Business

Helping teachers find the next wave of computer programers

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A recent workshop at Roger Williams University showed teachers how to use a program called Alice, which lets students develop animated movies and games to encourage their interest in computer science.Roger Williams professors say the growing use of Alice as a teaching tool is a response to a decline in the number of computer- programming students that began when the dot.com bubble burst in 2000.

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The red dragon flew toward the castle, determined to rescue the imprisoned princess.

Only sometimes it flew too high, or too low. Once it flew right through the princess.

In a classroom at the Gabelli School of Business at Roger Williams University, 32 computer teachers stared into their screens and tried to get the dragon to fly to the princess correctly. On a pair of big screens at the front of the room, Stephen Cooper, associate professor of computer science at St. Joseph's University in Philadelphia, demonstrated how to get the dragon to the princess.

"How is he going so fast?" someone asked.

"I used a speed multiplier," Cooper said.

The dragon, the princess and the castle were created by a program called Alice, developed in the late 1990s at

Carnegie Mellon University in Pittsburgh. Since then, Alice has evolved into a teaching tool designed to introduce students to computer programming by developing animated movies and games.

The computer teachers were taking a three-day workshop hosted by Roger Williams University and financed by the National Science Foundation, designed to help them take Alice, along with a teaching approach to the programming language Java, called Media Computation, back to their classrooms.

W. Brett McKenzie, associate professor of computer-information systems at Roger Williams, said the growing use of Alice as a teaching tool is a response to a decline in the number of computer programming students that began when the dot.com bubble burst in 2000. Since then, he said, the demand for computer programmers has gone up, but the number of students enrolled in programming classes has not kept pace.

McKenzie said the shortage is particularly noticeable among women and minorities.

Alice is intended to appeal to a new generation of computer scientists, people who grew up playing video games.

"We're looking for a way to reenergize students in computing," said McKenzie, who started using Alice in one of his courses two years ago. "Students today grew up in a media-rich world, and we're trying to teach computing from an era before interactive graphics.… I'm in my fifties. When I was introduced to computers there was 'a green screen' and that was it."

The teachers taking the three-day workshop, who included both high school and college instructors, said they thought Alice could work for them. Indeed, some had used it already.

"I've used it, and the kids loved it," said Regina Sikorski, of Northern Highlands Regional High School in Allendale, N.J. "With Alice, they have the ability to do interesting things quickly. They can create some wonderful problems, and see the results right away."

Dick Whalen, who teaches computer science at the College of Southern Maryland, said the college is planning to begin using Alice in its courses this fall. He said he wanted to come to the seminar to get some hands-on training, and talk to other people who will be using the program.

"And coming to Rhode Island in the summer is always delightful," he added.

David Gannon, who teaches at Bryant University, said Alice is a way to get students started in programming.

"Alice is a good way to get them interested, and then be able to take them on to the more 'normal' programming languages," he said. "They need to crawl before they can walk, walk before they can run.… Alice is an easier interface, an easier way to get the ideas across."

Is Alice difficult for someone trained in more traditional methods?

"It's not hard, but you need to look at it for a few seconds," Gannon said. "You need to unlearn what you'd learned before."

Stephen Cooper, who led the Alice section of the seminar, said he's been working with the program since 1998. Originally written by a team supervised by Randy Pausch at the University of Virginia and then Carnegie Mellon, Alice was intended for use with computer-generated virtual reality. Cooper and Wanda Dann, of Ithaca College, thought Alice has potential as a teaching tool, and went to Pausch with the idea.

Cooper said one of Alice's advantages is that if you can make a mistake, it's immediately visible on the screen. Your dragon, for example, might keel over instead of fly. On a more general level, he said, Alice

addresses a universal human urge, which spans many cultures, to tell stories.

Cooper, Dann and Pausch collaborated on a textbook, Learning to Program with Alice, published by Prentice-Hall, although there are several other textbooks on Alice available as well. The program itself is available for free at www.alice.org.

To promote Alice, Cooper, Dann and Pausch decided to "take our show on the road" to teachers. Cooper said Roger Williams' McKenzie, an "early adapter" of Alice, invited the workshop to Roger Williams.

Cooper said the Roger Williams workshop is the first time that Alice has been paired with Media Computation, which uses a set of computer files that enables users to work with sounds and images.

The Media Comp section of the workshop was taught by Barbara Ericson, of the Georgia Institute of Technology.

In her section of the workshop, Ericson had members of the class act out various roles in a restaurant — greeter, waiter, chef — to demonstrate the kind of data that has to flow back and forth in creating an action. Then she had the class create tiny turtles on their screens, and began explaining how to control their movements.

Cooper brought some teaching assistants with him from Philadelphia to help with the Alice/Media Comp workshop.

One of them was Jennifer Mung'Au, a junior at St. Joseph's majoring in math and computer science. Mung'Au said that someday she plans to return to her native Kenya. The problem for computer students there, she said, is not so much software as hardware — there are not enough computers to go around.

In the meantime, Mung'Au said she enjoyed the workshop at Roger Williams.

"People start out in the morning not able to do anything, and then by the afternoon they can," she said. "It's fun to see the improvement. It really makes you feel like you've accomplished something."

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