

Promising Practices for Engaging Girls in IT

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Overview

- Background
- Project Components
- Methodology
- Survey of informal IT education programs
- Survey of women working in IT
- Discussion



Project Background

- Funded by NCWIT and Girl Scouts of the USA
- Conducted by Evaluation & Research Associates
- Goal: Identifying effective practices in informal education for engaging girls in IT



Project Components

- Literature Review
- Database of informal IT programs
- Survey of informal IT programs
- Survey of women working in IT
- Formal report
- Guide to Promising Practices



Theory of Change

Informal education programs can influence the career choices of girls and there are specific practices that are effective when used with girls in informal education programs in grades 6 – 12.

Informal education programs that adopt these practices will be more successful in influencing girls' career choices.



Project Motivation

- Women hold less than 30% of computer and mathematical occupations (U.S. Census Bureau, 2000)
- Teenage girls are five times less likely to consider a technology-related career (Melymuka, 2001)
- 15% of high school students taking the 2005 Advanced Placement exam in Computer Science were female (The College Board, 2006)
- Women earning bachelor degrees in Computer Science dropped from 37% to 25% between 1985 and 2004. (National Science Foundation, 2006)
- Women earned 33% of the master's degrees in computer sciences in 2002 and 20% of the doctoral degrees in 2003. (National Science Foundation, 2006)



IT Pipeline

- Influences on women's career decisions
- Early formation of appropriate careers
- Perceptions of the field and nature of IT
- Feelings of self-efficacy in IT



Methodology

- Survey to informal IT education programs, 156 respondents
 - Rated practices identified in the literature
- Site visit interviews and observations of 4 IT programs
 - Practices “in-action,” stories and examples
- Survey to women working in IT-related careers, 937 respondents
 - Influences on their career path



Categories of Practices

- Staff
- Curriculum
- Learning Experience
- Career Information
- Other Practices (not categorized into the above categories)
- Additional Practices (survey respondents wrote in practices)



Limitations

- Distinguishing between promising and very promising
- Self-report of program representatives
- Self-selection: Who participated in the study
- Women working in IT: Different generation than girls today



- Any other intro slides?



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Highly Rated Practices

- Hands-on experiences (mean = 4.90)
- Opportunities to work together with other people (4.73)
- Opportunities to use technology to be creative and explore (4.67)
- Project-based learning opportunities (4.61)
- Making curriculum relevant, tying it to real-life issues (4.49)
- Experienced program director (4.49)



Hands-on Experiences

- Reaches a diverse set of learners
- Involve multiple learning modalities
- Retention of content is higher
- Fun
- Sense of accomplishment



Opportunities to Work with Others

- Collaborative not competitive
- “Informal” = social
- Learn and practice communication and team-work
- Participants can teach and learn from each other



Opportunities to be Creative and Explore

- Time to experiment
- Feel more comfortable
- Designing and personalizing their work
- Sense of accomplishment



Project-based Learning Opportunities

- Inquiry-learning strategies: creating a testable question, choosing methods to investigate that question, interpreting results and reporting on findings
- Mimics work in IT
- Instructors take a guiding role



Making Curriculum Relevant

- More easily motivated and engaged
- Flexible topics to match diversity of group
- Explicitly discuss connection between activities and real-world
- Find a real-world audience



Quality Program Director and Staff

- Leadership and experience of director
- Components, goals and long-term direction
- Relaxed learning of informal setting
- Making connections with participants
- Constructive feedback



Girls-Only Programs

More likely to indicate the importance of:

- Girls-only environment
- Female staff
- Gender neutral materials
- Mentors



Informal Program Survey Summary

- Not a lot of variation in responses
- Hands-on and project-based
- Informal learning environment
- Location
- Career information



Women in IT

- IT = new field
- Access to a computer at school
- Computer or video games
- Support from parents
- Friends interested in IT



Informal IT Education

- 40% participated, rated positively
- Impacted decision to work in IT
- Have positive attitudes toward the field and those working in IT
- Understand the nature of work in IT
- Feel competent in IT skills
- Feel comfortable in IT environments



Informal Education Experiences

- Meeting and working together with others
- Hands-on activities
- Programming, designing, or creating projects
- Real-life application or problem-solving



Elements Selected as Critical

Informal IT Education Programs		Women working in IT	
Practice	Percentage Selecting	Practice	Percentage Selecting
Hands-on experiences	64.1%	Hands-on experiences	50.6%
Project-based learning opportunities	48.9%	Relevant curriculum, tied to real-life issues	40.3%
Relevant curriculum, tied to real-life issues	48.1%	Engaging staff	39.7%
Opportunities to use technology to be creative and explore	45.8%	Project-based learning opportunities	38.7%
Girls-only environments	38.9%	Opportunities to use technology to be creative and explore	30.6%



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IT Attitudes

- 1/3 said not exposed to technology in grades 6-8
- Skills and abilities in IT
- Time to explore and experiment
- IT classes
- Encouragement from others
- Exposure to IT
- Enjoyment of related subjects



Early Interest

- 11% interested in IT in middle school
- Twice as likely to have access to a computer
- 31% participated in an informal IT program (versus 10% overall)
- 24% had mentors
- Higher levels of comfort and feelings of competence
- More positive views of those involved in IT work and a better understanding of the nature of IT



Attitudes of Respondents Participating in an IT-related Program Versus Those Not Participating

Topic	Middle School Mean		High School Mean	
	Participated in Informal IT Program	Did not participate	Participated in Informal IT Program	Did not participate
I felt competent in my IT-related skills	3.8*	3.3	4.4*	3.8
I had a positive image of those involved in IT	4.4*	4.1	4.6*	4.3
I felt comfortable in IT environments	4.0*	3.6	4.3*	3.8
I had a good understanding of the nature of work in IT	2.9*	2.5	3.7*	3.0
I believed work in IT could solve social problems	3.0*	2.7	3.4*	3.1
I believed people in IT did not have a lot of opportunity for social interaction	3.4	3.4	3.5*	3.4



Motivators and Influences

- Natural abilities in IT
- Experimenting, being successful, and becoming more confident
- Encouragement from others
- Exposure to and opportunities in IT
- Intellectual challenge of the field
- Work opportunities and earning potential
- Genuine interest in the field



Informal IT programs

- Similar findings on the factors that influence girls' career decisions
- Programs can utilize strategies to lead more females to IT careers
- Informal IT programs aim to impact girls' decisions about IT careers by increasing interest, raising awareness, and building understanding of IT and confidence



Summary

- Role of informal education experiences
- Hands-on
- Project-based and relevant
- Experimenting and designing
- Working together
- Fun
- Challenging



Questions?

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