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Scaffolded Training Environment for Physics Programming (STEPP) MIDORI KITAGAWA, MICHEAL KESDEN, PAUL FINSHWICK, MARY URQUHART, University of Texas at Dallas, ROSANNA GUADAGNO, University of California, Berkeley — Scaffolded Training Environment for Physics Programming (STEPP) in which students learn physics and computational thinking (CT) synergistically through Finite State Machines (FSMs)by creating their own simulation tools. FSMs are a method for state-based modeling and have been used to design algorithms and teach programming and engineering. FSMs are effective in teaching CT because they help students to learn integral elements of CT, such as iterative thinking and conditional logic. Scaffolding and programing with FSMs will allow students to focus on aspects of programming that complement the physics learning process. Our hypothesis is that by constructing their own simulation tools, students learning with STEPP will master physics concepts and CT more successfully than students learning with pre-made simulation tools. We are creating three STEPP modules with learning content that aligns with Texas's standards and NGSS. A summer institute will be held for in-service and pre-service teachers to learn STEPP and incorporate it into their own curricula. The STEPP modules will be tested at high schools in local ISDs. Students' gain in physics knowledge will be measured by the Force Concept Inventory and their gain in CT, state-based modeling, and programming concepts will be assessed by rubrics developed in collaboration with high school teachers.

Midori Kitagawa
University of Texas at Dallas

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