," "science," and "early science education." The network map showing the relationships among the used keywords, authors, and published journals is presented in Figure 6.

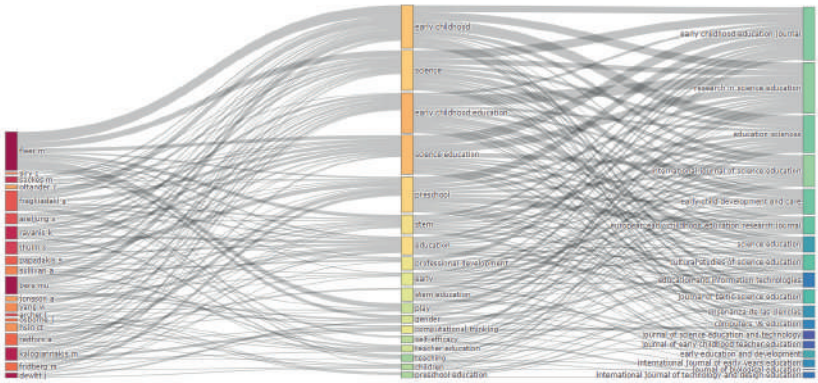

Figure 6. Author–Keyword–Journal Network

Within the scope of the fourth research question, which was developed to determine researchers' research trends in the field of early childhood science education, the global distribution of researchers was examined. Determining

this distribution is expected to provide data on scientific contributions, global trend identification, international collaboration, and similar aspects for experts working in the field.

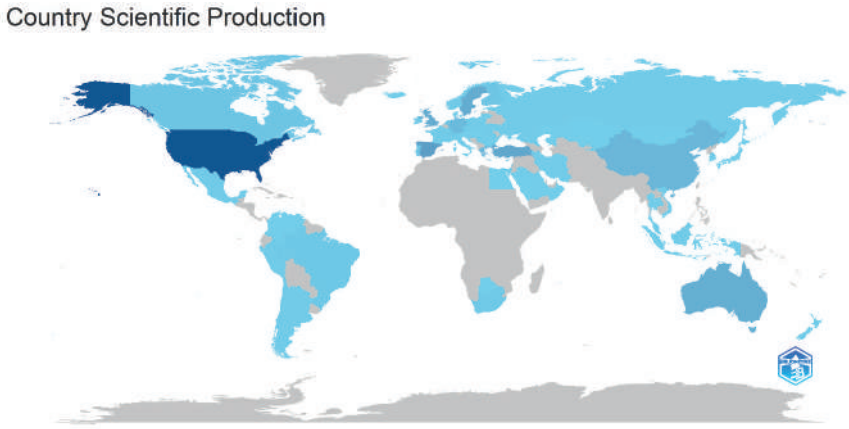

Figure 7. Distribution Map of Publications by Country

Based on the obtained findings, it can be stated that, on a global scale, the authors publishing on early childhood science education in the Web of Science database contributed most to the literature from the United States (N = 210), Spain (N = 83), and Türkiye (N = 67). The publication counts by country are presented in Table 4.

Table 4. Publication Counts by Country

Country	Articles	SCP	MCP	SCP %	MCP %
USA	210	195	15	92.8	7.1
Spain	83	78	5	93.9	6
Turkey	67	57	10	85	14.9
United Kingdom	60	47	13	78.3	21.6
Sweden	58	55	3	94.8	5.1
Australia	49	44	5	89.75	10.25
Greece	32	27	5	84.3	15.6
China	31	18	13	58	41.9
Germany	25	20	5	80	20
Netherlands	12	10	2	83,3	16.6

Another finding obtained from the analysis relates to whether the authors adopt a "single-authored" or "multi-authored" approach. In this context, examining the percentage distributions shows that the countries with the highest tendency toward single-authored publications are Sweden (f = 94.8), Spain (f = 93.9), and the United States (f = 92.8). The countries with the highest tendency toward multi-authored publications are China (f = 41.9), the United Kingdom (f = 21.6), and Germany (f = 20). The percentage distributions of publication types in terms of authorship are presented in Table 4, and the corresponding visualization of the findings is provided in Figure 8.

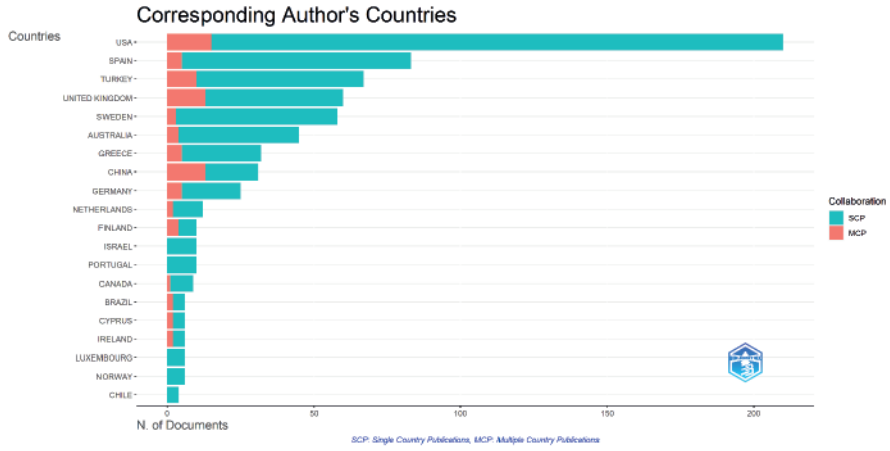

Figure 8. Publication–Authorship Type Trends by Country

When research in the field of early childhood science education is examined at the country level, it can be stated that the United States, Spain, and Türkiye lead in terms of scientific productivity and hold a significant position in the global literature. However, to evaluate countries' research trends and their impact on the literature, it is important to consider not only the number of publications but also the citation counts these publications have received. Citation counts are significant in terms of the widespread impact of studies, as they indicate how frequently a study is referenced by other researchers in the literature. In this context, an analysis of the total and average citation counts by country shows that the United States (N = 3,400), the United Kingdom (N = 1,369), and Australia (N = 509) are the countries receiving the highest number of citations. The total and average citation counts by country are presented in Table 5.

Table 5. Citation Counts by Country

Country	TC	Average Article Citations
Usa	3400	16.2
UK	1369	22.8
Australia	509	11.3
Sweden	444	7.7
Turkey	382	5.7
Spain	381	4.6
Germany	348	13.9
Greece	324	10.1
Israel	296	29.6
Netherlands	198	16.5

Although the importance of citation counts in determining countries' research trends and impact on the literature is well recognized, it is also believed that countries' institutional structures and publication productivity play a significant role in the development of research fields and their global dissemination. In this context, when universities publishing in the field of early childhood science education are examined, it can be stated that Monash University (N = 49), Tufts University (N = 39), and Penn State University (N = 37) are the most prolific institutions. The publication counts of the universities are presented in Table 6.

Table 6. Number of Publications by University

Affiliation	Country	Articles
Monash University	Australia	49
Tufts University	United States	39
Penn State University	United States	37
Kristianstad University	Sweden	26
Umea University	Sweden	23
University Crete	Greece	23
University Patras	Greece	20
Indiana University	United States	19
Aristotle University Thessaloniki	Greece	18
Linkoping University	Sweden	18

Within the scope of the fifth research question, research trends were examined according to subject areas. In this context, to determine the trends of studies on early childhood science education by subject area, the keywords used in publications indexed in the Web of Science database were analyzed using word cloud, word tree, and word network techniques. When the studies published in the Web of Science database between 2013 and 2023 are examined, it can be stated that the most frequently used keywords are "science" (f = 13), "education" (f = 6), and "students" (f = 6). The percentages and frequencies of keyword usage are presented in the word tree in Figure 9, while the word cloud of the keywords used is presented in Figure 10.

Figure 9. Keyword Tree

Figure 10. Keyword Cloud

Although the number of keywords used to determine research trends indicates the topics on which studies in early childhood science education are focused, the relationships among the keywords are important for understanding the context in which the literature is structured. For this purpose, a network analysis was conducted on the keywords used in the studies. Based on the findings from the keyword network analysis, the relationships of the prominent keywords "science," "education," and "students" with other keywords are presented in Figure 11.

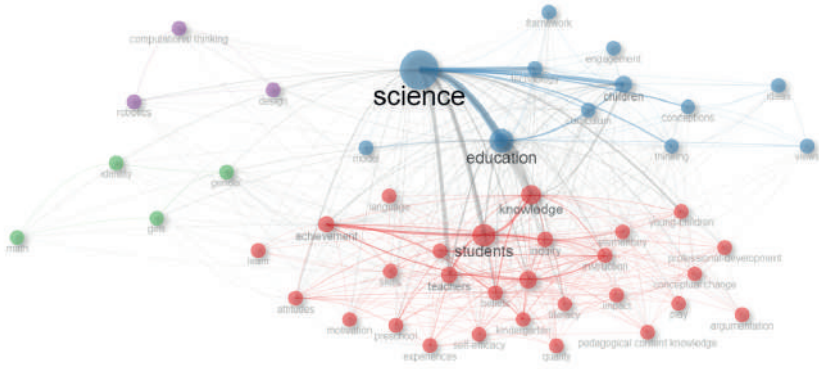

Figure 11. Keyword Network

In this context, when the research areas are examined, it can be stated that while science education is at the center, concepts such as "teacher education," "self-efficacy," "achievement," "skills," "argumentation," and "technology" also represent important topics studied within the field of early childhood science education.

4. Results

This study aimed to examine research trends in early childhood science education between 2013 and 2023. To this end, 669 studies published in the Web of Science (WoS) database were analyzed using bibliometric methods. During the review process, performance analysis and scientific mapping techniques were employed to describe the research trends addressed by the study. The analysis results indicate a global increase in studies conducted in this field. Specifically, studies published after 2017 account for 75.81% of the total publications, suggesting a growing interest in early childhood science education. In terms of journal research trends, the analysis revealed that the International Journal of Science Education, Research in Science Education, and Early Childhood Education Journal were the most prolific journals publishing studies on early childhood science education. The H-index values of these journals reflect their scientific impact within the field.

Regarding researcher trends, bibliometric analysis identified Marilyn Fleer and Marina Bers as influential scholars in early childhood science education based on their publication and citation counts and associated indices. When examining trends by country, the United States, Spain, and Turkey emerged as the leading contributors to the relevant literature. To evaluate the global impact of national research trends, total and average citation counts for each country were analyzed. According to these results, the United States, the United Kingdom, and Australia received the highest number of citations. Furthermore, to investigate the influence of institutional contributions on research trends, bibliometric analyses were conducted on university publication counts. This analysis showed that Monash University (Australia), Tufts University (USA), and Penn State University (USA) were the top-publishing institutions. These findings suggest a high level of interest in early childhood science education, particularly in the United States, and indicate substantial contributions to the literature from these countries. Analysis of research trends by topic revealed that science education remains central, with dimensions such as teacher education, self-efficacy, achievement, skills, argumentation, and technology emerging as prominent subfields.

The rapid evolution and integration of digital technologies have prompted changes in the nature of education and educational content, necessitating strategies and policies for technology integration (Timotheou et al., 2023). Moreover, the accelerated adoption of artificial intelligence (AI) is increasingly influencing educational processes and environments. For instance, the launch of ChatGPT in 2022 is recognized as having a significant impact on the field of education (Barbu & Sbughea, 2024). Globally, there is a concerted effort to integrate AI into education (Park & Kwon, 2024), which affects educational planning and curriculum design. In this context, it can be stated that research on AI in education has gained considerable momentum. Future bibliometric studies may consider AI adoption periods when constructing datasets. Comparing results from such studies with the findings of the present research could provide insights into the effects of AI on early childhood science education and emerging research directions.

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