More Motivation, Adventures in Alice Project, Usage of Alice in K-12

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Computer Science Declining Enrollments, Few Women
CompSci 4 – Alice Class at Duke for non-majors

- Lecture for 10-20 minutes
- Students work on problem with computers in pairs
- Bring students back together
Success - Alice attracts diverse group

- At Duke
  - CompSci 4 Spring 2005
    - 22 preregister, 30 enroll (12 female + 3 African Amer.)
  - CompSci 4 Fall 2005
    - 20 preregister, 31 enroll (17 female – 1 African Amer.)
  - CompSci 4 Fall 2006 – 2 sections
    - 64 students, 33 female, 7 African Amer.
  - CompSci 4 Fall 2007 – 2 sections
    - 84 students -> 50% female
  - CompSci 4 Fall 2008 – 2 sections
    - 100 students -> 50% female
  - Similar in Spring 2009, Fall 2009, etc
  - Advertised in school paper
    - picture of ice skater
    - Web site of animations
Games Created by Duke CompSci 4 Students

• Non-majors
• Most never programmed before
• Final projects after 10 weeks of Alice
• 50% of students are women
• Spring 05, Fall 05, Fall 06, Fall 07, Fall 08, Spring 09, etc, last time Fall 2013
Game: Candyland

Select girl and boy to play

Click on red and green buttons to move them.
Game: Frogger – Get frog across road
Game: Eragon

4 tasks to win the game
Game: Tic Tac Toe

Score: 4.0

Game: DDR

Click on arrow keys,
Player moves foot to square
Game: Dating Game
Game: Rumble Putt
Game: Sarah Palin’s Seaplane Adventure

SARAH PALIN’S
SEAPLANE ADVENTURE

INSTRUCTIONS   PLAY   CREDITS

TAKING FLIGHT
Sarah Palin’s Seaplane Adventure (cont)
Transition - Alice into K-12

• Non-majors course at Duke
  – Popular, fills up with seniors
  – College students pretty set with their major before they come

• Students in middle school are starting to form decisions on careers

• They have exposure to Teachers, Doctors, Astronauts, etc.
  – BUT DON’T KNOW WHAT COMPUTER SCIENCE IS
Success - Alice Excites 4th-6th Grade Girls

• Duke Femmes Event, April 07
• 60 girls – 4 groups of 15
• Taught them Alice for an hour
• Handout to take home
• Event again every year since
Thank you from 4th Grade Girl

Dear Susan,

Thank you for showing me the Alice program. I think it's really cool. I got my mom to download it, and I've created a show world. Again, I think Alice is really cool and thank you for showing it to me.

From [Name]
Adventures in Alice Programming
Grades 5-12 Outreach

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

• Integrate Alice into high school and middle schools by training teachers

• Started with Six Regional sites in 2008:
  
  Durham, NC         Charleston, SC         Virginia Beach, VA
  Denver, CO         Oxford, MS             San Jose, CA

• Durham site

  www.cs.duke.edu/csed/alice/aliceInSchools

• We’ll go over the history of what we have done and plan to do
Duke: Adventures in Alice site

- Summer 2008
  - 3-week Teacher workshops
    - About 35 teachers, mostly middle school, some high school
    - All disciplines
    - Taught them Alice, Developed Lesson Plans
  - 1-week middle school camps
    - Taught Alice
    - Lots of time to build their own Alice worlds

- NSF ITEST grant, IBM support
How to Use Alice in Middle Schools

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

• Students
  – Projects (in place of a poster, a model)
    • Bonus – Learn programming while preparing project!
  – To learn concepts by interacting with worlds
  – To view and answer questions about a world
We have developed Introductory Tutorials

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

2. One hour tutorial for younger kids
   - Writing methods, simple events, camera
   - several versions – we did island/rowboat

3. 3-4 part tutorial for middle school kids
   - More detailed on placement of objects, writing methods, events, camera control
   - several versions – we did short knight rescue princess from dragon

4. 2-3 versions of each of these tutorials
Many short tutorials on CS Topics

- Programming – sequential and “at the same time”
- Methods
- Events
- Looping
- Conditionals (making a choice)
- Functions (compute and return an answer)
- Lists
- Variables
Other “Fun” Topics Blended in

• Storyboards
• Changing camera views
• Scene changes and lighting
• Making Billboards
• Making objects invisible and visible
• Sounds
• Glueing objects to others
K-12 Example worlds and Lesson Plans

Developed by teachers from previous summers
Science Example:
How volcano is formed

Today, we are going to see how HOT SPOT volcanoes form.
How a volcano is formed (slide 2)

Deep under the earth's crust heat from the core makes the mantle move like a lava lamp.
Over thousands of years, the volcano builds up...
And emerges above the ocean as an island.
Math Example:
Teacher Lesson Plan on quadrant plane

- Click on lighthouse
- Enter x,y position
- Objects randomly move
5. What type of tree is the treehouse on?
- maple
- oak
- a magic tree of no special type
- elm
- I don't know

score 5.0
Other Ideas for Projects

- Story from Ancient Egypt
- Spanish Quiz in which you see a word and have to click on the object the word represents
- Animate a scene from a book you have read or a poem you have written
- Create a world about school safety
- Memory game – remember a random color sequence
- Math Quiz – Answer the questions

Alice worlds for these and more are on our website.
Other Teacher Lesson Plans

• Math
  – Finding surface area
  – Rate of Change and Slope

• Science
  – Create a food chain
  – Sun, Earth and Moon system
  – Tornados
  – Physics – Newton’s law of gravity
  – Alternative Energy
Other Teacher Lesson Plans (cont)

• History/Social Studies
  – The continents – view world and answer questions
  – Animated overview of Japan
  – Animated overview of Egypt

• English
  – Write and animate a poem
  – Animate a poem or scene from a story
  – Write a movie trailer
Usage of Alice by Middle School Students in Alice Camp 2008
We examined the student’s worlds - What type of objects did they use?

• Girls top five
  – People, animals, environments, nature, 3D-text

• Boys top five
  – Vehicles, people, buildings, scifi, special effects
Typical Boy Example
SciFi, vehicles, fire
More fire
And more fire
And more fire!
Girl Examples – Dancing chicken
Girl Example 2 – Egypt story

behind me is where mummys lye.
Girl Example 3 – Attack of the lemurs

Hello, I'm the chief of this island and we welcome you.
Girl Example 4 - carnival
Girl Example 5 – rescue baby
How did the Students use Alice?

- Examined worlds to see which concepts they used

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<th>3+ times</th>
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<td>26%</td>
</tr>
<tr>
<td>color property</td>
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CS Topics

Basic topics
Feedback from Parents

• “[My daughter] thoroughly enjoyed her week with you. It was a great experience!”

• “I’m convinced. Kids like Alice and Alice is a good way to teach kids programming. [My son] is doing my python course and he’s not all that interested in python and never touches it between the courses. However, in the evenings when he comes home from the Alice course, he works on his Alice worlds.”
Summarizing 2008

• We developed
  – Tutorials
  – Examples of possible use in Middle Schools

• Teachers developed
  – Lesson Plans for history, science, math, language arts, art, and technology
  – Animation Fair

• Middle School Students
  – Were engaged, developed their own worlds
  – Animation Fair
  – Difficult to get away from the computer

All materials are on our website.
In 2009 and 2010

• June 17, 2009 – Alice Symposium
  – Submit papers, about 120 attendees
    [website link removed]

• 1-week Teacher beginner workshops
  – Over 100 teachers, mostly middle school, some high school
  – All disciplines
  – Taught them Alice
  – Not long enough!

• 2-day followup Workshops

• Supported by IBM, some NSF
2011 on and Future Work

• National Science Foundation ITEST Grant for 2011-2016
  – Starting in 2011, two-week workshop every summer
  – One-week followup workshop every summer for previous summer participants
  – Ran an Alice Symposium in 2009 and 2013
    • www.cs.duke.edu/csed/aliceSymposium2013

• Scale-up grant
  – Reach throughout the state – NC, SC, CA, NE
  – Invite some from other states to NC site
Alice Symposium and Workshops: June 17-21, 2013

It is a week of Alice activities! Papers, posters, contest, and workshops!

The Third Alice Symposium will be held on Wednesday, June 19, 2013 at Duke University in Durham, NC. There will be two-day Alice workshops (Alice 2.3 and Alice 3.1) and related workshops both before and after the Symposium on June 17-18 and June 20-21, 2013.

The Third Alice Symposium will have several paper tracks including using Alice in middle school, using Alice in high school, and using Alice in Community College and University. New this time will be a poster session and teachers will be able to enter student worlds in an Alice contest. See the call for participation.

Alice is a 3D virtual worlds programming environment that makes it easy to create animations or games. Alice 2.3 is a great introduction to programming for novices in all disciplines in middle school, high school and college if the emphasis is just an introduction to programming and a way to use animation with objects. Alice 3.3 works great with many levels and other disciplines to.

REGISTRATION
deadline: May 29, 2013

PROGRAM is available.
PAPER DEADLINE:
February 15, 2013

POSTER DEADLINE:
EXTENDED: April 12, 2013

Contest Deadline:
EXTENDED: April 12, 2013
Other Alice Outreach

• Teachers use Alice during the school year
• Been in touch with teachers on feedback on Duke student work
• Visited several schools
  – Taught Alice to three sixth grade classes in 2012
  – Ran Activity day at Duke for sixth graders March 2013
• Presented at
  – Durham public school technology day
  – NC Catholic Schools Education Conference 2012
  – Region 5 School Library Media and Technology Directors/Supervisors, Orange County
Future of Alice

• What we need from you....
  – Your usage of Alice, any materials/lesson plans you develop this summer/fall and use. They must meet NC teaching standards.
  – Troubles you encounter along the way with schools/Alice, anything
  – Come back next summer for followup workshop and maybe a Symposium