Lessons Learned With Girls, Games, and Design

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ABSTRACT
Girls have long been dismissed and trivialized by the game industry. The Girls' Game Movement of the 1990s aimed to create games specifically for girls, but ultimately struggled to reach consensus on whether to make games catering to the feminine content that girls expressed interest in, or whether to challenge gender stereotypes and guide the ways that girls engage with games. Other research-based programs and interventions to engage girls in game design have faced similar difficulties, attempting to find balance between respecting girls' values and empowering them as designers. This paper offers a review of these programs, highlighting similarities in findings about what girls value in games and design, and synthesizing shared challenges and struggles. Analyzing past programs can be invaluable to contemporary educators, scholars, and designers looking to engage girls with game design and technology.

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gender; game industry; game design; game design curricula

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DISMISSING GAMES FOR GIRLS

The value of games is a matter of debate among learning scientists and educational researchers. Some see players as passive, almost mindless consumers of content. A substantial body of research challenges this view of games, arguing that participating in gameplay and game communities is significant and consequential. Stevens, Satwicz, & McCarthy [30] call this discourse a "flare-up in the Culture Wars," describing on one hand "a view of video games as mind-numbing, antisocial, low culture activities," and on the other hand, games "as wellsprings of new cultural production, positive identity formation, and learning of all shapes and sizes." This research field explores learning principles embedded in the design of well-designed games [14] and outlines how game play provides opportunities for sociality, joint engagement, and productive knowledge sharing [30]. Studies suggest games can be a catalyst for IT expertise [16], computational thinking [3], and forming a variety of literacy skills, including technology literacy, [6], design literacy [27], information literacy [24], and a constellation of print and digital literacies [28, 29].

If you subscribe to the more negative rhetoric around games, then the low quality of games marketed to young women and the low numbers of women in game development positions are a non-issue. However, in light of evidence that being a part of game communities can have consequential implications for learning and engagement, tackling demographic inequalities should be a priority. We should not treat it as trivial that even in 2015, girls are often discouraged from playing games or from participating in game-based fan communities.

Though play patterns have changed in recent years, girls have traditionally been a 'marked,' [6] or irregular category when it comes to digital games and computers. Even as gaming becomes a normative activity among youth, *what* girls play is still highly scrutinized by gaming communities, game developers, and the media. When playing mainstream games, girls are accused of being *fake geek girls*, having ulterior motives such as garnering attention from male players. Girls are also judged for playing casual games such as puzzle and mobile games. Finally, there are stigmas around anything falling in the loosely defined category of *girl games*—a genre that draws on stereotypically feminine topics such as cooking and cleaning; relationships and weddings; pregnancy and childcare; and physical beauty.

Girl games are often framed as the inferior counterpart to so-called *regular games*. Produced on insufficient budgets by teams who may not aspire to making games for girls, the effect is a devaluing of the girl game genre. In an article on the gendered discourse of media franchising, Johnson [21] argues that gendered hierarchies of cultural value reify binaries that pit traditionally masculine standards for *creativity* and *quality* against feminized franchising practices that are perceived as catering to *industry* and resulting in *trash*. As predicted by Cassel and Jenkins, the dismissal and trivializing of games that seek alternatives to the mainstream standard has been, and continues to be, a

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major challenge to the industry. Many members of the games community currently have hope that the indie games movement will bring about some much-needed change, but in the 1990s, developers and scholars had set their sights on a different movement for change—the Girls' Game Movement.

THE GIRLS' GAME MOVEMENT

In the 1990s, several women founded development studios with the goal of developing games to appeal specifically to girls. Many of these companies practiced research-centered design to learn about girls' interests, and conducted ethnographic research on girls' play patterns to inform their design. According to Jenkins and Cassell [19] the Girls' Game Movement had six major goals and expectations:

1. *Economic* – Women and girls were a viable new group of consumers for games
2. *Political* – Closing the gender gap in technology
3. *Technological* – While consoles were dominated by Sony, Sega, and Nintendo, the CD-ROM market had room for growth
4. *Entrepreneurial* – At this time, women were starting up businesses in large numbers, targeting new markets and aiming for new forms of management and customer relationships
5. *Aesthetic* – There was promise for innovative content, new models of play, and imaginative aesthetics

These companies were cited as examples of *entrepreneurial feminism* [6] and just as feminism is based on myriad ideologies and theories, not all of which align without dispute, the Girls' Game Movement soon became the site of conflicting arguments about how to approach game design for girls.

One side argued for utilizing market research about what girls like and committed to making games based on girls' interests. "I agreed that whatever solution the research suggested, I'd go along with. Even if it meant shipping products in pink boxes," developer Brenda Laurel shared with *Wired* [2]. Cassell and Jenkins [6] call this approach a *pragmatic compromise,* where the first and foremost priority is fostering girls' interest in technology and getting them to use digital media, even if that means producing content that does not match the values and ideologies of the developers.

Not everyone agreed that a pragmatic compromise was best, however, and many Girls' Game Movement leaders objected to catering to girls' interests, refusing to reinforce gender stereotypes. Developer Theresa Duncan stressed that catering to market research was the same as selling out for profit and that it resulted in a "'perfunctory' feminism" that was "more meaningless than slapping the pink bow on Pacman" [6]. de Castell and Bryson [8] urged designers to be skeptical of focus group research because children have a tendency to say what they think adult researchers want to hear. They argued that appealing to empirical research to justify design decisions runs a risk of reinforcing and naturalizing a polarized play culture. Opponents of the pragmatic approach urged developers to "explore new formats, to develop alternative models of software rather than simply to conform to assumptions about gender that are created and reinforced by existing market pressures" [6].

Cassell and Jenkins [6] warn that we should be careful about dismissing the things that girls traditionally like as it runs the risk of demeaning girls' interests. Citing research that documents the loss of self-confidence that girls experience as they discover that the culture undervalues their interests, skills, and abilities [25, 26], they were concerned that the movement would perpetuate an essentialist position regarding what boys and girls want from digital media. They argued that this was "one short slippery step away from the biological determinist position that argues that boys and girls want different things because of the fact that they are boys and girls" [6].

The debate comes down to the choice to pursue the development of gender specific or gender-neutral games as the ideal. Gender specific material, besides essentializing gender, also risks unintentionally marginalizing games targeted to girls by dooming them to become *girl games*, inevitably compared to all of the other *regular games* on the market. Conflicted, Cassell and Jenkins [6] own that, "Despite the clear dangers of such 'sweeping generalizations,' the ability to determine what girls want may seem necessary at a time when we are trying to open up a space for girls to participate within this medium at all."

The Girls' Game Movement ultimately resulted in a small number of *pink* games, which assumed the traditional values of femininity, and some *purple* games, those that aimed for a broader perspective on what appeals to girls. Laurel [7] contends that one of the reasons the movement did not gain the kind of traction they hoped for is that the games did not receive adequate marketing and retail support. This effectively doomed the games to failure and provided proof to those who wanted it that the majority of girls will not play videogames. Despite the efforts of the Girls' Game Movement, women are still at best, a secondary market, and more often an afterthought. Cassell and Jenkins [6] note that, "If a mainstream game attracts women, it is viewed by most game industry executives as a happy accident." While the industry has not always embraced girls, game scholars and researchers have been active in creating programs and developing research to support girls in learning game design.

GIRLS IN PLAY & DESIGN: A REVIEW OF RESEARCH-BASED INITIATIVES

In this section, I describe various programs, curricula, and interventions that have been designed to engage girls in

playing and designing videogames. Throughout these efforts, the most notable through-line seems to be that the scholars and developers working on these projects had to grapple with the same tensions and anxieties that the founders of the Girls' Game Movement struggled with. They ask, are there differences between tools and games designed by girls or boys, and if so, how do we incorporate girls' values into the design of our games and programs? Or, how do we encourage girls to defend what they value when the commercial market so blatantly favors the preferences and practices of boys, vanquishing girl games to the bargain bin or re-framing them as *learning tools* rather than so-called *real* games?

Imagining the Tech of the Future

In 1988, Brunner, Hawkins, and Honey speculated that design is an avenue through which we can support alternative pathways for girls to engage with technology. Finding that "girls…are not expected to know about technical matters, and are often encouraged to be merely consumers and users of technology" [5], they began to wonder what kinds of tools women would imagine, given the task or reflecting on future inventions. To further explore that idea, they developed a project called *Designing for Equity: A New Approach for Girls and Engineering*. One of the major goals of this research was to help female creators reflect their interests, values, and perspectives through design projects [4]. They developed *Imagine* a prototype graphics application for creating and animating machines [4], combining basic draw and paint tools with simple animation capabilities [19]. With the tool, they had participants create their visions for futuristic tech devices.

The team's findings suggest that girls in particular are interested in designing objects with personal relevance, but also give significant thought to how technology impacts society. Girls tended to respond to activities that "enabled them to investigate how technological design is related to the design process of artists, scientists, and other professionals" [4]. As a result of their research with girls, the team modified the tool to better incorporate the design of machines that work in everyday contexts. They also made changes to support more narrative approaches to design. It was also important that the application be embedded in a curriculum that fosters thinking about design and invention. While this research pre-dates interventions to engage girls in game design, Honey and colleagues' [19] anxiety about typecasting girls as consumers rather than producers of technology is the same anxiety that drives many efforts to engage girls in game design. This research is significant in that it was one of the first to put girls in the role of digital producers.

In *KAHooTZ* with Girls

As an extension of the *Imagine* project, the Center for Children and Technology teamed up with the Australian Children's Television Foundation to support design and invention with *KAHooTZ*, a "multimedia construction environment" [4] for kids to create and share their own games and stories. They also developed a set of learning activities that encouraged girls to think about themselves as future designers and to think systematically about their inventions. Finding the tool to be incompatible with what girls wanted to make, they had to redesign the animation functions to better support a narrative approach to design and invention. They also had to find better ways to connect the students, enabling them to share their invention ideas and discuss their ethical concerns about technology. Arguing that the butch-femme continuum helps avoid a conflation of sex and gender, Brunner describes that femme narratives tended to involve intimate, personal themes over the vast, epic struggles so typical of many AAA games. These narratives favored teams of problem solvers over a lone hero. Finally, success tended to stem from restoring justice more than achieving victory or conquest.

The Game Design Project

Among the first major studies on game design with kids was Kafai's [22] Game Design Project, a six-month research project evaluating the gender differences between games made by girls and boys. As an exploratory study, Kafai's research questions were twofold: 1) In designing games, which features of commercially available videogames would children choose to include in their designs? 2) Concerning the gender stereotypes found in many videogames, what kinds of games would girls choose to design? [22] The initial study [22] had 16 participants, eight boys and eight girls, and a follow-up study [23] included nine girls and seven boys. For six months, classrooms were transformed into game design studios where the students worked on programming their games in Logo, developing stories and dialogues, and learning about interface design and advertising. The students were instructed to utilize problem solving with fractions in their games in the math class [22] and to incorporate a space theme in the science class [23]. The coding scheme used to evaluate the students' games featured five major features: 1) Genre; 2) Game worlds and places created; 3) Game characters and supporting cast; 4) Interaction modes and player feedback; and 5) Narrative development in game structure. While the n size on these studies was small, they were among the first of their kind, and have been highly cited in the research literature on girls and games over the past two decades. I outline the findings in the section below.

Game Genre

The adventure game genre was most popular, but more so for boys than for girls. The second most popular genre was teaching, adopted by more girls than boys. Kafai [23] hypothesizes that this may be a result of the fact that software for girls in the 1990s was often classified as a learning tool, whereas software designed for boys was simply considered a game. Another possibility is that the

girls took the educational component of their assignment seriously, and designed teaching games as a result. Kafai [22] notes that one of the sharpest contrasts between girls and boys occurs in the depiction of the conquest between good and evil. Five boys, but none of the girls in the math class chose to incorporate the conquest of evil in their games.

Game World

Many of the boys chose to design games with fantasy settings, because boys have a need for "extended play space." Girls chose realistic settings in both classes. [23]

Game Characters

The boys were more likely to assign a specific gender to their characters, assuming them to be male [22]. The girls tended to leave the player's gender unspecified so that they player could identify with their character.

Game Feedback

None of the games in the science class incorporated violent feedback when the player got a "Game Over" condition. Most of the boys and one girl used violent feedback in the math games. A possible explanation for the lack of violent feedback in the space setting was that space settings naturally align with a need to overcome physical limitations [23].

Game Narrative

A complex game narrative was much more prominent in the math games, perhaps providing a context for the fraction problem solving. The science games were notable in that narratives were largely absent in the students' games. Kafai (1998) suggests that the space-science context itself provided the narrative.

Overall, Kafai observed more variability in the games made by the boys. They exhibited more variability in genre, choice of fantasy vs. realistic setting, specified character vs. player-defined character, and violent vs. non-violent feedback. She [23] wonders if the greater variety in the boys' games reflects the many commercial game influences that they have to draw from. In contrast, girls are rarely cast in the main role of commercial games. Kafai [23] notes, "In many ways, girls created their own worlds and characters, compensating for the sexism and violence found in many video games." Reviewing her findings, I find greater variety across both girls' and boys' games than many of the research articles that cite Kafai's findings might suggest. It is important to keep in mind that this study is incredibly useful as a starting point—particularly for its methodology showing how we might analyze games made by children—but analyzing the games that 32 children made in the mid 1990s does not show us *what girls like* even then, and most certainly not almost 20 years later. We would do well to keep in mind that kids' play patterns, particularly as they relate to videogames and digital media, are constantly shifting.

Inviting Girls to Purple Moon

Among the most well known companies to emerge out of the Girls' Game Movement was Purple Moon, founded by Brenda Laurel. While Purple Moon only lasted for three years before being sold to *Barbie Fashion Designer* publisher Mattell in 1999, the studio conducted extensive design research and focus testing with players. In interviews, Laurel [7] argues that videogames give boys an edge with becoming comfortable with computers. She emphasizes thinking of the computer as an appliance and not being afraid of authoring content for it. Girls haven't had the same opportunities as boys to develop these types of thinking because they weren't motivated by games in the way that boys were. Research suggests [6] that mastery for its own sake tends not to be particularly interesting to girls, who prefer an experiential path. Girls also tend to be turned off by games that set up obstacles that prevent them from progressing in a game and are not particularly interested in timed challenges. Heeter and Winn's [18] research comparing how boys and girls played educational game title *Life Preservers* suggested similar findings. They recommended that educational game designers not implement speed mechanics in their games.

One of the themes that frequently emerged out of Purple Moon's research was that girls incorporate their friends both with in-room gameplay and in their game narratives. Laurel observed the tendency for girls to find ways to play games together, regardless of whether they were designed for more than one player. She noted that girls have a talent for finding collaborative ways to play single-player games. She also observed that girls incorporate personal relationships into the narratives of games:

> When you ask a girl what an adventure is, well, it's about exploration, and it's all about relationship. She'll say, 'I go on a quest with my friend or for my friend or to find my...' The relationship is there all the time. (p. 123)

Overall, narrative was really important to the girls they brought into their studio. Laurel observed that girls do not mind violence as much as they dislike the lack of good stories and characters in games. Similarly, girls were most impressed by gameplay experiences where they could make connections that were personally relevant and meaningful.

TechSavvy* Girls Mod *The Sims 2

The TechSavvy Girls Club was a two-year effort with the goal of getting—and keeping—girls interested in learning about digital technologies. Research suggests that in middle school, girls face pressures to distance themselves from appearing too invested in technology because it becomes "uncool" to be seen as a "techie" or sometimes even to appear too smart [15].

In TechSavvy Girls, Hayes and King [17] worked with girls to develop IT fluencies through playing and modding *The Sims 2*. Their primary motivation for using this game was its popularity with female game players, as well as its focus on "building communities, social interactions, relationships, and virtual lives" [15]. However, much like the founders of the Girls' Game Movement, Hayes and King [17] experienced mixed feelings about using a game that reinforces many of the gendered stereotypes that feminist academics are weary of. They eventually reject *The Sims 2* as simply a dollhouse, finding that the game leaves players ample room to engage in subversive play practices and social critique. The game poses an ideal opportunity to build a foundation for future learning and holds promise for teaching a wide range of computer-related skills.

By situating IT fluencies more broadly than the boy-friendly programming paradigms they frequently observed, Hayes and King argue that the participants in TechSavvy girls were able to leverage their existing practices within a game playing community to develop IT fluencies within the context of a participatory culture. This enabled the girls to experiment with socially acceptable and powerful identities while also getting a foothold on IT skills such as managing complex systems, and practicing programming, 3D design, and behavior modeling. Additionally, they felt that by using a tool that is not immediately focused on programming, they were able to develop "a distinctive approach to technology-related learning, one that melds technical skills with emotional intelligence...which is essential for everyone in our high-risk, high-tech, complex, world" [15]. Gee and Hayes [15] argue for "collaborative problem solving where knowledge is shared and distributed across people and smart tools and technologies" because students "need to know how to use these skills in complex problem solving contexts where they recruit social and emotional intelligence so that they can change people and not just things" (p. 173). This is the strength of TechSavvy Girls—it challenges traditional paradigms of technology education and re-envisions it in a way that incorporates values that have traditionally been aligned with feminine sensibilities.

Values at Play with *RAPUNSEL*

Flanagan, Howe, and Nissenbaum [12] emphasize that designed artifacts inevitably embody political, social, and ethical values. Their team developed a framework called Values at Play, which integrates values into the science of design [13]. There are three core features in the Values at Play framework:

1. *Discovery*, in which designers discover and identify values relevant to their project
2. *Translation*, in which designers translate value considerations into architecture and features
3. *Verification*, in which designers verify that the values outcomes they sought have been realized in the system

Through a collaboration between computer scientists, interaction designers, and social psychologists, the team developed *RAPUNSEL*, a game to teach programming to middle school girls. Using Java, players work through a set of scaffolded exercises to learn to teach characters dance moves and eventually to coordinate multiple dancers together. One of the project's underlying motivations was to include girls' perspectives in software design [13]. As the team frequently came across challenges relating to values, it became essential to iteratively address these issues in a way that enabled them to systematically implement their solutions into the design of the game. The team ascribed values to desires expressed by the players. For example, based on descriptions of how their users tend to play *The Sims*, the team identified *subversive play* as a value. Players also expressed the desire to design and dress up characters, which the team ascribed the values of *authorship* and *creative expression* to. Additionally, the values *community, autonomy, authorship, and collaboration* came out of players' desire to manipulate characters in the game to engage in deeper relationships with each other through flirting, dancing, and other social behaviors.

At times, the values of the users came into conflict with the project goals and values. For example, girls expressed interest in more complex social situations, but the team felt that focusing on social engagement tended to draw attention away from the programming activities [12]. After its release, research on game outcomes showed a significant change in general self-efficacy and confidence about programming among girls, but not boys [13]. It is difficult to determine whether these findings can be attributed to the team's commitment to incorporating girls' values into the design process, but nonetheless, considering the struggles that girls tend to face with confidence an programming, it is encouraging that the game was able to boost girls' confidence with programming.

Girls Creating Games to Become Producers

The Girls Creating Games (GCG) program consisted of 23 separate two-hour sessions in which middle school-aged girls work in pairs to design and program a game. The GCG program aimed to increase girls' interest and confidence in becoming producers of technology, enabling girls to develop *fluency* that goes beyond the skill-based technology education in schools, which fails to provide opportunities to think critically and creatively with technology [10]. While acknowledging that not all girls will choose to pursue careers in technology, Denner [9] believes "it is important to level the playing field of opportunity so that when students make that choice, it really is a 'choice."

The theoretical frame for the GCG builds on four design features [9]:

1. *Learning by Design* – Instruction is organized around a meaningful problem—how to design and

create a story-based, choose-your-own-adventure game using Macromedia Flash software [11].

2. *Scaffolding and Modeling* – Instructors support students' conceptual understanding by providing the resources they need to create their games and solve problems independently and with their peers.
3. *Collaborative Learning* – Activities support communities of learners, such as programming in pairs.
4. *Identity Formation* – Girls work with female role models that challenge existing gender stereotypes. They also share their games with friends, family, and online to promote tech savvy identities.

In the six years of development and research on the project, the research team has identified several relevant findings. Selective findings are outlined below:

- Girls showed a decrease in negative stereotypes about girls and IT fields [9]
- There was significant increase in girls' perceptions of their knowledge about computers, but there is still work to be done to help "strengthen girls' critical assessment of gender stereotypes regarding who is good with computers [9]
- Long periods of direct instruction were unsuccessful, with participants reporting frustrating levels of boredom [9]
- Opportunities for exploring identity, expressing creativity, and developing connections with other girls were important to the participants [9, 10]

Denner & Campe [11] conducted an analysis of the games that girls made throughout the program and compared them to games that boys made in similar iterations of the club. Half of the girls made games that enable the player to name and select the gender of the player-character. This suggests that girls are especially interested in exploring identities through gameplay.

Comparisons between games made by girls and boys suggest that the girls' games were more likely to engage players in narratives, social relationships, conversations, and pro-social problem solving. Boys' games more often focused on victory, competition or conquest, and utilized fantasy settings. It is unclear whether many of these differences are better explained by difference in preference or by differences in prior gaming experience. Similarly, the program tasked students with creating a game that "helps other students" [9]. It is a bit unclear what that specific assignment parameter entailed, so another possibility for interpreting the gender differences may be in part explained by differences in how students understood the helping nature of the assignment. Nevertheless, many of the findings from this analysis coincide with Kafai's findings from the Game Design Project [22, 23].

Synthesis of Themes

While each of these programs had unique objectives and methodologies, several recurring themes emerge. To help readers synthesize these themes, I outline them in Table 1 (next page). In addition to the six programs and interventions I have discussed above, I opted to include one additional report. The American Association of University Women [1] published a report with recommendations for game design and content features that are 'girl friendly' and might be implemented in games that appeal to girls. Since their research was based on focus group testing without applying it to an organized research program to engage girls in design, I did not outline their research in detail above. However, since many of their findings align with themes that emerged from the programs I examined, I include their recommendations in the table.

One important thing to keep in mind is that this is a synthesis of findings from research projects and interventions that did not necessarily share the same goals or utilize the same tools and research methods. The table outlines suggestive trends based on research, but does not give a real account for what girls like because such a thing does not really exist in a singular, articulable way. Girls hold a diverse array of interests, abilities, and ideas, and while there are research-based suggestions for how we can engage girls with games and technology, individual girls' trajectories and experiences will vary.

CONCLUSIONS

A recurring theme across these game-based programs and interventions for girls is a struggle over values. The designers and academics who committed to developing these programs want to respect girls' interests and preferences. Brunner and colleagues ask, what tools would girls develop to build a better future? Kafai wonders, what kinds of worlds and characters do girls design into their games? Laurel explores, how do girls incorporate personal relationships into their gameplay and game narratives? Hayes and King take *The Sims 2*, a game immensely popular with female audiences, as their starting point for exploring, how can we get girls engaged in trajectories of IT fluency? The Values at Play team puts the question of what girls value at the center of their design of *RAPUNSEL*. Finally, Denner and the Girls Creating Games team researched what kinds of experiences the girls had in pursuit of their goal of increasing girls' confidence as producers of technology.

Each of these projects encountered struggles—whether technical constraints, ideological tensions, or otherwise—in their efforts to incorporate and value girls' needs and interests. Brunner's team found that the software tools they were using in their research were not well adapted to enable

	AAUW	Game Design Project	Girls Creating Games	Imagine & KAHooTZ	Purple Moon	RAPUNSEL	TechSavvy Girls
Alternatives to violence	✔	✔	✔		✔	✔	✔
Challenge authority			✔			✔	✔
Complex narrative	✔		✔	✔	✔		✔
Experiment with identities	✔	✔	✔		✔	✔	✔
Focus on social issues	✔		✔	✔	✔	✔	✔
Moral decision making	✔		✔	✔	✔		
Pro-social action	✔	✔	✔		✔		
Real-world settings & contexts	✔	✔	✔	✔	✔		✔
Relationships over conquest	✔	✔	✔	✔	✔	✔	✔

Table 1: Game features that appeal to girls.

girls to make the kinds of designs they wanted to build. The technology itself got in the way of the team's efforts to elicit girls' ideas. Laurel grappled with the delicate balances required in designing games that reflect girls' interests and styles of interaction while also empowering them with technology. Hayes and King struggled with mixed feelings about using a game that is frequently criticized for reinforcing gendered stereotypes about women. Flanagan's team found that the girls' desire for social interaction deflected attention from their foremost goal of teaching the girls about code. Denner and her collaborators experienced difficulties in presenting the pedagogical content in ways kept the girls interested in engaged. These kinds of issues come up across all kinds of learning interventions, but can require a special sensitivity when the developers want to take care not to reject or neglect the things their participants care about.

All of the programs outlined in this paper were designed with *change* in mind. These efforts are meant to challenge the status quo and bring more girls to the playing field of technology and media. And change, especially in the form of a directed effort to affect culture, rarely comes easy. One of the most significant takeaways from this review is not necessarily the specific findings about girls' interests and desires—though these are certainly valuable—but equally useful is the documentation about how to navigate the inevitable tensions that come with trying to carve out a space for girls to become programmers, producers, and designers in their own unique ways. We can learn a lot from the challenges that these scholars and designers faced, and from the choices they made along the way.

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