Summer Game Camp: Modding a SMALLab Systems-Thinking Game

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Abstract: SMALLab Summer Game Camp 2011 took place over two weeks, where 20 middle-school kids modified a systems-thinking game intended for use in a high-school classroom, using their own metaphors and game mechanics (narrative, images, sound). We believe that allowing kids to modify games helps them to develop high-level system thinking skills, and prepares them to be successful in our algorithmically driven world. The kids move from merely being players and consumers towards reinventing the game as designers, and create innovative story lines and characters, shifting the representational plane away from the original game's learning goals. They demonstrated their high-level thinking when describing their design choices in our daily group presentations. Our research on embodied learning in SMALLab indicates that learning about systems and participating in closed-system simulations in a collaborative & embodied, mixed-reality computer mediated environment, helps them understand systems experientially. Although much of the previous research in SMALLab has focused on formal learning, this paper is intended to share how it can also be used as an informal learning space.

Introduction

The Situated Multimedia Arts Learning Lab (SMALLab) is a mixed reality learning environment, and an educational platform that engages the user through the use of sonic, visual and kinesthetic interaction and feedback. It is an embodied environment that requires the user to physically move through the 15x15 foot space, and is able to track up to 4 users with up to 12 motion sensor cameras. Students are able to collaborate and build knowledge in this space and research results have indicated a significant improvement in test scores when including SMALLab in formal (classroom-based) instruction. (Birchfield, 2009; Johnson-Glenberg, 2009; Birchfield, 2010; Johnson-Glenberg, 2011) For the past five years, members of the SMALLab research group at Arizona State University have also taught a summer game camp, where participants have ranged in age from 8-18. The goals of the SMALLab Summer Game Camp are aligned with the learning goals of GameStar Mechanic (providing an environment that teaches kids how to design video games as a form of system thinking through 21st century skill building exercises) and integrated the three major components of GameStar Mechanic games: Play, Design, Share. In this case, it was an accelerated 2-week period (35 hrs). On day 10, the 20 kids presented their games to friends and family, and all had a chance to play the games. Campers' ages ranged 10-13 ys., with diverse ethnicities and economic backgrounds.

Game Modding

The term "modding" has been used by the gaming community to describe when players or users make modifications to technology, either hardware or software (Ito, 2010). Here this word refers to designing new interface elements and game levels. One conceptual model for understanding different types of mods classifies them into 3 categories: alteration, juxtaposition and reinvention, according to Salen and Zimmerman (*Rules of Play*); reinvention sits at the intersection of alteration and juxtaposition, as it affects form and context by changing the game's representation and interactive structures. Some believe that game modding has the potential to foster highly engaged learning by tapping into the natural passion of students for making video games because the process of creating a good video game requires a complex set of skills that maps closely to key competencies (Gershenfeld, 2011). According to the "Pew Research Center's Internet & American Life Project," more than half of all teens are currently creating, modding, and mashing up media content ranging from videos to music to blogs. As the tools for video game creation are becoming more accessible, an increasing number of the 97 percent of teens that regularly play video games now want to make video games. (Lenhart and Madden, 2005).

The Camp Format

Camp lasts two weeks, or ten days, for four hours per day and takes place in the SMALLab at Arizona State University. On the first day of camp, campers typically fill out worksheets that prompt them to share their knowledge or understanding of certain game design principles such as: *What makes a good game? What is flow? What is an example of a game mechanic? Etc.* They also fill out these

same surveys out at the completion of game camp so that we might compare the two to see how much they have learned, and also consider the complexity of the responses. The first few days of camp are spent playing simple non-technology games and board games, designing rule sets for these games collaboratively, while having discussions and sharing insights about game mechanics and user experience. Next, the SMALLab mixed-reality learning space is introduced to the kids, and time is spent building knowledge about systems, using the SMALLab infrastructure as a model. Then the kids split into teams of 3-5 per group and they begin to design their games (genre, main character, narrative, and create audio and visual assets). Once teams have come up with a concept to modify the template, they move into the computer lab to begin creating their assets for the game. Counselors taught students how to create, find, and modify digital images; and also taught them how to record or find, and then modify digital audio to create sound effects. Teams also took turns working in the SMALLab space, under the supervision of a camp counselor and added their images and sounds, and also play-tested their games. The counselors challenged the students to consider how embodiment was being used in their game play. Each team developed three levels for their game, with each increasing in difficulty and complexity. Finally, on the last day of Game Camp, friends and family were invited to an Open House, where the teams would showcase their games and allow everyone to play the games in the SMALLab space.

The Game Template

The game template that was used for the camp was a derivative of a SMALLab simulation that had been used in a high school classroom. The simulation, designed collaboratively with a science teacher, was designed to teach students about disease transmission and its misconceptions in a closed system; and to encourage system-thinking skills to discover the cause of the outbreak in the game. A description of the first year study can be found in last year's GLS proceedings (Johnson-Glenberg 2011). The simulation consisted of a modifiable amount of characters in the periphery of the space, and a medicine supply and water supply in the middle. Players could interact and replenish the health and water level of each character. The original simulation was ported from Java into Unity3D, and a version was created to allow kids to easily modify the images and sound effects by dragging and dropping assets into a folder.

Results & Discussion

At the end of the workshop, the students presented their projects to family and friends. It is interesting to note the social dynamics of the group, where kids that probably would not have interacted in their school setting were working together and supporting each other through the game development process. The other is that the final game styles were all different and demonstrated through the design as well as language used during presentations, that they had gained a better understanding of systems by creating their own variations of one. One team modified the original game so that the characters became boats and cars; water supply in the middle of the space represented Fuel, and thus the energy disc surrounding each player represented a diminishing fuel supply. The medicine repository in the center represented *Repairs*, so that when the avatars from the original simulation were "sick" they were repaired.

Conclusion

As this was the fifth year of the summer game camp, there are indeed lessons to be learned for the design of embodied games in a technology-enhanced embodied-learning mixed-reality space such as SMALLab & FLOW. With the advent of the Kinect in educational games on the horizon, there is much to be gained in further developing the model of game modding in informal spaces.

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