

Stanford University Study Details Evidence That Early Childhood Environmental Education Delivers Many Benefits for Young Learners



Research shows what educators, policymakers, and parents have recognized for years: early childhood environmental education can positively impact young children’s development. A research team at Stanford University conducted a systematic analysis of the peer-reviewed literature to identify what studies report about the effects of environmental education for children from infancy to age eight (Ardoin, N., and Bowers A., 2020).

What Is Early Childhood Environmental Education (ECEE)?

This study uses a broad definition of ECEE aligned with the North American Association for Environmental Education’s (NAAEE) definition: “Environmental education in early childhood is a holistic concept that encompasses knowledge of the natural world, as well as emotions, dispositions, and skills” (NAAEE, 2016, page 2). As such, the research team acknowledges and values multiple variants of and approaches to ECEE including, but not limited to, nature-based early childhood education and early childhood education for sustainability. These, and related approaches, share a common aim of developing a local, regional, and global community of environmentally active people through engaging young children in meaningful, relevant environmental learning experiences (Davis & Elliott, 2014; Wilson, 1996).

To conduct the study, researchers analyzed 66 studies published between 1995 and 2016 that examine commonly identified and measured ECEE program outcomes. The team identified studies for analysis through conducting a systematic search-and-screen process seeking those that met criteria for relevance and quality. For additional information on the research methodology used for all the identified outcome areas for the eeWORKS project, please see *From Anecdotes to Evidence: Diving into the Research Review Process*.

What Are the Benefits of ECEE?

The Stanford team’s analysis found overwhelming evidence supporting what early childhood educators have observed for years. The Stanford team’s analysis found that ECEE can provide **wide-ranging benefits** for children, such as **increased learning** in a range of areas such as mathematics, science, language, and literacy; **enhanced social and emotional skills**; and **improved physical development**.

ECEE programs can also improve **environmental literacy outcomes** such as environmental cognition, attitudes, and behavior, while building knowledge and skills that **lay the foundation for more environmentally responsible and engaged adults**.



Program Outcomes Measured:

ENVIRONMENTAL LITERACY DEVELOPMENT

- environmental cognition, attitudes, and behaviors

COGNITIVE DEVELOPMENT

- cognitive functioning, academic content, and creativity

SOCIAL AND EMOTIONAL DEVELOPMENT

- social-skills development, self-regulation, and sense of autonomy

PHYSICAL DEVELOPMENT

- increased physical activity and physical skills

LANGUAGE AND LITERACY DEVELOPMENT

- language skills and concepts

Snapshot of Findings

The final sample of reviewed studies (n = 66) included programs for young children from birth to age eight, with the largest concentration focusing on age five (79%). Geographically, the programs took place in North America, Europe, Australia and New Zealand, and Asia (48%, 24%, 18%, and 9%, respectively). More than half (55%) of the studies reported on qualitative data, although the sampled studies also included some with quantitative data and those using mixed-methods designs. Studies varied in terms of program length, with some programs categorized as one-time events occurring over one or two days, others taking place over multiple weeks (often as part of a curricular unit), and still others reporting on programs fully integrated into the yearly school curriculum.

Key findings include:

- Four- and five-year-olds were the most frequently studied age group, with few studies reporting programs with the youngest audiences (one-year-olds and infants).
- The reviewed studies emphasized the **vital role of adult mentors, teachers, and facilitators as companions and guides in the learning process**, supporting young children's **environmental learning** experiences. Across the reviewed studies, mentors for early childhood environmental education included teachers, school staff, parents, and researchers, among others.

- The diversity of programs in the reviewed studies highlights ECEE's versatility, demonstrating that **programs exist in many different formats and settings**. ECEE can be undertaken with modest resources, with either on- or off-site locations, and with a range of types of outdoor access. A large portion (83%) of the programs included time outside and/or in a nature-rich setting, while others occurred primarily indoors, using classroom resources to stimulate and support environmental learning. The majority (94%) took place in formal settings (i.e., a school, daycare, or early childhood education center), with only 6% in nonformal settings (e.g., nature center or park).
- In the articles reviewed by the research team, the most frequently reported outcomes were related to the category of **Environmental Literacy Development**, which was evident in 50 (76%) of the studies. Thirty-five (53%) of the studies reported outcomes other than, or in addition to, Environmental Literacy Development, including **Cognitive Development** (25 studies, 38%), **Social and Emotional Development** (25 studies, 38%), **Physical Development** (14 studies, 21%), and **Language and Literacy Development** (6 studies, 9%).
- In the 66 reviewed studies, the research team found that 82% reported positive findings, and no studies reported negative findings.

What Are Effective Pedagogical Practices for ECEE?

During the analysis, the research team found that studies described evidence of more than 150 pedagogical practices associated with effective ECEE programs among the 66 studies. Researcher-described, effective pedagogical practices included a range of engagement types and settings from highly active and immersive (e.g., hiking outdoors), to reflective (e.g., creating drawings), to analytical and synthetic (e.g., guided in-class discussions). The research team analyzed those 150 practices, organizing and coding them into 9 thematic categories that describe ECEE strategies supporting development of the desired outcomes. (See table below.)



Thematic Categories of Pedagogical Practices Reported in ECEE Studies

Thematic category (Practices)	Number of studies (%)*	Examples
Time in Nature	50 (76%)	Visiting a nature-rich area Gardening Playing with natural materials
Play and Movement	38 (58%)	Allowing children to play freely Engaging in imaginary play Incorporating movement
Knowledge and Skill Development	28 (42%)	Collecting and analyzing data Developing thematic units Solving problems
Social Interaction	24 (36%)	Working in small groups Discussing with classmates Sharing findings
Creative Arts	21 (32%)	Creating artwork Watching a puppet show Singing songs
Time to Reflect, Think, and Observe	20 (30%)	Observing nature Journaling Reflecting on feelings
Action Taking	11 (17%)	Recycling Making an action plan Planting trees
Family Connection	11 (17%)	Sharing experiences with family Conducting a family project Suggesting family activities
Personal Connection	1 (17%)	Connecting to existing knowledge Sharing personal experiences Emphasizing local ways of knowing

*In order of decreasing frequency (n = 66).

Conclusion

This literature review by Stanford University researchers documents that ECEE has powerful benefits for children's cognitive, social and emotional, and physical development. Environmental literacy, such as environmental cognition, attitudes, and behaviors, was the most frequently documented outcomes among the studies in the analysis. The results suggest opportunities, in the short and longer term, for laying the groundwork for these young children to take action to improve and protect the environment in the future. These programs, diverse in their design and implementation, emphasize the importance of nature-rich settings, play and movement, and effective guidance by mentors such as teachers, school staff, and even researchers in bringing about the abundance of positive benefits documented in this analysis.

References

Ardoin, N., & Bowers, A. (2020). Early childhood environmental education: A systematic review of the research literature. *Educational Research Review*, Volume 31, Article 100353. <https://doi.org/10.1016/j.edurev.2020.100353>

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