

Uncovering the Gender Bias among Educational Games

Introduction

Educational video games are a great supplemental learning tool for children of all ages. Many parents and teachers are starting to see the many advantages of using educational games to teach children important skills in a fun way. Although many children are benefiting from this advanced technology, because of the gender bias of the educational video game makers, young girls may not be getting the same benefit from such games as their male peers when it comes to the fields of math and science.

Keys to Good Learning

The most successful educational video games incorporate many necessary characteristics important to learning. In order to retain the most knowledge, it is important that the user feel like an active participant as opposed to just a passive observer (Gee, 2005). As an active participant, the user is able to participate and experience learning where as a passive observer relies on someone else to give them the information. Similarly, learning is most effective when the learner is able to take on a new identity and learn through this new character. By taking on a new identity, the user is able to become actively involved and feel more connected to the task at hand. Video games are great ways to incorporate both of these concepts. The user of the game takes on a new identity and actively participates in their learning through the use of his or her character. This is even more constructive when the user feels a connection to their character and becomes personally involved and committed to their alternate identity.

A video games ability to actively engage children in combination with their character based nature, make them a good tool for learning. With proper development, these characteristics can be exploited to develop video games into advanced and specialized educational tools. Game designers must carefully balance the level of difficulty of a task so that it does not become frustrating or monotonously easy. (Gee, 2005). A task must be challenging, but still doable, to reach the optimal learning environment. One common method of avoiding frustration is to break down a complex topic into smaller portions or steps. By breaking down a complex topic, designers can optimize learning without overwhelming the learner.

In general, people do not like practicing skills over and over out of context, however in order to master a skill, repetition is necessary (Gee, 2005). The most successful educational games provide the user the repetition of practicing skills while making this repetition an important step in moving forward in the game. By doing this, the user no longer feels as if they are just repeating a skill, but that they are moving toward a goal.

Gender Preferences Research

Gender preferences play a big role in what children are drawn to when it comes to technology. Young girls, in general, prefer a calm environment when playing a game (Passig and Levin, 2000). The use of colors is important to girls and they tend to prefer imagery which uses a variety of colors. Girls are also drawn to details especially when it comes to people, plants and animals. Unlike their male peers, girls prefer peaceful images (Rogers, 1995). Girls also tend to prefer a story about female characters (Langerman, 1990).

Comparatively, boys want to have control over what is happening on the screen. They prefer games in which they can make sharp moves and there is a lot of movement occurring on the screen (Passig and Levin, 2000). As opposed to their female peers, when it comes to images, boys like action, suspense, danger and rescue (Rogers, 1995).

However, similar to their female peers' preference to female characters, boys prefer male characters (Langerman, 1990).

It is apparent that boys and girls have very different preferences when it comes to imagery and games. Boys are drawn to action, suspense and danger while girls tend to pay more attention to details and prefer a more peaceful environment. Because so many of these preferences are complete opposites, it is evident that games that are most appealing to boys are not going to appeal to their female peers and visa versa.

Review of Educational Games

With these gender preferences known, it is important to look at the characteristics of the most popular educational games on the market today. These educational video games teach a variety of subjects including math, science, and English. Each game has characteristics that may make it more or less appealing to boys or girls.

Timez Attack is a great video game for teaching children multiplication tables. Without even looking at the game itself, the name "Timez Attack" implies action, suspense and danger, all components appealing to boys. The environment of the game is a dungeon which again gives the feeling of danger, an element preferred by boys. This is opposite to the peaceful, colorful environment preferred by girls.

ChemRacer 2713 is a game meant to teach children the basis of chemistry. Similar to Timez Attack, the name itself "ChemRacer 2713" implies action, a preferred characteristic of boys. The game itself challenges the player to chase-down other racers at which time the player must figure-out which element they have captured. The game advertises the experience as "pulse-pounding excitement".

The Number Devil is a game in which the main character, Robert, learns about middle-school math concepts such as prime numbers, Fibonacci numbers, power and square roots through a series of nightmares. The use of a male character makes this game very

appealing to boys. Similarly, the use of a “number devil” as a secondary character incorporates a level of action and danger, which are also preferred by boys.

Bonnie’s Bookstore is a game which teaches vocabulary and other elementary English skills through the story of Bonnie who aspires to be a children’s author. The game is set in a colorful, peaceful environment and includes a main female character; all components preferred by girls

Fairy Words is a game similar to the common game of Scrabble, where the user tries to create words from a set of letters. Instead of a character, the user is the actively playing the game as themselves. Because of this, there is not a set female or male character. The game environment includes dragons and a mystical feel which adds a sense of adventure and suspense; however the general play of the game is a peaceful environment. Fairy Words combines characteristics that appeal to both genders, creating a more appealing game for all.

Dimexian is a game that teaches algebra through a series of missions. The player must complete the mission through the use of math in a first person shooter. The layout of this game incorporates many components that are appealing to males such as action, suspense and danger. The violence in the game is in contrast to the preferred peaceful environment preferred by females.

Gender Bias

While educational games are made to teach many subjects, there is a distinct correlation between the subject matter being taught, and the characteristics of the game. Often times, games targeted to teach certain subject matter have characteristics that only appeal to one gender with math/science and liberal arts being the dividing line.

The educational games that teach subjects within math and science contain elements such as action, suspense and danger that appeal to boys. These games also tend to contain

male characters. Timez Attack, the Number Devil and Dimexian are all geared toward the teaching of math concepts. All three of these games also have common characteristics that would make them more appealing to boys such as action, and suspense. There is a lack of educational games that contain elements that are preferred by girls. Of the games looked at, only Bonnie's Bookstore and Fairy Words contained characteristics such as female characters and a peaceful environment which are preferred by girls. Both of these games containing desirable elements for girls teach English concepts.

The absence of educational games geared toward females and teaching the subjects of math and science proves the gender bias among educational video game designers. This bias promotes the growing gap between female and male enrollment when it comes to higher education in the fields of math, science and engineering.

The subject of such video games is deterring girls from exploring technical subject matter. Ms. Klawe states in *The Ottawa Citizen* that "Often, girls' first encounters with computers will be in the form of video games. Because most of these games are violent, very competitive, and geared more toward boys, girls will be turned off from playing them." Girls relate the fields of computer and software engineering with these violent games and are turned off before even considering pursuing such a degree.

Recommended Solution

The content of many current educational games is not based on the field of math or science that it is teaching. The game is simply an ulterior story line used to as a basis for learning. These story lines are aimed towards males and often contain a lot of danger, action and suspense.

There are two separate ways for video game designers to overcome the gender bias when creating games used to teach math and science. Because of the seemingly opposite

preferences between boys and girls, one solution would be for designers to simply develop an equal amount of games geared toward girls as boys.

An alternative solution is to develop games that incorporate both characteristics that are preferred by girls as well as characteristics that are preferred by boys. In order to give a more realistic impression of what math and science fields entail, video game designers should create games that incorporate not only math and science concepts, but include a storyline relating to things that professionals in those fields would actually encounter.

More realistic story lines will lead to less danger, and action within the game environment making them more appealing to girls. This would create a more realistic and appealing view of educational video games for females.

Creating a more realistic story line however would not only help girls, they would also help boys learn what math and science fields actually entail. This would help both boys and girls apply their knowledge of math and science in real life problems. Games with realistic story lines would benefit all children by giving them knowledge in a broader sense and allowing them to apply that knowledge in real life scenarios.

Conclusion

While educational video games are a great learning tool for all fields of study, the bias of education video game designers is preventing girls from becoming interested in the fields of math, science and engineering. While a simple solution to this bias would be simply to develop more educational video games that teach math and science and incorporate characteristics preferred by girls, there is an alternate solution that would benefit not only girls, but boys too.

By making the content of the games more related to the field of study, and limiting the elements of action, danger, and suspense, games will not only become more inviting to female players, but will teach both sexes more about the real life implications and

situations within the field of study. In doing this, video games will not only empower young girls to explore the possibilities among math, science and engineering fields, but empower all children to learn math and science concepts so that they can make a difference in these fields in the future.

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