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Award Abstract #1044191

Integrating Visualization and Interaction into the Formal Languages and Automata Course

NSF Org: [DUE](#)
[Division of Undergraduate Education](#)

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ABSTRACT


A major problem in computer science education is that students have difficulty understanding abstract concepts in theoretical computer science. Almost all Formal Languages and Automata (FLA) textbooks present material in a formal manner with little visualization and no feedback. A previously developed instructional software tool, called JFLAP, allows one to explore FLA topics in a visual and interactive manner. The accompanying user manual is used as a supplement with an automata theory textbook. Previous studies demonstrate that JFLAP is easy to use, increases student engagement and self-efficacy.

This project is extending JFLAP features and developing new learning modules that introduce concepts rather than simply reinforce concepts. Each web-based module

includes background information, targeted questions and JFLAP exercises. Unlike a typical textbook, the online nature of the module and interweaving content with interactive exercises allow students to explore concepts. The goal is to develop thirty modules that support fifteen chapters of a traditional automata theory textbook.

JFLAP has been widely adopted and is used in over 160 countries. Six faculty from a variety of institutions have been selected to serve as early adopters and contribute to the assessment plan. Student learning gains, software usability and student perceptions are assessed. Developed materials will be available for free and promoted to the extensive number of JFLAP users as well as the broader computer science education community.

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