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Elementary Teachers' Verbal Supports in a Science, Engineering, and Computer Science Unit

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Tweet: This study provides insight into how teachers may differentially support science and engineering practices across science, engineering, and computer science lessons in elementary classrooms

Audience: Teachers; Administrators; Curricula Developers

Key Points

- Teachers provided a range of pragmatic and epistemic supports for many different science & engineering practices (SEPs) in science-focused and engineering-focused lessons.
- The majority of teacher support aimed to help students to engage pragmatically with SEPs.
- Teachers provided epistemic support more frequently in the science-focused lesson.

INTRODUCTION Contemporary science education frameworks identify computational thinking as an essential science and engineering practice that supports scientific sensemaking and engineering design. Despite national emphasis on teaching science, engineering, and computational thinking (NGSS Lead States, 2013), little research has investigated the ways that elementary teachers support students to engage in science and engineering practices (SEPs) within integrated science, engineering, and computational thinking curricula. This study explores how teachers provide verbal support of SEPs to upper elementary students during a four-week NGSS-aligned curricular unit that challenged students to redesign their school to reduce water runoff.

FINDINGS Results show that teachers provided a range of pragmatic and epistemic supports for many different SEPs in science-focused and engineering-focused lessons, but support for a more limited variety of SEPs in the lesson focused on computational thinking. Across the lessons, the majority of teacher support aimed to help students engage pragmatically with the SEPs through sensemaking and engaging prior knowledge. Additionally, teachers provided epistemic support more frequently in the science-focused lesson than in the engineering-or computational thinking-focused lessons. Results also demonstrate differences within the quality of the verbal support across lessons.

TAKEAWAYS This study provides insight into how teachers may differentially support science and engineering practices in elementary classrooms and the kinds of learning experiences and educative materials teachers may need to provide equitable supports for students across practices.