Girls Creating Games: Challenging Existing Assumptions about Game Content

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ABSTRACT
In a reinforcing cycle, few females create games and fewer girls than boys play games. In this paper, we increase our understanding of what girls like about games and gaming by describing the content of 45 games that were designed and programmed by middle school girls. The findings suggest that that when given the opportunity, girls design games that challenge the current thematic trends in the gaming industry. The most prominent theme was the way they expressed and worked through fears and social issues in their stories. Most used bright, vivid colors, and their stories took place in real world settings and involved moral decisions. Few used violent feedback. Girls also used the games as spaces to play with gender role stereotypes by challenging authority figures and using humor. We discuss the implications of these findings for the debate on whether games should be gender-specific or gender-neutral.

Keywords
girls, gender, children

INTRODUCTION
Both the production and enjoyment of games is dominated by males. In a reinforcing cycle, few

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females create games and fewer girls than boys play games. According to the Interactive Digital Software Association's 2003 survey, 72% of all video game players are male. This is unfortunate, because early game playing not only fosters specific cognitive and motor skills [20], it is also a gateway to shaping the future of technology. Indeed, interactive games have an early influence on the skills and attitudes that are the best predictors of future technology-related behavior [8, 19].

The most popular console games on the market today have distinct qualities. They provide spaces for players to take initiative, they are typically competitive, and they give players the opportunity to save the world or have personal triumphs. The most popular games have larger-than-life settings, and the goal is to overcome an enemy and win rather than to experience new cultures or build relationships. In other words, success comes from eliminating competitors, not making friends. These games allow the player to act out fantasies, which include becoming a successful football player in the NFL, being a professional skateboarder, or testing one's bravery as soldiers fighting an elusive enemy. Brunner, Bennett, & Honey [2] conclude that most popular computer games emphasize "victory over justice, competition over collaboration, speed over flexibility, transcendence over empathy, control over communication, and force over facilitation" (pp. 81-82). These qualities make most games more attractive to boys than to girls.

What Kinds of Computer Games Appeal to Girls?

In order to attract more girls to gaming, the industry has designed and marketed games specifically for girls. For example, Barbie Fashion Designer was released in 1996 to a target audience of elementary school girls. In this game, girls design clothes and then print them out to use with Barbie dolls. Its success is attributed to the bright colors and to the sense of accomplishment girls achieve out of making a product. In general, games that target girls have had character-centered plots, issues of friendship and social relations, and brightly colored graphics [4]. The games that are most popular with girls and women have positive female characters, allow them to explore relationships and roles, and take place in realistic worlds. These games include the Sims and 102 Dalmatians [5].

There is debate amongst researchers, people in the game industry, and those who play games, about whether we should have girl-specific games. Some argue that girls have different interests from boys, and that game companies should respond to those interests [14]. Others counter that this approach perpetuates negative and limiting stereotypes about what girls like, and ignores the diversity within gender. Regardless, there are a number of publications in which researchers describe what they believe to be the kinds of games that girls prefer. They suggest minimizing competition and conflict, situating the game in a real-world setting, and providing opportunities for girls to challenge and explore gender roles.

Competition and conflict

Research suggests that to appeal to girls, games should minimize the focus on competition and conflict. Females prefer games that are not competitive, have a narrative and characters they can relate to, little meaningless violence, rich audio and images, and have multiple ways to win [5, 7, 14, 18]. It is not as important to girls to have a clear way to win or lose; it is more important to simply explore. In her book on gender-inclusive game design, Ray [16] argues that we need more games that do not have zero-sum outcomes where conflicts are resolved by one person winning and everyone else losing. In order for games to appeal to girls, winning and losing must

be meaningful [2]. Simply killing off the enemy is not viewed as a worthwhile goal [13]. Having opportunities for personal triumph is less important than having opportunities to help others or teach a lesson. For games to appeal to girls, they must emphasize creation rather than destruction [1]. Girls like games that involve puzzles, quizzes and trivia questions, and traditional arcade games, where the goal is to outsmart not to overcome [17]. The Zoombini's Logical Journey is an example of this type of game, where the player must solve riddles before moving along on the journey. Kafai [11] found that elementary school boys designed games with violent feedback, where players "get" something (i.e. win), whereas girls were more likely to describe activities.

Real world applications

Girls like games that allow them to work through real life problems or challenges they expect to face in the future [1]. They like the opportunity to play with identity [1], and want to rehearse the contradictions of what it means to be a woman. This includes juggling career and family, thinking about success versus sacrifice, and pleasing others without calling attention to oneself. They also like games that allow them to work through social issues with stories, or narrative [2, 7], especially where the story involves character development and characters they can identify with. For example, Kafai [11] found that girls were more likely than boys to create math games that take place in real-life settings, while boys were more likely to create games in fantasy settings. Interestingly, there were fewer gender differences in settings chosen for games about science.

Games as places to challenge gender roles

Girls dislike games that reinforce gender stereotypes, such as games where female characters are sexualized and/or portrayed as victims not heroes. Girls like games that include humor [2] which is one way to challenge stereotypes. Researchers suggest girls like game spaces in which they can challenge and explore identities. Most games that target girls involve "good" girls that get along with their friends and do well in school. Notably, researchers have not examined whether girls like opportunities to engage in activities that challenge social rules or expectations, such as social taboos that include talking back to one's teacher or lying to a parent.

How Can We Increase the Participation of Girls and Women in Gaming?

Again, both researchers and people in the game industry make claims about what girls like to play. The debate centers on whether to create girl-specific games, or to make more gender neutral games, since girl-specific games have not led to increases in the number of girls and women pursuing careers in technology. Unfortunately, games that attempt to follow the directives of research, such as "Rockett's World" which allows girls to explore relationships at school, have not sold well. How can we better attract, engage, and sustain the interests of girls in gaming? One strategy is to increase the range of games available [10]. For example, Culp and Honey [6] challenge us to create "less gendered game worlds" which go beyond the dichotomy of gender-focused vs. genderless games. They suggest creating games that allow the player to define the role or importance of gender and how it is enacted.

In this paper, we aim to increase our understanding of what girls like about games and gaming by describing 45 games that were designed and programmed by female middle school students in California. Our study focuses on what happens when we provide girls with the skills and supports to program their own computer games. This approach to understanding children's

perspectives fits within a "constructionist" approach, which says that students construct meaning through their actions. Kafai and Resnick [12] describe constructionism as "both a theory of learning and a strategy for education. It builds on the 'constructivist' theories of Jean Piaget, asserting that knowledge is not simply transmitted from teacher to student, but actively constructed by the mind of the learner. Children don't *get* ideas; they *make* ideas" (p. 1). Many studies have focused on how children learn through the design and invention of meaningful projects, and Kafai [11] used this approach in her study of elementary school children creating math and science games. Similarly, rather than asking the girls to tell us what they like, we had them construct their understanding of games by making their own game.

METHODS

Participants

The games were designed and created by girls who were voluntary participants in an after-school and summer program. There were 126 sixth (52%), seventh (24%), and eighth (22%) grade girls, and the average age was 11.71 years. Information on social class is limited, since only 64% responded to the question about their mother's education. Of those, 46% said their mother had obtained a college degree or more; 25% said their mother had a high school diploma or less. The sample was 31% Latina and 60% white; and 36% speak another language at home at least some of the time. At the time they enrolled in the program, 90% said they had a computer at home they can use. The program met twice a week after school in the library and computer lab, and four times a week during the summer in the library and computer lab at the Boys & Girls Club. This paper focuses on 45 games created by 116 participants.

Procedures

The Girls Creating Games (GCG) Program is funded by a grant from the National Science Foundation, as part of their Research on Gender in Science and Engineering initiative. The program was implemented six different times. The girls met with female adult instructors and assistants and learned to design and program a digital game using Macromedia's Flash™ software program. Building on work that shows the benefits of collaborative learning structures for female students [15, 21], girls worked in pairs to both write and program their story. They all created interactive, story-based, choose-your-own-adventure games. All the pairs built their games using the same mechanics, but each game is unique in its themes, stories, characters and game features. Girls were provided with instructional materials and guidelines on how to build a game that would allow the player to make decisions within the context of the story narrative and follow different story paths leading to different endings. We had the girls create story games with interactive, multiple paths because girls supposedly like narrative, because the Flash software was too technical to create other types of games within the time constraints of the program, and because we agree with [3] that "storytelling" is "a nexus of change in the relationships between gender and technology" (p. 307).

Building on the work of Kafai (1995), two researchers reviewed the 45 finished games, and identified 12 sub-categories grouped within three main themes: competition and conflict, real world applications, and challenges gender stereotypes. The categories are shown in Table 1.1.

Table 1.1: Coding Categories for Games

Categories	Game Examples
Competition and conflict	
Opportunity to win and lose	Get good grades or fail a test
Opportunity for personal triumph	Score a soccer goal
Opportunity to help others	Save cats from the evil doctor
Violent feedback	Get eaten by a shark
Real world applications	
Addresses social issues	Choose between friends and homework
Deals with fears	Get in trouble with a teacher
Real-world settings	School
Teaches a prosocial lesson	It is important to study for tests
Challenges gender stereotypes	
Defying authority	Talking back to principal
Reinforces gender stereotypes	Fashion emergency
Uses humor	A ball of cheese that attacks
Female authority figures	Female sports coach

RESULTS

Our coding of the girls' games provides information about the kind of games that girls design and build. Table 1.2 provides a summary of the findings. Most games offered the player the chance to either win or lose the game; 18% had endings where the player would only win or only lose. Winning often involved getting an "A" on a test, winning a trip to an exotic place, or getting married. Ways of losing the game included getting school detention, getting hurt, or losing friends. Over half the games provided opportunities for personal triumph, such as making a sports team, or doing well in school. There were few opportunities to help others; these included saving animals and saving students at the school from evil forces. This was in contrast to the assumption stated by other researchers that girls want to use technology to help others. It is even more surprising, given the fact that instructors encouraged the girls to make games to help other students. Violent feedback occurred in less than one third of the games, and included getting hurt or killed (e.g., getting sucked into the Bermuda Triangle).

The data support previous findings that girls are interested in games that have real-world applications. The most prominent theme that emerged from the girls' games was how they expressed and worked through fears in their stories. Another level of coding revealed that the fears were about getting into trouble (50%), the threat of violence (34%), negative repercussions for relationships (20%), and school failure (11%) (the total adds up to more than 100% because some games included more than one type of fear). Fears about getting into trouble included getting detention from a school authority or grounded by their parents. Fears that focused on the threat of violence included being chased by a bear in the game "Getting Lost." Fears also involved relationships, such as concerns about social exclusion and judgment as a result of peer pressure to skip school, sneak out of the house, or listen to certain kinds of music, as in the "Music Mania" game. Fears were grounded in both fantasy (e.g., Big Foot) and realistic worlds.

Most games addressed social issues that are on the minds of teen girls. These issues were primarily about dealing with authorities (57%) and making moral decisions (45%) as in the game called "My Big School Test." Moral decisions involved making choices about hard work (especially in school) versus having fun, such as in "To Go to School or Not to Go to School."

Decisions about social issues also revolved around hiding from attackers versus helping others. In the game "A Horrifying Alienistic Experience," aliens invade the school and turn students into pigs. The player must decide whether to confront the aliens and help her classmates--putting herself at risk--or to run away. Other social issues included romantic relationships (20%), peers and parties (18%), sports (16%), animals (11%), and media (7%). Examples of games with animals include "Welcome to the Great Cat Rescue" and "Me and My Ape," where a student brings her pet to school.

Most of the games that girls built took place in real-world settings, such as the school, home, or the beach near their house. Despite the real world settings, only 53% used a social issue to teach a lesson or take a moral stand. This was also in contrast to the assumption stated by other researchers that girls want to use technology to help others. Those games that did attempt to teach a lesson tended to focus on how to behave or succeed at school, or on how to be a moral person by showing the negative consequences of lying or sneaking out of the house.

Some of the games challenged or reinforced gender stereotypes. Examples of challenging stereotypes take the form of social taboos, such as rejecting the good girl image by defying authority, or having two male characters live together as a couple. Two thirds of the games included opportunities for characters to defy authority, such as cutting school, sneaking into the principal's office, or yelling at a teacher. Examples of how female gender roles were reinforced have to do with dating boys or worrying about appearance. In the game "Cruise Line," the characters end up dancing with boys at a party, and in "Fashion Emergency" the character's reputation depends on her choosing the right outfit. Games about boys included "The Day I Got Paired Up With the Hottie" and "Dreams Come True," where the dream is to go to the school dance with the cutest boy at school.

Over half the games used humor in their stories, which was a way to play with gender role stereotypes and adult expectations about behavior. For example, in the game featuring a fictitious game show called "Who is Your Dream Date?" the character must choose between different types of dates (e.g., the romantic, the funny guy, or the quiet mature guy). Another example of humor was the pie thrown at the character Ms. Boom when she refused a marriage proposition in the game "The Story of Mr. Kaboom."

In another challenge to traditional expectations about gender roles, there were more female than male authority figures in the games. These included mothers (22%) and females in institutions, such as teachers (13%). Some games featured male authorities in institutions (29%), such as male coaches or principals.

Table 1.2: Results of Coding Games

Categories	**Percent of games**
Competition and conflict	
Opportunity to win and lose	82%
Opportunity for personal triumph	51%
Opportunity to help others	24%
Violent feedback	31%
Real world applications	
Addresses social issues	99%
Deals with fears	99%

Real-world settings	71%
Teaches a prosocial lesson	53%
Challenges gender stereotypes	
Defying authority	64%
Reinforces gender stereotypes	58%
Uses humor	35%
Female authority figures	33%

Table 1.3 provides a summary of the characters in the games. Slightly under half of the games gave the player an option to choose the character's gender, such as by filling in the name of the character. A small percentage of the games had only female main characters, and two games had only male main characters. Notably, 13% did not designate a gender category; this was most common when the characters were animals.

Table 1.3: Characters

	Percent of games
Allow player to choose sex	42%
Female main characters	22%
Mixed main characters	15%
Gender neutral or unclear	13%

DISCUSSION

The content of the girls' games is very different from the most popular games on the market today, but is not always consistent with what previous research says girls like about games. As suggested by previous research, most games had bright and vivid colors, rather than the gloomy worlds of the most popular computer games on today's market. The game content was also quite different from most popular games. Most stories took place in realistic settings, but most did not provide violent feedback. Games focused on the fears and social issues that girls face (or expect to face) in their lives. Very few games on the market today allow girls to express and work through fears about getting in trouble or doing well in school. In addition, few games provide opportunities to make moral decisions and to challenge authority figures.

As predicted, there were few games that included violent feedback, and only half that offered opportunities for personal triumph. In contrast to popular games, the violence was often comic, such as throwing a pie in someone's face, and the personal triumph focused mostly on the school or after-school setting, rather than saving the world. Very few used violence to provide feedback to the player; violent consequences were rarely the result of the player choosing a particular story path. This finding is in stark contrast to the vast majority of games created by the male-dominated computer game industry which feature violent feedback.

Our findings challenge several assumptions about what girls want in their games. Others have suggested that girls want technology that will help other people. Despite being encouraged to make a game that would help other students, only 53% actually used their game to teach a lesson, and even fewer included opportunities for the character to help others. It has also been suggested that girls like games that involve puzzles and trivia questions, but these elements did not appear in the girls' games, but this was probably due in part to the story path structure they were required to follow.

These findings also challenge the assumption that girls are satisfied with games that allow them to explore, and that it is not important to girls to have opportunities to win and lose. All games had at least three different endings, and most had both positive and negative endings. However, unlike most popular games, the girls created opportunities for winning that were not at the expense of someone else losing. Consistent with what others have recommended for games that target girls, winning often entailed accomplishing something meaningful, such as succeeding at school or having your pets love you.

Despite the fact that girls created the games, there was not an overwhelming focus on female characters. Less than one quarter of the games include only females as the main characters. While this is a greater percentage than the games marketed by the gaming industry, it is still surprisingly low. Instead, almost half the games allowed the player to name the character, and thus to choose the gender, which supports research that says girls want games that allow them to play with identities. In addition, in over ten percent of the games, the gender of the characters was ambiguous, which reflects one strategy of creating a gender-neutral game space.

There are several limitations of this study. One limitation is that almost all of the games were created in pairs, so we can not say how pairing affected the kinds of games that were created. Another limitation is that we did not ask them directly to create the kind of game they would like to play; we are assuming that they created a game that they liked. Third, the interactive story structure of the game limited the type of game the girls could create. Finally, 33 of the games were created in an after-school program, and the school placed some limits on the content they could include to make it appropriate for a school activity.

These findings have implications for understanding the intersection of gender and computer gaming. Our research suggests that when given the opportunity, girls design games that challenge the current thematic trends in the gaming industry. In particular, they use humor and defiance of authority to play with gender stereotypes and reject the expectation that girls are always well-behaved. Through their games, the girls have shown us new ways to make games and new ways to play. In particular, the games address the issues and problems that affect girls' lives and what they think about. We can use this information to make games that will engage girls in game playing. Should we design girl-specific or gender-neutral games that appeal to both males and females? The girls in this study created games that have elements that are believed to attract both genders to gaming, such as opportunities to both win and lose, and to experience personal triumph.

Our research demonstrates the ways that game production can be a site of resisting and transforming traditional gender stereotypes. Consistent with previous research, the games suggest that girls want opportunities to experiment with different notions of femininity [2] and experiment with identifying and resolving fears. In addition, looking at the games the girls built suggests they seek to explore different identities in realistic rather than fantasy settings [9]. Until now, games have served to reinforce traditional gender stereotypes and alienate females from the benefits of gaming. Our findings suggest a clear opportunity to use this powerful industry to transform gender stereotypes and transform the face of technology. In order to engage and sustain females' interest in technology, the gaming industry needs to create software to "highlight the human, social, and cultural dimensions and applications of computers rather than the technical advances, the speed of the machines or the entrepreneurial culture surrounding

them" [1].

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