

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

Technology Coding

Computer Science

Programming Digital Learning

Media Literacy Computing

Computational Thinking

STEM-C

Tech Skills



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

Katie Hessen





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Heather Benedict



SciGirls Code Project Goals

- Spark and strengthen girls' interest, skills, and confidence as technology creators.
- Train educators and role models in best practices for engaging girls.
- Research <u>computational</u> <u>thinking</u> and the <u>connected</u> <u>learning</u> model for out of school CS learning.



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The SciGirls Seven

Research based gender equity strategies





"To change how millions of girls (ages 8-13) think about STEM"

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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)



The SciGirls Seven

THREE. Girls enjoy hands-on, openended 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)



SciGirls Seven

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)





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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

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Operators

Data

SciGirls Code

Content Criteria

- Open Ended
- Existing/Adaptable curriculum
- Robust User/Learning community
- Possibility for browser based or mobile development environment



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Computational Thinking/Unplugged Activities

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Options





CREATIVE COMPUTING



SciGir

'IS







An enrichment and extension programme for primary-aged students



Created by Tim Bell, Ian H. Witten and Mike Fellows ustrations by Matt Powell 2015 Revision by Sam Jarmar

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Location Based Augmented Reality

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Platform Options



TaleblazerMIT AppInventorThunkable



Robotics

SciGirls

200 0 °°

Platform Options



Sphero SPRK+ Hummingbird Ozobot Bits Duo

Sci

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E-Textiles/ Wearables

Sci





Platform Options







Chibitronics

Sci

Lilypad Arduino

Adafruit Flora

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Curriculum - Starting Points





Kylie Peppler, Melissa Gresalfi, Katie Salen Tekinbaş, and Rafi Santa foreword by Leah Buechley







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.

EAT

MEET

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

MAKE

SHARE

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



Our tools: Scratch & MaKey MaKey

Scheduler Strategie and Scheduler and Schedu

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Facilitating Fundamentals

Use technical words cautiously

to you want it to do?"

Ask questions rather

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Put yourself in their (unique) shoes

Hold the tools as a last resort

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South project

Build trust and relationships Learned is a solid process. Detroit now your learned and his sherr particulate you

Learning is a social process. Det to how your learners and help them get to index you Learning new things requires a mercing the oper and summary. Deing ensure the operation in given want that can find the the strength generative Methodever to be expansional test.

Encourage exploration, experimentation, and

risk-taking

Be a connector

Connect learners with similar interests to each other and to relevant resources in the walkshop.

Surface their interests

In our constitues take time for people to know when they want to do Cestre an environment that is open to many interests. As constitues like "What do you like to do?"

Authentic

enthusiasm

goes a long way

Source restaurces especially

encouragement or discribuiling

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their work and their next steps.

beginners, can feel varuae

about their projects. Some

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Mistakes and failures are welcome!

Boths: the extending risk bioscenaria applicances to be open to them. As you autoport them through its help them are what they are learning in the process.

When helping someone with Makey Makey, we flex thick to explain things verbely, but somatimes we had to physically show how to connect things together To make sure that parents and children has a try, we also stepped back to let them do it themselves while we worthered and assided

To show how conductive people are, families held hands to



what our make time looked li



we turned a into concurs

Watch an In MaKey Mak

Download the guide: <u>http://familycreativelearning.org/guide/</u>

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PBS FAMILY KIDS **Creative Learning**

FACILITATOR GUIDE

A multi-generation engagement program designed to activate creative and collaborative learning using PBS KIDS media and resources



Facilitating Learning with English Language Learners

English proficiency is not a requirement for participation in PBS KIDS Family Creative Learning. For some participating families, English may not be the primary language spoken at home. To help support this inevitability, below are some suggestions and practices that can help you as you work to support participating English Language Learners (ELL).

Encourage and support the use of a family's primary language

As families work together, they should feel free to do so in the language that they are most comfortable with. All of the programming blocks and most of the features in the app are icon based, and as such, language should provide few barriers to participants as they explore and create with the app.

To further support ELL families, we would recommend having a facilitator who can communicate in the primary language of participating ELL families. While the app might be language agnostic, FCL itself includes a lot of discussion. Having a facilitator present to help translate the conversation will go a long way in supporting the successful participation of ELL families.

All materials for adults are available in both English and Spanish, TIP and editable versions are available for additional translations. PBS KIDS ScratchJr is also available in Spanish.

Provide multiple means of representation



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Communicate clearly and allocate wait time

FCL introduces and explores a lot of big ideas. All learners, especially ELLs, will benefit from slow and clear speech. Additionally, allocating wait time after questions and during discussions will allow for the thoughtful formulation of ideas and responses.

Check for understanding



Family Varia

Adapted version for younger learners: https://whut.pbslearningmedia.org/collection/pbson, pause periodically tion with a simple veryone feels ing simple and le, encourage they're confused s can then personally

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kids-family-creative-learning/#.WimfN4anGdE

Beyond the diversity of languages and cultures you are likely to encounter, it is important to acknowledge that families come in all shapes and sizes. As facilitators, it is important to be as prepared and flexible as possible as you work to craft an experience that will successfully support all of your families. Some variables to keep in mind and plan for include:

Families with Multiple Kids

If there are more than three family members present during the sessions, especially if the kids outnumber grown-ups, it will be difficult for the whole family to all work on the same project and even harder for the grown-up to support all of the kids equally as they work together. If you have the resources, consider offering larger families multiple tablets to use and encourage them to work on multiple projects simultaneously. Additionally, make sure facilitators keep an eye on grown-ups trying to support multiple kids at once, as they will most likely benefit from additional support.

Older Siblings

For kids older than eight, the PBS KIDS ScratchJr app and the supporting activities may seem too 'babyish.' If that's the case, there are several fun ways you can engage older siblings by giving them special tasks and challenges throughout the experience

- · Junior Facilitator Many older kids will pick up on how to use ScratchJr very quickly and can assume a junior facilitator role helping to support participating families as they work together on their projects. Providing an older kid with this type of leadership role can be a great way to engage and empower them as learners.
- Documenter Whether just documenting their family experience. or FCL as a whole, older kids can be really helpful documenters. Provide them with a recording device and encourage them to capture pictures, videos, and interviews to help document the creative process of their family and other participants. Additionally, provide them with the opportunity to share their documentation with the group during the Share portion of the sessions

· More Advanced Tools - If you have the resources available and notice older kids quickly mastering the use of ScratchJr, you can point them towards other creative coding apps and websites where they may find more challenging and exciting coding tools:

 Scratch - https://scratch.mit.edu/ a web-based creative coding tool for 8-16 year-olds that works on computers (and requires web access).

 Hopscotch - https://www.gethopscotch.com/ an app-based creative coding tool for 8-14 year-olds that works on iPads and iPhones.



Session 1 What is a MAKER?

Eat Family and facilitator introductions

EXPLORE Technology, Makers, and Maker hats

Make **PBS KIDS ScratchJr**

Share Set norms, discuss thoughts and share projects

Some parting strategies...

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





SciGirls



Ricarose Roque Family Creative Learning

Audience Q&A

Thank you!

Questions: Email mjballard@afterschoolalliance.org