Build IT

Girls Building Information Technology Fluency Through Design

Year 1 Report
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Melissa Koch, Principal Investigator
SRI International's Center for Technology in Learning
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CONTENTS

PARTNERS, COLLABORATORS, AND RESOURCES

Partners
SRI International's Center for Technology and Learning (SRI)
Girls Incorporated of Alameda County (Girls Inc.)
Hatchuel, Tabernik, and Associates (HTA) as the external evaluator

Collaborators & Resources
The Build IT team consulted the following resources to develop Units 1, 2 and 3:
- Techbridge (NSF-HRD 0080386)
- Imagination Place! (NSF-HRD 9714749)
- *The New Way Things Work* (Macaulay, 1998)
- The ACM's report *A Model Curriculum for K-12 Computer Science* (Tucker et al., 2003).
- CyberSmart's Communication Inventions Activity. By the CyberSmart Education Company
- Learn the Net http://www.learnthenet.com
- Intel's The Journey Inside http://www.intel.com/education/journey/
- Internet Safety National Center for Missing and Exploited Children, www.missingkids.com.
- New Games Foundation's *New Games Book*, *More New Games*, and *Best New Games*.
- *Introduction to Computing*. Bermuda Information Technology Course Track. (2000) By Stanford University Computer Science Department. Bermuda Computing Curricula Project
- Girls used GroupScribbles (NSF-ITR #0427783) and Tapped In (NSF-REC #0106926) when they visited SRI International for a field trip during Unit 3, the Build IT Summer Camp 2006.

The PI attended NSF-funded Girls 'N' Games Conference at UCLA on May 9, 2006, at the invitation of Jill Denner, PI for Girls Creating Games: Increasing Middle School Girls' Interest in Technology (HRD-0217221). Dr. Denner and the Build IT PI co-presented at a local Bay-CHI Kids event and are exploring other co-presenting opportunities since their work is complementary.

ACTIVITIES
SRI International and Girls Incorporated of Alameda County (Girls Inc.) are collaborating to create and implement Build IT, an after school and summer youth-based curriculum for low-income middle school girls (sixth, seventh, and eighth grades) to develop IT fluency, interest in mathematics, and knowledge of IT careers. Build IT, a cornerstone of the Girls Inc. middle school program, is a problem-based curriculum that capitalizes on girls' interest in design and communication technologies and incorporates performance tasks for IT fluency assessment. The curricular, professional development, and assessment materials developed during this NSF-funded 3 year project will reach 150 girls initially and be portable to 1,500 Girls Inc. program sites that reach more than 600,000 girls annually.

The Build IT team is developing a coherent portable program for girls to learn about, design, and use information technologies in IT activities that includes

- Curriculum
  - Problem-based activities that use the design process as a means for girls to learn to define problems and then test and critique solutions.
  - Scaffolds for participation in design as design partners with computer science students and as designers, identifying and solving design problems.
  - Integrated performance assessments that provide formative assessment information to the girls, youth leaders, teachers, parents/guardians, and evaluators. Many of the girls' performances will occur at Family Tech Nights, involving the community in reflecting on what the girls are learning.
  - Structured interactions with IT professionals that provide scaffolds for the professionals to share their career paths, education, and the interests they had as a middle school student, and to co-lead an activity with the youth leader.
- Professional development and supports for the youth leader staff to develop the staff capacity, as well as the organization's knowledge and resources, to run a technology program beyond the 3 years of the grant.

Build IT's programmatic goals are to:
- Encourage middle school girls to pursue IT careers.
- Motivate middle school girls to use technology and to strengthen and build their technology fluency.
- Increase middle school girls' interest in and desire to take high school algebra and geometry courses in preparation for postsecondary STEM education and/or IT careers.
- Increase Girls Inc. staff capacity, as well as the organization's knowledge and resources, to run a technology program beyond the three years of the grant.

Year 1 Goals and Achievements
The goals for the first year of the Build IT project were to develop and implement the three units of the curriculum at four school sites reaching a total of 60 girls in sixth and seventh grade in order to begin to achieve the above three programmatic goals. During the first year of funding the Build IT team has:
- Developed and implemented three units (two semesters and the summer) for a total of 123 contact hours for girls from Muir and 128 contact hours for girls from EXPLORE.
- Implemented the program at two schools, reaching 76 girls total.
- Hosted five IT professional visits to Build IT classrooms.
- Visited seven IT organizations and three women with their own businesses on field trips.
- Developed and distributed IT professional resource guides to support IT professionals and youth leaders in leading sessions focused on IT professions.
- Implemented five professional development sessions, including materials, for youth leader staff and provided ongoing professional development for the youth leaders through Girls Inc.'s curriculum planning time.
- Hosted four Family Tech Nights and a Summer Celebration.

Year 1 Measurable Impacts
In Year 1, the Build IT team piloted the first three curriculum units at two schools and the professional development for program leaders (one leader at each school with support from a program coordinator at each school and the ALL STARS program manager). While the changes in girls' interests and learning resulting from the implementation of the curriculum and the Girls

Inc. staff capacity resulting from the professional development and support are preliminary, they are encouraging. Preliminary findings from a quasi-experimental study show girls to have more realistic images of IT careers, interest in pursuing these careers, and the skills to use these tools as informed users and designers of technologies. Girls Inc. staff are also demonstrating greater IT knowledge and skills over the course of the project and are able to encourage and enhance girls' interest and engagement in a number of the Build IT activities. Areas for growth for the Build IT project include increasing girls' conceptual knowledge of IT and providing explicit information about the mathematics courses girls need to take in high school to prepare for an IT career.

FINDINGS

Major Achievements and Progress
The Build IT team has developed and implemented the following curricular resources as planned:
- Developed and implemented three units (two semesters and the summer) for a total of 123 contact hours for girls from Muir and 128 contact hours for girls from EXPLORE.
  - Unit 1 focused on the design process and design concepts that the girls will use throughout Build IT. The enduring understandings for Unit 1 include: Design is a process, composed of specific stages and elements: brainstorming, planning, gathering user data, scenario development, storyboarding, requirements and documentation, prototyping, user testing, and revising; Design is used to address users' needs; Design has to satisfy constraints; Design is iterative; and Design is a collaborative endeavor.
  - Unit 2 focused on making connections between what the user sees and does and how the Internet works. The enduring understandings for Unit 2 include: Designs have both form (how it is designed, what it looks like) and function (what it is designed to do); Engineering conventions (i.e. shared standards) create opportunities and constraints for design; The Internet is a large global network comprised of thousands of smaller networks.
  - Unit 3 focused on girls apply their design knowledge and skills to the development of their own Web pages and Web-based communication tools. The enduring understandings for Unit 3 include: Designs have both form (how it is designed, what it looks like) and function (what it is designed to do); Engineering conventions (i.e. shared standards) create opportunities and constraints for design; IT professionals work with others to solve problems – colleagues and users.; There are a variety of IT careers.
- Implemented the program at two schools: Muir Middle School in San Leandro (42 girls) and EXPLORE in Oakland (34 girls), reaching 76 girls total.
- Hosted five IT professional visits to Build IT classrooms and visited seven IT organizations and three instructional designers on field trips. The Build IT development team actively seeks IT professional women from the same backgrounds as the girls (Latina and African-American). The curriculum is explicit about the lack of women and especially women from Latina and African-American backgrounds in IT careers.
- Developed and distributed IT professional resource guides to support IT professionals and youth leaders in leading interactive sessions for middle school girls that focus on IT professions. These guides support IT professionals who may visit a Girls Inc. site or host a fieldtrip to their organization.
- Implemented five professional development sessions, including materials, for youth leader staff and provided ongoing professional development for the youth leaders through Girls Inc. curriculum planning time. ALL STARS staff (one Program Manager, two

Program Coordinators, and two Program Leaders) attended these sessions. For the program leaders, who work directly with the girls, these sessions were their first introduction to the unit. Additional curriculum meetings followed with the ALL STARS staff.

- Hosted four Family Tech Nights and a Summer Celebration. These events provided an opportunity for girls to demonstrate their IT skills and knowledge to themselves, their peers, parents, program leaders, and teachers.

Impact on Girls and Girls Inc. Staff

Together, these major achievements and our program's goals have enabled us to have the following impacts on the 76 girls who participated in Build IT and the 5 Girls Inc. staff members and organization.

Encourage middle school girls to pursue IT careers.

Summative Evaluation Findings. Girls' image of IT careers as solitary and boring are changing significantly to collaborative, fun, and intellectually stimulating. These changes in perception about careers and their own experiences using information technologies are fostering girls' interests in pursuing IT careers. The summative data shows that girls have demonstrated positive changes in IT career attitudes. Notably, they demonstrated a 10 percent increase in sentiments that IT careers would be fun, a 10 percent decline in feelings that IT careers would be boring, and a statistically significant 13 percent decline in feelings that they would not enter IT careers because they do not like computers. The comparison group did not exhibit changes of this scale. Thus, Build IT participation has had a positive effect on career interests and attitudes.

Formative Evaluation Findings. Observations and interviews in the formative evaluation data of girls' interactions with the IT professionals support the findings of the summative evaluation. For example, Maria said that although she used to want to be an author and a teacher, after going to the Tech Museum, she is not sure about that. She realized that women like those she met at the museum have really interesting jobs. Other girls at Muir expressed specific professions they were interested in pursuing and were able to articulate the kinds of responsibilities involved. Alicia said, "I would like to work in computers, like, creating software" because she would make a lot of money, and she noted that the kinds of people in this profession are intelligent. At the end of Unit 3, Gia said in her self-reflection that she wants to be a teacher or a software engineer because "I want to be involved with computers."

The girls and program leaders are taking an active role in the IT professional selection as well. For example, girls from African-American backgrounds at EXPLORE asked the program leader if they could meet more women from African-American backgrounds in IT careers. The program leader arranged a field trip to BUMP Records where the production engineers are African-American women.

The Build IT curriculum also creates an environment for the girls to work collaboratively, in the same way that engineers work with each other. In an interview, one staff member said that in Unit 2, the girls "had something in common and worked towards common goals" to develop their blogs. In particular, they worked together when they wanted the same features or items on their blogs. Staff at EXPLORE found there was more interaction between girls by choice and noted

that the girls' excitement grew as they shared their work with each other. During Unit 2, girls also openly gave and incorporated feedback on their blog designs. Giving and hearing this feedback is another important aspect of the design process, and a step the girls found difficult to accomplish in Unit 1, but doable by Unit 2. This ability to collaborate and give constructive feedback is particularly significant at EXPLORE, where girls had trouble working together in Unit 1 in general.

Motivate middle school girls to use technology and to strengthen and build their technology fluency.

Build IT aims to address the core aspects of fluency with information technology as defined by the National Research Council (NRC) (1999). It aims to teach fundamental concepts of IT, so that youth have a foundation in some of the big ideas that organize computer science as a field. It also aims to develop contemporary skills by providing practice with today's design and communication technologies. And it aims to build youth's intellectual capabilities for posing and solving problems with technology through design.

Summative Evaluation Findings. Girls are demonstrating their technology skills to themselves as well as program leaders, parents, and formative evaluators. In the summative evaluation, girls showed substantial growth in perceived IT skills as well. This growth was particularly true with respect to perceived ability to learn new programs, using the computer to communicate, using the design process to solve problems, and describing how information travels through the Internet. The growth in skills may be attributable to greater computer activity and use than the Build IT project alone. With continued and increased computer usage in Build IT, we anticipate that girls will demonstrate substantial growth in perceived IT skills over the next couple of years.

In contrast to IT skills, the summative evaluation found little growth in girls' conceptual knowledge of IT, an important factor in IT fluency. There was very little change in knowledge for either the comparison or Build IT groups. On average, respondents in both groups answered approximately half of the questions correctly. In addition, respondents demonstrated declines in design and content areas. The curriculum developers do need to find additional ways to reinforce the knowledge components of the activities for both the program leaders and the girls.

Formative Evaluation Findings. The formative evaluation and performance tasks highlight areas of the curriculum that successfully enabled girls to develop IT skills. For example, in Unit 1, girls demonstrated the ability to make changes to their designs based on input from intended users. In Unit 2, girls were able to use a blogging tool to create their own blogs. In Unit 3, girls were able to use HTML code to create their own web pages. Girls entered Build IT with technology skills that varied from having created their own blogs to having difficulty using a mouse. Girls who completed Units 1 and 2 during the school year gained basic computer use skills (using a mouse, turning on computers) to skills planning and implementing a design for their blogs and using asynchronous and synchronous communication tools. Those girls who continued with Unit 3 also gained HTML skills. The performance task for Unit 3 captured this understanding as girls were asked to look at HTML code and draw the resulting page. Half of the completed pages had one or two missing pieces of information, but overall, the look of the web page designs matched the HTML. The ALL STARS program manager commented that the girls worked quickly suggesting that they understood the task and the HTML code. Several girls in the summer program also

commented that they preferred learning HTML and creating their own web pages rather than using a blog because they had more control over the web page design and features.

The formative evaluation also highlighted budding examples of girls' conceptual understandings of IT. For example, the program manager for ALL STARS relayed a conversation with one of the girls at Muir that demonstrated the girls' level of understanding of Unit 2 concepts:

"I had a conversation at Muir [with one the girls], who does Blogger at home and at school uses think.com, telling me how she liked think.com better. [She was] able to describe how she was enjoying the two different tools and was able to articulate a comparison of the two tools."

In addition, at Family Tech Nights at EXPLORE and at Muir in Units 1 and 2 girls gave presentations to attendees on the design process and how the Internet works, demonstrating to themselves, peers, parents, and program leaders that they understood these concepts.

In Unit 3, girls demonstrated their troubleshooting skills and conceptual understanding in fixing their own HTML code, and helping each other to troubleshoot HTML errors. In addition several girls demonstrated their understanding of whether or not their web pages were accessible via the Internet by going to the chat feature and leaving messages after Summer Camp hours from computers outside of Build IT. They demonstrated that they know (1) how to access URLs that were not linked from anywhere on a website; and (2) that the sites were accessible from outside Girls Inc. without program leaders emphasizing this fact. The girls needed to write down or memorize the URL to get to their own website or the website of other girls in the Summer Camp.

Increase middle school girls' interest in and desire to take high school algebra and geometry courses in preparation for postsecondary STEM education and/or IT careers.

Summative Evaluation Findings. There is considerable room for growth in influencing girls interest in mathematics and plans for taking mathematics courses in high school. While the girls expressed more interest in taking mathematics and computer science courses (20 percent gain from pretest to posttest), they became increasingly uncertain about what math courses they needed to take. The summative evaluation suggests that the Build IT program make this course information more explicit in the curriculum.

Formative Evaluation Findings. The formative evaluation supports the conclusion as well as highlights that the mathematics activities are frequently disconnected from the rest of the curriculum. In general, program leaders and the girls struggle with the math activities in Build IT because they are not well-connected to (1) the information technology content and (2) the mathematics courses girls need to take in high school to prepare them for an IT career.

Although identifying interesting and relevant mathematics to IT has been a challenge for the Build IT team, we feel it is an important aspect of Build IT and a contribution to the field to meet this challenge. Specifically, math self-efficacy is a significant predictor of the likelihood of young women's persistence in STEM (Farmer, Wardrop et al. 1999). Proposed ways for us to address this challenge as part of our program development are addressed in the Difficulties in Achieving Goals section.

Increase Girls Inc.'s staff capacity, as well as the organization's knowledge and resources, to run a technology program beyond the 3 years of the grant.

From interviews by the *summative evaluation* team as well as interviews and observations by the *formative evaluation* team, staff have developed greater IT knowledge and skills over the course of the project, and they are able to encourage and enhance participant interest and engagement in a number of the Build IT activities.

Most notably, Girls Inc. staff are able to troubleshoot technical issues and are beginning to call on their outside technology support person. Prior to Build IT, all technology support staff took direction from Girls Inc.'s leadership working at the organizational level rather than working directly with individual programs and program staff. The contact with the outside technology support still primarily falls on the PI for Build IT, but communication is beginning to flow directly between Girls Inc. staff and the outside technology support. Even more importantly, Girls Inc. staff are troubleshooting their own technology issues, primarily network-related. During the summer program, two Girls Inc. staff members were able to solve a technical issue with the functionality of the chat feature on several of the girls' websites. They deduced the problem, tried different solutions, discussed options, and ultimately got the chat to work without assistance from the PI or technology support. It is critical that Girls Inc. staff develop these skills so that they feel confident about the technology and communicate that confidence to the girls.

Another great example of capacity building occurred during Unit 2 when the program leader at EXPLORE was able to arrange a field trip to the recording studio of BUMP Records, one of the youth programs of Youth Sounds (www.youthsound.org). The program leader, inspired by the girls' requests to see more African-American women in IT careers and their interest in music, took the initiative to locate and contact this organization. During the field trip, African-American female production engineers shared about their work, careers, and education paths.

Girls Inc. staff noted, however, that there are time and facility issues that have a negative impact on effectively implementing the full curriculum. They recommend that Build IT developers can aid capacity development and provide a more appropriate fit to the ALL STARS program by shortening some of the activities, providing more hands-on professional development before each unit, providing in-class assistance during activities, constructing projects or providing supports for adapting the curriculum so it is relevant to urban nonwhite middle school girls, and helping staff identify IT professionals with backgrounds relevant to the girls.

Because of the technology requirements, Girls Inc. staff recommend that the Build IT program recommend to future Girls Inc. sites that they consider implementing Build IT at a Girls Inc. staff site if at all possible rather than at a school site to reduce technology issues, such as school firewalls, Internet access, and specific school limitations on student web access. While we did have a couple of technology issues —getting wireless installed at both schools and finding a blog site (think.com) that met the Muir school sites's requirements—the issues were relatively minor and quickly addressed in comparison to other experiences of the PI in setting up networks and running project in schools. The PI attributes this positive response from the schools as an indicator of the strong and effective relationship that Girls Inc. has with the schools. The Girls Inc. staff also recommends having low-tech options in the curriculum to help sites that have limited computer access for the girls.

Processes Used in Materials Development

The SRI team and the Girls Inc. leadership (ALL STARS program manager and two program coordinators) collaborate to develop the curriculum. Using an *Understanding by Design* (Wiggins & McTighe, 1998) approach, the SRI team develops the enduring understandings, evidence of learning, and ideas for the activities, including the mathematics-related activities, performance tasks, and existing activities from sources noted. The PI and co-PI from Girls Inc. (ALL STARS program manager) discuss these initial ideas and begin to define the activities. The co-PI drafts the schedule, while the SRI team completes a draft of the unit.

The draft of the unit is reviewed by the Girls Inc. leadership. Feedback is given to the SRI team and changes are agreed to in a design meeting. Changes are incorporated into the curriculum documentation by SRI and, in some cases, Girls Inc. leadership. Advisors are consulted individually by e-mail to review the curriculum as well. The PI leads the professional development at which the Girls Inc. team (program manager, program coordinators, and program leaders) engage with the curriculum as learners (the girls). This process highlights additional changes to be made which SRI and Girls Inc. implement.

The formative evaluation team uses observations of the implementation and interviews with staff and the girls to provide feedback to the curriculum developers in a formative evaluation report for each unit. Details on the formative evaluation process are in the Evaluation Activities section.

The curriculum developers will meet in early August 2006 to review and make necessary changes to the existing three units as a series, and to plan for the next three units. Anticipated changes, based on the formative and summative evaluations, include:

- Shorten the current content of Unit 1 and lengthen the technology content of Unit 2. The Build IT team believed that the girls and the program leaders needed to ease into the technology, beginning with a full semester of design. The communication technologies can start earlier in Unit 1.
- Integrate the design process more fully throughout the curriculum.
- Allow more time for girls to reflect and play.
- Allow more choices and opportunities for girls to express themselves in the activities. Blog and website creation are good examples of opportunities for girls to express themselves within the context of an activity.
- Develop fewer, more focused Enduring Understandings.
- Design the performance tasks to better reflect the Girls Inc. culture by connecting with how staff evaluate girls (see the "For program staff" section below).
- Make the IT conceptual activities more connected to the design and development activities.
- Make the mathematics activities more connected to the IT content, and specifically address mathematics course taking.

For program staff:

- Spend more time teaching the design process to program leaders.
- Translate the goals of Build IT for program leaders so that they understand the expected outcomes of the program and why these goals are important.

- Explain the *Understanding by Design* curriculum development process and show what enduring understandings and associated activities are key to the curriculum.
- Connect with staff on how they determine a girl's strengths and challenges in order to meet her needs.

Recruitment and Retention of Girls

The recruiting for the Build IT project benefits from the well-established relationships that Girls Inc. has with the schools and community, and their experience working with parents and girls from these communities. Two of the schools, ASCEND and Muir combined have worked with Girls Inc. for more than 25 years, with regular communication among teachers, administrators, and program staff. Teachers and administrators from these schools have recommended that the girls attend the Girls Inc. middle school program called ALL STARS, parents may encourage their daughters to attend, or the girls themselves have asked to participate after previous involvement with Girls Inc. Build IT is part of the ALL STARS program.

In Year 1, to pilot the first three units of the Build IT project two schools, the Muir and EXPLORE sites, included Build IT in their ALL STARS program. Girls Inc. implemented Build IT for 76 girls, 42 at Muir and 34 at EXPLORE. Girls Inc. chose to offer Build IT at these two schools because service numbers there matched the overall target number of girls Build IT proposed to serve during Year 1 (a total of 60 unduplicated girls, averaging 30 girls per site). In addition, both of these schools are able to support the necessary infrastructure for Unit 2 of Build IT, including safe and secure storage of laptops and a room designated for wireless Internet service.

As Year 2 of Build IT commences in September 2006, Girls Inc. will add ASCEND, the third school housing Girls Inc. ALL STARS, to the sites offering Build IT. In addition, Girls Inc. collaboration with ASCEND's after-school provider has resulted in the addition of a fourth ALL STARS, therefore Build IT site, in fall 2006. This fourth site, Urban Promise Academy, is housed near ASCEND in an underserved, low-income community in Oakland, California.

Retention in the ALL STARS program and subsequently the Build IT project during the 2005-06 school year was 65 percent at Muir and 59 percent at EXPLORE. These numbers are consistent with the retention rates shown by ALL STARS during its pilot school year (2004-05). While retention rates are higher for Girls Inc. programs serving younger girls, these numbers are consistent with, though slightly higher than, other Girls Inc. programs serving middle-school-aged girls. The majority of girls who exited ALL STARS stated the need for more time after school to complete homework as the primary reason they could no longer attend programming. The remainder stated a variety of other reasons for exiting the program including joining a spring sports team, moving to another town or school, and family's inability to provide transportation during after school hours.

The retention rate during Unit 3 (Build IT Summer Camp) was 100 percent. Overall, Girls Inc. notes girls participating in site-based summer programming tend to show greater retention and attendance rates than those girls participating in school-based, after-school programming. Likely reasons for this include a lack of alternative activities to participate in and fewer commitments during summer vacation, including homework; enrollment in summer programming requires more initiative and effort, as participants must submit an application and access daily

transportation to the Girls Inc. site, which results in a greater sense of accountability and investment; and more parent/guardian buy-in, due to need for summer day care and activities for girls while the parent/guardian attends work.

Evaluation Activities

Formative evaluation
SRI's Deb Kim (co-PI) and Torie Gorges lead the formative evaluation for Build IT. The purpose of the formative evaluation is to (1) identify the challenges and successes the group leaders experienced in implementing the curriculum. This work focuses on the research question, "Which of the intended task situations in the curriculum do staff find easy or challenging to enact, and how do they adapt them to changing program conditions?" (2) investigate how girls are participating in Build IT and the kinds of practices they are developing through their participation, working to answer the questions, "Which of the intended roles as designers are the girls able to take up, and at what point during the curriculum experience are they able to take them up?" "How do girls in the program perceive the relationship between their participation in Build IT and other Girls Inc. activities, and between Build IT and school?" and "What evidence is there that girls are thinking about and revising their thinking about computer science subject matter, as well as planning and revising plans for course taking?"

The formative evaluators conducted structured observations at the Build IT program sites (Muir and EXPLORE during the school year, and Girls Inc. during the summer), pre- and post interviews with key stakeholders (i.e., program manager, program coordinators, and group leaders), weekly group leader feedback forms, self-reflection surveys completed by the girls, interviews with girls, and review of the curriculum and artifacts produced by the girls and group leaders. The formative evaluators prepared a report of their findings for each of the three units. These three reports are in the Addenda.

Summative evaluation
Hatchuel Tabernik and Associates (HTA) lead the summative evaluation. The purpose of the Build IT summative evaluation is to examine the effect of the intervention on girls' technology-related development and explore the outcomes of the program for staff and sites. HTA, in collaboration with SRI International, developed a pair of surveys: the *IT Attitudes Survey* and the *Fundamental IT Concepts Survey*. The *IT Attitudes Survey* covered the topics of academic plans, interest in and attitudes regarding IT careers, and the perceived skills of respondents. The *Fundamental IT Concepts Survey* asked respondents to read a series of brief vignettes regarding issues and problems that arise in the design process or everyday technology usage and choose the correct response from a multiple choice selection.

HTA administered these surveys as pretest in the fall of 2005 (or when the girls entered the Build IT program) and as posttests in the spring of 2006 and at the end of the summer camp 2006. The girls in the summer camp had received the pre-test during the school year. HTA also analyzed the data and prepared the Build IT Summative Report (see Addenda).

Support from Sources Other than NSF
The funds for field trip transportation, the 16 laptops, and their technology support were provided by The PSB Fund.

An important component of the Build IT project is the connection to IT professionals. Networks of IT professional women have been important for identifying and recruiting these IT professionals, a factor we intend to develop further in year 2 with an eye towards sustainability and scalability of this component of Build IT. The IT professionals who participated this year in Build IT include:

IDEO
- Emily Ma, Mechanical Engineer
- Kara Krumpe, Product Designer

SFMOMA
- Dana Mitroff, Head of Online Services
- Tana Johnson, Producer and Instructional Designer for Interactive Educational Technologies

The Tech Museum
- Christina O'Guinn, Museum Programs Developer
- Melissa Koch, SRI International, Senior Educational Developer

Children's Discovery Museum
Tina Cosby, Exhibit Developer/Designer

Stanford University
Jen Burney, Astrophysics Ph.D. candidate at Stanford and Ultimate Frisbee Player

BUMP Records, a youth program at Bay Area Video Coalition (BAVC)
- Femi Andredes, Production Engineer
- Felice Smith, Production Engineer

Interaction Designers
- Janette Cullinan, Director of Instructional Design at Ninth House
- Debbie Stephen-Stauffer, Co-owner/Inventor of Double U Products Inc. of the product DaysAgo digital day counter (http://www.howmanydaysago.com)
- Nikki Reynolds, Director of Design at Fresh Perspectives, a company currently translating a face-to-face parenting curriculum into an interactive CD-ROM

SRI International's Center for Technology in Learning
- Patti Schank, Cognitive Scientist and Software Engineer
- Zaz Harris, Software Engineer
- Krista Davis, Software Engineer

Google
- Stephanie Williams, Operations Manager
- Ellen Spertus, Software Engineer
- Katie Stanton, Product Management
- Robin Jeffries, User Interface

- Jessica Gray, iGoogle Designer
- Sophia Brueckner, iGoogle Designer
- Additional Google IT professionals served as Lunch Buddies and Tour Guides. These professionals included Maricia Scott, Sarah Moussa, Michelle Levesque, Kim Ngo, Natasha Wyatt, Ellen Spertus, Julie Chin, Clara Lee, and Natasha Mohanty.

Project Schedule and Status

The Build IT project is on schedule for achieving more than 120 contact hours per year through its after-school and summer-based curricula, serving more than 60 girls in its first year, and providing capacity-building professional development to Girls Inc. staff.

We did change our development approach for logistical reasons: we started with a smaller number of schools (two rather than four) and piloted the first three of six units with the two schools. Originally, we were going to work with all four schools and pilot the curriculum quickly with a subset of girls before implementing it, allowing us to develop all six units in the first year. Given the need for the curriculum in ALL STARS by the first week of October and an official start to the project on September 1, we designed a different approach. We will complete the piloting of the last three units in Year 2 of the project. This approach allows us to meet our goals and have time to effectively refine the curriculum.

Project Challenges

Graduate students

We did encounter difficulties in recruiting graduate students from Stanford University to work with the girls as design partners. We also attempted to recruit from other local institutions such as UC Berkeley and Mills College. While we had interest from several students, other projects, travel and time commitments proved to be barriers. We did have some interest from graduates who are currently work-at-home mothers and from graduate students interested in working on technology projects at SRI. We will explore these possible sources but with an eye toward sustainability. If it is not feasible for graduate students to be involved in the Build IT project, we do not want to force the issue during the funding period only to find that it is not a sustainable component of the project.

Mathematics component

The summative evaluation shows that girls are not making progress towards knowing which mathematics courses they will take. The summative evaluation suggests that the Build IT program make this information more explicit in the curriculum. The formative evaluation supports this conclusion as well as by highlighting that the mathematics activities are frequently disconnected from the rest of the curriculum. While each of the activities has had various levels of engagement for the program leaders and the girls, they are not well-connected to the information technology content and the mathematics courses girls need to take in high school to prepare them for an IT career. Solutions include (1) providing staff with a better understanding of course taking requirements for middle school and high school at all of the schools involved in the Build IT program so we can make connections to what courses are available to the girls in school; (2) talking with girls directly about the courses to take in conjunction with the mathematics activities; (3) asking students to link mathematics activities in the curriculum to school-based experiences in mathematics; (4) encouraging IT professionals to share their own struggles and

successes with math, as well as the math courses they took to prepare for their career and examples of how they use this math knowledge in their jobs; (5) offering math activities that vary in difficulty, so girls with advanced math skills stay engaged and challenged and girls with lower math skills feel successful rather than frustrated; and (6) providing program leaders with a better understanding of how these math concepts are used in IT careers, as well as in what future math courses these math concepts will appear, so girls can recognize they will use and benefit from this knowledge in the future.

Conceptual knowledge of IT

In developing the curriculum, the Build IT team started with enduring understandings in computer science (design, computers, systems and networks, collaboration and leadership) and mathematics. Enduring understandings is a term from *Understanding by Design* that refers to the "big ideas" of a discipline that experts know and that are the foundation for building knowledge in the discipline. The enduring understandings or "big ideas" in Build IT draw from the following standards documents: Being Fluent with Information Technology (NRC), the National Council of Teachers of Mathematics (NCTM) standards, and the Secretary's Commission on Necessary Skills (SCANS).

Following the *Understanding by Design* approach, these enduring understandings were then connected to evidence of learning these concepts and curriculum activities. During the implementation, the formative evaluation highlighted that Girls Inc. staff often understood the IT skills knowledge but often had difficulties with or ignored the IT conceptual knowledge. For the most part, Girls Inc. staff did not see connections between the skills knowledge and conceptual knowledge. In addition, Girls Inc. staff expressed a desire to better understand the *Understanding by Design* process, the importance of the enduring understandings and their relationship to the activities, and the connection of these enduring understandings to the goals of the Build IT project. The professional development needs to do a better job of providing activities that make the importance of the enduring understandings clear to the Girls Inc. staff. The curriculum also needs to highlight the enduring understandings and related essential questions that allow girls and Girls Inc. staff to identify the IT concepts that are important to know and why, and to reflect on their understanding of these IT concepts. Girls Inc. staff need time to reflect on these understandings in their own learning as well since this experience is often the staff's first encounter with these IT concepts.

Training and Development

For staff

The SRI team provided professional development for each unit to the Girls Inc. team a few weeks prior to implementation. Build IT program leaders and program coordinators then met during weekly curriculum development meetings to prepare the activities throughout the school year. For the two-week summer camp, the Girls Inc. team met a couple of times prior to the two-week session to prepare.

In the professional development, the SRI team used the curriculum to teach the concepts and run through the activities with the Girls Inc. team. The sessions included discussions and hands-on activities with leaders as youth. During the school year, the professional development is split into two sessions. The Build IT team learned from conducting the professional development for Unit

1 over two consecutive afternoons, that it is better to split the curriculum in half and do the first professional development session prior to implementation and the second professional development session prior to the implementation of the second half of the curriculum.

As part of the capacity building goal for Girls Inc., the transition for Girls Inc. staff leading the professional development will begin fall 2006 with Units 1, 2, and 3. While new program leaders will be implementing Build IT in the 2006-2007 school year, the ALL STARS program manager and program coordinator already have experienced Units 1, 2, and 3. The SRI team will assist with this PD and the PD for new Units 4, 5, and 6.

For youth
During the school year, girls at Muir and EXPLORE had Build IT twice a week for a total of 2.5 hours each week. During the summer, girls from both schools attended Build IT Summer Camp 2006 for two weeks for 4 hours Mondays, Wednesdays, and Fridays, and 6 hours on Tuesdays and Thursdays for field trips.

Unit 1 (October 2005 through February 2006)
Unit 1 focused on the design process and design concepts that the girls will use throughout Build IT.

Week 1 introduces girls to the fact that design is all around them, that they can and do design, and that they can influence the world around them through design.

Week 2 gives girls the chance to explore the design of familiar objects and to learn one of the first two steps in the design process: defining the problem and brainstorming. IDEO visits.

Week 3 provides girls with opportunity to explore simple machines and to storyboard the process that they see and one they design.

Week 4 begins a six part activity extending through Week 6. The goal of this activity series is to have girls research the history and design of flying toys such as Frisbees, Aerobies, and Boomerangs in order to propose and then construct the best design. Astrophysics Ph.D. candidate at Stanford and Ultimate Frisbee Player

Week 5 introduces girls to strategies for comparing features and learning about technology tools that professionals use. Girls use mathematics to compare the flight patterns of different flying toys. Mathematics is used in several Build IT activities as a tool to aid in design.

Week 6 provides girls with the opportunity to develop designs for their flying toy that another team then builds.

Week 7 fosters girls' research skills of investigating the needs of different users, including 'end users'. Children's Discovery Museum visits.

Week 8 is a performance task in which girls demonstrate that they understand that the goal of design is to satisfy client needs.

In Week 9, girls learn how to synthesize and address many users' needs. They learn the importance of iteration.

In Week 10, girls design something that their local community needs. Girls have the opportunity to see the permanence of their designs.

In Week 11, girls incorporate user feedback that they received in Week 10 into their designs, then build and test the place or object they have created for their community.

In Week 12, girls learn how to present their designs in PowerPoint and begin the performance task that addresses several of the enduring understandings.

In Week 13, girls complete the performance task and prepare for Family Tech Night.

Unit 2 (March 2006 through June 2006)
Unit 2 focused on making connections between what the user sees and does using Internet-based communication tools and how the Internet works. During this unit, the Build IT team decides to try field trips rather than visits from IT professionals to (1) show girls where IT professionals work, (2) make IT professional encounters more significant events for the girls and IT professionals, and (3) make it easier for the IT professionals to participate in Build IT. Girls visit IT professionals at SFMOMA, The Tech Museum, and BUMP Records.

Week 1 introduces girls to the Internet and the Web as communication tools. Girls investigate the design of Web pages in order to understand why designers made the decisions they did.

In Week 2, girls experience what aspects of the Internet are designed technologies. The girls share what they know about the Internet and participate in activities to help them conceptualize how the Internet works.

In Week 3, Internet safety is discussed and email accounts are set up for the girls that they'll use as part of their blogging activities.

In Week 4, girls compare and evaluate Internet-based communication tools. In the process girls, learn about two distinct forms of communication (synchronous and asynchronous) and specific communication tools and features (e.g. IM, Chat, Discussion Boards).

In Week 5, girls begin creating their blogs, comparing and evaluating this medium to other communication tools they have used in Week 4.

In Week 6, girls continue working on their blogs and focus on connecting and communicating with others in Build IT through their blogs. Girls practice their algorithmic thinking in a math activity that involves thinking through how best to use several blogs to reach the largest number of people possible.

In Week 7, girls learn different methods for encouraging others to post to their blogs.

In Week 8, girls complete a performance task where they demonstrate their understanding of how

a network functions.

In Week 9, girls prepare for and host Family Tech Night.

Unit 3 (July 10, 2006 through July 21, 2006)
Unit 3 focused on girls apply their design knowledge and skills to the development of their own Web pages and Web-based communication tools.

Day 1 introduces girls to the summer camp and the design requirements for the websites they'll created. Girls choose a theme and begin to plan their websites based on the design requirements.

Day 2 is a fieldtrip to Stanford University where girls meet three Interface/Interaction Designers: Janette Cullinan, Nikki Reynolds, and Debbie Stephens Stauffer.

Day 3 introduces girls to HTML coding. Girls learn to set up their website using a folder and file structure, and implement basic tags to create a web page and include title, spacing, and formatting codes.

Day 4 continues girls' learning of HTML. Girls learn how to add internal and external hyperlinks, images, and image links to their websites.

Day 5 is a day for girls to work on their websites and help each other learn HTML codes.

Day 6 continues girls learning of HTML. Girls learn how to add color to the text, background, and image borders of their websites. The mathematics activity provides girls with an opportunity to reason through possible web page combinations if 16 colors are available for the text, background, and image borders.

Day 7 is a fieldtrip to Google with presentations and activities by Ellen Spertus, Software Engineer; Katie Stanton, Product Management; Robin Jeffries, User Interface; Jessica Gray, iGoogle Designer; Sophia Brueckner, iGoogle Designer. Additional Google IT Professionals served as Lunch Buddies and Tour Guides. These professionals included: Maricia Scott, Sarah Moussa, Michelle Levesque, Kim Ngo, Natasha Wyatt, Ellen Spertus, Julie Chin, Clara Lee, and Natasha Mohanty

Day 8 is a performance task that checks girls understanding of HTML and provides time for girls to add the chat feature to their pages.

Day 9 is a fieldtrip to SRI International, with a focus on using the Tuples Groupspace and Tapped In. Patti Schank, Zaz Harris, and Krista Davis share their careers.

Day 10 is the Web Publishing Celebration where girls present their websites to each other, parents, and Girls Inc. staff.

Outreach Activities
The Build IT team focused this first year on the development of the Build IT curriculum; outreach activities primarily took the form of recruiting IT professionals from industry (For a list of IT professionals, see the "Additional support from sources other than NSF" section).

The Build IT team also completed the following outreach activities include:
- Submission of poster session for AERA 2007 in collaboration with ITEST's LRC and grantee colleagues
- Inclusion in the peer-reviewed *Consumer Guide to Afterschool Science Resources* at http://www.sedl.org/afterschool/guide/science/index.html
- Participation in a panel on *Developing Girls' Technology Fluency* organized by the BayCHI Kids organization (http://www.baychi.org/bof/kids/). The following is the panel announcement sent to the BayCHI community:

DEVELOPING GIRLS' TECHNOLOGY FLUENCY
Wednesday, April 19, 2006. 7 p.m.
SRI International, 333 Ravenswood Avenue, Menlo Park

PANEL OVERVIEW
Experts believe students need to become fluent with information technology to gain a deep understanding of the fundamental concepts behind how technologies work and to acquire an ability to use technology tools to solve practical problems in different disciplines (National Research Council, 1999). However, little is known about how to identify and measure technological fluency. Further, girls express little interest in becoming technologically fluent or in pursuing IT careers (AAUW, 2000). Our panelists will describe how after-school programs and settings can provide innovative and motivating learning opportunities for girls to achieve technological fluency and to develop interest in IT careers. The panelists will relate research on girls' access to computers and the Internet, and then share specific research on three community-based programs. Panelists will then dialogue with the audience about how to support and assess technological fluency across learning contexts.

PANELISTS
Rebecca London, University of California, Santa Cruz
Jill Denner, ETR Associates
Deborah Kim Emery, Center for Technology in Learning at SRI International
Melissa Koch, Center for Technology in Learning at SRI International

PANELISTS' RESEARCH IN BRIEF
Rebecca London, University of California, Santa Cruz: *A Longitudinal Study of Girls' Access to Computers and the Internet*
Although adolescent girls have begun to close the gender gap in science and math coursework, they continue to lag behind boys in technology-related coursework, particularly at the advanced level. Access to computers and the Internet at home affects school attendance, high school graduation, and other educational outcomes. This study will describe the findings from a longitudinal study of how home computer and Internet access for girls ages 5-17 has changed. The data will be used to describe changes over time in girls' home computer and Internet access, where they use the Internet (e.g., school and the library), and the family and personal

characteristics that affect the probability of home computer and Internet access. This study will also describe variations across subgroups of the population, including differences by race/ethnicity, age group, family type, metropolitan status, and region of residence. Finally, the data will be used to offer comparisons between girls and boys in their access to computers and the Internet at home, and their use of the Internet at other locations.

Jill Denner, ETR Associates: *Girls Creating Games: The Development of Information Technology Fluency*
Girls Creating Games is an after-school and summer program which utilizes a constructivist approach to put girls in the role of producers (not just users) of technology. Girls learn to design and program an interactive "choose your own adventure" game. In addition to game design, program activities encourage identity formation, link technology with real-world applications, support collaboration, and connect girls with technical female role models. This program has led to significant gains in some aspects of IT fluency for participating girls. In our study, we describe the process through which participants develop IT fluency. We collected data to determine how producing technology in programming pairs affects girls' fluency, interest, active participation, and persistence in technology studies. We will report on the girls' fluency with regard to problem solving, creativity, and conceptual understanding.

Deborah Kim Emery, Center for Technology in Learning at SRI International : *Learning Opportunities for Adolescent Girls in a Community Technology Center*
Community technology centers (CTCs) are contexts in which youth find safe havens and opportunities to engage in authentic learning opportunities with peers and adults, as well as new technologies. Teen TechArts is an after-school, community-based program intended to foster belonging and a sense of safety by providing opportunities for girls to interact with one another and a clear program structure. Using a sociocultural lens and ethnographic methods, this research examines how girls' participation in activities and use of technology tools within activities transformed over time. Three profiles of participant trajectories revealed that negotiation of new roles was an individual process and followed a nonlinear pattern, and that the opportunities provided by Teen TechArts were such that participants did negotiate increased ownership of the program and take on greater responsibilities over time, but participants also went back and forth between roles as "participants" using technology and "instructors" helping younger youth learn how to use it.

Melissa Koch, Center for Technology in Learning at SRI International: *Build IT: Supporting Girls in Building Their Information Technology Fluency Through Design*
Build IT is a design- and problem-based curriculum that capitalizes on girls' interest in design and communication technologies. In this after-school program for low-income middle school students, girls develop IT fluency, interest in math and taking math courses, and knowledge of IT careers. Girls learn from IT professionals about IT careers and participate as design partners in the software engineering process. By introducing girls to women professionals in IT, the project directly challenges girls' stereotypes about the types of careers available in IT as well as the characteristics and lives of people in IT careers. The Build IT program includes embedded performance tasks that support girls in demonstrating their understanding of and skills in using and programming information technology to themselves, youth leaders, teachers, and parents/guardians.

Publications and Products

The Build IT website is at http://ctl.sri.com/projects/displayProject.jsp?Nick=buildit and includes a press release issued jointly by SRI International and Girls Inc. The Build IT materials have not been made public to date since they are still in development. The Girls Inc. website highlights the ALL STARS program (http://www.girlsinc-alameda.org/programs/programsByName.htm) of which Build IT is a part and the Consumer's Guide to Afterschool Science Resources by the Southwest Educational Development Lab (http://www.sedl.org/afterschool/guide/science/index.html) features Build IT.

Awards and Innovations

Selected to appear in the peer-reviewed Consumer's Guide to Afterschool Science Resources. The developers of the Consumer's Guide to Afterschool Science Resources from the Lawrence Hall of Science and the Southwest Educational Development Lab contacted the PI in November 2005 about submitting materials to be reviewed for possible inclusion in the Consumer's Guide. The PI sent the completed draft of Unit 1 and an outline with sample activities for Unit 2 for review. The description of Build IT and the reviews are available at http://www.sedl.org/cgi-bin/mysql/afterschool/science.cgi?location=search&show_resource_id=45

Developed graphical design process reference. After reviewing design resources for youth as well as materials for adults for a simple representation of the design process, the SRI team created a graphic of the design process that is used in the Build IT curriculum and was made available to the ITEST community. The image can be made into a poster. See Addenda for the graphic.

Developed simple chat feature that girls included on their websites. In Unit 3, we enabled girls to create their own context for online communication (their websites) and add a tool to their site (chat feature) to communicate with other girls who participated in the Build IT Summer Camp 2006. The chat feature and directions for enabling it were created by SRI software engineer, Zaz Harris, in PHP which comes with Linux, an open-source operating system, and can be easily added to a server at no cost if it is not already installed. The girls added the PHP code to their websites to make the chat feature work. This simple feature will be bundled with the Build IT curriculum. Instructions and the working chat feature are available at http://butterfly.ctl.sri.com/buildit/async_chat/creating_client.html

ADDENDA

Advisory Board

The advisory board for the project includes
- William Penuel, Senior Education Researcher at SRI, an expert in assessment, evaluation, and after-school learning
- Judy Brown, Vice President of Programs at Miami Museum of Science and Director of the NSF-funded GREAT! Curriculum
- Pat Loomes, Executive Director of Girls Incorporated of Alameda County
- Jan Stanton, Director of Girls Inc.'s National Programs
- Allen Tucker, Professor of Computer Science at Bowdoin College and Editor of the ACM's *A Model Curriculum for K-12 Computer Science*
- Allison Druin, Assistant Professor of Computer Studies at the University of Maryland Charles Patton, Senior Researcher at SRI, mathematician and technologist, expert in mobile networking
- Linda Kekelis, Techbridge Director
- Lynn Johnson, Youth Development Specialist at the Community Network for Youth Development.

The advisory board was first e-mailed an outline of the planned curriculum for the first year for comment. Specific e-mails were then sent to Judy Brown, Allen Tucker, Allison Druin, Charles Patton, Lynn Johnson, and Linda Kekelis with questions pertinent to their areas of expertise. Most of their suggestions were incorporated into the curriculum with the exception of suggestions that were not aligned with the ALL STAR context. For example, Lynn Johnson suggested that every Build IT activity needed to begin with an ice breaker for the girls. The larger ALL STARS program had the ice breakers for the day; a separate one was not necessary for Build IT specifically.

In addition, William Penuel has advised on the development of the performance tasks for each unit and the evaluation efforts for the project.

We anticipate kicking off the second year of Build IT in a similar way with the advisors by sharing what we have accomplished, presenting our plans for the next three units, and asking for specific suggestions based on their expertise. Charles Patton will play a larger role in the project this year as we include mobile networking and work on mathematics in Build IT. Pat Loomes and Jan Stanton will also provide guidance on the sustainability of Build IT and scalability across different Girls Inc. sites.

Summative and Formative Evaluation Reports

The following evaluation reports are included as separate pdf documents with this annual report:
- Build IT Summative Report, Year 1
- Formative Evaluations of Units 1, 2, and 3, Year 1

Awards and Major News Items

SRI and Girls Inc. issued a joint press release on October 27, 2005, available at

Several publications printed the release, including:

- Tri-Valley Herald
- The Oakland Tribune
- The Daily Review
- Palo Alto Daily News
- Education Week
- TMCnet.com
- T.H.E. Journal in *T.H.E Newsletter*

Build IT Program to Strengthen Technology Fluency in Middle School Girls

Menlo Park and San Leandro, California – October 27, 2005 – SRI International and Girls Incorporated of Alameda County (Girls Inc.), today announced an $875,195 three-year grant from the National Science Foundation's Information Technology Experiences for Students and Teachers (ITEST) program (http://www.nsf.gov/). The Build IT grant supports Information Technology (IT) fluency and knowledge of IT careers through problem-based design curricula in after-school and summer programs for middle school girls in typically under-served communities. Additionally, program participants will collaborate as design partners with IT professionals and graduate students in the software engineering process.

The SRI and Girls Inc. collaboration draws on the combined strengths of both organizations in youth development, gender equity, technology fluency, technology design, and evaluation research. The Build IT curriculum will capitalize on middle school age girls' interest in design and communication technologies to motivate them to use technology, build their technology fluency, and foster their interest in pursuing IT careers.

"We are excited to work collaboratively with SRI designers and engineers to significantly expand the depth of IT experiences that we are able to offer Girls Inc. participants," says Pat Loomes, executive director, Girls Inc. "While our expertise focuses on girls' needs with the intent of making a difference in girls' lives, working with SRI will stimulate a new level of technological innovation and creativity that allows girls to confront and counteract the societal messages about their value and potential."

"Developing and implementing Build IT with Girls Inc. gives us the opportunity to inspire middle school girls not only to use information technology, but to learn that they can design information technologies that solve human problems," says Melissa Koch, SRI Build IT principal investigator and director. "Working with a youth development organization that strives to improve girls' learning will draw on SRI's expertise in assessment and evaluation. Together, we will develop youth development-friendly instruments and practices to identify girls' technology fluency."

During the three-year grant period , Build IT will be offered at Girls Inc. middle school programs in Alameda County and will reach more than 150 girls. Beyond the grant period, Build IT will be disseminated through the national Girls Inc. network, which reaches more than 600,000 girls annually through 1,500 program sites. More information about Build IT is available at http://www.ctl.sri.com/projects/displayProject.jsp?Nick=buildit

About ITEST
ITEST is a program within the Division of Elementary, Secondary, and Informal Education (ESIE), a branch of the National Science Foundation's (NSF) Directorate for Education and Human Resources. ITEST is designed to increase the opportunities for students and teachers to learn about, experience, and use information technologies within the context of science, technology, engineering, and mathematics (STEM), including Information Technology (IT) courses. It is in direct response to the concern about shortages of information technology workers in the United States. Supported projects are intended to provide opportunities for both school-age children and for teachers to build the skills and knowledge needed to advance their study, and to function and contribute in a technologically rich society. ITEST is comprised of youth-based projects with strong emphases on career and educational paths and comprehensive projects for students and teachers.

About Girls Inc.
Girls Incorporated of Alameda County is a local affiliate of the national Girls Inc. a nonprofit organization dedicated to inspiring all girls to be strong, smart and bold . Currently serving over 7,000 girls annually, Girls Inc. of Alameda County offers year round academic, enrichment and skill building programs, as well as counseling services to youth, and their families, from low-income communities. Girls Inc. challenges girls to explore their potential, attend college, build careers, and expand their sense of what is possible.
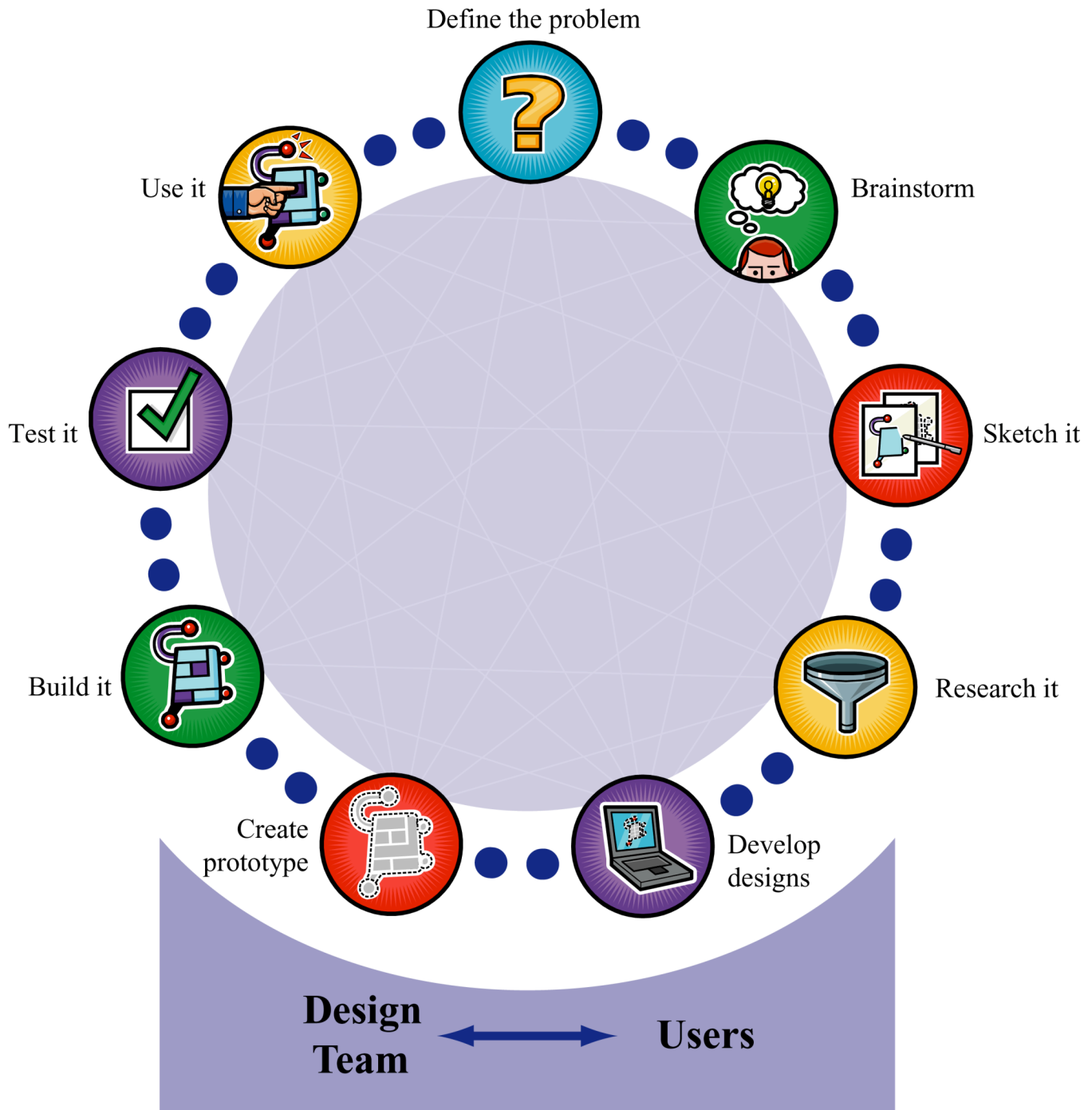
About SRI International
SRI's Center for Technology in Learning (CTL), which will lead the Build IT program, focuses on significant issues in learning and teaching, and on the use of innovative technologies to address those issues. To maximize its impact, CTL (http://ctl.sri.com) works in cooperation with education organizations, school systems, and technology companies.

SRI, located in Silicon Valley, is one of the world's leading independent research and technology development organizations. Founded as Stanford Research Institute in 1946, SRI has been meeting the strategic needs of clients for more than 55 years. The nonprofit research institute performs contract research and development for government agencies, commercial businesses, and private foundations. In addition to conducting contract R&D, SRI licenses its technologies, forms strategic partnerships, and creates spin-off companies.

Innovation: Design Process Graphic

The Design Process

Define the problem

Use it

Brainstorm

Test it

Sketch it

Build it

Research it

Create prototype

Develop designs

Design Team ⟷ **Users**

Build IT Curricular and Professional Development Resources

The following Build IT curricular and professional development resources are available to NSF through this password protected site at https://www.sri.com:1800/display/builditinfo/Home Others interested in these materials, please contact the principal investigator.

Build IT

Curriculum Documents
The Build IT curriculum is still in development. Activities and some artifacts from units that have been implemented are located here.

Units 1 and 2 were updated June 27, 2006. Unit 3 was updated July 31, 2006.

*   Unit 1
*   Unit 2
*   Unit 3

Working with IT Professionals

The following documents are guides and examples provided by the Build IT team to IT professionals who share their careers, interests, and education experiences with the girls.

*   ITPacketFieldtripfin.doc
*   ITPacketVisitfin.doc
*   MelsITProfessionalpres.ppt
*   ITProfPresentationExample.pdf
*   IDEO IT Professional Brainstorming Session.pdf

Professional Development for Girls Inc.

The following documents capture the process and activities of the professional development provided to Girls Inc. staff.

*   PD_Unit1.doc
*   PD_Unit_2_Part1.doc
*   PD_Unit2_Part2.doc
*   PD_for_Unit3.doc
*   URLs_PD_Build_IT_Unit3.doc

Evaluation Documents

The following documents are the formative evaluation reports for each unit and the summative evaluation report and surveys for Year 1.

*   [FormativeEvalUnit1.pdf](#)
*   [FormativeEvalUnit2.pdf](#)
*   [FormativeEvalUnit3.pdf](#)
*   [Summative_BuildIT_FnlRptY1.pdf](#)
*   [Build IT Concepts Survey.pdf](#)
*   [Build IT Attitudes Survey.pdf](#)

Presentations

The following are presentations by the Build IT team.

*   [buildit_poster_fin.pdf](#)
*   [BuildITBayCHIEvent.ppt](#)

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