**A Digital Bridge to Children**  
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**Abstract**

I once met an eight-year old boy who lived in inner-city Chicago. He never visited a public library; never ventured into a museum; and never heard his mother read to him as a child. He taught himself to read looking through *People* magazines in the beauty shop where his mother cut hair. When I asked this eight-year old, “If you could wave a magic wand over your school library how would you change it?” he gave me an answer I could not have imagined. He said, “What’s a magic wand?” He had no idea since magic wands didn’t seem to appear in magazine articles. After I explained as best as one surprised adult could, I asked him again in a different way, “If you could change the library how would you do it?” To this, he answered “Oh, that’s easy, I would change the floor into grass. I’ve always wanted to read a book on the grass, but it’s not safe.”

This was the way I began designing a new digital library for children. I could not have expected that I would be talking about a child’s fear of his neighbourhood or his questions about magic wands. Talking about the future of libraries and computers was a bridge to having an honest true conversation about what was important in a child’s world. What I have found is that the act of technology design has helped me to understand who children are; what matters to them; what needs to be changed; and what needs to be built for the future. In that act of brainstorming and creation is an honesty about dreaming that goes well beyond the nuts and bolts of new technologies. During these design experiences, children have reminded me how important stories are; what it means to be brave; how difficult it is to be different; how important it is to be with other people.

The children I have had the good fortune to work with have not been my “sample” or “subject pool” but “partners” in understanding their world. My goal has been for our team of adults and children to elaborate on each other’s ideas and to make sense of and refine what we know. Could this digital bridge be found if these young people were not partners, but only technology users? Perhaps, but with the notion of partnership there is a respect between adults and children that can easily lead to shared understanding.

Since 1999, children have been my partners at the University of Maryland. We’ve explored making new storytelling worlds; travelled to new outdoor places with mobile technologies; taken new digital library journeys; and built bridges between children from different cultures (see References for more details). Twice a week we work with a local pre-school class of children ages 3-6. On alternative days after school, children ages 7-11, come to our lab and join researchers from computer science, education, psychology, art, and robotics. Over the summer, the lab team meets for two intensive weeks, eight hours a day to continue our work. Children have worked with us as long as three years and as short as one year. Through brainstorming techniques that range from sketching new ideas with art supplies, to critiquing...
existing technologies with the use of post-it notes, each team member contributes to the development of new technologies.

From my years of notebooks, video tape or audio recordings, four aspects of children’s identity have become more clearly defined for me. Each of these aspects will be explored in more detail in the remaining chapter sections that follow. Each section will begin with the words of children from my lab, at schools, on fieldtrips, in libraries, anywhere children might be. Along the way, you will meet children who can explain why school hurts, how playing matters, and when talking doesn’t make sense. These are not special children, brighter than the average, more creative than most. These are children who were given an important opportunity to have their voices heard.

In the sections that follow a brief summary is given of the expected focus for the full chapter. This is followed by an example introductory paragraph:

1. **Children are not short adults**
Children have their own likes, dislikes, and needs—far different from adults. From year-to-year as children grow, so too do their abilities and interests. Young people are not the same at 7 as they are at 12. Imagine how silly it sounds to consider making new technologies for an adult who is 25 and an adult who is 30, but we need to do this for children. This section will explore the differences and needs of children and adults.

I once met a 3-year old girl who was terrified by *automated toilets*. The offending technology accidentally flushed on her while she was still sitting on it. I tried to explain to her that the toilet was not going to “pull her in” while she was still on it, but this did not appease her. I tried to explain to her how sensors worked and that when I covered “the eyes of the toilet” it would flush—but these explanations only made things even worse. This poor little three-year old just did not want to believe that we humans could control the whims of toilets with eyes. This was a perfect example of how we as adults have asked our children to use a technology-enriched experience that was clearly not created for them. This technology took the control out of the users’ hands and made a decision of when the experience should be over. Imagine how outraged we would be if the same control were taken away from a child when using a storytelling program…

2. **Children are social beings**
Children want to be with other people. They naturally gather around computer screens, even when there is only one mouse to use. They spend endless hours instant messaging their friends. Whether the person is right in the same room or half a world away, children want to connect to others through any means that is at their disposal. This section will present the social side of children and their focus on distributive and “shoulder-to-shoulder” collaboration.

“IT’s my turn.” “No, wait, I only got 7 clicks, I get two more.” “I don’t think you’re counting right.” This was the scene our team was observing in the lab between two 6-year old boys. Our team of children and adults were taking notes and sketching. Later as we discussed what we saw, we discussed how difficult it was for the two boys. We spent the afternoon making
“mice of the future”. Groups of children and adults designed everything from mice that counted the “clicks” to computers where you could plug in multiple mice…

3. Children need to express who they are
Storytelling, personal expression, and collaborative creativity can all be opportunities for children to express who they are and control a small piece of their hectic world. This section will discuss the importance of empowering personal expression.

_The Eye_
_There once was an eye._
_It could see what you looked like on the outside._
_It could see what you looked like on the inside._
_It could see even more on the inside—it could see your questions._
_One day the eye met a boy._
_And the boy asked can you see what I look like?_
_And the eye said yes._
_Can you see what I look like on the inside?_
_And the eye said yes._
_Can you see I look like a girl?_
_And the eye said yes._
_Can you see that I’m asking why?_
_And the eye said you are both inside and outside, there is no need for why._

This was a story written by two 7 year-old girls who were concerned about their friend. They didn’t write it on paper; they wrote it in KidPad, a collaborative zooming storytelling tool we designed for children. By enabling children to zoom into their pictures and ideas, these young people found a powerful storytelling voice. Thanks to this story, we not only improved the technology we were building, but the life of the boy they described…

4. Children can learn outside of the classroom
We need to question what we mean by a classroom. Classrooms in the future may be anywhere learning can take place, from the playground to the home. This section will explore children as learners and the technologies they may need to support who they are.

We were working on designing the “classroom of the future” when one 5-year old explained, “There’s lots of thinking spots in my classroom, but my favorite spots are in other places too.” This young child reminded me that it’s just not good enough to expect children to “only think” in the classroom. There are so many places that can encourage learning. Therefore, when we consider designing new learning technologies we need to consider how to expand the walls of the classroom…
References from my work:
Children as Technology Design Partners:


Digital Libraries for Children


Storytelling Worlds for Children


Mobile Technologies for Children


Online Communities for Children
