

Gender and Gaming: A Literature Review

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Abstract

Educational games are commonly used to help motivate students and provide enhanced learning opportunities. However, because of gender differences in how males and females play games, concerns regarding potential gender inequity arise when games are used for education. In order to explore what gender differences exist and how they might impact educational games, this literature review summarizes the common themes and findings of recent research articles focusing on gender and gaming. In particular, this review discusses the demographics of video game players, especially as they relate to gender; characteristics of female game players; gender differences in motivation and game style preference; gender and educational games; and the implications of gender differences on video game design.

Introduction

As technology becomes more prevalent in education, students of all ages have increased opportunities to play and learn from educational games. At first glance, educational games appear to be an ideal educational tool because they provide increased motivation for students to spend time engaged with academic concepts. However, concern arises as possible gender differences in gaming are considered. Stereotypically, most game players are males (Shaw, 2012) and females typically exhibit higher levels of anxiety than males with regards to playing online games (Huang, Hood, & Yoo, 2013). If not appropriately addressed, gender differences could promote gender inequity when games are used for education.

The topic of gender differences in video game play has been addressed often in recent research. The purpose of this literature review is to explore that recent research to determine if there are any gender differences in how people interact with games. Is so, what are those differences? And what impact should those differences have on game design?

Although gender differences in educational games is the desired focus of this research, there is much that can be learned by examining gender differences in gaming for entertainment. As such, this literature review will look at research on all types of games. This includes games played on all types of media such as computers, handheld devices, and dedicated gaming consoles.

Who Plays Video Games?

Most researchers seem to agree that the stereotypical video game player is a young, white, heterosexual male (e.g. Shaw, 2012; Williams, Consalvo, Caplan, & Yee, 2009). In considering the topic of gender and gaming, one of the first questions to arise is whether or not this stereotypical view of video game players is accurate. Each year the Entertainment Software Association (ESA) publishes a report containing statistics on video game player demographics. Many of the articles selected for inclusion in this literature review cited gender statistics from the ESA annual report (e.g. Shaw, 2012; Williams Consalvo, et al., 2009). Statistics from five ESA annual reports are summarized in Table 1. As these results are considered over time, it appears that although more men than women play video games, the percentage of women game players is increasing over time. However, as these statistics are evaluated, it is important to realize that the ESA uses a very broad definition of what constitutes a video game. Any digital game is included in this statistic, including games played on smartphones, tablets, or other handheld devices

(Entertainment Software Association, 2012). Two other studies included in this literature review looked at game player demographics. Williams and Consalvo, et al., (2009) found that 80.22% of Everquest II players were male. Similarly, Yee (2006) found that 85.4% of players of massively multiplayer online role-playing games (MMORPG) were male. From these studies we see that although the most recent ESA annual report shows that approximately 45% of game players are female (ESA, 2013), the percentage of female players varies drastically depending on the type of game.

Table 1

Summary of Research on Gender Demographics for Video Game Players

Source	Data Based On	Percentage Male	Percentage Female
Entertainment Software Association (ESA, 2006)	2006 ESA Annual Report	62%	38%
Entertainment Software Association (ESA, 2008)	2008 ESA Annual Report	60%	40%
Entertainment Software Association (ESA, 2011)	2011 ESA Annual Report	58%	42%
Entertainment Software Association (ESA, 2012)	2012 ESA Annual Report	57%	43%
Entertainment Software Association (ESA, 2013)	2013 ESA Annual Report	55%	45%
Williams, Consalvo, et al., (2009)	Random sample of Everquest II players (mean age = 33)	80.22%	19.72%
Yee (2006)	Survey data from 30,000 MMORPG users (Mean age = 27)	85.4%	14.6%

Although it is common for both men and women to say that they play games, it is less common for individuals of either gender to describe themselves as a gamer. In particular, women are less likely than men to self-identify as a gamer (Shaw, 2012). Women are also more likely than men to underrepresent the amount of time they spend playing video games (Shaw, 2012; Williams, Consalvo, et al., 2009). By comparing self-reported data to data collected from game servers, Williams and Consalvo et al. found that women underrepresented their playing time by an average of 3 hours per week, while men underrepresented their playing time by an average of 1 hour per week. Overall, men have more positive attitudes about gaming than women (Bonanno & Kommers, 2008).

Another interesting consideration related to gender demographics in games is the gender of game characters. Williams, Martin, Consalvo, and Ivory (2009) used a sample of 133 different video game titles to examine the gender distribution of game characters. Their results are summarized in Table 2. Notice that most of the game characters are male, especially if only primary game characters are considered. This indicates that many of the female characters in video games have a secondary role. The authors reported two statistics for the distribution of male and female characters, a weighted percentage and an unweighted percentage. The unweighted percentage considers all game characters equally while the weighted percentage weights characters based on the number of game copies sold. Notice that the statistic that is weighted has a higher percentage of male characters. This indicates that although game designers do create some games with female characters, the games that are being purchased are biased in favor of male game characters.

Based on these studies, we see that some women do play video games, although not as prevalently as men. In fact, women who do play games actually play games more often and for longer periods of time than men. The group of players who plays at the highest rates is older female players (Williams, Caplan, & Yee, 2008; Williams, Consalvo, et al., 2009). In order to gain a better understanding of these women, we now turn to literature that considers women as gamers.

Table 2

Gender Distribution for Game Characters (Williams, Martin, et al., 2008)

Character Group	Percentage Male	Percentage Female
All Characters (weighted)	85.2%	14.7%
All Characters (unweighted)	81.2%	18.3%
Primary Characters	90%	10%

Women as Gamers

Two of the studies selected for inclusion in this literature review explored the game play characteristics of female game players. In order to illustrate their findings, these two articles will be described. The first study was conducted by Hayes (2007) and used a qualitative case study research design to describe the game play experiences of two women. The second study by Royse, Lee, Undrahbuyan, Hopson, & Consalvo (2007) used data obtained from focus groups and in-depth interviews with women to describe the game play characteristics of women game players at different levels of play.

Hayes (2007) detailed the experiences of Joanna and Deirdre, two female graduate students who were required to play an online role-playing game as a requirement for a graduate level course on video games and learning. With both women, several aspects of their game play can be seen as a reflection of their life experiences and personalities.

For example, consider the following connections between Joanna's personal background and her game play. Joanna grew up in a family of academics who pushed her to do well in school. Joanna had the academic talent to succeed, but described herself as a troublemaker who lacked the motivation to do well in school. As a result she barely graduated from high school. Joanna's self-described identity as a troublemaker was evident in her game play. For example, while playing the game she stole items from other players and developed a reputation as a thief. She also tried to work around the rules of the game by using cheat codes she found online to avoid the aspects of the game she was less interested in.

Deirdre's personal background also showed up in her game play choices. Deirdre was very involved in a church youth group and was passionate about helping others. She had excelled in science in school, especially in chemistry. This combination of being good at science and her passion for helping others led her to consider a career as a physician. This background appeared in her game play as Deirdre made game character choices that allowed her to be a lay-healer and a magician. As a magician she created potions, something she said she liked because it reminded her of chemistry.

These two examples, and several other detailed by Hayes (2007), provide support for Hayes' conclusion that the personal background, personality, and life experiences of women have an impact on their game play. Hayes argues in favor of "developing a more holistic approach to understanding women's choices, pleasures, and challenges in game play, one that takes into account their past, present, and anticipated identities and goals" (p. 42). This case study research provides an initial look at how women's identities affect their game play. However, because of the small scale of the qualitative study, further research would be needed in order to generalize the results or draw any broad conclusions.

In her study, Royse et al (2007) separated the female participants into three separate groups: power gamers, moderate gamers, and non-gamers. Power gamers were defined as those who played games for more than three hours each week, moderate gamers played approximately one to three hours per week, and non-gamers did not play any video games. Table 3 summarizes some of the differences found among the three groups. Of particular interest is the difference in players' opinions of violent content and the over-sexualization of female characters. The power gamers were not concerned with these issues while the moderate gamers tended to avoid very violent games and expressed concern about the roles of female game characters. Non-gamers had very negative, critical opinions about games in general, for these and other reasons.

This difference of opinion among women with differing levels of experience with game play seems to support the possibility suggested by Hayes (2007) that gender might be confounded with inexperience in video game research. Women in the Royse et al. (2007) study who were experienced game players did not express the same opinions and concerns as those who played games less often or not at all. Hartmann and Klimmt (2006) further support this possibility with their observation that inexperienced male

game players often had game preferences that more closely matched those of women than those of experienced male players.

Table 3

Characteristics of Female Gamers at Different Levels of Game Play (Royce et al., 2007)

Characteristic	Power Gamers	Moderate Gamers	Non-Gamers
Level of Game Play	Played more than 3 hours per week	Played about 1 – 3 hours per week	Did not play games
Reasons for Game Play	Technologically advanced players who both played and enjoyed a variety of games	Played games to avoid pressures of everyday life	Consciously chose not to play games and had negative, critical opinions of games and gamers
Opinions about combat and violent content	Enjoyed competition and combat	Typically avoided the very violent games	Worried about game violence and addiction
Opinions about game characters or game players	Wanted game characters that were sexy and strong Enjoyed beating male players	Saw themselves as controlling the character, not being the character Expressed concern about over-sexualization of characters.	Asserted their own interpersonal skills while disparaging the perceived asocial behavior and lack of interpersonal skills of gamers

Gender Differences in Motivation for Game Play

One main gender difference that emerged in the research is motivation for game play. A series of three related articles were particularly helpful in examining gender differences in game play motivation. The first study by Yee (2006) was later expanded and replicated in a second study by Williams et al. (2008). Additional research reported by Williams, Consalvo, et al., (2009) in a third article further expanded the results reported in the second article.

In the first article in this series, Yee (2006) used survey data from 6,675 players of massively multiplayer online role-playing games (MMORPG) to research game play motivation. Using an exploratory factor analysis, he found five factors that describe the motivations of players: relationship, manipulation, immersion, escapism, and achievement. For each of the five factors, Yee found a significant difference between the scores for male and female game players. In particular, males were more likely to be

Table 4

Descriptions of Game Motivation Categories (Williams et al., 2008)

Motivation	Examples
Achievement	<ul style="list-style-type: none"> • Advancement • Analyzing Game Mechanics • Competition
Social	<ul style="list-style-type: none"> • Chatting • Casual Interactions • Developing supportive relationships • Teamwork
Immersion	<ul style="list-style-type: none"> • Geographic exploration • Role-playing • Avatar Customization • Escapism

motivated by achievement or manipulation, while females scored higher on relationship, immersion, and escapism.

Williams et al. (2008) used Yee's (2006) results to develop questions for a survey of players of the MMORPG game Everquest II. This follow-up study used a factor analysis to further revise the motivations for game play. The authors identified three main motivational factors: achievement, social, and immersion (see Table 4). Using the same survey results and data set, Williams, Consalvo, et al. (2009) looked for gender differences among these three motivation categories. They found that males were significantly more motivated by achievement factors, women were significantly more motivated by social factors, and there was no gender difference in motivation by immersion factors. These results largely replicated the earlier results found by Yee.

Overall, this series of articles contributed greatly to the existing research on motivations for game play. The data used in the latter two studies is particularly valuable because survey data from Everquest II players was linked to actual game play data provided by the Everquest II game servers. This led to data that was more reliable than the self-reported data used by most of the other studies included in this literature review. Additionally, the series of three articles provided replication for the same results based on two different sets of data. One weakness of the series of articles is that they apply to only one type of game. Games that are not MMORPGs were not accounted for in the studies, so the results cannot be generalized to all game play. However, this gap may be somewhat filled by a study by Hartmann and Klimmt (2006) that also addressed motivation for game play. This study used survey data and included game players who played a wide variety of video game types. Their results were similar to those found in the series of articles. Specifically, Hartmann and Klimmt found that men are more likely to play games because they enjoy competition and have a need to win. Women are more likely to play because they enjoy the social interaction provided by game play.

From these research studies it seems clear that men and women have different motivations for playing games. Generally, men are more motivated by achievement and competition while the women are more motivated by the social aspects of the game. Given that men and women have different motivations for game play, it would be reasonable to hypothesize that they enjoy playing different kinds of games.

Gender Differences in Game Style Preference

Several of the articles included in this literature review addressed the topic of game style preference (see Table 5). It is somewhat difficult to compare the results of these studies based on the very different descriptive labels used by researchers for game styles. However, even though different names were used, a general pattern of game style preferences based on gender does emerge.

Table 5

Summary of Research on Game Style Preferences

Researcher	Age of Subjects	Male Game Style Preference	Female Game Style Preference
Lowrie & Jogensen (2011)	10-12 years old	Action Games	“Other” Games (e.g. <i>Brain Training, Buzz!</i>)
Quaiser-Pohl, Geiser, & Lehmann, (2006)	High School Students (Mean age =14.9)	Action and Simulation Games	Non-players or Logic/Skill Training Games
Karakus, Inal, & Cagiltay, (2008)	High School Students (Grades 9 – 12)	Car Race Sports Games First Person Shooter	Action Adventure Puzzle Games Car Race Card Games Board Games

Kinzie & Joseph (2008)	Middle School Students (Mean age = 12)	Active Strategic	Creative Explorative
Hartmann & Klimmt (2006)	Adults (ages 18-26)	Competitive	Games with little violence, a non-sexualized role for females, and opportunities for social interaction

In describing the game style preference of individuals in their study, Kinzie and Joseph (2008) advocated using descriptions of the activity modes available in a game rather than using more traditional game style descriptions (e.g. first person shooter or action game). They define an activity mode as a description of a type of activity that game players like to engage in as they play video games. Six activity modes were identified: active, explorative, problem-solving, strategic, social, and creative. Using a survey of 42 middle-school age children, they determined that more children than expected prefer to engage in exploratory mode and fewer children than expected prefer to engage in problem-solving or social mode. As they examined gender differences the researchers found that males were more likely to prefer active or strategic mode while females were more likely to prefer exploratory or creative mode.

Quaiser-Pohl, Geiser, and Lehmann (2006) used a sample of 861 high school age children to study different types of computer game players. Using a latent class analysis (LCA) they divided game players from their sample into three different groups. The three groups, called latent classes, grouped together subjects who expressed similar game-playing preferences on a computer game questionnaire. Table 6 summarizes the game playing preferences of the three latent classes. Note that gender was not a consideration used creating the classes in the LCA. However, after completing the LCA the authors determined the gender distribution within each latent class. Interestingly, Class 1 was made up of approximately 82% females, Class 2 was made up of approximately 82% males, and Class 3 was made up of approximately 83% females. Using a chi-square test for independence, the authors determined that there is a strong association between computer game style preference and gender.

Table 6

Gender distributions of latent class profiles grouping subjects with similar game playing preferences (Quaiser-Pohl et al., 2006)

Latent Class	Description	Gender Distribution
Class 1	Not likely to play	18% male; 82% female
Class 2	Most likely to play action or simulation games	82% male; 18% female
Class 3	Most likely to play logic or skill training games	17% male; 83% female

Karakus, Inal, and Cagiltay (2008) looked both at what types of games children like to play and why they select that particular type of game. Their results were based on a sample of 1224 high school age children from eight different high schools in Turkey and found that males generally preferred to play games that were classified as car race, sports, or first person shooter games. Females preferred to play games that were classified as action adventure, puzzle, car race, card, or board games. Males were more likely to select a particular game because it was entertaining and females were more likely to select a particular game because it was instructive. One weakness of this study was that although some of the questions on the survey were open-ended, many of them were multiple choice and contained a very limited number of options from which the student could select their answer. In many cases the choices were rather arbitrary and did not cover all possible answers.

Lowrie & Jogensen (2011) also conducted a study to determine if there were any differences in the types of games that children like to play. Their study specifically focused on children between the ages of 10 and 12. They determined that males were more likely to play action games and females were more likely to play games labeled as 'other' (the other category contained games such as *BrainTraining* and *Buzz!*). They found no significant difference in simulation games, which was rated highly by both males and females.

Hartmann & Klimmt (2006) took a slightly different approach to examining game style preference. Rather than looking at the type of game (e.g. first person shooter or puzzle game), they looked at the type of content that was preferred by women. They created five fictional game descriptions that appeared to be the back of a video game package and asked the females in their study which games they would like to play. They found that the preference was to play games that had less violence, a non-sexualized role for female characters, and lots of opportunities for social interaction. Because this study was conducted with only female subjects, we are not able to determine whether there are any gender differences based on this result. A second study reported in the same article included both male and female subjects and found that men were more likely than women to play highly competitive games. A similar gender difference was not found in non-competitive games.

Looking collectively at these five separate studies (see Table 4) highlights the gender difference in game style preference. All four studies found very similar results, although they may have used different terms to describe the games. It appears that males prefer games with a lot of action and competition, while women tend to prefer logic, puzzle, or skill training games.

The game style preference for males also seems to align with the game play motivations discussed in the previous section of this literature review. Recall that men were motivated by achievement, which may be one reason why they enjoy playing games with lots of action and competition. For females, the same alignment is not universally seen in all of the studies. Although, most of the research agreed that females were motivated by social interaction, not all of the articles on game style preference found social games to be preferable to women. Hartmann & Klimmt (2006) did find that women preferred games with a lot of opportunities for social interaction. However, Karakus et al. (2008) found that only 1.7% of females and 2.2% of males selected games because of the social environment of the game. Kinzie and Joseph (2008) found that overall their subjects had a “lesser desire for game play involving...social modes” (p. 654) and that there was no gender difference in preferences for social modes. One reason for this seemingly contradictory research may be that all of the studies on motivations for game play were conducted with adults playing games for entertainment purposes and most of the studies on game style preference were conducted with middle- or high-school age children. As such, the results really don’t apply to the same population of game players.

Gender and Educational Games

Given that males and females have different game play motivation and game style preferences, educators should question whether or not educational games provide equal learning opportunities to both males and females. In order to help address this issue, Papastergio (2009) conducted a study comparing learning from an educational game and learning from a web-based application in order to determine if there was a gender difference. The high school students who participated in the study were divided into two groups. In group A the content was delivered through an educational game. In group B the same content was delivered through a web application. Initially, the researcher cited gender differences in gaming as the basis for his hypothesis that males would have greater learning gains from the educational game and females would have greater learning gains from the web application. However, the results of the study did not support this hypothesis. The only gender difference in the study was in pretest scores. Although females had lower pretest scores than males, there was no significant gender difference in learning gains for the educational game or for the web application. Both males and females exhibited significantly higher learning gains when content was delivered through the educational game than they did when content was delivered using the web application. Papastergio claims that this study provides evidence that educational games are a valuable resource for helping students learn and they work equally well for both genders. One weakness of this study is its limited scope. It dealt with students in one class on one subject. There is a need for similar results to be shown for other populations in different subjects and age groups.

If the results of Papstertio’s (2009) study hold true among other populations and educational games provide greater learning gains for both males and females than other web applications, then it will be especially important to consider how to best design educational games. Ideally, the goal would be to create “educational games that children will choose to play in their free time” (Kinzie & Joseph, 2008, p. 661). Educational game designers are trying to create educational games that students find fun and enjoy playing, but that also help the student engage with educational content in a meaningful way. Research on educational games has identified a few roadblocks to this goal.

Children often find educational games to be uninteresting. Boys in particular find educational games to be boring (Kinzie & Joseph, 2008). Girls expect games to have an instructional component while boys just want games that are entertaining and competitive (Karakus et al., 2008). Bonnano & Kommers (2008) found that females often see games as just one possible way to learn something that could also be learned another way. Males, on the other hand, see games as a unique learning experience that couldn't be achieved in another way. This tends to make females more skeptical about the value of games for education than males. In order to overcome these potential game design difficulties, it becomes very important that educational games are well designed using a method that takes gender differences into account.

Implications of Gender on Game Design

As has been detailed in earlier sections of this literature review, there are gender differences in motivations for game play and game style preference. In order to appeal to a larger audience, game designers should come to a better understanding of those differences. Some specific design suggestions were provided in a few of the articles included in this review. Specifically, Kinzie and Joseph (2008) offer some suggestions for designers of educational games and Shaw (2012) provides suggestions for designers of games for entertainment.

Kinzie and Joseph (2008) base their suggestions for game designers on the results of their study of activity modes in video games. They suggest incorporating opportunities for students to engage in exploratory mode or problem-solving mode to appeal to players of both genders. Exploratory mode is particularly desirable because it scored quite high for both males and females, but it scored especially high for females who might already be at a disadvantage when it comes to video games because of the cultural and social idea that video games are better for boys. In designing a game that is meant to appeal particularly to girls, such as a game to help girls develop an interest in math and science, Kinzie and Joseph recommend using the creative activity mode. And to help promote interest in educational games for boys, who are often bored by educational games that they don't find fun, they recommend providing opportunities for active and strategic modes. Although they provide suggestions for creating games that appeal to a single-gender, Kinzie and Joseph's main recommendation is to incorporate as many activity modes as possible into an educational game in order to appeal to as broad of a game playing audience as possible.

Shaw (2012) points out that by creating 'girl games', game designers increase the gender divide in the gaming industry by further separating women game players from the more mainstream games. Rather than creating games that appeal to a single target audience, Shaw (2012) recommends that designers create games that incorporate diversity.

It seems particularly important to notice that researchers provide the same suggestion to designers of both educational games and games for entertainment: create games that appeal to a diverse game playing audience. Progress towards achieving this goal might also be made if there were more female game designers. Williams, Martins, et al. (2009) found that the demographics of video game designers closely mirror the demographics of game characters. In particular, approximately 80% of game designers are male and about 80% of game characters are male. Having both male and female game designers working together on the creation of games may help achieve the goal of designing games that appeal to a broad game playing audience.

Conclusion

Based on the articles included in this literature review, there do appear to be gender differences in how people interact with video games. In particular, men and women have different motivations for game play and different game style preferences.

Men generally prefer to play games that are active and competitive, while women prefer logic, puzzle, and skill training games and enjoy social interactions provided by games. These gender differences provide some unique challenges to game designers as they attempt to design games that appeal to as broad of a game playing audience as possible.

Games are often used in educational settings because it is thought they provide increased learner motivation. It is particularly important in an educational setting to use games that appeal to both genders in order to provide equal educational opportunities to all students. Based on the recommendations of Kinzie and Joseph (2008), designers of educational games should try to incorporate as many different types of game play activity as possible. In particular, opportunities for exploratory play are particularly attractive to

children of both genders. As game designers incorporate these and other game design suggestions in order to appeal to children of both genders, they will hopefully come closer to achieving the goal of creating games that will allow all children opportunities to learn.

References

- Bonanno, P. & Kommers, P. A. M. (2008). Exploring the influence of gender and gaming competence on attitudes towards using instructional games. *British Journal of Educational Technology*, 39(1), 97-109. doi: 10.1111/j.1467-8535.2007.00732.x
- Entertainment Software Association. (2006). *Essential facts about the video and computer game industry*. Washington DC: Author. Retrieved from: http://www.theesa.com/facts/pdfs/ESA_EF_2006.pdf
- Entertainment Software Association. (2008). *Essential facts about the video and computer game industry*. Washington DC: Author. Retrieved from http://www.theesa.com/facts/pdfs/ESA_EF_2008.pdf
- Entertainment Software Association. (2011). *Essential facts about the video and computer game industry*. Washington DC: Author. Retrieved from http://www.theesa.com/facts/pdfs/ESA_EF_2011.pdf
- Entertainment Software Association. (2012). *Essential facts about the video and computer game industry*. Washington DC: Author. Retrieved from http://www.theesa.com/facts/pdfs/ESA_EF_2012.pdf
- Entertainment Software Association. (2013). *Essential facts about the video and computer game industry*. Washington DC: Author. Retrieved from http://www.theesa.com/facts/pdfs/ESA_EF_2013.pdf
- Hartmann, T. & Klimmt, C. (2006). Gender and computer games: Exploring females' dislikes. *Journal of Computer-Mediated Communication*, 11(4), 910-931. doi: 10.1111/j.1083-6101.2006.00301.x
- Hayes, E. (2007). Gendered identities at play: Case studies of two women playing Morrowind. *Games and Culture*, 2(1), 2-23. doi: 10.1177/1555412006294768
- Huang, W. H. D., Hood, D. W., & Yoo, S. J. (2013). Gender divide and acceptance of collaborative Web 2.0 applications for learning in higher education. *The Internet and Higher Education*, 16, 57-65. doi:10.1016/j.iheduc.2012.02.001
- Karakus, T., Inal, Y., & Cagiltay, K. (2008). A descriptive study of Turkish high school students' game-playing characteristics and their considerations concerning the effects of games. *Computers in Human Behavior*, 24(6), 2520-2529. doi: 10.1016/j.chb.2008.03.011
- Kinzie, M. B., & Joseph, D. R. D. (2008). Gender differences in game activity preferences of middle school children: Implications for educational game design. *Educational Technology Research & Development*, 56(5/6), 643-663. doi: 10.1007/s11423-007-9076-z
- Lowrie, T. & Jorgensen, R. (2011). Gender differences in students' mathematics game playing. *Computers & Education*, 57(4), 2244-2248. doi: 10.1016/j.compedu.2011.06.010
- Papastergiou, M. (2009). Digital game-based learning in high school computer science education: Impact on educational effectiveness and student motivation. *Computers & Education*, 52(1), 1-12. doi: 10.1016/j.compedu.2008.06.004
- Quaiser-Pohl, C., Geiser, C., & Lehmann, W. (2006). The relationship between computer-game preference, gender, and mental-rotation ability. *Personality and Individual Differences*, 40(3), 609-619.
- Royse, P. Lee, J., Undrahbuyan, B., Hopson, M., & Consalvo, M. (2007). Women and games: technologies of the gendered self. *New Media and Society*, 9(4), 555-576. doi: 10.1177/1461444807080322
- Shaw, A. (2012). Do you identify as a gamer? Gender, race, sexuality, and gamer identity. *News Media and Society*, 14(1), 28-44. doi: 10.1177/1461444811410394
- Williams, D., Yee, N., & Caplan, S. (2008) Who plays, how much, and why? Debunking the stereotypical gamer profile. *Journal of Computer-mediated Communication*, 13(4), 993-1018. doi: 10.1111/j.1083-6101.2008.00428.x
- Williams, D., Consalvo, M., Caplan, S., & Yee, N. (2009). Looking for gender: Gender roles and behavior among online gamers. *Journals of Communication*, 59(4), 700-725. doi: 10.1111/j.1460-2466.2009.01453.x
- Williams, D., Martins, N., Consalvo, M., & Ivory, J. (2009). The virtual census: Representations of gender, race and age in video games. *New Media and Society*, 11(5), 815-834. doi: 10.1177/1461444809105354
- Yee, N. (2006). The demographics, motivations and derived experiences of users of massively-multiuser online graphical environments. *Presence: Teleoperators and Virtual Environments*, 15(3), 309-329. Retrieved from EBSCOhost

Appendix A

Appendix A

Brief Summary of Articles Included in the Literature Review

Researchers	Methodology and/or Subjects	Problem Statement, Research Question(s), or Hypothesis(es) Related to Gender	Summary of Findings
Bonnano & Kommers (2008)	<p>Development of an instrument to examine gaming attitudes.</p> <p>Survey of 170 students (ages 16-18)</p>	Is there a gender difference in attitudes toward gaming?	<p>Males are more confident in game playing skills and game hardware than females.</p> <p>Males played for entertainment and relaxation while females were more likely to only play games for education.</p> <p>Overall males have a very positive attitude about gaming and females have a less positive or neutral attitude towards gaming.</p>
Hartmann & Klimmt (2006)	<p>The first study was based on a sample of 317 females (ages 18-26).</p> <p>The second study used an online survey of 795 users of German computer-game-related websites (only 18 participants were female).</p>	<p>The first study hypothesized that females interest would be low if a video game involved violence, an over-sexualized female protagonist, and few opportunities for social interaction.</p> <p>The second study hypothesized that more men would play competitive computer games than women and that men would express more of a need to win.</p>	<p>Women typically prefer games with low violence, lots of social interaction, and a non-sexualized portrayal of women. However, there were women who went against the general trend, most often with respect to violence.</p> <p>Men were much more likely than females to play highly competitive games.</p>
Hayes (2007)	<p>Case Study Research</p> <p>Two female adult graduate students</p>	Describe the experiences of two women with playing Morrowind. Explore how they enacted gendered identities and how they engaged with new forms of identity.	<p>The two women both let their own personal identity impact the choices they made, more than just making choices because they were women.</p> <p>Women from similar backgrounds can have very different responses to gendered practices.</p>

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Karakus, Inal, Cagiltay (2008)	Descriptive Study Survey of 1224 high school age children in Turkey	What are the most favored computer game genres for males and females? What aspects of those games do they like the most? What is their opinion of the value of games for education and the effects of games on players' behavior?	Males preferred car race, sports, and first person shooter games. Females preferred action adventure, puzzle, car race, card, or board games. Females wanted games with an instructive element while males wanted games that were competitive and entertaining. Females were more skeptical about the value of games for education and expressed more concern about negative behavior effects of games.
Kinzie & Joseph (2008)	Survey of 42 middle school age children (average age is 12)	The survey attempts to describe information in four categories: 1) demographics and game play experience, 2) character, setting, and help preferences, 3) activity mode preference, and 4) activity mode attitude.	Children prefer to play with a character that is similar to themselves in gender and ethnicity, but slightly older. The most preferred activity modes for boys were strategic and active. For girls, creative and explorative. There was no gender difference for the problem-solving or social activity modes.
Lowrie & Jorgensen (2011)	Survey of 426 children in Australia (ages 10 – 12)	Are there gender differences in the amount of time spent playing games? Are there gender differences in the types of games children play or the mathematics sense-making obtained through games?	Boys played games more days per week than girls. On school days there was not a significant difference in the amount of time spent playing games. On non-school days, boy played significantly more than girls. Boys liked games with more action and girls liked the “other” category. Both liked simulation games the most.
Papastergiou (2009)	Experiment 88 Greek high school students in a required computer course	Hypothesized that males would exhibit greater achievement and have more positive attitudes than females when learning was based on an educational game. Hypothesized there would be no gender difference when learning was based on a web-based non-gaming application.	They found no gender differences in achievement or in attitudes. Both boys and girls had greater achievement and more positive attitude when learning was based on an educational game rather than a web-based non-gaming application.

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Quaiser-Pohl, Geiser, & Lehmann (2006)	Used a mental rotation test (MRT) and a computer game experience questionnaire. 861 individuals (ages 10-20)	They hypothesized that males and females would have different game preferences and that males would perform better than females on the MRT.	There is a gender difference in game preference with males being more likely to play action or simulation games and females being more likely to not play any games or to play logic or skill training games. Males performed better than females on the MRT. Males who played games often performed better on the MRT than males who did not play as often.
Royse et al. (2007)	Qualitative research to provide thick descriptions of women game players Focus groups and interviews with 20 female adults	Why do women play games? How do women's perceptions of themselves affect their decision to play games? Do games have an effect on women's identity?	Females who with different levels of game play experience played games for very different reasons and had very different opinions about games and gamers. Findings support the theory that "gender and technology have a reciprocal relationship" (p. 574).
Shaw (2012)	Ethnographic and Grounded Theory Research Interviews with 27 adults	Determine how and why people identify as gamers or not.	Men are more likely than females to identify as a gamer. There is a perceived negative connotation for identifying as a gamer.
Williams, Yee, & Caplan (2008)	Descriptive Study/ MANOVA Survey of 7,129 adult Everquest II (EQII) game players	What is the gender distribution of MMO players? What are the motivations of MMO players?	Men outnumbered women 4 to 1, but that the average playing time was higher for women and for older gamers than it was for young players or male players. Older female players are playing at the highest rates. Motivations for game play can be divided into three categories: achievement, social, and immersion.
Williams, Consalvo, Caplan, & Yee (2009)	Descriptive Study/ MANOVA Survey of 7,129 adult Everquest II (EQII) game players	What are demographic differences between men and women? What gender differences are there for motivation, length of game play, and health benefits?	Men are more motivated to play by achievement; women are more motivated to play by social interactions. More men play games, but women who play are older and play for more hours than men.

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Williams, Martin, Consalvo, & Ivory (2009)	Sample of 133 different video game titles – weighted by popularity	How frequently are males and females represented as characters in video games?	<p>Most video game characters (85%) are male. This percentage of male characters is even higher (90%) when considering only primary characters.</p> <p>The percentage of male characters is higher when games titles are weighted by popularity – indicating that games with male characters are purchased more than games with female characters.</p>
Yee (2006)	Online survey of 30,000 MMORPG players over a 3-year period	<p>What are the demographics of players of MMORPG?</p> <p>What are game play motivations for MMORPG players?</p>	<p>Includes a detailed description of demographic information for male and female game players.</p> <p>Five factors were found to describe motivation for game play: relationship, manipulation, immersion, escapism, achievement. Females scored higher on relationship, immersion and escapism, while males scored higher on achievement and manipulation.</p>