What is this research about?
Recent curriculum revisions and policy documents in Ontario support a vision of science education with an increased emphasis on the relationship between science, technology, society, and the environment (STSE) (Ontario Ministry of Education, 2009).

This study explored the relationship between STSE and citizenship education. Specifically, the study examined the impact of STEPWISE on the active or participatory citizenship development of a class of grade seven students. STEPWISE is an STSE curriculum and research project that stands for Science and Technology Education Promoting Wellbeing for Individuals Societies and Environments. In this research study, participatory citizenship is defined as self-awareness that one’s actions and community involvement can have positive and negative impacts.

What you need to know:
This study examined the impact of an STSE curriculum and research project called STEPWISE, in which grade 7 students developed and implemented action plans related to waste management. Results from the study suggest that integrating citizenship education into the science curriculum can have a positive impact results, such as encouraging students to: become active citizens on issues related to the environment, develop long term initiatives, and may lead to a greater sense of self-efficacy among some students and an increase in students’ scientific literacy.

The STEPWISE program was implemented for eight weeks in the winter and spring of 2008. During that time students developed and implemented self-created action plans that promoted personal, social, and environmental well-being and awareness around the broad
Students presented their plan to the class and kept learning logs to track the progress of their action plan. Projects could be based at school, in their home, on in the broader community and could be an individual effort or as part of a team that included their neighbours, friends, family, or peers. Projects included a water conservation plan, a waste diversion plan, and a recycling plan.

What did the researchers do?
The researchers collected data for this study from a variety of sources including:

- Three informal interviews with the classroom teacher;
- Six sets of field notes from classroom observations;
- Recordings of student presentations of their action plans, progress, and outcomes;
- Artefacts of student work including learning logs;
- Three group interviews with six students which occurred before, during, and after the action project. Students were asked open-ended questions including “what did you learn from this project?” and “what did you think about the action project?”.

All data was analyzed for the presence of themes related to participatory citizenship development through science.

What did the researchers find?
The researchers found that:

- Many students demonstrated a tendency towards active citizenship, discussing the positive impact of their projects on both the environment and the people involved in the project, including themselves. There was a recognition that, through their projects, they were participating as responsible citizens of society;
- Students expressed a commitment to citizenship over the long term, indicating that they planned to continue with their action plan after the program had ended. None of them, however, planned to record or monitor outcomes as they did during the project;
Students who demonstrated the highest levels of citizenship also had a strong sense of self-efficacy and believed that they were capable of making positive changes. Self-efficacy was also boosted by the positive responses of family and community members who supported the projects;

The self-directed nature of the projects significantly contributed to the development of students’ scientific literacy, especially in terms of product knowledge and skills development. Because they had ownership over the project, students were keen to find information that would help them develop their plans. This often involved researching waste products and disposal methods and learning how to record results and present outcomes using graphs, tables, and charts.

How can you use this research?
This research article may encourage science teachers and school administrators to consider:

- consult the wider body of literature on the relationship between STSE and students’ citizenship development;
- integrating citizenship activities into the science curriculum;
- advocating for increased professional development for science teachers in the area of citizenship education.

Original article:
To learn more about this study, we invite you to read the original research article:


Other references:

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To view the STEPWISE framework in more detail than offered in the paper, please visit www.stepwiser.ca

About the researchers:
At the time of this research study, Erin Sperling was a Master’s student with the Department of Sociology and Equity Studies in Education at OISE, University of Toronto. erin.sperling@utoronto.ca

Larry Bencze is an Associate Professor of science education with the department of Curriculum, Teaching and Learning at OISE, University of Toronto. His research focuses on student and teacher actions to addresses social and environmental problems associated with science and technology. larry.bencze@utoronto.ca

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Science education, technology, social sciences, environmental education, citizenship education.

About this summary
The Ontario Education Research Exchange (OERE) is a project of the Knowledge Network for Applied Education Research, an Ontario network promoting the use of research in education. The OERE’s clear language summaries of academic research aim to support this mandate.

This summary has been adapted from the ResearchSnapshot series developed by York University and ResearchImpact and has been developed according to writing and design principles unique to OERE. For more information about this summary or the OERE network please contact oere.knaer.oise@utoronto.ca.

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