Perceptions of student ability, testing pressures hinder some science teachers

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A survey of science teachers finds they support a new approach to science education, but they struggle to believe that all students are capable of exploring science using a method called argumentation, according to researchers from the Lynch School of Education at Boston College.

Furthermore, teachers in low-income schools said the pressure to meet testing requirements curbs the use of argumentation in their lessons, according to the findings, which were presented today at the American Educational Research Association annual meeting in Philadelphia.

Moving away from rote memorization and generic worksheets, new science education standards favor a practice known as argumentation—teaching students how to work with information in order to analyze their own ideas, as well as those of others. It is a hands-on approach that explores science through projects and debate, requiring thoughtful lessons for learners of all abilities.

While teachers surveyed say they believe in the value of argumentation, not all think each of their students is capable of benefiting from the practice, according to a survey of teachers conducted by Lynch School of Education Associate Professor Katherine L. McNeill and researcher Rebecca Katsh-Singer and Lawrence Hall of Science science curriculum coordinator Suzanna Loper.

"Teachers expressed concerns that their students did not have the

background knowledge or experiences necessary for argumentation," McNeill said. "For example, teachers discussed that their English Language Learners (ELLs) did not have the necessary literacy skills or that their students with special needs lacked basic skills of critical thinking."

In low-income schools, teachers said the pressure to meet performance benchmarks on state tests and other assessments restrict their ability to teach the lessons that argumentation requires.

"Teachers in low income schools described their teaching as driven by standards and the need to ensure that students perform well on state tests," said McNeill. "Many of the teachers discussed how their current state tests focus on the memorization of science facts limiting their ability to include argumentation in their classroom instruction."

The researchers report that solutions may lie in providing teachers in low-income schools the types of support they need to manage accountability pressures, and that teachers from all types of schools need support to view all their students as capable to engage in argumentation.

More information: The report "Scientific Argumentation and the Beliefs of Teachers in Low- and High-Socioeconomic-Status Schools" was honored with the Rubovits Award for Best Paper presented at the annual conference of the New England Educational Research Organization in 2013.

McNeill, Katsh-Singer and Loper will discuss their research at the 2014 AERA annual meeting on Saturday, April 5 at 2:45 p.m. For more information about the session, please see the link tinyurl.com/k4husl4.

Provided by Boston College