

Making the case for STEM in early childhood education

What you need to know:

Science, technology, engineering, and mathematics (STEM) education in early childhood can encourage children to explore and observe the world according to their own interests. While there are few early childhood STEM initiatives in Canada, this research shows that educators, Pre-K students, and parents of students view STEM activities in a positive way and find it important in fostering future successes.

What is this research about?

Science, technology, engineering, and mathematics (STEM) education has typically focused on post-secondary students, however, there is support for expanding this approach in early childhood education. STEM education allows students to apply science, technology, engineering, and mathematics in their everyday lives. Experiences with STEM in early childhood can support children's future social and academic successes.

Currently, little attention is given to researching STEM activities in early childhood education although existing evidence suggests that limited time is spent exploring STEM subjects with young children.

The first phase of Todd Milford's and Christine Tippet's ongoing research with early childhood educators seeks to answer the question *how do data collected from multiple stakeholders inform our understanding of early childhood STEM education?*

What did the researchers do?

Dr. Milford and Dr. Tippet worked with 2 early childhood educators, 14 Pre-K students, and 11 parents. To guide data collection, two tools were created: a classroom observation protocol, which helped the researchers document the behaviours of early childhood educators and students during STEM activities, and an online parent survey. Using these unique tools, data were collected via: classroom observations, interviews with early childhood educators, student work samples, student focus groups, and parent questionnaires.



Children typically have a natural enthusiasm for science and engineering (Photo credit: Todd Milford, with permission).



What did the researchers find?

The researchers developed four conclusions:

- Educators believed that STEM is a valuable component of the Pre-K classroom
- Pre-K students actively engaged in STEM activities
- Parents responded positively to STEM in their child's Pre-K classroom
- STEM education can be an appropriate component of early childhood education

Educators viewed STEM as beneficial in promoting students' curiosity while parents viewed STEM as important in preparing their children for future successes. Students showed enthusiasm and understanding for concepts when participating in STEM activities. The collected data supports the inclusion of STEM-based learning for young children.

How can you use this research?

The researchers will be using the findings to inform the next phase of their study, which will include assessing specific interventions and providing suggestions for best practices when incorporating STEM activities in early childhood education. This research also provides a framework for other researchers to study STEM-related interventions.



(Photo: Todd Milford, with permission).

About the researchers

Todd Milford is an Associate Professor in Science Education and Research Methodologies at the University of Victoria. Christine Tippett is an Associate Professor in Science Education at the University of Ottawa.

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Keywords

Design-based research; early childhood education; science education; science, technology, engineering, and mathematics education; STEM

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