

PHD THESIS PROPOSAL

February 11th, Thursday 10am-12pm
Gates-Hillman Center (GHC) 6501



Kelly Rivers

Human-Computer Interaction Institute

Committee:

Ken Koedinger	HCII / Psychology (Chair)
Brad Myers	HCII / ISR
Vincent Aleven	HCII
Sharon Carver	Psychology
Tiffany Barnes	CS (North Carolina State University)

Automated Data-Driven Hint Generation for Learning Programming

Introductory programming has become a highly desirable subject of study, but it can prove to be very difficult for novices. In particular, novice programmers often get stuck and frustrated while they are attempting to solve problems. One way to provide support for these students is to use intelligent tutoring systems (ITSs), which can help students master material with more support. However, these systems take much time to create, especially for problems with very large potential solution spaces.

My research has focused on whether we can automate the production of ITS components such that they are still well-formed and useful for novices. I have designed and constructed ITAP, the Intelligent Teaching Assistant for Programming, which uses collected student data to automatically construct next-step hints. This system uses algorithms for state abstraction, path construction, and hint reification to automate the generation of hint messages. I have tested ITAP with novice programmers and identified potential research areas for exploration and improvement.

For my thesis work, I plan to conduct a series of experiments that determine the effect hint availability has on student performance and learning. I also plan to study how students' internal motivation and help-seeking beliefs affect their practice habits and learning, and I intend to evaluate ITAP's ability to improve its performance as data is collected. I anticipate that the findings of these planned studies will result in modifications to ITAP that make it a practical, useful, and usable system.

Proposal document can be found at krivers.net/proposal.pdf

