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Building Virtual Spaces

Games as Gatekeepers for the IT Workforce

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Abstract. The percentage of young women choosing educational paths leading to science and technology-based employment has been dropping for several years [1, 2]. In our view, the core cause for this phenomenon is a lack of interest and social support on the part of the girls and their families and not a lack of ability. The specific aim of this paper is to evaluate the utility of building virtual environments in influencing girls' interest in computer-related educational paths and careers. This is evaluated through an intervention, or action-research, in the form of a class named *Gaming for Girls*. This class was offered to middle and high school girls three times over the years 2005-2006. We assert playing and developing computer games can lead to the acquisition of tangible IT skills and a higher sense of self-efficacy in terms of computer use. In particular, we discuss intervention methods that aim at changing socialization patterns by bringing girls into an all-girl classroom, reducing game violence by altering the forms of game action, and removing potentially negative character designs by allowing girls to design characters and game interaction themselves. We assert that within the information economy, playing video games is an advantage.

1 Introduction: The Problem

The percentage of young women choosing educational paths leading to science and technology-based employment has been dropping for several years [1, 2]. The

core cause for this phenomenon is a lack of interest and social support on the part of the girls and their families and not a lack of ability. The specific aim of this paper is to evaluate the utility of building virtual environments in influencing girls' interest in computer-related educational paths and careers. This is evaluated through an intervention, or action-research, in the form of a class named *Gaming for Girls*. This class was offered to middle and high school girls three times over the years 2005-2006. We believe that this intervention is one mechanism to increase middle and high school girls' exposure to computers, programming, and IT employment in order to demystify the technology and IT profession. In so doing, it challenges the prevailing stereotype of IT professionals in a way that would enable girls to 'see themselves' in this career as well. Thus, we define our research questions as follows: (1) Did the use of activities around building virtual environments and experiences motivate and capture the interest and attention of middle and high school female students? (2) Did students gain significant exposure to diverse images of IT education and employment? (3) Did students gain computer skills and increased information literacy? The data presented in this work is drawn from the students and parents involved in these classes.

Currently, we do not understand why women students do not select IT as a career choice. The vast majority of students enrolled in educational programs in information technology and employees in the information technology workforce are male [3-5]. Despite numerous efforts to recruit and retain women students into both educational programs in IT and the IT workforce, these efforts have largely proved unsuccessful. In addition, despite the current availability of high-paying and often prestigious positions in IT, a common observation finds that women remain acutely underrepresented at the higher-paying professional and managerial levels [6-11]. Women now represent a significant proportion of the labor force, yet they are underrepresented in the IT workforce. Women accounted for 46.5% of the American labor force [2] in 2005 and only 32.4% of the IT workforce [2]. ITAA [6] reported that the percentage of women in the overall IT workforce actually dropped from 41% to 34.9% in 2003.

This under representation of women in the IT workforce can be attributed to a "pipeline" issue. Women earn significantly fewer undergraduate degrees in computer science and engineering than their representation in the U.S. population. When examining the participation of women in IT, it is significant to observe that in the US there generally is a decrease in the participation of women in the field of computer and information science in a progression up the ranks of education [3-5]. In turn, this collegiate trend may be traced back to the middle and high school experience for women students. Women students continue to track out of math and science classes, without which they do not have the foundation on which to build IT careers. American cultural expectations and influences often convey the message that women are unsuitable for the IT world [12, 13]. By the time young women reach college, there is evidence of the effects of these social norms and expectations. For example, in years prior to college, research studies have revealed that some women exhibit lower levels of self-efficacy in computing, smaller amounts of informal and

voluntary computer exploration in computer camps and clubs, and have misconceptions of IT workers and IT work [14, 15-22].

In the middle and high school setting, young women students are faced with immense forces of cultural reproduction in which the values, norms, attitudes, and beliefs of their predecessors are instilled in the current generation [23, 24]. At times, these cultural agents of socialization may act as gatekeepers for items of social value such as degrees, jobs, social networks, and forms of social capital.

2 Review of Literature

2.1 Games as Gatekeepers

The metaphor of gate-keeping or gatekeepers is ubiquitous across disciplines including communications [25, 26-28], economics [29], education [30-32], political science [33, 34-36], and psychology [37]. Gate-keeping is commonly defined as institutionalized control mechanisms that allow some elements, people, ideas, etc. to pass through to a new status and others not. In most definitions, the gate-keeping function is seen as a passive set of norms, rules, and laws through which some may pass, not unlike a semi-permeable membrane. However, more modern definitions have seen this same function as active and imbued with institutional agency, encouraging and rewarding some elements, people, and ideas over others.

We use the gate-keeping metaphor for computer games because of its relationship with highly useful computer skills that may be gained in the process of playing them. Jobs that require IT skills are wedded to wealth, power, and prestige, and the traditional means of achieving those is through education. However, there exist fast tracks to these skills and employment and gaming is one of those. Youths who play games gain technology skills [38]. We believe that computer games serve a gate-keeping function because by playing games, people learn IT skills they might not otherwise learn. We assert that within the information economy, playing video games is an advantage.

Academics have noted this as well. There is a direct link between playing computer games and successful student performance in computer classes [38]. Several authors have also made the link between computer game play and interest in future careers in computer science or related fields [39-41]. For several authors the connection is straightforward: girls that do not play computer games usually become women that do not use computers [42, 43]. Ritterfeld and Weber state that giving girls the opportunity to develop their own video game could enhance their interest in technology and help overcome gender differences in technological skills [44]. Huff supports this claim by stating “we know now that software design can carry social values, can influence the behavior of others, and may even contribute to influences on career choice” [45, p. 115].

Therefore, playing and developing computer games can lead to the acquisition of tangible IT skills and a higher sense of self-efficacy in terms of computer use. However, as we will discuss below, there are some unidentifiable barriers to

engaging girls in games in the same ways boys do. If women are to benefit from the fast tracking aspects of game playing, on-ramps must be built for them so that they can fully engage the space as well.

2.2 Games and Learning

Students learn well when actively engaged in discovering and building their own understanding of new concepts and skills [46, 47]. Constructivist Learning Theories or Learning by Design Theories guide these educational activities using games [48-54]. As students designed their own programs to create games, they developed an informal understanding of mathematics and computer science formalisms [55]. With the recent drop in students entering the computer science and related fields, academic departments have introduced game design into their curricula with the intent of recruiting and retaining new students [56]. The belief is that students' familiarity with games can be used to motivate computer science learning and attract and retain future generations of computer scientists. In one study, students who enrolled in experimental game design courses averaged higher grades than those students who did not enroll (in control-group classrooms). More important, 88% of students registered in game design courses continued in the major compared to 47% for the control groups [57]. Kafai [58, 59] states that by building games, students learned programming and other IT skills. An example of the use of game design and building as a learning activity includes the work on *Alice* at Carnegie Mellon University [60]. *Alice* is a visual programming environment that makes 3D graphics accessible to novices. Due to the massive learning curve for creating games from scratch, several research efforts have been engaged in developing authoring tools to reduce the complexity of programming, thus encouraging novice participation [61-65].

Several recent authors have claimed that a range of skills can be acquired by designing video games, including programming, mathematics, software engineering, project management, and graphical/sound design [55, 66-68]. Games provide a good environment for promoting different types of learning, including problem solving and creative thinking [69]. While learning through design and game design has elicited research interest, few have focused this research lens on learning and design and gender [70, 71]. Perhaps this is caused by the disparity between the percentages of men and women who play games as discussed in the following section.

2.3 Gender and Games

The small growth of the research surrounding computer games and gender has coincided with the massive growth of the computer game industry. In 2001, the computer-game market generated $1 billion more in revenues than the motion picture industry [72]. By 2004, the game industry in the United States reached $9.9 billion in sales [73]. As the game industry has grown, the lack of women consumers and developers is undeniable. Cassell and Jenkins [42] introduced the topic of the

gender gap in games and argue that while "games for girls" can be made, the paltry state of research in the area may advance the gender gap rather than alleviate it. Ray [74] argues that if more girls played games, they would be more comfortable with computers in general, which would eliminate a disparity in the video game market. Unfortunately, much of the initial work with gender in games lacked empirical evidence and resulted in mostly anecdotal conjecture. What we do know from this literature is that age and gender are the most important factors in predicting video game use [75], males play more often than females among adolescents [76], and from a marketing standpoint, males are "specifically targeted by the marketing efforts of software firms." [77]

After this first foray into research on gender and games, academics have entered the space and attempted to answer several fundamental questions. The first, and perhaps most pressing question, is "why are women not attracted to video games?" Four main reasons arise from this research: 1) socialization, 2) violence, 3) hyper-sexualized, objectified, and shallow female characters, and 4) male adeptness with technology. Parents do not encourage girls to play video games in the same way they do boys [78], resulting in a problem of socialization. The violent content that is common to games can also deter women. Buchman and Funk [79] suggest that females prefer different types of content than boys (non shooting-type violence), and Gorriz and Medina state that, "girls are more interested in creating than destroying." [40] Several authors state that games depict female characters in unappealing ways using negative stereotypes [39, 80-82]. Finally, Natale [77] gives a biological or cognitive foundation for the disparity, stating that boys have an "innate affinity with technology and lean towards inquisitively figuring out how things work and delves deeper into complex, technical matters." This last point, that the cognitive differences between males and females can explain the disparity between game players and non-players, has been mostly debunked. Kiesler [38] found that while girls generally performed more poorly than boys when they were first exposed to a game, girls played as well as boys after a period of practice.

In the research presented in this paper, we focus on the first 3 potential causes. In particular, we discuss intervention methods that aim at changing socialization patterns by bringing girls into an all-girl classroom, reducing game violence by altering the forms of game action, and removing potentially negative character designs by allowing girls to design characters themselves.

3 Gaming for Girls: The Class and Intervention

We have developed a set of weekend courses for middle and high school girls, called *Gaming for Girls*. In the *Gaming for Girls* courses, girls were taught technology skills, including programming, design, and visual editing, through developing video games [83, 84]. Since this work is primarily an intervention, it can be seen as a form of action research in which we have both research goals and intervention goals. Action research seeks to change something about the environment being studied and involves a cyclical process in which research, action and

evaluation are interlinked. The action research process is often conceived as a spiral in which both the researchers and the subjects engage in self-reflective planning, acting, observing, reflecting, and re-planning [85-90]. Our interventional goals for this project are to stem the tide of female attrition from computer-related disciplines, to increase middle and high school girls' exposure to technology and the IT profession, and to challenge the prevailing stereotype of IT professionals in a way that will enable girls to 'see themselves' in this career as well. As stated by The FunWorks/Career Resources Network project, when intending to influence young women to consider careers in science and technology, "a program designed for middle school students should allow the students to explore multiple careers and be deliberately structured to widen their concepts of future possibilities. Counselors should expect the students to arrive with sex-role stereotypes, especially with respect to STEM (science, technology, engineering and math) and vocational careers, and need to explicitly show students how these stereotypes are limiting." [91]

At the time of publication of this work, this class has been offered three times: Fall 2005, Spring 2006, and Summer 2006. Each Fall/Spring class spanned five weeks in four-hour weekend lab sessions (Summer students covered the same materials in a highly intensive week-long camp session). The class is currently being offered (Fall 2006) and is expected to continue to be offered in the future.

During these weekly sessions, students learned how to use specific game building technologies, including Game Maker, RPG Maker XP, and Warcraft III, to build games and interactive stories. Each student was expected to complete a working game by the end of the fifth week. Students engaged in a show-and-tell activity with parents, instructors, and school personnel during the last session. Class size ranged from 20-27 students. Survey data was collected during classes to tackle the research questions discussed previously.

3.1 Data Collection

Our principal research questions are:

1. Did the use of virtual environments and computer gaming motivate and capture the interest and attention of middle and high school female students?
2. Did students gain significant exposure to diverse images of IT education and employment?
3. Did students gain computer skills and increased information literacy?

The principal method of data collection discussed in this paper is through surveys. In the larger research setting observational data and student project analyses were also conducted in later instances of the class, but these data are not included in this paper out of concern for space. During the first two instances of the class (Fall 2005 and Spring 2006), the surveys were administered on paper. The students were asked to answer approximately 50 questions, 10 questions each day, for the five days of the course. During the summer of 2006 the surveys were moved online

(surveymonkey.com). The core student questions remained the same, but the surveys evolved to include a parent pre and post survey as well. The data for this paper are drawn from the following sources, student surveys (Fall, 2005, paper), student surveys (Spring, 2006, paper), student surveys (Summer, 2006, online), parent surveys (Summer, 2006, online), and the initial review of current student and parent surveys (Fall, 2006, online). The student surveys included the following sections (1) motivations and influences to take the course, (2) relationships with computer technologies, (3) relationships with computer games, (4) interests, activities, and future plans, (5) demographics, (6) reflections of learning in the course, and (7) perceptions of future applications of skills/course materials. Parent surveys included the following sections, (1) daughter's motivations for taking the course, (2) family computing, (3) daughter's computing activities, and (4) family background and demographics. The data presented in the following sections is descriptive and qualitative in nature, despite having been collected via survey. The data must be seen as micro-case studies of each class instance, aggregated for the purposes of this paper into a useful framework. This data cannot be generalized from this work, but may have implications for future work in this area.

4 Findings and Analysis

We have organized this section around the three research questions listed above. In each subsection below, we make several points and support these with a few illustrative quotes from both parents and students.

4.1 Games: To Capture and Motivate

On the first day of class we asked students to talk about their motivations and hopes for the class. Most students expressed some excitement for creating a game. The most common response was "Making a game!" One student said, "After this morning's class, I'm excited to start working on more RPGs and perhaps even buy the program and make my own RPGs later." Most of the other students expressed a desire to creatively bring their stories and characters to life. Another common response was "Making my story!" A student said she was most interested in, "making my characters talk, building a world, and making an interesting story." From the summer class data, when asked why they decided to take the course they overwhelmingly chose 2 reasons: they stated they liked computers (68%) and games (68%), and they thought the class would be fun (61%). When asked directly how they felt about computers, 83% felt they "Loved them."

One week after the end of the last day of each course parents were asked to take a final survey. When asked what long term effects the class has had on their daughter, slightly more than half of the parents said they had noticed some change. One parent said that the class had, "challenged her in a fun way and she enjoyed it." Another parent stated, "At first she was extremely enthusiastic about pursuing technology as a possible career choice. This is something that I will need to follow-up on to ensure

that she is given the opportunity to explore. Additional classes would be of great interest." A mother of one of the students said about her daughter, "She wears her tee-shirt with confidence and talks often about her camp experience. She also talks more about enrolling in the College of IST and would like to explore possible scholarships, grants, and/or funding for that program." Another mother stated that her daughter "has purchased the software and is making new games already." Parents of two students stressed how much fun their daughters had had in the course stating, "That computers can be fun!" and "She learned the math she has been studying in school can have a real application. She learned programming can be fun."

In regards to this first research question, it seems clear that the use of virtual environments and computer gaming motivated and captured the interest and attention of the students in our classes. The results were overwhelmingly positive. The students enrolled in the class because of their interests in computers and gaming and those interests grew during and after the class. The parents perceived that their daughters enjoyed the class and were inspired to do more with what they had learned. These strong positive results must be tempered by the strong limitations of this study. This population was self-selected. The students who enrolled already had an interest in computers and gaming before they enrolled in the class or they would not have been interested. In addition, this self-selected sample also possessed some computer skills before they took the class. All of the students also came from middle class homes in which there existed at least one computer connected to the Internet via broadband. Perhaps the most valuable point from this data was that some of the students were surprised by how much fun they had, by how much they learned, and by their own growing interest in the field of computers and gaming. While the data can say nothing about the effects this class might have on a truly general population, it obviously had some positive effect on this narrow, self-selected sample. This question obviously demands further research. If the question was truly to be answered, without limitation, it would have to encompass several classes of random, conscripted students (non self-selected). Ideally, this random sample would encompass students who felt both negatively and positively oriented toward computers and gaming, as well as those of diverse skill levels and socioeconomic backgrounds. However, to ensure this coverage, a more stratified random (quota sample) sample could be drawn among several populations.

4.2 Exposure to Diverse Images of IT Education and Employment

On the last day of class we asked the students their opinions concerning their experiences in the class. Most said they had fun and learned a lot. However, one third stated that it inspired them to think more about computer related fields as a career. One student said, "It was so fun and I like working with computers now." Another student said, "I realized that computers are more awesome than I originally thought." Another student said she loved the class because, "I love computers, so I plan on going to IST when I go to college." From the summer class data, 52% of the

students predicted that after college they would use computers in their work “as a tool to do something else” while 32% stated they would use computers as the focus of their work, 30% predicted they would get a 4-year degree, and an additional 42% predicted they would go on for a professional degree.

On the last day of class we asked the students to describe what kind of job someone might get with a degree from a school like IST. The majority of the students responded with “There are too many to list,” or something like, “All of them, of course.” A few students expounded on this sentiment and named particular jobs. One student said with an IST degree you could hold the jobs of, “computer programming, game design, computer maintenance, computer sales, working with computers for science experiments or business, operating a computer for business.” Another student said, “Computer technician, network admin, computer programmer, data manipulator, accountant, graphic artist, computer science teacher, software tester and a lot more other jobs.” One student said, “I don't know . . . I suppose all kinds. I'd assume it'd be easy to get a job in low-paying jobs, but they'd also be able to get jobs in good things, like computer repair/help, information booths, game design, website design, etc., etc.”

Before the course began, we asked the parents what they hoped their daughter would get out of the class. From both summer and fall data, 30% hoped that the class would “spark her interest in math, science or technology.” Additionally, in second place parents hoped their daughter would “Eventually choose a career using computers” (20%) and “learn how to make computer games” (20%). One parent stated that she hoped her daughter:

> will learn about programming without thinking she is doing something difficult like taking a class in programming but will be doing this as she is having fun. I also hope the class will introduce her to possible careers using a computer as she is talented in this area but may not know how to apply these skills to a career of her liking.

However, few of the parents actually thought that the class would influence their daughter’s choice of a computer related career (16%). However, it is worth noting that some parents included some textual responses in which they expressed the hope that their daughter would, "become more interested in computers" or “she will decide if she would like to pursue further computer studies in high school, possibly leading to college study." One parents stated, “I hope that she will learn that working with computers can be as much fun as playing with them I hope that she will learn about IST careers.”

One week after the course had ended parents were surveyed again. Drawing from summer data, 88% of parents felt that the camp may have influenced their daughters’ perceptions of working with computers. One father stated about his daughter, “I believe [my daughter] learned that IST is not just fixing computers or writing software programs, she learned different ways IST applies to many areas, including artistic avenues which she is interested in pursuing as a career.” One parent stated, “I believe she learned there is more to technology especially information technologies

than hardware and software, that there are many other useful and interesting applications."

In terms of the second research question, did students gain significant exposure to diverse images of IT education and employment, the results here are more mixed. Both parents and students alike expressed the belief that the class had inspired them or their daughters to think about education and a future career using computers. However, in many cases because of the self-selected nature of the sample, these efforts may have just reinforced previously existing education and career interests. One of the goals of this research was to eliminate the negative stereotypes that prevail concerning IT work, predominantly those that portray the work as male-dominated, solitary, boring, and non-creative. In this light the effort was successful. The students left the class seeing IT work as creative and fun, a team effort, and obviously done by women. However, while accomplishing this goal the class showed the students an alternative image of IT work, not the diversity of it. Perhaps if more breadth of IT work options had been shown it would have inspired more of the students to think about computer oriented education and work paths. If this class is ever expanded to a non self-selected sample, this change would be essential.

4.3 Increased IT Skills and Self Efficacy

On the first day of class the students were asked several questions to determine their confidence level with computers and their perceived self-efficacy. Twenty-four percent felt they knew a lot about computers, 48% felt they knew [somewhat] a lot about computers. Fewer claimed they knew a lot about computer games (60%). Fewer still felt they knew very little about programming (80%). Several expressed some concern about being able to manage the programming aspects of the course. One student stated, "Learning to Learning to use programming to create a game." Another group of students expressed concerns with being able to finish the project in the time allotted. She said, "I don't know if I'll be able to finish a whole video game in 4 more days."

On this same day we asked the students what they hoped to learn. The most common answer was "To build video games." However, about a third of the students responded with the desire to learn more programming or computer skills. One student stated, "I hope to learn to program computers. Learn more about computers." Another student said she would like to learn, "How to make an awesome video game. I want to learn everything about technology or at least more than I did." Another student stated that she simply wanted to learn, "how to be able to fix minor problems on my family's computer."

On the last day of class we asked the students similar questions about competency and self-efficacy. Sixty-four percent of the students responded that they felt more confident about their abilities than they had on the first day, with 36% more stating they felt somewhat more confident. Ninety-six percent felt they had learned a lot from the class, 48% felt they understood more about computer programming than on the first day with an additional 40% stating they felt somewhat

more confident in their programming abilities. Fifty-two percent felt they clearly understood how a computer game is built, with an additional 48% giving more cautious assent. Sixty percent felt very confident they could build a computer game in the future with an additional 24% feeling somewhat confident. Sixty-six percent felt they had enough time outside of class to complete their projects and had not felt time pressured. Perhaps most importantly, 76% claimed they would like to take a computer programming class.

Before the course began, parents were surveyed as to the hopes they had for the impact of the *Gaming for Girls* class on their daughters. The majority of the parents hoped that their daughters would learn how to make a computer game (32%) or how to program a computer (28%). When the parents were asked what they imagined their daughters would be doing in the class, the answer was unanimously that learning how to create computer games using programming tools. When asked what they imagined their daughters would be doing one parent stated, "My hope is that she learns programming skills and has a lot of fun doing it . . . I also hope that she might get an idea of the wide range of interesting things that can be done with good advanced computer skills." Another parent said, "I hope that she will gain a greater understanding of how computers work, especially how games are developed I imagine she will learn some basic programming skills."

One week after the course had ended parents were surveyed again. Drawing from summer data, 88% of parents felt that the camp might have influenced their daughters' perception of working with computers, as well as influenced their daughters' confidence level with computers. When asked what long-term effects the class has had on their daughters, slightly more than half of the parents said they had noticed some change. One parent stated, "She's a lot more confident with computers." A mother stated that her daughter:

> has always been fairly comfortable with computers but she talks more about getting a Dell or converting one of our Macs with a PC emulator. The camp was clearly a confidence booster–something immeasurably important to girls of this age group. Also, I think that exposure to the wonderful facilities, environment and resources of the University further reinforces the desire to do well in school and get into a good university.

The parents also felt their daughters had gained some technical skills. A mother of a student said, "She learned the basics of how games are made. She learned about various applications of computer technology and how computers are used in various areas." Another parent agreed by stating, "She learned basic techniques in game design theory, plus the operation of a role-playing game design application. It appears she also learned some things about teamwork."

Perhaps most positive were the responses to our third research question, did students gain computer skills and increased information literacy? Both parents and students felt that the class improved the computer skills of the students involved and in turn raised the students' levels of self-efficacy in regards to computer abilities. In this case, these complimented each other and worked in a circular fashion in that as the students learned more skills they made fewer mistakes, as they made few

mistakes they grew more confident, and as their confidence grew they experimented more and thus learned more skills. The students learned several IT-based skills including basic programming, design, scheduling, and event programming.

5 Discussion and Conclusions

As mentioned in the previous section, one of our principal goals with this action research was to engage girls' interest in computing education and careers by engaging them in building their own games. This effort is both supported and challenged by the literature. There exists strong evidence to support the fact that students learn computer-related skills through engaging with designing and building their own tools and games. However, simultaneously, the evidence states that girls do not play games, giving both reasons found in culture and socialization, and reasons found in the games themselves—violence and poor characters. Therefore, to assuage this dissonance, changes must be made in middle and high school girls' culture and socialization that allow for more girls to play games and be supported in that action by their social networks, and/or changes must be made to games that realistically reflect girls' interests, not merely creating games that reify gender stereotypes.

Since the literature states that there are multiple causes for the lack of women gamers, the *Gaming for Girls* class was intended to address all of them (socialization, game violence, and female character). Middle and high school girls are at a stage in their lives when they are most reliant on their social networks for the creation of their identities. If those who posses the strongest influence over the lives and identities of these girls are unsupportive of their interest and interaction with technology, then they are likely to find alternate interests. *Gaming for Girls* provided an environment in which being interested in computers, programming, and games was both normal and natural. With this class, we sought to foster more formalized and sustainable support networks, such as clubs, mentoring programs, and tutoring programs that focus on technology that will either counteract the absence of other technical support groups or support those that may already exist. We also expected the social support for the girls' technological interests to extend beyond the class, at least into their families and close friends. In some cases the excitement of the class did translate, with parents almost universally attending the final day of class to witness their daughter's project demonstration. Several of the students also became repeat customers, enrolling in a second offering of the class. Several others convinced some of their friends who had not taken the class before to enroll. However, most of the students reported that their parents, siblings, and friends did not assist them with their projects at home (helping with class homework) leaving us wondering how strong the social support may have gone. In terms of using the class to address the other causes for why girls may not play games as much as boys (game violence and female character design), the essence of the class was to allow the girls to design their own games, reflecting their own images, characters, and storylines. When they created their own virtual environments, they created acceptable forms of

competition, violence, and gender clues in characters, thus eliminating the cultural distaste as described by the literature.

Through the offering of such classes as the *Gaming for Girls* class, we believe we have the beginnings of a model that with repetition, critical reflection, and further development, may both encourage girls to become more engaged with games and encourage girls to use games in their gate-keeping function to provide a fast track toward IT skills, education, and careers.

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