"This Is for Boys. You Did It?": Agency Under Construction in a Girls-Only Design and Making Program

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Abstract: This study explores a summer program for high school girls in a girls-only space for design and making of physical objects using a combination of power tools and digital fabrication. The goal of the study is to understand how the program's design, practices and mentor-mentee interactions support girls' agency. We report themes which emerge in interviews with the girls illuminating the way girls view their participation in the program in relation to their lives and community.

Introduction

Over the past ten years, a growing number of youth informal learning spaces have been incorporating making and building into their programming. Making is an umbrella term that combines the long-standing culture of do-it-yourself, artistic exploration, and craftsmanship, together with newly accessible digital technologies and new ways for community building and information sharing (Martin, 2015). Since the beginning of the maker movement, researchers in the field of learning sciences have been interested in the learning that takes place through making, its potential to expand our views on learning and teaching, and the impact of making practices on specific educational concerns. Research in the field shows that incorporating making activities in learning spaces provides an avenue for engaging, interest-driven learning experiences that support youths' sense of agency and opportunities to impact their communities (Sheridan et al., 2014). At the same time, there is a growing body of literature that is concerned with issues of equity, and that is critical of the maker movement for being mostly dominated by the images, practices and work of middle-class, white men (Vossoughi et al., 2016). This criticism is joined by efforts in the field to design maker platforms that purposefully broaden access to making and, through making, to STEM and design practices for girls and youth from marginalized communities (Buechly, 2014; Barton et al., 2016).

This study explores a summer program for high school girls that took place at a girls-only space for design and making that uses a distinctive approach to give girls the opportunity to design and build large physical objects using a combination of power tools and digital fabrication. The program combines design work with discussions about gender issues like what it means to be a girl in our culture and in STEM fields. The goal of the study is to understand how the program's design, practices, and mentor-mentee interactions support girls' expression and sense of agency. We follow a sociocultural perspective on agency that pays attention to "the socioculturally mediated capacity to act," and therefore is sometimes referred to as mediated agency (Van Lier, 2008). Through this lens, agency is situated in a specific context, is constructed through action, and is not a static trait or tendency that someone has (Lasky, 2005). This perspective shifts the focus to the cultural tools and the ways they enable or constrain the possibilities for action (Holland et al., 1998). This perspective guides us in our analysis of how mentors and girls talk about themselves and their experiences, and in our observations of the physical work that takes place during the program.

Methods

The study took place at a girls-only space for design and making. The space accommodates different programs throughout the year and special programs during the summer. The program described in this study took place in two separate full-day, one-week sessions with twelve high school girls at each session (seven Hispanic, eight African American, three White, two Asian, four other). Data sources include video-recorded observations of program activities; semi-structured interviews with girls and mentors at the beginning and end of the program; program artifacts like documents and presentations prepared by mentors; written material produced during the design process (annotated sketches, journals, etc.); photographs of projects in process and finished; and field notes. We are currently in the process of analyzing the data. At this stage we are analyzing the pre and post girls interviews. After transcribing each of the interviews, we first read each transcript to get a sense of the girls' stories as a whole. Transcripts are coded in an iterative process of inductive and deductive coding (Valanides, 2010), ending up with emergent themes. In addition, we code for agency using Konopasky and Sheridan's (2016) linguistic agency toolkit. We plan to similarly analyze the mentors' pre and post interviews. The final stage of our analysis will examine how agency is co-constructed during work interactions, paying attention to both discourse and gestures.

Preliminary findings

Preliminary coding of girls pre and post interviews has raised themes of exploration, caring and support, inclusive environments and dealing with stereotypes. These themes illuminate how girls see their participation in the program in relation to their lives and their community. To illustrate these themes using the girls' words, we provide here several quotations from one of the girls, Avishag. Avishag is a senior in high school who lives with her mom in a small rural town. When she described her town, she said: "In my town, it's the White people and the Mexicans. The White people don't really like to talk to the Mexicans, so it's kind of like, so there's not really... they don't really blend". Not all girls came from small towns - the majority actually came from the inner city - but other girls described similar social situations in their daily lives.

Exploration: Girls spoke about the program as a place to meet and work with like-minded girls, and an opportunity to try different ways of being. When Avishag summarized her experience, she said: "It made me feel like there's more than that. There's more than the little town where I live, there's more of what the stereotypes are there. You can come out here and be someone else and learn better skills, and it's not just you staying up there and doing whatever everybody else does."

Caring and Support: Several of the girls described a teacher in their school who cares about them and supported their program application process. In Avishag's case, it was her elective design class teacher: "Mr. Carlson, which is a person that first introduced me and motivated me to do this... He just really believes that I have a lot of potential. He's always telling me about opportunities. He always wants me to explore and travel. So this was a good opportunity to do that." Some girls described their mom or a friend of the family as the person who introduced them to the program and encouraged them to participate.

Inclusive environment & Dealing with stereotypes: When girls spoke about the fact that this is a girls-only space, they usually compared their experience to the way their family and community associate gender with maker practices. Avishag described the difference between her feelings in the program to how she sometimes feels in the design class in her school: "You don't feel intimidated by the guys, because the guys are the ones that are supposed to be doing this stuff. So you feel like you want to do it more because you know that it's for girls. It just makes you feel like you know you could do it. It empowers you to try to do it more." When she spoke about showing her friends and family her welding project, she said "I think they're going to be surprised that I did well, and that it looks good. It's like, only my first or second time welding. My mom's going to be really surprised. Like, 'This is for boys. You did it?'"

Conclusions and implications

As we continue our data analysis, we will focus on aspects of the program design and design work interactions that foster the interview themes of a caring feeling and an inclusive environment. We will also look at the way girls talk about themselves in relation to STEM, while tracking what led to this talk. We expect that the findings of this research will contribute to the body of literature on equity and making with an emphasis on girls' learning through making, and will have implications for maker settings promoting girls' agency.

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