COMPUGIRLS, Culture, & Formative Evaluation: Lessons Learned

Presentation at ITEST Summit
February 26, 2010

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By grade 8, girls possess less positive perceptions of computers than boys (Christensen, Knezek, & Overall, 2005).

Low-income African American, Hispanic American, and Native American students have less access to advanced information and communication technology (ICT) in their homes or schools than their White counterparts (Kaiser Family Foundation, 2004; Goode & Margolis, 2004; Margolis et al, 2008).

Programs are boring and culturally irrelevant (Werner, Denner, & Campe, 2006; Scott, 2005; Eisenhart & Edwards, 2004), yet STEM enrichment has potential for girls (Scantlebury & Baker, 2007)
Theory to Practice

Theoretical Foundation

I. Culturally Responsive Practices:
   
   
   
c. Connectedness (Delpit, 2006; Gay, 2000; Howard, 2003; Ladson-Billings, 1995; Lane, 2006)

II. Social Justice Youth Development Framework
   (Ginwright & Cammarota, 2006)


COMPUGIRLS’ Practice

I. Culturally Responsive Computing:
   
a. Mentor Teachers (COMPUGIRLS’ Instructors) reflect about girls’ of color technological capacities.
   
a. Curricula build upon girls’ community, technology, and topic-matter expertise
   
b. Technology is a means to establishing and maintaining peer connections that advance community

II. Technology used to research social/community issue to ultimately advance community

III. Provide ICT models and pathways

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COMPUGIRLS!

Started in AZ Summer 2007
Summers & Afterschool
Cohort-based

Program for adolescent
(grades 8-12) girls from
under-resourced school
districts

Social Justice Technology
Program integrating CRC

Year II-NSF ITEST

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COMPUGIRLS’ OBJECTIVES

To use multimedia activities as a means of encouraging computational thinking

To enhance girls' techno-social analytical skills using culturally relevant practices

To provide girls with a dynamic, fun learning environment that nurtures the development of a proactive self-concept

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COURSES

Course I
- Introduction: Introduction to social justice, media and technology

Course II
- The Sims: Participants design a virtual world in which they determine the trajectory of their characters' lives
- Scratch: Participants learn and manipulate graphical programming language to create animation, games, music and art

Course III
- Intro to Teen Second Life: Participants create characters and begin to operate in a virtual world

Course IV
- Teen Second Life: Participants begin social justice projects to affect change in virtual world

Course V
- Capstone of Teen Second Life: Participants execute proposed projects in virtual world

Course VI

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Program of study

- Field Trips
- Intel Mentors
- Courses & Closing Ceremonies
- Peer Mentoring
- Internship
- Community Presentations
- Conference Presentations
- Programming 101

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Partnerships

COMPUGIRLS

ACBES’ Programming Camp

American Dream Academy

ASU Gaming

Intel
SITES

- Started in Summer 2007
- Mostly Hispanic and African American Girls
- Collaboration with Phoenix Union High School District, Roosevelt El., Tempe Union HS

- Started in Summer 2009
- Native American Girls: O’Odham
- Collaboration with Boys and Girls Club
- Unique collaboration with the Gila River Indian Community
PARTICIPANTS
MENTOR-TEACHERS
Both ASU Graduate Students and In Service Teachers from School Districts

Given Opportunity to Enhance their Academic and Research Knowledge and Experience

Intensive Training:
 يونиков
✧ Graduate Level Class
✧ 12-hours training per course
✧ Pairing
✧ Curriculum and Technology Coaches
CANCER MULTIPLE MYELOMA

The video in Dr Scott's presentation can be found from the following link:

http://www.youtube.com/watch?v=ne2iyzaEqJ0
## Original Project Evaluation (ASU Site)

<table>
<thead>
<tr>
<th>Goal</th>
<th>Measurement Strategy</th>
</tr>
</thead>
</table>
| COMPUGIRLS participants will experience a change in their motivation for and engagement in **academic skills** | - Possible and Plausible Selves  
- ASDQ (academic subscale)                                         |
| COMPUGIRLS participants will experience a change in their **technological skills** | - Computer Interface Literacy Measure (CILM)               |
| COMPUGIRLS participants will experience a change in their motivation for using and learning Technological skills | - ASDQ (technological subscale)                             |
| COMPUGIRLS participants will experience a change in their **self worth** | - ASDQ (Stable Personal Preferences)                        |
| COMPUGIRLS participants will experience a change in their **future self-perception** | - Possible and Plausible Selves                             |
Original Evaluation Plan

• To identify the combination of factors presented in the program design, a hierarchical regression model will be used to estimate change over time. Expected individual outcomes include increased:
  – Academic skills
  – Technological skills
  – Self-perceptions
Original Evaluation Plan

Level-1: \( Y_{ti} = \pi_{0i} + \pi_{1i} X_{ti} + e_{ti} \)  \hspace{1cm} (1)

Where:

- \( Y_{ti} \) = the outcome measure at time \( t \) for individual \( i \)
- \( \pi_{0i} \) = the growth rate for individual \( i \)
- \( \pi_{1i} \) = the ability of individual \( i \) at \( X_{ti} = 0 \)
- \( X_{ti} \) = the value of the predictor at time \( t \) for individual \( i \)
- \( e_{ti} \) = error, which is normally distributed with a mean of 0 and constant variance
Original Evaluation Plan

Level-2a: $\pi_{0i} = \beta_{00} + \beta_{01}W_i + r_{0i}$  \hspace{1cm} (2)
Level-2b: $\pi_{1i} = \beta_{10} + \beta_{11}W_i + r_{1i}$  \hspace{1cm} (3)

Where:

$W_i$ = an individual-level variable/predictor;
$\beta_{00}$ and $\beta_{10}$ = the second-level intercept terms (fixed effect);
$\beta_{01}$ and $\beta_{11}$ = the slopes relating $W_i$ to the intercept and the slope terms from the Level 1 equation (fixed effect);
$r_{0i}$ = the Level-2 residuals;

Group 1: CompuGirls
Group 2: Social Justice (only)
Group 3: Technology (only)
Group 4: No treatment
Guiding Questions

1) To what extent does the program meet its goals?

2) What specific aspects of the program create a change in attitudes, behaviors, and skills related to social justice awareness and STEM interest and aspirations?

Interviews and observations will be used to address these questions.
Current Methodology

<table>
<thead>
<tr>
<th>Dependent Measure</th>
<th>Covariate</th>
</tr>
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<tbody>
<tr>
<td>CG Summer post</td>
<td>Summer pre</td>
</tr>
<tr>
<td>Control Fall post</td>
<td>Fall pre</td>
</tr>
</tbody>
</table>

• ANCOVA
• Paired sample, t-test
## Current Methodology

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<td>Summer pre (all)</td>
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<tr>
<td>Control</td>
<td>Spring post</td>
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</table>

- Possible year-end analysis
- Continued qualitative sources

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Early Results

• Wild levels of enthusiasm
  – Students
  – Parents
  – Program staff
• Some programmatic glitches (parking, food)
• Ability to define social justice
• Strong relationships

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Early Results

![Graph showing Early Results with ASDQ_AS values]

- ASDQ_AS: 6.6565 to 6.8085
- Summer: 6.65
- Fall: 6.8085

p < .01

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Early Results

- ASDQ_TS
- Summer: 6.2212
- Fall: 6.8533
- p < .01

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Summary/Questions

- Social Justice + Technology + CRC = Increased enthusiasm and interest in STEM/CS careers
- Technology as a means to community advancement
- Formative Evaluation Results promising in some areas
- Gender Equity needs to consider other variables than gender alone

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