

BUILDING COMPUTATIONAL THINKING (CT) READINESS: A SELF-ASSESSMENT FRAMEWORK AND TOOL FOR INTEGRATING CT IN PRIMARY CLASSROOMS

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The CT Integration Framework was developed to provide administrators and teachers with a tool to guide and evaluate readiness for the school-wide integration of CT and to monitor the success of CT integration efforts at the primary level. Extensive expert reviews have helped to establish the content validity of the framework, and pilot-tests have demonstrated the usability of the self-assessment tool in real world settings, including mathematics classrooms.

The Need for Guidance on the Integration of CT into Primary Classrooms

CT refers to a set of problem-solving methods that help us break down complex problems and their solutions in ways that a computer could execute. CT typically involves analyzing, modeling, and abstracting ideas and problems; designing solutions and algorithms to manipulate these abstract representations; and identifying and executing solutions. Despite the rapid expansion of CT-focused initiatives and the many projects underway across the U.S., there is relatively little evidence-based practical guidance or published literature on how schools and individual teachers can effectively integrate CT across the primary curriculum. Further, widely agreed upon definitions for CT and related learning objectives remain elusive. These issues are a significant barrier to formulating visions and implementing plans for CT integration in pre-K–12 classrooms (NASEM, 2021).

The CT Integration Framework and Self-Assessment Tool

With funding from the National Science Foundation, we developed [a framework and self-assessment tool](#) to help administrators and teachers to identify and think strategically about the variables that are likely to have an impact on the school-wide integration of CT at the primary level. The Framework includes six focus areas: teacher content and pedagogical knowledge; teacher supports; curriculum features and planning; CT assessment; student outcomes; and families and the school community. Within each focus area, the Framework describes indicators of effective schoolwide CT integration, examples of what the element might look like when implemented, and reflection questions to guide educators in assessing their school's priorities, strengths, and challenges. A series of expert reviews conducted by researchers and practitioners helped to establish the content validity of the Framework. Pilot-tests have demonstrated the usability of the framework for guiding school-wide CT integration efforts (see <https://stemforall2021.videohall.com/presentations/2132>).

CT Integration in Mathematics Classrooms

The CT Integration framework holds promise for guiding the integration of CT into primary mathematics classrooms, and for coordinating these efforts with those in other subject areas by guiding educators in using a shared definition of CT and a common language to identify CT concepts and skills, and in developing a school-wide and interdisciplinary scope and sequence for teaching CT concepts and skills .

Reference

National Academies of Sciences, Engineering, and Medicine. (NASEM; 2021). *Cultivating Interest and Competencies in Computing: Authentic Experiences and Design Factors*. Washington, DC: The National Academies Press.