

I learned many things about designing and creating a digital physical system. For one, I never really realized how many different types of systems there were. I didn't really know about ambient systems, and the concept of something operating in the background really intrigues me. One of the systems that we learned, Breakaway, I really liked. I found it amusing how the longer you sit, the more the chair wilts. It reminded me of my dog, for the longer you sit without petting him, the more mopey he gets. I feel that this is actually a good design concept, because I think that when people see something wilting they want to do something to help it. So when people see their Breakaway system wilting, they will gladly help it by taking a break and walking around.

To build a digital physical system, you must first decide on what you want to create. There are many ways to get do this, from an idea popping into your head, or to figure out what the user might want. There is also many ways to go about this, from observing their lives to having them fill out a questionnaire to creating a probe. Once you figure out what you want to design or reinvent, you then have to decide on whether what you will be creating will be ethical for the group you are creating it for. Designing a product that would give negative feedback or that might try to influence the user's behavior in a negative way would do you as a designer no good. Even if your initial design gave positive feedback except for maybe under one condition, you as a designer should realize the fault and try to fix it. If it cant be fixed, you have to assume responsibility and provide the information to the buyers.

Another thing is you have to think about all, and I mean all, of the product's potential uses. The big reason for doing so being that even if your product is meant to help out people and to be useful, another group might find another use for it that would be harmful for others. The best way to figure out all of its uses is probably to tell your family and friends about your concept and have them come up with all of the potential ways that your concept might be used. This way you might be able to design it in such a way or add precautions that could prevent people from using it in ways that are not intended.

Once that has been decided, you need to design the object to fulfill the needs of whatever group of people you are intending the object to be for. If you were to be

designing an object for a group of young kids, it will probably need to be extremely durable with big buttons and have bright colors. If you were designing a product meant for a group of middle aged working women, it will probably have a more efficient design to it, from smaller buttons to a sleeker look. A child's product would be big and bulky, so the child would not be able to accidentally swallow any pieces or the object, whereas the product for the adult would be smaller and more compact to allow for better mobility.

Another thing that you have to consider when designing a digital physical system is that just because it looks good aesthetically, doesn't mean that works well functionally. A product could look amazing, but that means nothing if it doesn't work well at all. On the other hand, just because your product works doesn't mean that it can't have aesthetic values either. People do judge things based off of looks, and so are more likely to use a product that is aesthetically pleasing.

Something else that you need to think about is all the circuitry and inner workings of the product. All of the components need to be carefully planned out according to what the product might be used for. If the product's use is to be very simplistic and for a child, then there is no need to use top of the line micro-controllers in the product. I also learned that when putting together the circuitry of a system, it seems that the wires and gadgets like to have a mind of their own. If you want to be fully sure that what you put together will work correctly, you have to double and triple check to make sure the wires all go where they are supposed to. I found it also helps to have a diagram beforehand of what the circuit should look like as a guideline.

While working on the Adventure Companion, I had a lot of hands on experience of what goes into building a digital physical system. I think the first thing I learned was during the design process. I found out that when creating an object, especially one for class, you need to be realistic about what you will be able to accomplish. During my groups first few drafts, we had ideas that were plausible, but might not have been doable with our skills, resources, and the amount of time we had to do the project. When we came up with our idea that turned into our final project, we made sure that we would be able to at least create a demo piece. So we discussed how it would be made, which we decided on their MakerBots, what we would need for electronics; some LEDs,

an arduino, and a battery; and how it would be coded; an easy random generator code would suffice.

For our idea, we knew we wanted it to be something to help people be more adventurous. We started off by thinking of what either allows or restrains people from being adventurous: time. We then drew our inspiration from the Breakaway project after I told them how I always have to take long road trips and sometimes during those trips you forget to take breaks. Because we wanted more freedom with the product, we decided that instead of it taking cues from the person to decide whether or not it would signal a break, we went with a random time generator. This way when people who use it for fun and who are already out and about it will still work.

When we were designing the product itself, we went through a few iterations before we came up with the final product. Our first idea was to use a fox character. Then Simon suggested that we could create a cube that would light up to signal the person to stop and then the user would throw the dice to get the activity. We decided to turn this down because it meant thinking up more activities, plus we felt that using a character would be more effective at having people get attached to the product. Plus this way the product would be more customizable in the way that people could change what animal the character was.

As we continued on with our initial idea of the fox, its first design was full bodied, as in the front wasn't flat like it was in the final. We changed this because we needed a way of showing the activities, and so we decided to create a chest plate made out of acrylic. We also had the nose being pushed to reset the functions, but that would have been too difficult to fabricate and so we changed it to the head. All of these things made me realize that even the smallest things have to be carefully considered. One little button placement could make all the difference in a failed or expensive fabrication process, or how by adding little quirks to the character can be the difference between people loving the product or thinking it is a waste of money.

The actual making of the fox body was left up to Moheeb and Spencer, since they both had MakerBots. Moheeb also volunteered to do the electronics and coding, so I volunteered to do the design of the posters and storyboards. This way all of us had

something to work on and contribute to for the final product and presentation. Here I learned how much work has to go into the advertising of the product. Not only does the product itself have to look good, but so do the posters and other things that show the use of the product.

Throughout the semester I have learned a lot, and I am sure that what I have learned will come into use in my future classes and careers.