

GIRLS AND GAMING: A SUMMARY OF THE RESEARCH WITH IMPLICATIONS FOR PRACTICE

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INTRODUCTION

Over the last two decades, girls and computer gaming has become a major topic of research interest. Researchers have examined a number of related issues, including the relative frequency with which girls and boys use computer games, the educational benefits of computer game use, and the types of games and game features that appeal to girls and young women. Most researchers have come to agree that

although boys and girls can be equally skilled at using computers and computer games, boys are more likely than girls to choose to play with them, and children of both sexes consider both computers and computer games to be boys' toys (Cassell & Jenkins, 1998, p. 14).

This report organizes the major findings from this body of research into thematic issues and considers the practical implications of each issue for teachers, librarians, parents, and other adults who work to connect girls to computer technology. These suggestions are summarized in Appendix A. Incorporating these ideas into the school, library, and home lives of girls can help to alter this perception of computer games as "boys' toys" to computer games as a medium of entertainment and education for all young people.

ISSUE #1: THE COMPUTER GAMING GENDER RIFT

What the Research Says:

Most researchers agree that preschool children of both sexes exhibit equal interest in computer games, but that as girls mature, their gaming interest and time investments decline (i.e. Comber, Colley, Hargreaves, & Dorn, 1997; Dorman, 1998; Funk & Buchman, 1996; Giaquinta, Bauer, & Levin, 1993; Leong & Hawamdeh, 1999; Mumtaz,

2001). In an early examination of gender and computer game playing, Crawford, Groundwater-Smith, and Millan (1989) showed that boys tend to express greater interest in video and computer games than girls. Five years later, Inkpen et. al (1994) observed girls and boys playing computer games at an interactive science museum and found a similar phenomenon. Computer gaming played a major role in the boys' lives, but it was merely a passing interest for the girls:

For almost all girls who visited the exhibit, the depth of their interest in electronic games in their lives away from the museum did not extend to talking about and reading game magazines, trading games, or expressing pride in the number they owned. The enjoyment of playing was enough to satisfy their interest (p. 392).

The age at which the gaming gender rift begins is uncertain. Some research indicates that it begins as early as kindergarten (i.e. Wilder, Mackie, & Cooper, 1985). Other authors (i.e. Gorriz & Medina, 2000) have pinpointed this rift at roughly age 13.

Implications:

The cause of girls' declining interest in computer gaming is also uncertain, but some authors have suggested that it is because most computer games have been designed for and marketed to boys (i.e. Gailey, 1996; Gorriz & Medina, 2000; Subrahmanyam & Greenfield, 1998). As Gorriz and Medina (2002) explained:

Unfortunately, the majority of today's games are aimed at a male market and in addition are not of particular interest to girls....Thus, in many cases a girl's first experience with a computer is a negative one and can turn her off of computing right from the start. (p. 42)

Although girls tend to spend less time playing computer games than boys, game playing is still the most popular use of home computers (Kafai, 1999). This means that on the average, girls enter computer science courses and workshops with less computer comfort and experience than boys. Girls' generally shallower interest in computer gaming can be an introduction to a life in which technology plays a less significant role than it does for their male counterparts.

It is important to realize that the gaming gender gap is not a mere reflection of a difference in leisure interests. Recent studies (i.e. Agosto, 2002b; Yelland & Lloyd, 2001) have shown that girls *are* interested in computer gaming. As one young woman explained when discussing the website design preferences that she and her friends share: “We're game people. We like anything with games” (Agosto, 2001, p. 90). Then why do girls express reduced interest in playing computer games as they age? That is a difficult question to answer, but two likely reasons are the common perception that computer games are boys' toys, and the disconnect between many computer games available today and girls' game content and design preferences (See Issues #5 & #6 below).

Practical Suggestions for Adults:

Adults can help to ease this gender rift by working to increase girls' interest in gaming. The GirlsTech evaluation framework (<http://girlstech.douglass.rutgers.edu/gt1b.html>) can facilitate the search for computer games likely to interest girls. The framework was developed to pinpoint educational and informational software and websites of high interest to girls, but it transfers easily to computer game selection.

Knowledge can be a strong start down a path of change. Adults can share the results of this research with other teachers, parents, and librarians, and they can discuss the issue of gender and gaming with girls themselves.

Another method of encouraging girls to increase computer game use is to create a Girls and Gaming Club. A school or public library is a perfect location for such a club to meet. Classrooms, Girl Scout troupes, and neighborhood clubs would also be excellent venues, provided that the necessary hardware and software resources were available.

ISSUE #2: REPRESENTATIONS OF FEMALES IN COMPUTER GAMES

What the Research Says:

Research has shown that most video game characters are male and that when female characters are used, they are often portrayed negatively (Deitz, 1998; Douglas, Dragiewicz, Manzano, & McMullin, 2002; Provenzo, 1991).

The research organization **Children Now** studied best-selling video games to determine that only 16% of game

characters were female (Douglas, Dragiewicz, Manzano, & McMullin, 2002). About half of the female characters were bystanders rather than active participants in the action.

In a content analysis of video games, Deitz (1998) found that most female game characters were either unnaturally large-breasted, unusually thin, and/or scantily dressed. Her analysis also indicated that the most common role of female video game characters was the role of “damsel in distress.” Similarly, Provenzo (1991) has shown that females are often either victims or prizes in video games.

Implications:

Under-representing and misrepresenting females in computer games can have insidious consequences, such as sending the message to users that males are the adventure seekers of our world, whereas females are either bystanders or completely absent from the action. Deitz (1998) suggested that negative representations of female characters can lead game users to internalize stereotypes of women as weak, easily victimized people and cause them to think of violence and victimization as normal, acceptable aspects of life.

Practical Suggestions for Adults:

Adults should be conscious of the messages that computer games send to young users. They should suggest that young people play games featuring female lead characters in positive roles, as well as games that enable users to select character genders. And if young users still prefer games that under-represent or negatively represent females, adults can use these negative representations as teaching tools for making girls and boys more aware of the messages hidden in the media that they encounter every day.

ISSUE #3: GAMING AND ACADEMIC ACHIEVEMENT

What the Research Says:

Early gaming experience can serve as motivation to study computer programming: “Computer games have provided a significant impetus for many boys to become more acquainted with computers and with programming in

particular” (Culley, 1993). It follows that young people who play games are more likely to study computer science and enter computer-related careers. Indeed, experience in computer gaming is one predictor of success in computer science course in college (Wilson, 2002).

Computer confidence based in gaming experience can also affect girls' success in problem-solving. From their observations of girls playing computer and video games, Inkpen et al. (1994) concluded that “the confidence levels of [selected study participants] affected their playing abilities and their willingness to solve problems through trial and error” (p. 396). When the girls in their study doubted their abilities, they were less likely to tackle math problems embedded in games, and they had less success in completing the games. In a similar vein, Wilson (2002) found that computer comfort level was the single best predictor of a high grade in an undergraduate computer science course.

Another educational benefit of computer games is spatial skills development. Subrahmanyam and Greenfield (1996) found ten- and eleven-year-old girls to exhibit generally poorer spatial skills than their male counterparts when playing video games. The boys made smaller errors than the girls in judging speed and distance. This study showed that increased video game practice led to improvement in spatial skills, especially for children who began the study with lower-than-average spatial skills. The authors concluded that “video games can provide a cultural push that sends both boys and girls down the developmental path of spatial skill development” (p. 108).

Finally, there is an additional educational benefit for girls who play computer games that support collaborative use. Inkpen, Booth, Klawe, and Upitis (1995) found that girls who worked in pairs or small groups solved significantly more math puzzles embedded in computer games than girls who worked alone. However, the opposite was true for the boys in the study.

Implications:

These studies offer more reasons to encourage girls to play computer games. They add up to the conclusion that “Computer and video games provide an easy lead-in to computer literacy” (Cassell & Jenkins, 1998, p. 11).

Female students continue to comprise a minority of computer science majors in both the U.S. and Canada. In the U.S., females comprised just 16 percent of the Advanced Placement computer science test-takers in 1995 and 1996

(American Association of University Women, 1999) and in Canada, the Canadian Information Processing Society found that women comprised less than 25 percent of computer technology graduates in 2001 (Clow, 2002). It is possible that boys' computer gaming dominance is a contributing factor to this disparity.

Practical Suggestions for Adults:

Adults can help girls equate computer use with personal enjoyment. Instead of presenting computers exclusively as educational tools, adults should present them as tools for entertainment as well. This will help girls *want* to use computers, rather than making them feel that they *need* to use them.

Removing the mystery from how computers work can also help to build computer comfort. Toward this end, adults can enroll girls in computer classes and other programs that involve building systems or learning how systems work. Adults who do systems work can invite girls to watch and learn as they work.

Playing a game with a more confident friend can be a confidence boost, so adults should encourage girls to play computer games together. This is especially important for girls who are shy around computers.

Lastly, adults can play computer games and use computers with girls. Playing a computer game with a daughter or granddaughter on a rainy afternoon can be a wonderful bonding experience as well as a boost to a girl's computer use confidence. An email message from an aunt or uncle can be a bright spot in a young girl's week, as well as a demonstration of the practical utility of computers.

ISSUE #4: THE NEGATIVE EFFECTS OF VIOLENT GAMES

What the Research Says:

Funk and Buchman (1996) surveyed seventh-grade girls and boys about their favorite video and computer games and the time they averaged playing games each week. They correlated the results of the survey with the Harter Self-Perception Profile for Adolescents to determine that increased time playing violent games was correlated with girls' lower scores on six of the subscales, including self-esteem: "For girls, inverse relationships were found between

typical time commitment and perceived Scholastic Competence, Behavioral Conduct, Social Acceptance, Athletic Competence, and Global Self-Worth (self-esteem)” (p. 28).

Implications:

This study does not imply that girls should refrain from playing computer games. To do so would deprive them of related benefits (see Issue #3). Instead, it implies that adults should take care to lead young females toward non-violent games, especially games that portray female characters in a positive light.

Practical Suggestions for Adults:

Encouraging girls to avoid violent computer games should not be a difficult task since, as Kafai (1996, 1998) has shown, many girls dislike violent games, preferring games that emphasize stories and characters. Agosto (2002a) conducted a content analysis of the 174 Web-based games recommended for children by Yahoo!igans.com and KidsClick.org and found that 27% contained graphic violence. In light of previous findings that graphic violence predominates in video games (i.e. Deitz, 1998; Douglas, Dragiewicz, Manzano, & McMullin, 2002; Provenzo, 1991), this study indicates that the Web can serve as a rich source of nonviolent games.

ISSUE #5: GIRLS' PREFERENCES IN COMPUTER GAME CONTENT

What the Research Says:

A number of studies have examined girls' preferences in computer game content. Kafai (1996, 1998) asked elementary school students to design their own games. The overriding theme of most of the boys' games was a contest between good and evil. The girls tended to favor storylines and character development. Other researchers have also shown that girls are more interested in games designed around storylines than around competition (Lawry et al., 1994; Inkpen et al., 1994). Similarly, the girls in Inkpen et. al (1994) were more interested in exploring game characters' personalities and lives than they were in winning the games, a finding echoed by Miller, Chaika, and Groppe (1996). Some of the girls in Inkpen et. al's study even pretended that they themselves were the characters. Unfortunately, 78.7% of the Web-based games that Agosto (2002a) analyzed were competitive in nature, indicating that Web game

designers tend to think of competition as core to the concept of gaming.

Another gender-based difference that Kafai (1996) detected in her study of elementary school children's computer game designs was in type of game locale. The girls exhibited strong preferences for real-life locales (such as houses or neighborhoods), while the boys favored fantasy locales (such as warp zones or Pac Man settings).

Using focus groups with girls in grades 6 through 12, Miller, Chaika, and Groppe (1996) asked girls to “imagine what they would like technology to do in their wildest dream[s]” (p. 30). They also asked the study participants to critique a set of computer games. Major themes to emerge included a preference for collaboration over competition, a preference for games with educational value over those designed purely for entertainment, and a preference for games that focus on human relationships.

In their study of girls' experiences with the Phoenix Quest mathematics computer game, De Jean, Uptis, Koch, and Young (1999) found that girls expressed strong preferences for female game characters over male characters, choosing to focus the game's interaction on the female characters.

Additionally, Subrahmanyam & Greenfield (1998) analyzed the case of Mattel's Barbie Fashion Designer and its success in appealing to large numbers of girls. Released in November of 1996, Barbie Fashion Designer “was the first piece of entertainment software to garner a mass market with girls” (p. 46). The authors determined that Barbie Fashion Designer appealed to girls because it contained lots of nonviolent action; the user played the role of nurturer; it allowed for role playing in a real-world situation; and it moved one of girls' common play patterns into the digital world.

Implications:

The studies discussed above indicate that girls favor the following characteristics in computer game content:

- § Games that eschew the conflict between good and evil;
- § Games that center on storylines and character development;
- § Games that are not competitive in nature;
- § Games that use real-life locales;
- § Games that feature strong female characters who are in charge of decisions and actions;
- § Games that enable users to play the role of main character, either through self-identification or through the power to make decisions;

- § Games that focus on human relationships;
- § Games with some educational value, as opposed to those designed purely for entertainment;
- § Games containing nonviolent action;
- § Games that reflect girls' common play patterns.

Practical Suggestions for Adults:

In addition to serving as selection guidelines, these studies point to other methods of increasing girls' interest in computer gaming. To foster the idea of computer games as based around stories and characters, adults can host a contest inviting girls to create storylines and casts of characters for imaginary computer games. To foster identification with existing computer game characters, adults can encourage girls to write essays explaining which computer game characters are the most like themselves and why, or which characters they would most like to have as friends in real life and why.

Until the game market begins to respond better to girls' game content preferences, adults can encourage girls to design their own games. Game design is also an excellent lead-in to the formal academic study of computer science.

Above all, adults can mold the future computer game market by sending girls to computer camps and workshops and by encouraging them to study computer programming. Then girls of today can become the next generation of game designers, and they can change the game market to reflect girls' interests.

ISSUE #6: GIRLS' PREFERENCES IN COMPUTER GAME DESIGN

What the Research Says:

Analyzing the research also illuminates girls' preferences in computer game design. A commonly found preference is for group gaming. The girls in Inkpen et al.'s (1994) study preferred playing in pairs or small groups.

Mattel Inc. research indicated that girls are more interested in playing computer games with other girls than they are in playing alone; conversely, this research indicated that boys are more interested in solo play (Heyman & Berstein, 1996).

In addition to collaborative play, researchers have learned that the quality of graphic and multimedia design is of great importance to girls (Agosto, 2001; Miller, Chaika, & Groppe's, 1996). Many girls decide whether or not a

website or game will appeal to them based on the visual design of the front page (Agosto, 2001).

Finally, research indicates that most girls prefer games that enable them to communicate with other people (Heyman & Berstein, 1996; Miller, Chaika, & Groppe, 1996). This preference seems to extend into adulthood. Jackson, Ervin, Gardner, and Schmitt (2001) found that female undergraduates used the Internet primarily for sending email, whereas undergraduate males used the Internet primarily for searching for factual information.

Implications:

These studies indicate that girls prefer the following characteristics in computer game design:

- § Games that enable them play with other players, either online or in person (by sharing the same computer);
- § Games with abundant high quality graphic and multimedia components;
- § Games that enable online communication with other players during play.

Practical Suggestions for Adults:

In addition to serving as selection guidelines, these design preferences lead to other suggestions for adults wishing to encourage girls to use computer games. First, adults can turn computer use into a social activity. Related methods include starting a computer pen pal group and encouraging girls to use computers together in small groups in class, after school, or in the library.

Adults can also create library, home, and classroom activities to capitalize on girls' interest in graphics and multimedia. For instance, the fifth grade students in Dobosenski's (2001) girls' computer club used digital cameras to take pictures of each other. They then imported the pictures into a word processing program for editing:

The girls were loud and exuberant as they shared their amusing special effects. They were so excited about the process that they couldn't sit still, and jumped from computer to computer, laughing at each other's altered images. Glitches that occurred during this activity became moments to teach the girls about potential software issues and solutions (p. 13).

CONCLUSION

Although much has been learned, research into girls and gaming is in a fledging state. As research proliferates, the importance of encouraging girls to play computer games should become more widely known, and game designers will hopefully incorporate related findings into their products. Until such time, the suggestions offered in this report can encourage girls to become equal players in the world of computer gaming.

As Inkpen et al. (1994) wrote nearly a decade ago, “The challenge then is to design electronic games which appeal to girls—that is, emphasize relationships and build confidence—while simultaneously engaging them in sound mathematics and science activity” (p. 400). This statement remains true today.

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APPENDIX A:

SUGGESTED METHODS

FOR CONNECTING GIRLS AND YOUNG WOMEN TO COMPUTER GAMES

- ✓ **Select computer games likely to appeal girls.** The GirlsTech evaluation framework (<http://girlstech.douglass.rutgers.edu/gt1b.html>) can facilitate the selection process.
- ✓ **Spread the word about the importance of the girls and gaming issue.** Share the results of this research with teachers, parents, and librarians. Discuss the issue of gender and gaming with girls.
- ✓ **Create a Girls and Gaming club.** Schools, libraries, neighborhoods, and online communities are good places to recruit members.
- ✓ **Help nurture future computer game designers sensitive to girls' needs.** Encourage girls to design their own games today, and they may become professional game designers tomorrow.
- ✓ **Be conscious of the messages that computer games convey.** Search for games that feature female characters in positive roles, and discuss negative representations of female characters with female and male game users.
- ✓ **Encourage girls to play non-violent games.** Remember that violent games can do damage to girls' self-esteem.
- ✓ **Make computer use fun.** Encourage girls to associate computers with personal enjoyment.

- ✓ **Educate girls about computers and computer science.** Enroll them in computer classes and workshops that teach computer programming or systems design.

- ✓ **Encourage girls to use computers together.** Playing a game with a friend can be a confidence boost.

- ✓ **Model computer game usage.** Play games with girls, send them email, and use computers in their presence.

- ✓ **Seek computer games with content likely to appeal to girls.** Look for:
 1. Games that eschew the conflict between good and evil;
 2. Games that center on storylines and character development;
 3. Games that are not competitive in nature;
 4. Games that use real-life locales;
 5. Games that feature strong female characters;
 6. Games that enable users to play the role of main character, either through self-identification or through the power to make decisions;
 7. Games that focus on human relationships;
 8. Games with some educational value, as opposed to those designed purely for entertainment;
 9. Games containing nonviolent action;
 10. Games that reflect girls' common play patterns.

- ✓ **Host a contest for the best new storyline and cast of characters for a computer game.** Such a contest can capitalize on girls' interest in stories and relationships.

- ✓ **Encourage girls to write essays explaining which computer game characters are the most like themselves and why, or essays explaining which game characters they would most like as friends**

and why. This activity can foster girls' personal identification with existing game characters.

- ✓ **Locate computer games with design features likely to appeal to girls.** Look for:
 1. Games that enable girls to play with other girls, either online or in person (by sharing the same computer);
 2. Games with abundant high quality graphic and multimedia components;
 3. Games that enable online communication with other players.

- ✓ **Make computer use a social activity.** Start a computer pen pal group, or encourage girls to use computers together during their free time.

- ✓ **Take advantage of girls' interest in graphics and multimedia.** Encourage them to use digital cameras and then teach them digital editing skills.