

Selected Studies on Benefits of Environmental Education



Study Summaries: K-12 Students

1. Study Finds the “Magic” of a Hawaii Program Boosted Kids’ Confidence, Interest in School, Scores on Critical Thinking and Cognitive Achievement Tests

Volk, T. L., & Cheak, M. J. (2003) *Journal of Environmental Education*

It’s not every day that young children testify before state legislatures, but that’s what 5th and 6th graders in Hawaii did through an educational program that engaged them as problem solvers for local environmental challenges. As one community member said, **“I think it prepares our children to be good adults. It makes me feel good to see these kids because I know Hawaii is going to be in good hands in the future.”**

Students in the program significantly outscored students who weren’t in the program on critical thinking skills assessments, cognitive achievement tests, and the belief that they can make a difference in their communities. Students also outscored their peers in assessments of cognitive skills such as issue identification, issue analysis, and action planning. Parents of participating students reported that they believed the program’s significance extended well beyond the environment and helped the students develop leadership skills, a sense of purpose, and an ability to resolve conflicts and teach their community.

Teachers reported that **the program improved their students’ maturity levels, self esteem, poise, and autonomy.** One teacher reported, “I think I’m a better teacher because of it. It has kind of completed the ‘whole package.’ The framework unified all my best approaches and it made my instruction much easier.” Another teacher said, “It forces me to facilitate rather than dictate...watching 25 young minds start to make their own discoveries...you must sit back and watch the magic work.”



*It forces me to facilitate rather than dictate...**watching 25 young minds start to make their own discoveries...** you must sit back and watch the magic work.*



*I have students with a variety of learning styles and learning abilities. **The hands-on aspect was an equalizer.***

2. Students in a Hydroponics Program Significantly Outscored Other Students in a Final Exam and Those With Learning Disabilities Were Very Engaged

Schneller, J.A., Schofield, C.A., Hollister, E., & Mamuszka, L. (2015) *Applied Environmental Education and Communication*

After engaging in a 12-week program centered around indoor hydroponic gardening, students at a middle school in upstate New York significantly outperformed their peers on a final exam. The program increased their understanding of complex industrial, agricultural, and environmental systems as the students discussed the differences between industrial agriculture and the organic agricultural system they created for working toward a sustainable future. The teachers noted that participating students demonstrated increased knowledge internalization and critical thinking skills compared to non-participating students

Several students in the study sample had learning disabilities, such as ADHD. Parents of these students reported that their children were learning more effectively through the experiential and interdisciplinary lessons. The students' teacher echoed these sentiments, "I have students with a variety of learning styles and learning abilities. The hands-on aspect was an equalizer. There's more collaboration and engagement and it contextualizes what they're learning. **The kids who have trouble learning, and for the kids who are super advanced, they're all having the same discussions."**

A parent remarked, "My child is learning disabled, so the visual and hands on [method] is better. He wasn't telling me what happened in math or English class when was telling me about this project."

Students reported that they adopted new pro-environmental behaviors, such as composting and buying local foods, as a result of their learning. The number of pro-environmental behaviors the participating students undertook nearly doubled in number following the program, and teachers confirmed these increases. Study author Andrew Schneller stated, "Since becoming an environmental educator in 1995 I now believe that EE's ability to create changes in student pro-environmental behaviors and attitudes is what society (and globally) we'll find to be necessary to create the next generation of environmental advocates and stewards."



3. Environmental Education Can Engage Students Who Are Resistant to School and Encourage Critical Thinking

Blatt, E. N. (2013) *Cultural Studies of Science Education*

High school students demonstrated increased critical thinking as they participated in an environmental education course. They started to examine and question their own personal assumptions, values and behavior. Some students stated that they weren't living their own values on the environment and checked themselves. **EE provides students with the skills to form their own opinions about an issue.**

One of the most exciting developments from the class was the student who was inspired to learn in the class and before wasn't very open to learning because he didn't like school. EE has been found to break through to some of the most closed off students.

From Anecdotes to Evidence: Demonstrating the power of environmental education



It's important for students to see they're caring for their own neighborhoods."



4. Fourth Grade Inner-City Kids Wowed Teachers by Taking the Initiative to Dream Up a Community Pond Clean Up

Bodzin, A. M. (2008) *Journal of Environmental Education*

Environmental education doesn't have to take place in a serene, park setting. The environment is all around us. As study author Dr. Alec Bodzin explained, "EE can help connect urban students to nature when nature isn't abundant—to help them use what they have and extrapolate it to a larger context."

The National Science Foundation funded an after school science club for 4th graders in a high poverty, inner-city school in Allentown, Pennsylvania. The club used hands-on outdoor learning and field investigation over 24 weeks to open up the children's eyes to the environment they live in and how ecosystems work. Students collected water samples to test the water quality and all the adults were surprised when the children insisted on holding a community pond clean up. Bodzin believes environmental education, "creates good citizens; its goals are at the core of what drives formal education (creating a more informed citizenry capable of facing society's challenges."

"It's important for students to see they're caring for their own neighborhoods. They'll think twice next time about throwing trash in the storm drain. It's also important that they learn where their water comes from; that water doesn't magically get treated on its way to them; how it must be filtered that it's habitat for native animals; and that the health of the creeks affects the health of the people living near them."

A researcher working at an urban middle school with NSF-funded EE commented, "We have a number of studies published showing that kids learn better this way compared to business as usual."

5. Environmental Education Program Was an "Equalizer" Among Kids With Very Different Skill Levels and Backgrounds

Ernst, J., & Monroe, M. (2004) *Environmental Education Research*

The authors stated that EE is "simply good education." An environment-based program administered to four hundred secondary students in 11 Florida high schools saw a real impact on skill improvements among students which were not related to initial skill level, existing academic achievement or demographic factors, such as ethnicity or gender. Participating schools and students were strategically chosen from a range of geographic locations throughout the state and represented a range of socio-economic statuses and average achievement levels. In fact, following the program, students as young as 15 years old had critical thinking skill levels that were comparable or exceeded those of college students in average American universities. **Teachers engaged in the program reported that it helped equalize students by highlighting individual skills and strengths.**

Critical thinking skills improved significantly and participating students were more skilled in critical thinking compared to their peers in traditional instructional programs, including conventional environmental science classes. Based on their observations, teachers also noted their belief that their students' improved critical thinking and dispositions were a direct result of the integrative and interdisciplinary nature of the learning. Teachers noted

the effectiveness of coordinating learning across subject areas, exploring connections between natural and social systems, and providing opportunities for developing and using thinking skills through investigation and interactions with real life applications. The participating students reported that they felt empowered to be responsible for their own learning. The systemic nature of environmental education proved to be a great integrator of subject areas as well as best practices in education.



6. Just One Day Results in a Lasting Impact

Farmer, J., Knapp, D., & Benton, G. M. (2007) *Journal of Environmental Education*

A year after fourth graders from Indiana spent just one day in an environmental education program at Great Smoky Mountains National Park nearly all recalled specific information they learned and consistently used correct terminology and recalled ecological principles. It yielded long-term memory retention, environmental awareness, understanding of the relationship between human action and environmental issues.

They retained ecological knowledge longer than students using conventional curricula. The principal researcher, who has been an environmental educator for decades, stated, “Experiential activities that infuse content with meaningful experiences help students retain knowledge longer. I’ve done a lot of work with memory models that shows how people retain information better when the content is integrated into a meaningful issue or context. What could be more meaningful or relevant than your surroundings?”

A year after their trip, over half of the children reported that they were more aware of their impact on the environment and were continuing to work on altering their behavior. These results would be impressive in a long-term program, but to see such results in one day is pretty mind blowing. Study author Dr. Doug Knapp explained, “The most important thing EE (environmental education) provides for students is passion and interest in learning.”



*The most important thing EE (environmental education) provides for students is **passion and interest in learning.***



7. Student-Led Learning With Teacher Facilitators Pays Off With Longer Knowledge Retention

Sellmann, D., & Bogner, F. X. (2013) *Environmental Education Research*

Teachers tried a different tact on a tenth graders’ one-day field trip to a botanical garden to learn about climate change: they let the children lead and were there to support them.

The students who participated consistently outperformed their non-participating peers in short and long-term knowledge retention. Their cognitive achievement was stable six weeks after the program. Both the teachers and researchers agreed that the **student-centered approach and the engaging teaching strategies of the program enabled students to retain the information better than their peers.** The teachers and researchers also credit the teaching style with enabling students to think critically and independently, as well as interact with their peers.



8. Students Say They Learned Better Than in a Traditional Classroom Setting and Even Convinced Family Members to Adopt Environmentally-Friendly Behavior

Schneller, A. J. (2008) *Environmental Education Research*

Many **middle schoolers in a two semester environmental learning course in Mexico said they learned better or enjoyed learning more compared to a traditional classroom setting.** Students said their learning felt “useful,” “meaningful,” “engaging,” and “inspired them to pay better attention,” “set an example for others to follow,” “experience the synergistic effect of their efforts,” and “take personal action for the community and endangered species.”

By supplementing classroom learning with service learning, local ecosystem field work, and other interactive learning strategies, teachers observed increased engagement, knowledge retention and learning across subject areas. Teachers noted that the way the program was teaching was more instrumental than the content of the curricula in initiating environmental awareness and behaviors.

Students reported greater concern about environmental issues and intentions to make a positive impact on their community. Two years after the program, students still were practicing one or two pro-environmental behaviors.

Unexpectedly, the students also brought a lot of what they learned back to their families. Well over half reported that they initiated discussions with their family members and nearly all of those discussions astonishingly led to behavior change among family members.

Study author Andrew Jon Schneller believes that, “EE and its related approaches (like service learning) should be more widely embraced as a learning tool that provides learners with multiple outcomes related to academics, civic engagement, and real world problem solving.”

9. Children Went From Feeling Powerless to Powerful

Tsevreni, I. (2011) *Environmental Education Research*

A teacher in Athens, Greece created an environmental education program aimed at encouraging children to become more involved in their communities. As a result of the program, students’ attitudes did a 360 from “Are you kidding me? Nobody will care,” and, “We are children, no one will listen to us.” A student’s statement reflects the shift seen in the group, “Children’s participation in urban planning is important because we and not the adults are going to live in this world in some years. We have to express our opinions...Besides, we are living in this world and we are going to make it according to our needs.”

Using a range of participatory approaches including storytelling, photography, and drama, the teacher encouraged students to be critically engaged in every aspect of their learning—from defining a problem in their community to collecting and analyzing the data and taking action.

In addition to noting his students’ **increased self confidence and feelings of empowerment,** the teacher reported that his students were cooperating and respecting each other’s opinions much more. The teacher explained, “The children had the chance to learn how to think critically, to be involved, to appreciate the importance of cooperative work, to participate and to take responsibility.”

“

The children had the chance to learn how to think critically, to be involved, to appreciate the importance of cooperative work, to participate and to take responsibility.”



97%
TEACHERS
highly recommend
the program

10. Teacher Calls Hooked on Fishing Program “Single Most Influential Experience”

Flowers, A. B., (2010) *Evaluation and Program Planning*

A Montana teacher whose students were in Hooked On Fishing – Not on Drugs® said, “I found this program to be the single most influential experience my students were exposed to. They learned, they grew as students, and **they gained confidence as they experienced nature and developed new skills.** They also developed teamwork and a sense of responsibility. I found lots of opportunities to spin other academics from their interest in fishing.”

The program is one of over 400 conservation education programs implemented by state fish and wildlife agencies. Across Montana, upper elementary students are participating in an interactive yearlong fishing education program called HOF, which is modeled after the national program. Begun in three Montana classrooms in 1996, HOF is currently conducted in over 30 states with thousands of programs across the country.

Another teacher stated, “It is one of the special things we can offer here in Montana which has a lasting impact on students and the environment. It also involves parents in ways that I have not seen in any other program during my 20+ years in education, and it involves parents who may not normally volunteer in school/classroom activities.”

In this study specifically, the Hooked On Fishing program was administered for one year in 70 public and private schools throughout the state of Montana. Students in the program scored significantly higher on tests of knowledge gain and skill development, and **97% of teachers using the program said they “would highly recommend the program to other teachers,”** and that the program provides “safe, hands-on and new experiences” that help students “gain self confidence through learning a lifelong skill.”



11. New Zealand Education Program Impacts Students’ Lives Outside the Classroom and Teaches Them to Find Solutions

Birdsall, S. (2010) *Australian Journal of Environmental Education*

The peer-reviewed study’s author Dr. Sally Birdsall wrote, “Their learning was valuable and relevant because it related to their lives outside of school, rather than learning that was only required for assessment purposes.” Middle school students in a 15-week environmental education program demonstrated an impressive command of new knowledge, **the ability to analyze a situation and come up with creative solutions, as well possess the desire to take action themselves.** Teachers and students were interviewed revealed that the real-world, action-oriented approach made it sink in with students that each of them plays an important role in the community that they live in and prepared them to use systems thinking.



*Their learning was valuable and relevant because it **related to their lives outside of school,** rather than learning that was only required for assessment purposes.”*

References:

- ¹Volk, T. L., & Cheak, M. J. (2003). The effects of an environmental education program on students, parents, and community. *Journal of Environmental Education*, 34(4), 12–25.
- ²Schneller, J.A., Schofield, C.A., Hollister, E., & Mamuszka, L. (2015). A case study of indoor garden-based learning with hydroponics and aquaponics: Evaluating pro-environmental knowledge, perception, and behavior change. *Applied Environmental Education and Communication*, 14(4), 256-265.
- ³Blatt, E. N. (2013). Exploring environmental identity and behavioral change in an environmental science course. *Cultural Studies of Science Education*, 8(2), 467–488.
- ⁴Bodzin, A. M. (2008). Integrating instructional technologies in a local watershed investigation with urban elementary learners. *Journal of Environmental Education*, 39(2), 47–58.
- ⁵Ernst, J., & Monroe, M. (2004). The effects of environment-based education on students' critical thinking skills and disposition toward critical thinking. *Environmental Education Research*, 10(4), 507–522.
- ⁶Farmer, J., Knapp, D., & Benton, G. M. (2007). An elementary school environmental education field trip: Long-term effects on ecological and environmental knowledge and attitude development. *Journal of Environmental Education*, 38(3), 33–42.
- ⁷Sellmann, D., & Bogner, F. X. (2013). Climate change education: Quantitatively assessing the impact of a botanical garden as an informal learning environment. *Environmental Education Research*, 19(4), 415–429.
- ⁸Schneller, A. J. (2008). Environmental service learning: Outcomes of innovative pedagogy in Baja California Sur, Mexico. *Environmental Education Research*, 14(3), 291–307.
- ⁹Tsevreni, I. (2011). Towards an environmental education without scientific knowledge: An attempt to create an action model based on children's experiences, emotions and perceptions about their environment. *Environmental Education Research*, 17(1), 53–67.
- ¹⁰Flowers, A. B. (2010). Blazing an evaluation pathway: Lessons learned from applying utilization-focused evaluation to a conservation education program. *Evaluation and Program Planning*, 33(2), 165–171.
- ¹¹Birdsall, S. (2010). Empowering students to act: Learning about, through and from the nature of action. *Australian Journal of Environmental Education*, 26, 65–84.