Alice Programming Adventures – Followup Workshop

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www.cs.duke.edu/csed/aliceInSchools

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Outline

• Welcome, Introductions, and Motivation
• History of our workshops
• Usage of Materials for Integrating Alice into K-12
  – Computer Science concepts
  – Animation and Special Effects
  – Tutorials, template worlds and classes
  – Discipline Specific
• Future Work
Introductions
Motivation - There are few women in computer science

- Many reports indicate the low number of women in computer science
  - 56% of Advanced Placement (AP) test takers are female
  - Yet only 15% of Computer Science AP test takers are female

- There are low numbers of women at all levels of the pipeline in computer science from high school through college to graduate school to professors.
Many students don’t know what Computer Science is when they come to college!

- Not taught in middle schools and many high schools
- What they think it is:
  - “keyboarding, spread sheets, word processing….”
- VERY EXCITING ……… NOT!
Bring on Alice Virtual Worlds!

• Alice is
  – Hands-on!
  – Interactive!
  – Visual!
  – Less Error prone
  – Exciting Results right away!

• Alice has the potential to excite kids about computer science in the same way that experiments excite kids about chemistry, physics and biology!
History of...
Adventures in Alice Programming
Grades 5-12 Outreach

www.cs.duke.edu/csed/alice/aliceInSchools
Adventures in Alice Programming 2007-2009

- Integrate Alice into high school and middle schools by training teachers
- Six sites in U.S.:
  - Durham, NC  Charleston, SC  Virginia Beach, VA
  - Denver, CO  Oxford, MS  San Jose, CA
- Durham site focused on Middle Schools in NC

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Only had funding for one three week workshop summer 2008
Duke: Adventures in Alice site

- 2008: 3-week Teacher workshop
- 2009-2010 – one week wkshps
- Over 130 teachers total, mostly middle school, some high school
  - Only a few had ever programmed before
  - Taught them Alice, Developed Lesson Plans
- (2008) 1-week middle school camps
  - Taught Alice
  - Lots of time to build their own Alice worlds
Alice Symposium
June 17, 2009

• 25 papers presented
• Over 120 attendees
Targeting all subject teachers

• Subject teachers using Alice
  – Language Arts
  – Mathematics
  – Science
  – History
  – Foreign Language
  – Music, Art
  – Media, Technology
  – Business

• Mostly Middle school, some Elementary, and some high school subject teachers (physics, chemistry, etc)
New NSF ITest Scale-up Grant 2011-2016

• Three states: NC, SC, MS
  – Reach out throughout the three states
• 3-week workshops (spread over 2 summers)
• 5 years of funding (2.5 million)
• Provides lodging/food, small stipends
• Another Alice Symposium (2012 or 2013)
Usage of Alice in Middle/High Schools

• Teachers
  – Examples in lecture
  – Make interactive quizzes
  – Make worlds on concepts for students to view

• Students
  – Projects (in place of a poster, a model)
  – To take or build quizzes
  – To view and answer questions about a world
  – Older students can do more with Alice.
Free Materials - Introductory Tutorials

1. Simple, Short (15 min) tutorials to try Alice
   - Add an object, use built-in methods

2. One hour starting tutorials
   - Writing methods, simple events, camera

3. Longer starting tutorials if more time/more detail (4 one-hour parts)
   - More detailed on placement of objects, writing methods, events, camera control
   - Animating a skateboarder
   - Adding sound and images
Example: 4-Part Starting Tutorial
Many short tutorials on CS Topics

- Programming – sequential and “at the same time”
- Methods (teaching characters how to walk)
- Events (buttons and birds)
- Looping
- Conditionals (making a choice)
- Functions (how tall are you)
- Lists (objects moving in unison)
- Variables (timers/scores)
Functions Tutorial using functions
Other Fun/Animation Topics Blended in

- Storyboards
- Changing camera views
- Scene changes and lighting
- Fading in/out
- Making Billboards
- Making objects invisible and visible
- Sounds
- Glueing objects to others
Scene Change Class
includes all ground covers
Scene Change Class (2) - Tutorial Uses variables to save sky color
Scene Change Class (3)
Math Example

- Danica McKellar
Math Example
Improper Fractions Story
Math Example
Rounding Numbers

Rounding World

Choose the level of difficulty by clicking on the handle:

**Level 1**  round numbers up to the hundreds
**Level 2**  round numbers up to the thousands
**Level 3**  round numbers up to the millions

START ➔
Quiz Worlds

• Tutorial to create a simple world

How many animals in this world?
Quiz Worlds (2)

• Respond to questions
Have Created Several Quiz Templates

• Template World – Click on an object that matches the sign
English as Second Language Example
Built a template world

Putting Images in random order. Wait....
English as Second Language (2)
You put the pictures in order
English as Second Language (3)
check to see if correct
Annotate each picture

Getting Cup
English as Second Language (5)
then the story plays

For another story, change list of pictures.
Other Quiz Templates

• Template World – Click on an object that is the answer
• Template Class – Quiz with “ask user” functions built in
Alice used as Projects
Project: Historical Tour
Project: Pong Game (2D)

Press Y to Begin
Project: Adventure Game

Getting the Grade:
a point and click game
Examples in Science

- Created a Bar Chart

- Others
This Summer’s Focus

• Running two-week Beginner workshop – and one week followup workshop in 2012.

• Focus with research students is “how to integrate computing into mathematics”
  – Tutorials for math worlds students can build
  – Looking at NC state standards and CSTA recommendations
Adventures in Alice Programming
Durham, North Carolina Region

Adventures in Alice Programming is a project for integrating the programming language Alice into middle schools and high schools in the state of NC, based in the Durham, NC region. Originally, the target schools were the schools in Durham county, Vance county, Person county and Chatham county. We have now expanded to schools throughout NC. We have also taken a few teachers from other states.

Free Alice materials for Use in K-12

Here are the K-12 materials we developed in summer 2009 (still have a few to put up) and also the older 2008 materials. These materials are available for free to use.

Materials from Summer 2008 are here:
Questions?
www.cs.duke.edu/alice/aliceInSchools