Tools, ideas, and strategies for creative computing in afterschool

December 6, 2017
Agenda

1. Defining Computing
2. SciGirls Code approach
3. Family Creative Learning approach
4. Audience Q&A
Speakers

Sarah Carter
Manager STEM
Media & Education
SciGirls

Ricarose Roque
Assistant Professor
University of Colorado, Boulder

Melissa Ballard
STEM Manager
Afterschool Alliance
SciGirls Code:
A National Connected Learning Model to Integrate Computing in STEM Learning with Middle School Girls
SciGirls Code

Partnership Model & Project Team

Joan Freese
Rita Karl

Karen Peterson

Cassie Scharber, PhD
SciGirls Code

More Project Team

Sarah Carter
Leah Defenbaugh
Katie Hessen
Heather Benedict
SciGirls Code

Project Goals

1. Spark and strengthen girls' interest, skills, and confidence as technology creators.

2. Train educators and role models in best practices for engaging girls.

3. Research computational thinking and the connected learning model for out of school CS learning.
The SciGirls Seven

Research based gender equity strategies

“To change how millions of girls (ages 8-13) think about STEM”
The SciGirls Seven

ONE. Girls benefit from collaboration, especially when they can participate and communicate fairly. (Parker & Rennie, 2002; Fancsali, 2002)

TWO. Girls are motivated by projects they find personally relevant and meaningful. (Eisenhart & Finkel, 1998; Thompson & Windschitl, 2005; Liston, Peterson, & Ragan, 2008)
THREE. Girls enjoy hands-on, open-ended projects and investigations. (Chatman, Nielsen, Strauss, & Tanner, 2008; Burkam, Lee, & Smerdon, 1997; Fanscali, 2002)

FOUR. Girls are motivated when they can approach projects in their own way, applying their creativity and unique talents. (Eisenhart & Finkel, 1998; Calabrese Barton, Tan, & Rivet, 2008)
FIVE: Girls’ confidence and performance improves in response to specific, positive feedback on things they can control – such as effort, strategies and behaviors. (Halpern, et al., 2007; Zeldin & Pajares, 2000; Blackwell, Trzesniewski, & Sorich Dweck, 2007; Mueller & Dweck, 1998)

SIX: Girls gain confidence and trust in their own reasoning when encouraged to think critically. (Chatman, et al., 2008; Eisenhart & Finkel, 1998)

SEVEN: Girls benefit from relationships with role models and mentors. (Liston, et al., 2008; Evans, Whigham, & Wang, 1995)
Connected Learning
Integrates three spheres of learning
# Computational Thinking

**Perspectives:** a particular attitude toward or way of regarding something, a point of view

- Expressing
- Connecting
- Questioning

**Practices:** the actual application or use of an idea, belief, or methods

- Experimenting and Iterating
- Testing and Debugging
- Reusing and Remixing
- Abstracting and Modularizing

**Concepts:** abstract ideas

- Sequence
- Loops
- Parallelism
- Events
- Conditionals
- Operators
- Data
SciGirls Code

Content Criteria

• Open Ended
• Existing/Adaptable curriculum
• Robust User/Learning community
• Possibility for browser based or mobile development environment
Computational Thinking/Unplugged Activities
Location Based Augmented Reality
Platform Options

Taleblazer  MIT AppInventor  Thunkable
Robotics
Platform Options

Sphero SPRK+  Hummingbird Duo  Ozobot Bits
E-Textiles/
Wearables
Platform Options

- Chibitronics
- Lilypad Arduino
- Adafruit Flora
Curriculum - Starting Points

Sew Electric
A Collection of DIY Projects that Combine Fabric, Electronics, and Programming
Leah Buechley & Kanjun Qiu
Foreword by Jessica Goldstein

Soft Circuits
Crafting E-Fashion with DIY Electronics
Kylie Pepple, Melissa Gersall, Katie Salen Tekinbas, and Rolf Santo
Foreword by Leah Buechley

Textile Messages
Describe the World of E-Textiles and Innovation

SciGirls
Family Creative Learning
Engaging Children and Parents as Computational Creators

Ricarose Roque
Information Science
University of Colorado, Boulder
When children learn to sew, they can create a variety of meaningful artifacts as well as access a rich history and tradition of sewing that spans generations and crosses social groups.
With the example of sewing in mind, let’s think of ways to leverage social support from families and communities.
Computational Creators
able to use computing to create things they care about
develop identities as creators
see the ways they can shape the world
Family Creative Learning
The Scratch Platform
Start them with something that they’re familiar with and know how to do together as a family.
Allow them to connect and build supportive network among their peers; see their shared experiences in their stories, share strategies, see each other as resources.
Focus on what their interests; learn to work together
Allow them to get recognition and practice talking about their experience and process.
Families come in all kinds of configurations and work in different ways together.
As much about building relationships as it was about building projects.
When you make something together with your kids... you become a little bit more close.

- DIANE
Shifting perspectives on themselves, each other, and computing
My son] was surprised I could do it. He thought I couldn’t do anything on the computer. When he saw that I made something, he was surprised that I made something. He said, “How did you do that? You made that?” He was amazed. He probably thought that he would come over and I would be lost. But I was like, “Oh I got it together.”

- MOTHER OF THREE
It's not about telling parents what to do. It's about just opening up spaces and letting them play and explore with their kids.

- FACILITATOR
Download the guide:
http://familycreativelearning.org/guide/
Facilitating Learning with English Language Learners

Adapted version for younger learners:
Some parting strategies…

1. Focus on building relationships as much as building projects
2. Allow parents to have first-hand experience
3. Address the different needs of families
4. Choose creative technologies that allow them to express their ideas and interests
5. Shift from being instructors to being facilitators
Sarah Carter
SciGirls

Ricarose Roque
Family Creative Learning

Audience Q&A
Thank you!

Questions: Email mjballard@afterschoolalliance.org