# Promoting Computational Thinking in Elementary School: A Narrative-Centered Learning Approach

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## ABSTRACT

One of the most efficient ways for elementary school students to gain exposure to computational thinking is when it is integrated into other disciplinary areas; however, elementary school teachers often lack the necessary resources to do this effectively. By leveraging the motivation force of narrative to engage students and the scaffolding affordances of block-based programming to support students, computationally-rich narrative-centered learning offers promise to address this need. In this work, we review design principles from prior work for engaging elementary students in computational thinking as well as results from initial pilot studies to investigate how computationally-rich narrative-centered learning in the context of science problem solving can support the integration of computational thinking into other disciplinary areas.

## KEYWORDS

Computational thinking, K-12 education

## 1 OVERVIEW

Computational thinking (CT) is recognized as a critical skill for problem solving in a variety of disciplines. Thus, preparing students to think computationally as they solve problems across subjects should happen early and often during their formative schooling years [1]. However, teachers in younger grades often lack the confidence and knowledge to effectively teach CT to their students [2]. Narrative-centered learning is a potential pathway for elementary teachers to comfortably integrate CT into their classrooms through storytelling [3].

Inspired by this prior work and the need for age-appropriate learning environments that support elementary school students as they learn and apply CT to solve problems across disciplines, we are designing, developing, and investigating INFUSECS (Figure 1). INFUSECS is a narrative-centered learning environment that features block-based programming to engage upper elementary students (ages 8 to 11) in CT through the creation of digital stories as they explore scientific phenomena [4]. In INFUSECS students use custom blocks to develop interactive science narratives based around physical science concepts. A palette of custom blocks enables students to integrate multiple scenes, characters, dialog, and audience participation into their narrative programs for interactivity that allows stories to take multiple directions.


**Figure 1: INFUSECS Learning Environment**

## 2 CONCLUSIONS

Computationally-rich narrative-centered learning offers significant promise to enable elementary school teachers to integrate CT into their classroom instruction. In this poster, we present results from initial pilot studies exploring the efficacy of a narrative-centered learning approach for supporting CT integration into disciplinary content learning.

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