JRST
Journal of Research in Science Teaching
Research Brief
VOL. 59, NO. 9, PP.1575-1606 (2022)

Leading Instructional Improvement in Elementary Science: State Science Coordinators' Sense-Making About the Next Generation Science Standards

Christa Haverly, Angela Lyle, James P. Spillane, Elizabeth A. Davis, Donald J. Peurach

Tweet: State science coordinators have broad consensus about elementary science education reforms, and this study investigates how that came to be.

Audience: Policymakers; Science education leaders; Researchers

Key Points

- State science coordinators (SSCs) had broad consensus around three themes related to improving elementary science: the introduction of three-dimensional (3D) science teaching and learning, the integration of engineering with science teaching, and the integration of science with ELA and mathematics.
- In the absence of federally-driven mandates and inducements, the national science education reform movement penetrated state policy-making, even in states that had not adopted the NGSS.
- The deprioritization of elementary science, SSCs' work with colleagues, the *Framework* to develop SSC standards, and SSCs' involvement in professional associations all contributed to their sense-making on elementary science education reforms.

INTRODUCTION The Next Generation Science Standards (NGSS), a reform effort in the US 'for states, by states', alongside the *Framework for K-12 Science Education*, advances ambitious ideals for elementary science teaching, but the fate of these ideals will depend in part on the engagement of state science coordinators (SSCs). Challenges related to elementary science education reform are exacerbated by a legacy of deprioritizing elementary science relative to English language arts and mathematics in the US. This paper explores the responses of SSCs to the NGSS and the *Framework* in a purposeful sample of eighteen US states.

FINDINGS Based on our analysis, we develop and support two central claims. First, despite limited mandates and incentives for states to adopt recent reforms set forth by the NGSS and the *Framework*, SSCs' ideas about elementary science aligned reasonably well with reformers' proposals and converged around three central themes: all but one SSC stressed the importance of three-dimensional learning (or rather, integrating disciplinary core ideas with crosscutting concepts and science and engineering practices), many indicated that integrating science instruction with engineering was an important new development, and a majority also emphasized the importance of integrating literacy instruction with science. Most attended to more than one of these themes. Second, SSCs' sense-making was situated in and shaped by (1) conflicting goals around the relative importance of science in the elementary curriculum, (2) working with colleagues to develop and/or adopt science standards and the role of the *Framework* therein, and (3) participation in professional networks that afforded SSCs discourse-rich environments for collective sense-making with colleagues and researchers nationwide.

TAKEAWAYS Though we highlight key points of convergence in SSCs' ideas about elementary science, there are also ideas from the NGSS and *Framework* that did not figure as prominently in SSCs' accounts and could be valuable entry points in ongoing work with state leaders. These ideas include better conceptualizing the role of crosscutting concepts in 3D science learning and promoting equity in elementary science classrooms. Furthermore, the "for states, by states" approach that was cultivated through the *Framework* and NGSS seemed critical to state leaders' ability to make adaptations to the state standards and engage in robust sense-making and may be a model worth replicating in future educational reform efforts.