Could Alice Equalize Student Learning?
Presentation at 2009 Alice Symposium

Alka Harriger
Professor & Assistant Department Head
SPIRIT Principal Investigator
Computer and Information Technology
Purdue University
harrigea@purdue.edu

Overview
• SPIRIT Background
• 2008 Teacher Program
• Teacher Testimonials
• Hypotheses for Success

SPIRIT Background
• Surprising Possibilities Imagined and Realized through Information Technology
  – See SPIRIT website: www.ITPossibilities.org
  – Supported by a $1.26M grant from the National Science Foundation, #DRL-0737679, 1/08-12/10
  – Attract more people to IT, especially women
  – Intervention programs for HS teachers, HS counselors, and HS students

SPIRIT Background
• Program Goals
  – Correct negative perceptions about IT
    • IT skills relevant to a broad range of disciplines
    • IT can benefit society
    • IT can be fun, welcoming, interesting
    • Both men and women can have successful careers in IT
  – Let participants try out and create many interesting & useful applications of IT
  – Give guidance on what to do now to have a successful career in IT

SPIRIT Background
• 2-week teacher institute
  – Week 1
    • Thorough instruction on using Alice to develop storyboards for each of the STEM disciplines
    • Development of classroom lessons teacher’s disciplines
  – Week 2
    • Practice instructing students using lessons developed in week 1
    • Learn IT’s relevance to and support of STEM disciplines
• 1-week program for counselors (during week 2 above)
• 1-week summer camp for students (during week 2 above)

SPIRIT Background
• Sample Activities During Week 2
  – Learn how to create Alice worlds (animated stories and interactive games)
  – Complete hands-on activities that show a variety of unexpected ways that IT can benefit society
    • Diet example
    • IT Healthcare
    • Law Enforcement
  – Listen to (and ask questions of) dynamic speakers
    • Successful IT experiences
    • Work on interesting issues
    • Solve problems that positively impact society
**SPIRIT Background**

- **Principal Investigator**
  - Alka Harriger, Professor & Assistant Dept Head of Computer and Information Technology
- **Co-PIs**
  - Kyle Lutes, Associate Professor of Computer and Information Technology
  - Buster Dunsmore, Associate Professor of Computer Science
- **Senior Personnel**
  - Jessica Berger, Science teacher at Delphi High School
  - Mikel Berger, Technical Consultant, self-employed
  - Gail Farnsley, Visiting Professor of CIT & former CIO at Cummins
  - Antonia Munguia, Director of Diversity, College of Technology
- **External Evaluator**
  - Barbara Moskal, Associate Professor & Director of the Center for Assessment of Science, Technology, Engineering and Mathematics at Colorado School of Mines
- **Advisory Board**
  - Dr. John Staver, Full Professor and Director of Purdue University’s Center for Research and Engagement in Mathematics and Science Education
  - Dr. Brenda Capobianco, Assistant Professor of Science Education in the Departments of Curriculum and Instruction and Engineering Education (courtesy) and Affiliated Faculty in the Department of Women’s Studies at Purdue University
  - Dr. Melissa Dark, Assistant Dean of the College of Technology
  - Industry Partners
    - IBM
    - Cummins
    - PTC
    - Micronsoft
    - Johnson & Johnson

**2008 Teacher program**

- **80 hours**: Two-week educational program in July 2008
- **40 hours**: Implementation of Alice-based lessons during the school year
  - Returning to Purdue campus for four in-service conferences to share:
    - Impact on self & students & others
    - Lessons learned
    - Future plans

**2008 Teacher program**

- **Subject areas**
  - Science
  - Business
  - English
  - Math
  - Spanish
  - French
  - Programming
  - Consumer & family sciences
  - Graphic arts
- **Geographic areas**
  - Indiana
  - Illinois
  - Ohio

**Teacher Testimonials**

- Applying Alice to real-world problems improves student learning
- Students who have difficulty focusing were engaged with Alice
- Students felt empowered with Alice
- Students were proud of their Alice worlds & eager to share with others
- Students enjoy teaching Alice to others

- Teachers were able to successfully use Alice as a reward mechanism
- Alice can help improve understanding of math word problems
- Alice can convey difficult science concepts visually
- Using Alice can help reach students of varying abilities
Hypotheses for Success

- Alice gets (and keeps) the students' attention
- Enthusiasm of teachers is contagious
- Students spend more time with Alice
  - Students learn Alice quickly
  - Using Alice doesn’t seem like work
- Learning requires engagement & Alice integrations have kept students engaged
- Explaining understanding through stories forces further reflection of own knowledge

Conclusion

- Alice has made a positive difference in the majority of SPIRIT teachers’ classrooms
- Unexpected (but multiple) observations about all levels of students learning with Alice
- Sufficient anecdotal data suggests further study needed
- Thank you 😊