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Award Abstract #1031351

Collaborative Research: Scaling up an Innovative Approach for Attracting Students to Computing

NSF Org: [DRL](#)
[Division of Research on Learning in Formal and Informal Settings \(DRL\)](#)

Initial Amendment Date: May 31, 2011

Latest Amendment Date: August 5, 2014

Award Number: 1031351

Award Instrument: Continuing grant

Program Manager: Edith Gummer
DRL Division of Research on Learning in Formal and Informal Settings (DRL)
EHR Directorate for Education & Human Resources

Start Date: June 1, 2011

Expires: May 31, 2016 (Estimated)

Awarded Amount to Date: \$2,005,339.00

Investigator(s): Susan Rodger rodger@cs.duke.edu (Principal Investigator)
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NSF Program(s): ITEST

Program Reference Code(s): 9177, SMET

Program Element Code(s): 7227

ABSTRACT

US college and universities are experiencing a dramatic decline in enrollment of computing majors, despite a predicted, rapid increase in future jobs in the computer science (CS) and information technology (IT) sectors. This reflects a decline in the number of students taking the AP computer science exam. To address this issue, this project will build statewide networks of college, middle school, and high school faculty who will offer workshops and provide continuing support during the academic year.

The networks will be set up in three different states (North Carolina, South Carolina, and Mississippi). College and university faculty will work directly with middle school and high school

teachers in teaching and learning innovative and effective ways of introducing computing and computer programming, and in incorporating computational thinking into other disciplines. This project scales up a previous, successful collaborative project for students and teachers using the Alice 3D programming environment. The approach focuses on a strong core of fundamental programming concepts and problem-solving techniques in an object-oriented, interactive environment. The project's external evaluation will include the collection of qualitative and quantitative data on teacher instruction and students' enrollment and performance.

The project will train approximately 265 teachers directly, and provide support for master teachers to provide subsequent training for other teachers in their home districts. This project has the potential to increase the amount and effectiveness of instruction in object-oriented programming concepts and problem-solving to a large number of middle school and high school students. By training middle school and high school teachers in the proposed approach, and by providing support networks and building community, the project should be able to impact students throughout three states. Developed curricular materials will be stored in an online, searchable database to be freely available to all teachers. In making computing, computer science, programming, and computational thinking more attractive to middle school and high school students, the project team expects to encourage more students to major in STEM, and particularly computing, at the college level.

BOOKS/ONE TIME PROCEEDING

Susan Rodger, Melissa Dalis, Chitra Gadwal, Jenna Hayes, Peggy Li, Liz Liang, Francine Wolfe, and Wenhui Zhang. "Integrating Computing into Middle Schools Disciplines Through Projects", 06/01/2011-05/31/2012, "*Forty-third SIGCSE Technical Symposium on Computer Science Education*", 2012, "page 421-426".

Melissa Dalis. "Adventures in Alice Programming", 06/01/2011-05/31/2012, "*CWIC 2012*", 2012, "presented on Feb. 17, 2012".

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