18 BUILDING RELATIONSHIPS AND BUILDING PROJECTS: DESIGNING FOR FAMILY LEARNING

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In 1996 Papert wrote a book called *The Connected Family: Bridging the Digital Generation Gap*. When he was putting the book together, parents shared numerous questions with him that ranged from what kinds of computers to buy for their kids to what they should encourage their kids to do (pp. 6–8). Parents continue to ask similar questions more than 25 years later. What has changed is the proliferation of computing devices in mediating many aspects of family life, including how they connect, how they play, and how they learn. Numerous debates about "screen time" continue to shape parenting practices and anxieties.

While Papert sympathized with parents' concerns, he did not feel that this was the right direction for his book. He then consulted with some young people, who expressed a desire for wanting their parents to learn, to open up, and to try new things. Inspired by their stories, he made an important realization: "What parents most need to know about computers is not really about computers but about learning," (Papert, 1996, p. 8). This realization is not too far from what Papert had been discussing in his other writing and books: that the computer is challenging not only what we can learn but also how we learn.

In this chapter, I describe how to engage kids and their parents in constructionist learning experiences with computing by positioning parents as co-learners with their kids. I discuss how we adapted the different aspects and principles of constructionism to support family learning—especially to support families who have limited social support and resources around computing. I ground this discussion in a family program called Family Creative Learning (Roque, 2016). I reflect on the past eight years of designing and studying this program, which includes qualitative research on the design process and families' learning experiences.

When I started designing this program with community partners, we also started by talking to parents and asking what they wanted to know and

do with their children in a family program. They asked questions similar to those asked of Papert in the 1990s and expressed additional anxieties. A dad shared a story of a son that preferred to read with an iPad rather than his dad. A mom wondered if her child would grow up to be a moral person if she were constantly on their phone. In my conversations with parents, I found other desires: to connect, to understand, and to be involved as a meaningful participant. In designing Family Creative Learning, my community partners and I learned that designing constructionist experiences for families was as much about building relationships as it was building projects.

ACCESS AND PARTICIPATION IN COMPUTING FOR FAMILIES

Since Seymour Papert described the image of a child exploring powerful ideas when programming a computer, there have been growing efforts to engage all children as creators with computing. Despite this increased attention, there are troubling gaps in participation, particularly among women and ethnic minorities. To understand how we can support broader participation in creative activities with computing, many argue that we need to move beyond thinking about access to technology and consider the broader ecology of social support and opportunities that surround a young person (Ito et al., 2009).

Parents can play essential roles in children's experiences with computing, taking on roles such as collaborators, resource providers, and co-learners (Barron, Martin, Takeuchi, & Fithian, 2009). However, for parents with limited backgrounds in computing, figuring out the roles they can play to support their kids and negotiating the mixed messages about the benefits or pitfalls of technology can be challenging. In studies of parents navigating new technologies, parents and families need and want access to opportunities that allow them understand the kinds of roles they can play to support one another (Livingstone, Mascheroni, Dreier, Chaudron, & Lagae, 2015; Takeuchi & Stevens, 2011). However, access to quality computing resources and opportunities remains a challenge for children and families, especially from low-income households who remain "under-connected" despite the growing adoption of Internet-enabled devices (Rideout & Katz, 2016). When we look at technology-related opportunities for families, programs are often focused on helping families to use or learn about technology rather than learning with or through technology. In imagining a family program, my community partners wanted to explore ways to engage children and parents as co-creators and co-learners with computing while

building on families' existing learning dynamics and cultural backgrounds. We see family engagement as an important strategy to break perpetuating cycles of inequality as the computational landscape continues to change.

FAMILY CREATIVE LEARNING

From 2012 to 2015 I collaboratively worked with staff at community-based organizations such as Boys and Girls Clubs and community centers in housing developments to iteratively design Family Creative Learning (FCL). Over eight iterations, we developed a model that consisted of five workshops, held once a week for two hours and hosted at the community site. Families created projects using the Scratch programming language and the Makey invention kit. The workshops culminated in a community showcase where families invited other friends and family.

Each workshop had a four-part structure called Eat, Meet, Make, and Share. During Eat, families and facilitators ate dinner together from a local restaurant. During Meet, kids and parents met separately and facilitators checked in with family members. During Make, kids and parents worked on projects. During Share, families shared projects with one another. We wrote a detailed description of the model in a facilitator guide that has since been adapted in other community settings around the world (see Roque & Leggett, 2014).

DESIGNING CONSTRUCTIONIST EXPERIENCES FOR FAMILIES

What can constructionist experiences look like for families? Constructionism argues that we learn best when we are building artifacts that are personally and socially meaningful (Papert, 1980). In designing FCL, we had to adapt these ideas to support families. In particular, we needed to expand our visions of the learner as well as what "personally and socially meaningful" looked like in the context of family learning. Our study of families' experiences in these workshops included more than 40 interviews with family members and facilitators, field notes of workshops and design meetings, and photo, video, and project documentation.

EXPANDING THE IMAGE OF THE LEARNER

When we began designing FCL, we had to consider what families looked like, what they needed to participate, and how they could work together with computers. At the start of the project, my community partners and I

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had extensive experience working with young people, but we were new to engaging parents and whole families. We used focus groups with parents at the community sites and feedback from families participating in workshops to help inform how we may engage families in these learning experiences.

First, we needed to expand what we meant by "family." We learned to use "parents" loosely to capture the variety of adult caretakers in a child's life, which could include grandparents, extended relatives, older siblings, and family friends. Families came in a wide range of ages from two years old to eighty-eight years old. They came in different configurations, ranging from dyads to large groups that spanned multiple generations. Many families were immigrants from all over Latin America, while others had been in the United States for generations. In one FCL program, every participating parent immigrated from a different country. Every family had its own microcosm of individual dynamics and personalities. Some worked so well together, while others needed a little assistance getting started in collaborative work.

To support family participation, we had to address the different needs of families. For example, families needed childcare for younger children. Some families had varying levels of fluency and literacy across family members and needed additional support and resources, such as an interpreter, to participate. Because families had to coordinate multiple schedules and transportation, for most sites, we held the workshops after school and in the evenings. We also provided dinner to alleviate one less task on busy parents. To attract families that typically did not attend technology-related opportunities at the community-based organization, we had to rely on trusted relationships between families, staff, and other community leaders to actively recruit families.

When it came time for families to participate in the workshops, we wanted to position parents and kids alike as creators and learners in the experience. Through our design iterations, we found it was as important to create time and space for parents and children to be apart and to be together. In early iterations of FCL, when families immediately worked on projects together, parents would often step back and either watch their kids or disengage into other activities such as looking at their phones. In order to give everyone time with the tools, we separated kids and parents during Make in Workshop 1 and 2 but brought families back together during Share to describe what they each accomplished. Additionally, we had kids and parents meet separately during Meet sessions to check in with facilitators. These separate Meet sessions were especially valuable to parents who shared experiences, questions, and strategies to support their kids. Parents

could see that they were not alone and they could share strategies with each other.

PERSONALLY MEANINGFUL: BUILDING ON FAMILIES' CULTURAL BACKGROUNDS

To design a personally meaningful experience, we wanted to find ways to respect and invite kids and parents to share what was personally meaningful to them as individuals and as part of a family. An important principle in engaging families was inviting them to share their "funds of knowledge," or the skills, knowledge, and stories accumulated across generations and embedded in families' networks, geography, and cultural backgrounds (Moll, Amanti, Nef, & Gonzalez, 1992). Additionally, we wanted to consider what would feel meaningful to the larger collective of families and facilitators brought together by the workshops.

We supported these multiple spheres in the ways we structured activities, giving space for individuals, peers, and families to express themselves. For example, in the very first activity in Workshop 1, we engaged families in an off-computer activity called About Me, About Us. On a small sheet of paper, each family member added his or her name, a drawing of him- or herself, something that he or she was interested in, and something he or she liked about him- or herself. Afterward, families combined their cards into a larger card called About Us, in which they wrote their family name, something they liked to do as a family, and something they liked about their family. Some families created cards for family members who were not present, such as family pets or a parent who had to work during the workshops. Then we asked each family to use their About Me, About Us cards to introduce themselves to the whole group. We concluded by asking families to put their cards up on a shared wall to create a collage of families in the room. Families could see the ways they were similar as well as learn about new interests and stories about other families.

We mimicked this overall structure in the rest of the workshops. During Make in Workshop 1, we asked each family member to create a Scratch project that featured the letters of his or her name in whichever way he or she imagined. Creating individual projects allowed kids and parents to express and connect across their individual and shared interests. For example, one kid embedded his name in a Minecraft background, which impressed his mom because he had just been talking to her about it before the workshop. Another mother created a project in which the letters of her name danced to her daughter's favorite Korean pop song. During Make in

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Workshop 2, parents worked with other parents and kids worked with other kids, allowing them to negotiate what "personally meaningful" meant with a peer. For example, two parents both enjoyed music and dancing and created a Scratch and Makey Makey project that featured drums and dancing characters.

When families transitioned to working together during Make sessions in Workshop 3 and 4, we encouraged families to share their interests and "funds of knowledge." To provide a creative constraint, we asked families to agree on a shared theme. For example, one theme families explored was Carnival, an annual festival celebrated in many of the countries participating parents had immigrated from. Families created dance-themed projects, musical instruments, and games using Scratch and Makey Makey. In more recent iterations of the FCL model, we have focused on the shared practice of storytelling. We asked families to share their favorite stories, a recent memory, or a dream vacation they might take together. Finally, in Workshop 5, all families share their projects with visiting friends and family during the showcase.

SOCIALLY MEANINGFUL: LEARNING TOGETHER AND EXPLORING NEW ROLES

To design a socially meaningful experience, we were inspired by sociocultural learning frameworks (Rogoff, 1994) that emphasize the social aspects of learning. As families take up new technologies, traditional roles of who is the expert and who is the novice are continually shifting (Correa, Straubhaar, Chen, & Spence, 2013). As families worked on projects together, different, and sometimes new, dynamics and roles emerged. In designing FCL, we found that it was important to create a space where parents and kids could figure out what roles made sense to them (Roque, Lin, & Liuzzi, 2016).

For some family members, the workshop series was an opportunity to apply existing roles in this context. Some kids and parents had experience working on projects together either for school-related homework or craft projects at home. One mom was used to stepping in and out to help her kids—balancing careful observation and more explicit intervention. Some parents were surprised at how practices they had already developed to support their kids in other contexts were relevant in the workshops. For example, another mom appreciated how her interests in crafts and self-expression were needed to work on a project with her son. She especially connected with Makey Makey because she could connect conductive and

craft materials to the project. She could be a collaborator with her son, whom she felt was more tech-savvy than she, rather than a passive observer.

Other families explored new roles and developed new strategies. One mother described how she and her daughter were both used to being "bosses." "Both got to have it our way," she said. As they started working together, both tried to drive the project direction. Eventually, they started to "give and take" by building on each other's ideas rather than trying to advocate for their own. Some parents tried to act as a project managers, while their child took on a creative lead role. As their kids developed ideas, parents helped them break down their ideas into smaller tasks, find material resources, or ask facilitators for help.

For kids, it was an opportunity to take on a role as "teacher" as they supported their parents. One son decided to let his mom have more input in their project because she was new and excited about their project. Other kids took on similar "teacher" roles, helping their parents, siblings, and even other families in the workshops. Some parents welcomed this role from their kids as they got much needed support on something they were unfamiliar with. One dad talked about how much he needed his kids' help because he kept forgetting how to do things. He also secretly enjoyed asking for their help because he could spend time with them.

SUPPORTING COMPUTATIONAL SAMBA SCHOOLS

In the chapter "Images of a Learning Society" in his book *Mindstorms*, Papert shared an image of samba schools as a model of community support for constructionist learning. The range of members included children to grandparents, learning side by side and teaching one another no matter their expertise. The schools inspired an image of a computational samba school that welcomed all ages, backgrounds, and levels of expertise. However, he wondered where computational samba schools might emerge:

> I am sure that a computational samba school will catch on somewhere. But the first one will almost certainly happen in a community of a particular kind, probably one with a high density of middle-income engineers.… But as an educational utopian I want something else. I want to know what kind of computer culture can grow in communities where there is not already a rich technophilic soil. I want to know and I want to help make it happen (p. 182–183).

While some might interpret FCL as a family engagement program, we see it as a *community* engagement program. When families from the same neighborhood come together, there is an opportunity to strengthen

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relationships, to share stories and strategies, and to build shared under-standing in the context of computing. Often, when designing construc-tionist learning environments, we might focus on the child, but there is a broader ecology of people, places, and activities that support and interact with children across time and space.

By engaging parents in a constructionist environment with their chil-dren, parents and children had opportunities to see both themselves and each other take on more empowered roles as learning partners. Parents could see the positive and creative things that their children could do with computers—an object that was often a source of contention between family members. Children could see their parents as creative learners with com-puters and experience working on projects together as a family—activities that often fell in the domain of games, crafts, and homework. Through a shared experience of designing and creating their own projects, families could apply practices that they used in other activities, such as homework help, and adapt it to the context of computing. Families could build con-nections to this important context in their lives while building relationships within their families and connecting to other families in their community. By engaging in design-based computing activities at their own community center, parents come to understand the wider learning ecology around their children's developing interests and see the kinds of people, activities, and interactions that can support their children—and develop a variety of ways to participate in these worlds as well.

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