

Shrooms: An Interactive Playground

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Abstract

Interactive technology provides various opportunities for enhancing user engagement while providing rich and compelling experiences. In just such a case, we present Shrooms, an interactive game for girls aged between 8 and 12 years. With describing our process and the final design, we highlight our success with the methods and techniques primary to physical interaction design.

Keywords

Interactive technology, prototyping, presentation

Introduction

In The Netherlands, various non-profit organisations have established public sporting venues for kids across cities. They mostly include a soccer field and what is called a 'panna' cage. Over the years, these organisations have noticed that these venues seem to attract more boys than girls. This project is therefore aimed at finding out why girls are not active with using these amenities, and how interactive technology can create opportunities for raising the interest and motivation of girls for playing soccer.

With some initial field visits, and insights from the organisations themselves, it was clear that lack of confidence with soccer skills, and a general male-oriented perception of the game were two key factors that discourage girls from actively taking part in soccer. Hence, the design problem was to create a new kind of a game using interactive technology that would cater to the profile of girls between 8 and 12 years of age that would in turn help them improve their soccer skills and give them confidence to start using the community soccer fields.

Process

From the start of this project the focus had been on rapid prototyping. Usually a lot of time goes into defining a problem, setting goals, sketching, drawing and development of ideas. The process for this project, however, was quite different. Following the process of constantly building a prototype of an idea and testing this was the way that the final design was reached. This way the original idea had had the opportunity to develop and grow into the idea which is now behind the final design. Each phase of prototyping went together with presenting it and getting peer and tutor feedback. This helped with not getting stuck

on certain ideas, and being able to go further and make decisions about developing and changing the design.

The process started off with conceptualizing about the design problem and making at least two experiential prototypes. Two prototypes were made. These were small scale models of possible game concepts. One concept was a maze with moving walls, and the other was a playground with moving obstacles. The playground concept was chosen to proceed with and develop.

In the next phase conceptualizing was enhanced by involving interactive technology. A new prototype was made, this time involving some technology such as movement sensors and LED's. In this prototype the idea of an interactive playground became more visible. Within one game, there were actually three games scattered over a small playground. The idea was that the playground be a fairy garden and that each part of the garden present a mini game. For example, one part was mushrooms that could be sit on, and another part was a weeping willow tree with hoops where balls could be thrown through. The prototype was presented to fellow students. The idea was that the prototype be of such a quality that it can be operated by peers. However the built prototype was a scale model and this was not possible. This did aid in the realisation that bigger steps had to be made. One of the three possible games on the playground was chosen, because it was realized that making a playground with different games was not feasible within this course. The chosen game was a small field of mushrooms that serve as targets to be kicked with a ball.

A final game was developed and from here focus was on making a physical prototype that could be tested. By testing the prototype again and again, it could be optimized so that the game rules were logic and it be a fun game to play. The physical prototype was tested by the target group, however, the interactive technology did not work. In the end, it was seen that this did not matter and the basic principle of the game was tested and approved by the girls.

Phidget 8/8/8 interface kit² was used to connect Max/MSP and sensors. Also, we used PhidgetLED64³ to control LEDs.

Sensors

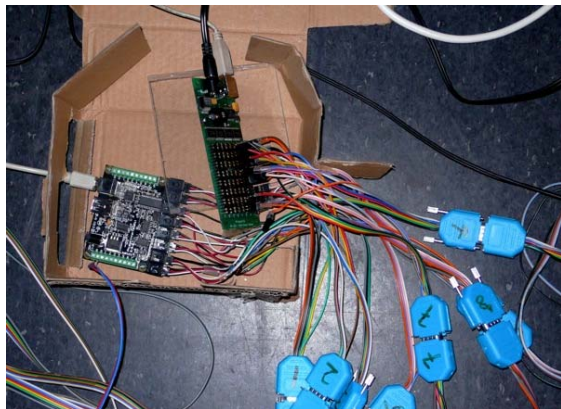
Ekulit shock sensors⁴ are used. Connected to signal generator which built by Rob, ID Studiolab to get stable outputs. When the sensor get hit, the signal generator produces a numeric value between 600~800 to Phidget interface kit analogue input.

Audio

To deal with 8-channel audio output, we used aggregate audio device⁵ of Mac OS X with USB type audio adapters.

Wiring

For the convenience of assemble and disassemble, we made eight 9-pin D-SUB connectors to connect each mushrooms. Sensor signals, LED powers travel through 7P flat ribbon cables.



[figure: IO box with connectors]

Hardware – Mushrooms field

Mushrooms are interactive targets. They can sense the ball hitting and lit up or make sound. The body of mushroom is made of cardboard cylinder so that can contains shock sensor and speaker.

Head of mushroom is sewed fabric. Inside of it is stuffed with polystyren foam and old news papers. There are LEDs which indicates whether it is garget or not on the top.

2

http://www.phidgets.com/products.php?product_id=1018

3

http://www.phidgets.com/products.php?product_id=1030

4 <http://www.ekulit.de/?id=19>

5

<http://www.apple.com/pro/techniques/aggregateaudio/>

We covered green acrylic carpet on the game field to cover up all wires. Mushrooms are set on sponge base so that can be bent certain amount.



[Figure: Shrooms game field. 3 X 3(m)]

Research

To test the Shrooms game, an observational study was done. Research goals were to see whether the target group will appreciate and like the game. Also, was interactive technology a good addition to a playground game? And finally, did we reach our design goal by making a game for girls to improve their football skills?

Method

The observational study was conducted during an open test day, in which random participants could come and test the game. Participants were asked what they think of the game and they could give comments and ideas for the game.

Results

In general the game was well appreciated. Not only the target group, but also fellow students enjoyed playing the game. The technology worked well most of the time and participants understood the rules of the game.

Suggestions for making the game competitive were given. This was possible. One participant could try and hit lit up mushrooms, while the other participant tries to stop him. However, this way of playing was not appreciated by the target group. As suspected, girls like to play alone and hit the mushrooms, in their own time and on their own way. If not alone, they like to play together and help each other to hit the mushrooms.



[Figure: Girls playing together.]

Girls enjoyed playing our game, not only by practicing their football skills, but also kicking, hitting or sitting on the mushrooms. This is a pleasant observation as can be noted that the game can be played in many different ways and will therefore not bore the user very quickly.

Discussion

Using interactive technology gave rise to the possibility to include more expressive ways of communicating aspects of user-interaction to the players. The lights on the mushrooms provide directed visual feedback to the players regarding the game state (targets, levels). The audio feedback from the mushroom gives a feedback about the player's game play (correct, incorrect, next level, restart level). The incorporation of such multimodal feedback mechanisms allows the player to find all the information required to play the game effectively within the gaming system itself, without relying on any externals. There is no rule book or reference manual to understand game state and game play. This increases the involvement and connection with the game and leads to a richer gaming experience. Multimodal feedback also gives an opportunity

to convey soft ideas, like emotional content, through the design of light (colors, brightness, and rhythm) and sounds. It gives elements within the game a personified character that helps players perceive the elements to be more alive. All these aspects can potentially lead to a more long-term involvement and interest with the game.

Conclusion

To conclude, not only the working principle of the game, but also the way the game looks was very much appreciated. The interactive technology in the mushrooms definitely adds to the game. By adding light and audio, the possibilities of different games and rules are almost endless. The game is perfect for public spaces so that girls can easily reach it to come and play.

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