Lazer Mouse Postmortem

CMU ETC Spring 2013 Project

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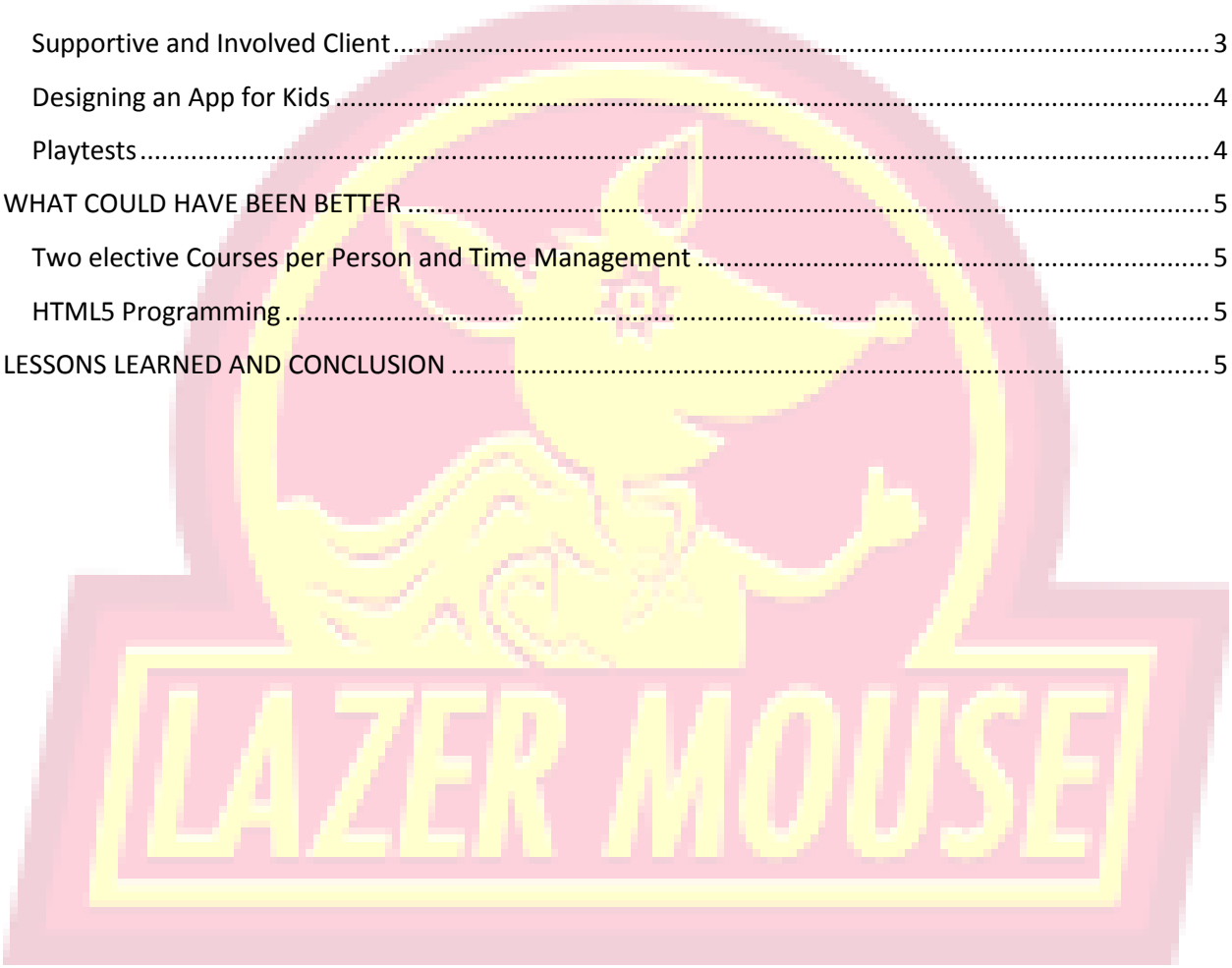

INTRODUCTION

Project Description

Lazer Mouse was a spring 2013 project at Carnegie Mellon's Entertainment Technology Center.

Over the course of the semester, Lazer Mouse worked with MAKESHOP at Children's Museum of Pittsburgh. In MAKESHOP, children are given real materials and tools to make physical their creative ideas. A team of skilled makers, artists and educators encourage and help visitors turn their vision into tangible objects. This exploratory environment is filled with sewing machines, electronic circuit blocks, stop motion tools, woodworking tools, and more. It all starts with a simple question, "What do you want to make today?"

This semester, we added a laser cutter to the MAKESHOP toolbox. We focused on designing and implementing an iPad interface that allows kids to design for that laser cutter. Finally, we documented our experimentation and end-product, so that the teaching artists at the museum can help kids create what is in their imaginations.

Team

We were 6 first year students in this project.

We had Regis Frey as the UI/UX designer and co-programmer, Sangyun Han as the industrial designer, Sahana Vijai as the artist, Akshaya Venugopal as the co-programmer, Atulit Kumar as the co-programmer and Dilara Semerci as the producer and the co-programmer.

Our advisor was Jessica Trybus.

Client

The Children's Museum provides innovative museum experiences that inspire joy, creativity, and curiosity. They achieve this through exhibits that are based on the philosophy of Play with Real Stuff, where real things and real processes challenge children's abilities and help them understand the world we live in, and themselves,

better. Children can take off on fantastic flights of imagination and return to earth to build a boat, play in the mud, hammer a nail and change the tire on a car. To accommodate our youngest visitors, each exhibit includes an area with activities designed to meet the developmental needs of infants and toddlers.

MAKESHOP was created through a unique partnership among Children's Museum of Pittsburgh, Carnegie Mellon University's Entertainment Technology Center (ETC) and the University of Pittsburgh Center for Learning in Out-of-School Environments (UPCLOSE). It is a space within the Museum dedicated to nurturing and furthering informal learning opportunities and research-based understanding at the intersection of the digital and the physical. MAKESHOP pushes the envelope of informal learning through the integration of old and new technologies into DIY, project-based activities in a hands-on workshop environment.

DELIVERABLES

We implemented an iPad application with which kids can create art to be cut and/or etched by a laser cutter.

In our application, we have stamps that allow punching out of the material. These stamps can be scaled or rotated by using pinch and zoom gestures. We have a knife tool which allows freehand cutting and we have an etching pencil which lets kid to "draw onto the material" by burning a little bit. We have an eraser tool which allows kids to erase both cut and etch lines. When the design is finished, kids tap onto the DONE button which lets them send the file to the laser cutter.

Between the iPad and the laser cutter, we have a Windows operated laptop. When we tap onto the Send button, the Etch and Cut PNG files are saved to the Google Drive. On PC side, we grab these files and convert the Cut PNG to SVG and embed Etch PNG into the Cut SVG by using the PNGtoSVGConverter.exe.

After the conversion, we open the SVG file with Inkscape then print it to the Full Spectrum Engineering Drive which opens the file with RetinaEngrave Software. We send the files to the laser cutter via this software.

WHAT WENT RIGHT

Supportive and Involved Client

MAKESHOP was an amazing client. They helped us a lot in every possible way. They were as enthusiastic as we were about the project and they supported us in our design decisions.

They were really involved in the process. They gave us invaluable feedback and let us test the application every weekend.

Designing an App for Kids

Designing and implementing an application which will introduce the laser cutter to kids was a big motivation factor with us. Observing the reactions of the kids and listening to their suggestions helped us to improve our design. It was a challenge to implement an intuitive, kid-friendly interface which is suitable to MAKESHOP's "playing with real stuff to make real stuff" philosophy. But we are happy to have achieved this.

Playtests

A big part of our development process this semester was making sure that we were constantly playtesting at the MAKESHOP and getting feedback from our clients. This required us to visit the MAKESHOP on a regular basis and we also tried to have our weekly client meetings at the MAKESHOP itself. We have been visiting the MAKESHOP almost every weekend since our second week and observing the way kids learn and play within the MAKESHOP while being guided by the MAKESHOP staff.

This visits and playtests in MAKESHOP area helped us a lot to improve our design. We also visited William Penn Elementary School and Central Elementary School in Elizabeth Forward School District to test our application during our 12th and 13th weeks.

We had play testers in ETC 3 times who could actually observe the process with the laser cutter (we installed the machine at the museum on the 21st of April).

The official number of play testers from Week 9 to Week 16 is 180; ages from 2 to 11 but mainly focusing on our target age 6-10.

WHAT COULD HAVE BEEN BETTER

Two elective Courses per Person and Time Management

All team members were taking two elective courses each some of which were in the main campus. This resulted in incapability of finding meeting times that work for everyone. Our daily stand-up meeting times varied during the week and the consistency could not been achieved.

HTML5 Programming

After our prototyping phase, we decided to move on with HTML5. However, none of the programmers were familiar with this framework. Some worked with HTML before in web projects but none of them was related to game programming or iOS application.

Other than non-familiarity, we tackled with the lack of documentation of this platform. At first we tried to solve the issues by patching the code. In our 12th week, we decided to rewrite the code and spent 2 nights to make the code more efficient and capable of what we were trying to achieve.

LESSONS LEARNED AND CONCLUSION

A big part of what we learned was how to listen to our client. And by client, we mean the kids! We learned so much through playtesting and had fun doing it too.

We also learned HTML5. None of our programmers had done app coding before this project and now they know the complexity of html, javascript, and css.

We learned clarity in how we communicated. Figuring out how to present ideas to the group and integrate feedback was difficult but important.

And hopefully, we learned time management. During the semester, we had hard times to find meeting times that work for everyone. It was either because of the elective course work or sometimes personal issues. We hopefully are now aware of the importance of the existence in the project room.

All in all, it was a great semester with a great advisor and a client. It was exciting to work with kids.