

Supplementary Materials:

Table S1: The fields and selected outcomes of the studies in this analysis.

Fields	Studies reviewed	Selected outcomes
Environmental education	Birdsall, S. (2010). Empowering students to act: Learning about, through and from the nature of action. <i>Australian Journal of Environmental Education</i> , 26, 65-84. doi:10.1017/s0814062600000835	Students developed different types of knowledge and took informed action toward sustainability categorized as action competence.
	Bohnet, I. C., Gooch, M., & Hickey, R. (2010). Young people envision the future of their local area: An explorative study from the wet tropics, Australia. <i>Applied Environmental Education & Communication</i> , 9(3), 185-197. doi:10.1080/1533015x.2010.510027	Participants visioned the future of their community and understanding their citizenship by realizing the problem of their community.
	Cincera, J., & Krajhanzl, J. (2013). Eco-Schools: What factors influence pupils' action competence for pro-environmental behaviour? <i>Journal of Cleaner Production</i> , 61, 117-121. doi:10.1016/j.jclepro.2013.06.030	The program cultivated pupils' action competence and perceived participation in decision-making in energy and water consumption in the household.
	Cincera, J., Kroufek, R., Simonova, P., Broukalova, L., Broukal, V., & Skalík, J. (2017). Eco-School in kindergartens: the effects, interpretation, and implementation of a pilot program. <i>Environmental Education Research</i> , 23(7), 919-936. doi:10.1080/13504622.2015.1076768	The project raised the pro-environmental attitude of the kindergarten students, especially by the emancipatory strategy.
	de Vreede, C., Warner, A., & Pitter, R. (2013). Facilitating youth to take sustainability actions: The potential of peer education. <i>The Journal of Environmental Education</i> , 45(1), 37-56. doi:10.1080/00958964.2013.805710	Peer education approach facilitated high school students to take sustainability action.
	Eames, C., & Barker, M. (2012). Understanding student learning in environmental education in Aotearoa New Zealand. <i>Australian Journal of Environmental Education</i> , 27(01), 186-191. doi:10.1017/s0814062600000173	Two framework contributed to guide school to develop action competence of primary and secondary school students.
	Ernst, J., Blood, N., & Beery, T. (2017).	

Environmental action and student environmental leaders: exploring the influence of environmental attitudes, locus of control, and sense of personal responsibility. <i>Environmental Education Research</i> , 23(2), 149-175. doi:10.1080/13504622.2015.1068278	The environmental attitudes, locus of control, sense personal responsibility were increase. The environmental attitude could predict environmental action developed by the educational effort.
Gooch, M., Rigano, D., Hickey, R., & Fien, J. (2008). How do primary pre-service teachers in a regional Australian university plan for teaching, learning and acting in environmentally responsible ways? <i>Environmental Education Research</i> , 14(2), 175-186. doi:10.1080/13504620801951715	The instructional plans enacted by pre-service teachers were not consistent in their beliefs, outcomes, learning experiences, assessment with the lack of the beliefs.
Gottlieb, D., Vigoda-Gadot, E., & Haim, A. (2013). Encouraging ecological behaviors among students by using the ecological footprint as an educational tool: A quasi-experimental design in a public high school in the city of Haifa. <i>Environmental Education Research</i> , 19(6), 844-863. doi:10.1080/13504622.2013.768602	Using the ecological footprint as a tool to significantly promote personal norms, behavioral intentions, and perceived behavioral control of high school students.
Katsenou, C., Flogaitis, E., & Liarakou, G. (2015). Action research to encourage pupils' active participation in the sustainable school. <i>Applied Environmental Education & Communication</i> , 14(1), 14-22. doi:10.1080/1533015x.2014.994820	Adopting the framework of sustainability helped pupils identify the difficulties and improve their participation in classroom, school, and community.
Krasny, M. E., Kalbacker, L., Stedman, R. C., & Russ, A. (2015). Measuring social capital among youth: Applications in environmental education. <i>Environmental Education Research</i> , 21(1), 1-23. doi:10.1080/13504622.2013.843647	The EE programs had positive outcomes on informal socializing and diversity of friendship in youth social capital compared to non-intervention group.
Krasny, M. E., & Roth, W. M. (2010). Environmental education for social-ecological system resilience: A perspective from activity theory. <i>Environmental Education Research</i> , 16(5-6), 545-558. doi:10.1080/13504622.2010.505431	The project provided middle school students with opportunities to engage in multiple activity systems to make informed decisions through action competence.
Kumler, L. M. (2010). Students of action? A comparative investigation of secondary science and social studies students' action	

	<p>repertoires in a land use context. <i>The Journal of Environmental Education</i>, 42(1), 14-29. doi:10.1080/00958960903479829</p> <p>Liarakou, G., Kostelou, E., & Gavrilakis, C. (2011). Environmental volunteers: Factors influencing their involvement in environmental action. <i>Environmental Education Research</i>, 17(5), 651-673. doi:10.1080/13504622.2011.572159</p> <p>Lynch, J., Eilam, E., Fluker, M., & Augar, N. (2017). Community-based environmental monitoring goes to school: Translations, detours and escapes. <i>Environmental Education Research</i>, 23(5), 708-721. doi:10.1080/13504622.2016.1182626</p> <p>Monroe, M. C., Ballard, H. L., Oxarart, A., Sturtevant, V. E., Jakes, P. J., & Evans, E. R. (2015). Agencies, educators, communities and wildfire: Partnerships to enhance environmental education for youth. <i>Environmental Education Research</i>, 22(8), 1098-1114. doi:10.1080/13504622.2015.1057555</p> <p>Schindel Dimick, A. (2015). Supporting youth to develop environmental citizenship within/against a neoliberal context. <i>Environmental Education Research</i>, 21(3), 390-402. doi:10.1080/13504622.2014.994164</p> <p>Wake, S. J., & Eames, C. (2013). Developing an “ecology of learning” within a school sustainability co-design project with children in New Zealand. <i>Local Environment</i>, 18(3), 305-322. doi:10.1080/13549839.2012.748723</p>	<p>The curriculum improved students’ abilities to take nonemanagement actions and to make decisions in support of sustainable land use.</p> <p>Learning with nature was the important factor in volunteer motivation. Some volunteers who had previously participated in the EE program had more voluntary action.</p> <p>Action competence was developed through the project of monitoring local coast environment with the involvement of the community stakeholders.</p> <p>The youth learned and took action in educator–agency–community partnerships. Youth gained action competence, including community skills and efficacy, to promote agency partners to attain their goals.</p> <p>Educators could support youth to develop different forms of the environmental citizenship for disrupting the privatization of responsibility.</p> <p>The student-led, adult-facilitated, action-taking project provided authentic and sustainability learning experiences for students.</p>
Health education	<p>Carlsson, M., & Simovska, V. (2012). Exploring learning outcomes of school-based health promotion--a multiple case study. <i>Health Education Research</i>, 27(3), 437-447.</p>	<p>Knowledge, commitment, visions, and action experiences were improved when students made change in their communities.</p>

	doi:10.1093/her/cys011	
	Riemer, M., Voorhees, C., Dittmer, L., Alisat, S., Alam, N., Sayal, R., Bidisha, S. H., De Souza, A., Lynes, J., Metternich, A., Mugagga, F., Schweizer-Ries, P. (2016). The youth leading environmental change project: A mixed-method longitudinal study across six countries. <i>Ecopsychology</i> , 8(3), 174-187. doi:10.1089/eco.2016.0025	The transformative learning experience facilitated the self-efficacy, engagement, and action of the participants through relating them to the environmental issues and regarding themselves as the change agents.
	Sayal, R., Bidisha, S. H., Lynes, J., Riemer, M., Jasani, J., Monteiro, E., Hey, B., De Souza, A., Wicks, S., Eady, A. (2016). Fostering systems thinking for youth leading environmental change: A multinational exploration. <i>Ecopsychology</i> , 8(3), 188-201. doi:10.1089/eco.2016.0023	The program engaged urban youth from three countries to have moderate-to high interest in the environment through fostering systems thinking by international exchange and a local speaker focusing on environmental injustice.
	Simovska, V. (2007). The changing meanings of participation in school-based health education and health promotion: the participants' voices. <i>Health Education Research</i> , 22(6), 864-878. doi:10.1093/her/cym023	Exploring, envisaging solutions of the problems, and acting to bring about positive changes led to the intent and development of new strategies for collaboration.
Science education	Barrett, M. J., & Sutter, G. C. (2006). A youth forum on sustainability meets the human factor: Challenging cultural narratives in schools and museums. <i>Canadian Journal of Science, Mathematics and Technology Education</i> , 6(1), 9-23. doi:10.1080/14926150609556685	The museum attempted to engage high school students in sustainability issues, and made some suggestions for improving future program.
	Hadjichambis, A. C., Paraskeva-Hadjichambi, D., Ioannou, H., Georgiou, Y., & Manoli, C. C. (2015). Integrating sustainable consumption into environmental education: A case study on environmental representations, decision making and Intention to act. <i>International Journal of Environmental and Science Education</i> , 10(1), 67-86. doi:10.12973/ijese.2015.231a	A more comprehensive representation concerning sustainability and environmental criteria for acting as sustainable consumers were increased after the learning intervention.
	Taber, F., & Taylor, N. (2009). Climate of concern - A search for effective strategies for	The intervention allowed students to have a better understanding on climate change with raising concerns in the cases by

	teaching children about global warming. <i>International Journal of Environmental and Science Education</i> , 4(2), 97-116.	hands-on and visual instruction.
	Tal, T., & Abramovitch, A. (2012). Activity and action: Bridging environmental sciences and environmental education. <i>Research in Science Education</i> , 43(4), 1665-1687. doi:10.1007/s11165-012-9327-9	Teachers deliberated on the teaching topics and had more instructional methods. The student assessment also improved by the workshop.
Curriculum studies	Elmose, S., & Roth, W. M. (2007). Allgemeinbildung: Readiness for living in risk society. <i>Journal of Curriculum Studies</i> , 37(1), 11-34. doi:10.1080/0022027041000229413	The project supported students to participate in the unit and take responsibility in local school community by visioning and investigating the problem.
	Jensen, B. B. (2004). Environmental and health education viewed from an action-oriented perspective: A case from Denmark. <i>Journal of Curriculum Studies</i> , 36(4), 405-425. doi:10.1080/0022027032000167235	Students demonstrated a commitment to future actions in influencing the community through the empowerment and action competence presented by students.
	Simovska, V., & Jensen, B. B. (2008). On-line learning environments and participatory health education: Teachers' reflections. <i>Journal of Curriculum Studies</i> , 40(5), 651-669. doi:10.1080/00220270701648092	Integrating participatory and action-oriented approaches with technology use and cross-country collaboration provided genuine student participation in authenticity.
Education	Aguayo, C., & Eames, C. (2017). Promoting community socio-ecological sustainability through technology: A case study from Chile. <i>International Review of Education</i> , 63(6), 871-895. doi:10.1007/s11159-017-9685-7	Most participants demonstrated positive learning outcomes in ecological literacy and carried out actions toward the community issue.
	Norðdahl, K., & Jóhannesson, I. Á. (2014). 'Let's go outside': Icelandic teachers' views of using the outdoors. <i>Education 3-13</i> , 44(4), 391-406. doi:10.1080/03004279.2014.961946	The outdoors enhanced play and learning, promoted health and courage, as well as affecting perspectives and actions of the children.
Art education	Jónsdóttir, Á. (2015). Teaching and learning for sustainability: An Icelandic practice-based research. <i>International Journal of Education Through Art</i> , 11(3), 391-406. doi:10.1386/eta.11.3.391_1	Using the artistic approach enabled the participants to express their personal and community concerns by working on sustainability .
Geographical education	McMillan, S. G., & Binns, T. (2011). Environmental education and learning communities: The case of Kaikorai Stream, Dunedin, New	The programe allowed students to participate in investigating the problem of the stream with the improvement on the

	Zealand. <i>New Zealand Geographer</i> , 67(3), 199-212. doi:10.1111/j.1745-7939.2011.01212.x	knowledge and attitude toward sustainability.
Others	Gauthier, B., Guilbert, L., & Pelletier, M. L. (2000). Développement de compétences en résolution de problèmes environnementaux dans un contexte africain. <i>Canadian Journal of Development Studies/Revue canadienne d'études du développement</i> , 21(3), 775-796. doi:10.1080/02255189.2000.9669912	The model presented an impact on the competences of the participants to resolve complex problems from the interaction of the environment.