Teaching Design to Youth: An Introduction to the Design Process

Design is a powerful entry points for preparing young people for and attracting them to careers in the IT field [2]. Teaching youth the design process and helping them recognize the strengths and weaknesses of designed objects in their everyday world engages their imagination, creativity, and problem-solving skills. When coupled with opportunities to learn about the fundamental concepts that underlie the design of new technologies, young people can become *fluent* in information technologies, as active creators of content, functionality, and even software applications. Professional engineering organizations agree: fluency with the design process is fundamental to becoming a "technologically literate" citizen in the 21st century [3,4,5,6].

This workshop will offer an introduction to an after-school curriculum that engages girls in the design process. This work is based on SRI International and Girls Incorporated of Alameda County (Girls Inc.) NSF-funded Build IT program, an after school and two-week summer curriculum for 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- and design-based curriculum that capitalizes on girls' interest in design and communication technologies.

In Build IT, girls explore and tinker with existing information technologies (e.g. web-based tools, collaboration tools, wireless and mobile devices) and create some of their own information technologies using simple programming tools. Throughout Build IT, girls use The Design Process (see Figure 1) and experience user-centered and participatory design methodologies on a variety of information technology development projects.

Embedded Evaluation

The approach used to develop Build IT is a research-based approach called *Understanding by Design* [7]. In *Understanding by Design*, writers begin with a set of big ideas or enduring understandings to be developed, and then develop assessments and evaluations to test those ideas before designing specific activities. Consistent with this approach, embedded within the curriculum, there are technology fluency performance tasks that enable the girls to demonstrate what they are learning to their peers, youth leaders, parents, teachers, and the larger community. Preliminary evidence of the curriculum's effectiveness shows that it can improve girls' attitudes toward IT and IT careers [1].

Staff Development for Sustainability

The Build IT program also enhances the Girls Inc. staff's capacity to provide IT fluency programming by increasing the staff's IT understanding, design knowledge and skills, capacity to troubleshoot technical problems, and capacity to support participants'

engagement. The curriculum developers and Girls Inc. staff are embedding these approaches into the Build IT curriculum and staff development materials.

Workshop Agenda

In this workshop, participants will be introduced to the design process and user-centered design, as well as learn to use specific design process skills (defining the problem, brainstorming, sketching, researching, developing designs, and testing with users) as they experience the Build IT activity, *Blog Creation*.

Introductions and Build IT Overview (10 minutes)

The Design Process Warm Up   (20 minutes)
   • Quick activity that gets everyone thinking about what steps they would take to design a new toy
   • Show and reveal The Design Process poster

Blog Creation activity   (30 minutes)
   • Break group into teams of 2-3 participants, depending on number of participants.
   • Show example blogs
   • Introduce Blog Design Requirements
   • Using the Blog Creation Template, get all groups started defining the problem; brainstorming content and approaches; sketching their ideas; noting research they need to do and where they would look; developing designs; and testing their designs with another group.

Discussion/Reflection   (20 minutes)
   • How does the form of a blog relate to its function?
   • Did the design process help you align the blog's form with its function? How?

Summary of Build IT approach   (10 minutes)
   • Share *Understanding by Design* process used to create the curriculum. Discussion questions used in the activity above are essential questions that run throughout the curriculum for ongoing reflection and discussion.
   • Highlight examples of formative assessments and evaluation embedded in the curriculum
   • Share lessons learned in enhancing Girls Inc. staff capacity to provide professional development and support for design process and technology.

Note: While a 90 minute workshop is not enough time to provide design experience *and* hands-on time with technology, the workshop leaders will provide the technology resources (blogger.com and think.com) and the related Build IT curriculum materials to enable participants to implement effective blog development activities with their middle school youth.

The Design Process
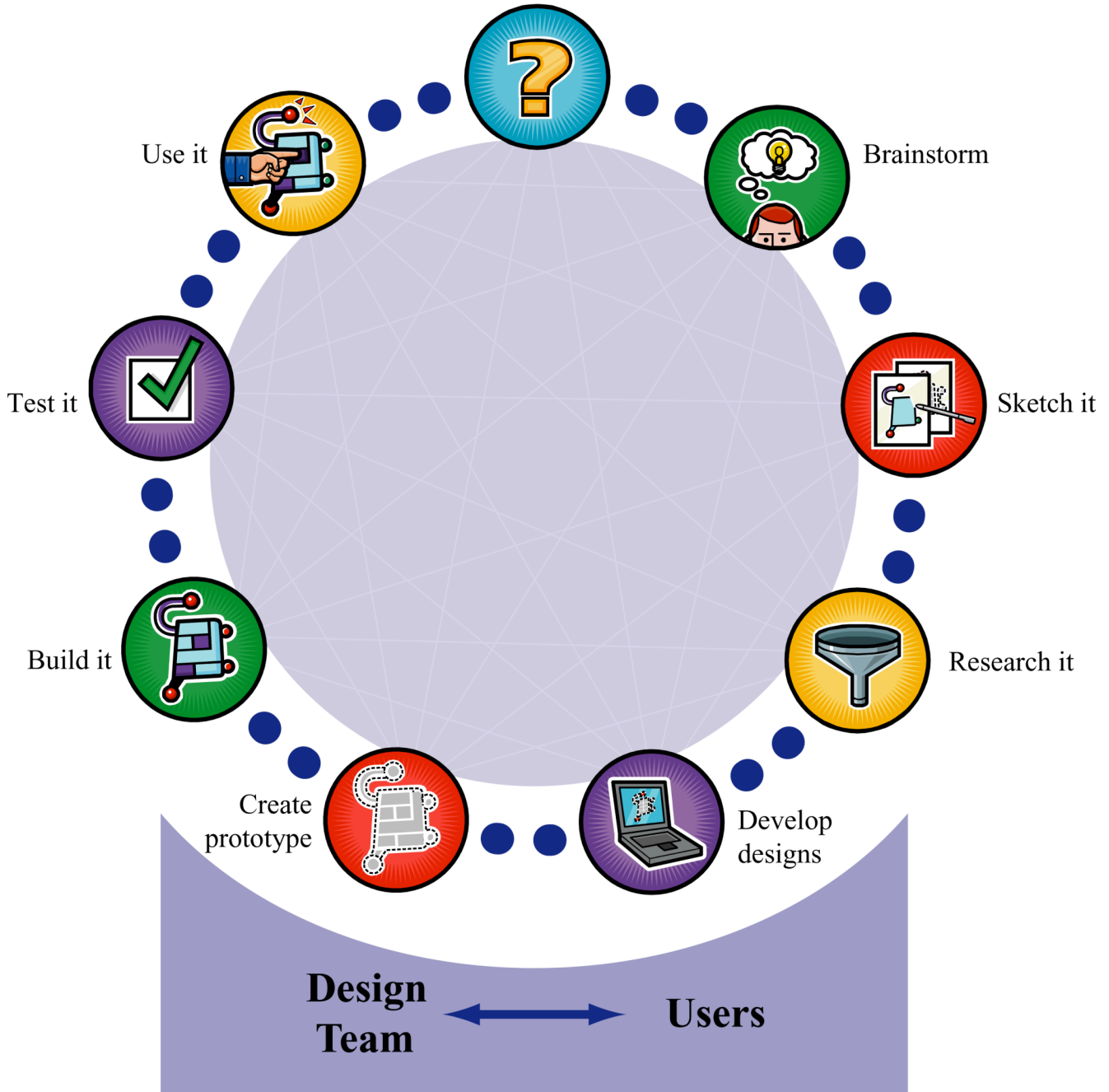
Figure 1. The Design Process poster used in the Build IT curriculum.

References

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