

Project Summary

Where is the next generation of high-technology, computer teachers, programmers, and entrepreneurs going to come from? On average, at least one half of college students majoring in computer science withdraw from the field, primarily during their freshman year. While there are many reported causes for this attrition, two important factors are a lack of previous programming experience and a lack of maturity in problem solving/logical reasoning skills.

This proposal describes a proof of concept project for the development and application of instructional materials for teaching fundamental programming concepts using an exciting simulation and visualization package. This package provides an environment that supports the creation of 3-dimensional, interactive, animated virtual worlds (which can be easily built by novices!). It is expected that this approach will strengthen and enhance student skills as well as provide sufficient programming experience to improve student performance and retention in introductory computer science (CS 1) and beyond.

This project will be implemented in three phases:

- (1) Developing a complete draft of a textbook and curricular materials. The materials will include laboratory exercises and a software reference (for an animation software package designed for the novice programmer).
- (2) Using and integrating the text and curricular materials in introductory programming courses at two institutions (prior-to or simultaneous-with the traditional CS 1 course) -- Ithaca College and Saint Joseph's University.
- (3) Evaluating the success of the materials by student surveys, interviews of students and instructors, course performance, and retention rates.

Two major outcomes from this project will be realized. First is creation of a set of instructional materials: textbook, laboratory exercises, lecture and demonstration slides, and a reference for the animation software. All curricular materials will be freely available and disseminated online. Second is collection and analysis of preliminary data on the use of these materials. Future work will include further development, testing, and dissemination of the materials as part of a broader study.

Sample projects illustrating the 3-dimensional animation environment may be found at: <http://www.sju.edu/~scooper/CCLI/grant.html>. The plug-in (to view the projects) may be downloaded from: <http://www.alice.org/downloads/plugin/>.