Project Proposal Final Version 1st Quarter 2008

Computer Systems Project Proposal - September 2008

1. Math Edutainment Software for Girls Grades 1-6 (Emily Clarke, Period 2)

2. Purpose and scope of the research project

The purpose of this project is to create an engaging and educational game for elementary-aged girls. This "edutainment" game will be driven by a comprehensive plot, a diverse cast of characters, and seven different mini-games. Through an all-female cast of scientists, a feedback system, a stereotype-free presentation of science in the real world, and rewarding game play, the game will encourage these girls to pursue higher-level math, science, and technology classes.

3. Background and review of current literature/research in this area.

Many girls shy away from taking advanced science, math, and technology classes. Research done by the Girls, Math & Science Partnership states that despite recent advances boys still outperform girls in primary education science, math, and technology classes. Boys' math SAT scores are, on average, 30 points above girls', more boys than girls are enrolled in in Advanced Placement Computer Science and Physics classes, and eighth grade boys typically have higher performances than girls in fractions, number sense, and the core sciences, in addition to a higher scientific confidence.

Concerned with this problem, several groups have created suggestions to help encourage girls both in the classroom and out. The Girls, Math & Science Partnership suggests making math more personal, helping girls appreciate math and science for its virtues instead of its utility in school; giving girls the feeling of control over their abilities in science and math; creating a "New Science Girl" archetype to break the "math is for geeks" stereotype; reminding girls that math and science can have rewarding, inspirational, elegant, and humanitarian aspects; and encouraging girls to explore what they can do with math and science. The Institute of Educational Sciences suggests teaching girls that their cognitive abilities are not fixed; giving girls specific feedback; providing strong female rolemodels; linking math, science, and technology to unusual (non-stereotypical) and interesting careers and activities; creating opportunities for research; and providing spatial skills training. The Commission on Technology, Gender, and Teacher Education suggests implementing strategy, personal interactions, diverse and interesting characters, narrative plots, non-stereotyped creativity, and appropriate challenge into "edutainment" games.

4. Procedure and Methodology.

To create this project, I will use Adobe Flash MX and ActionScript 2.0 to create an interactive, web-based edutainment game based on math skills. The mini-games involved will focus on basic math skills, word problems, logic, spatial skills, patterns, simple cryptography, and awareness of female scientists and careers in math, science, and technology. This game will be driven by a

comprehensive plot based on a fictional space station and will allow players to customize their own character. Through gameplay-based plot advancement and a system that tracks the character's progress, the player will be given feedback, rewards, and the ability to see how their math abilities are evolving. An interactive cast of diverse all-female characters will attempt to break stereotypes surrounding girls and math. The game will also feature animated cut scenes to give it the feel of an "interactive adventure" instead of a clever worksheet.

I also intend to test this project by making it available through the Internet and contacting various Fairfax County elementary schools. Before playing the game, I would ask the students to take a survey on their attitudes about math, science, and technology. After playing the game, I would ask the students to take a similar survey. Using this data, I would track how this game affects girls' perceptions of math, science, and technology. I would also gather data on how much fun the game was, how much the player learned, how well the player could identify with the characters, and if the player would play the game again.

5. Expected Results & Applications, value to others

I expect that this game will cause some change in girls' perceptions by integrating math into a fun, plot-driven web-based game. After collecting a representative amount of data, I would display the data question by question with the frequency of the numerical answers. I would also display screenshots of gameplay to help someone reading my project understand what sort of games the players were introduced to. If my project does cause some positive change in girls' attitudes, then I would continue to share it with other schools since it would be a valuable tool in encouraging girls to pursue math, science, and technology educations.