



POST-MORTEM

First Draft

Fall 2011



Project Overview

¿Plástico? ¡Fantástico! is working with the Hewlett-Packard Company in Barcelona, Spain. HP, a world leader in printing technologies, has recently entered into the up-and-coming field of 3D printing and is interested in adding value to the 3D assets created by their printers by exploring new methods of creation and interaction.

¿What is 3D printing?

3D printing, also known as additive manufacturing, is the process of building up a physical shape layer by layer. The process starts with the creation of a digital model which is then interpreted by the printer as many individual cross-sections stacked on top of one another. HP's printers use high temperatures to melt ABS plastic- the same material used to make LEGOS- which is extruded through a computer-controlled nozzle.

3D printing is used in a professional capacity by engineers, artists, and designers to rapidly prototype their ideas, with applications as varied as architectural mockups to parts of Iron Man's armor. Currently, 3D printing technology is relatively inaccessible to those unfamiliar with computer aided modeling software. The team is working to develop a novel and entertaining way to interact with 3D printers that can be used by current customers as well as attract new audiences.

What Went Well

Maintaining Personal vs. Professional Team Relationships

Our team was in a unique situation this semester in that we lived together and worked together. Since we were working in Barcelona, we did not know anyone else before starting the project. We spent A LOT of time together -- we ate together, went out together, and traveled together, on top of spending stressful long days working on a project together.

Overall, this semester went very well in terms of maintaining our relationships. We quickly learned each other's quirks and emotional triggers. It was very important for us to make time to spend apart, either in smaller groups or individually. We were all aware and thus respected each other's need for personal space, both at home and in the work place. This was integral to our project because we knew to be forgiving if someone was having a rough day or was in a bad mood. These close living/working quarters also helped us appreciate each other's personal schedules. We learned that David works better at night, while Dani and Matt work better in the morning. It took a little time, but eventually we found a relatively good system for scheduling team meetings and core work hours that took into consideration everyone's optimal work time.

Working with Cultural and Language Barriers



Our

client this semester was Hewlett-Packard, specifically their Barcelona branch, and therefore the majority of the representatives that we worked with and presented to spoke English as a second language. Not only that, but our faculty and support system at the Media Dome spoke English with varying degrees of efficiency. We worked hard to clearly express our ideas, our opinions, our needs and our wants. Although we had our ups and downs, on the whole we were able to clearly communicate our ideas to HP by using physical demonstrations, lots of visuals, and by trying to speak slowly and clearly. We also tried to become more aware of cultural sayings and terms that might be unfamiliar to non-English speakers. It was a great exercise not only for cross-cultural communication, but also cross-disciplinary. We were able to explain technical functions and ideas to people with a non-technical background. We came a long way since the beginning of the semester in terms of explaining things and having the patience and understanding to try to re-phrase an argument in order to get our points across.

Scrum-Style Project Management

This was the first ETC project for all of us that utilized scrum-style project management. This was great for our project! Even though it might seem unnecessary, since we worked right next to each other and were always together, it was very useful to have daily scrum meetings where we discussed what everyone was working on, what they needed from other people, and if their progress was blocked for any reason. We had this daily meeting for about 15 minutes at the beginning of every work day, so that we started out every day knowing what our tasks were.

We worked in 2 week sprints, with milestones at the end of every sprint. This helped keep us focused on what we had to do, and help keep us motivated throughout the semester. Breaking down our large project deliverable into smaller goals that were more achievable helped us stay on track and on pace. The scrum sheet was also a great tool for everyone individually because they could keep track of their tasks and their progress. They could add tasks to the sheet throughout the sprint, as well as take things off that might not apply as the sprint progressed.

We also had retrospectives at the end of every sprint where we discussed the things that went well and the things that didn't. For the things that didn't go well, we talked about ways we could improve them for the next sprint. This was a great way to address problems as they happened, instead of letting them fester.

Resourcefulness with Limited Resources

There were several instances this semester where we had to work with less than ideal circumstances. For example, the support removal system for our printer needed a water line in order to run. The Media Dome itself does not have any form of water supply, but with the help of our advisors and some clever tinkering, we were able to hook it up in a men's bathroom-turned janitor's closet. At the beginning of the semester we had some issues with computers and getting the correct software installed. Steve Audia was a huge help in getting our computers set up and ready for the semester. Knowing that we would have some computer issues, we also looked for alternative ways to make progress, which included using software we had on our personal computers, as well as learning new software which was available. We were also able to work with programs in Spanish, which was challenging at first, but became easier once we learned the short-cuts and the menu names.

We worked closely with the faculty at the Media Dome to share resources, such as the printer, the Kinect, microphones, etc, which are more readily available at the Pittsburgh



campus. If we didn't have something that we needed for our project, we reached out to the faculty for advice on where to find it.

Learning How to Use and Operate 3D Printer & Accessories

One of the best things about this semester was learning how to operate HP's 3D printer and washer. Every member of our team can load and print models, load and unload material, troubleshoot basic problems, and run the washer. We learned how to deal with hardware failures as well as identify user failure. We have learned the capabilities of the 3D printer and the washer and how they might be improved upon. This was so successful, not only because it was a major part of our project, but because we were all very excited to test and use a 3D printer.

Good Contacts

The members faculty at the Media Dome have been great! Not only have they been very supportive, but they have been very helpful in introducing us to people that might be able to help our project. Those people in turn have been very willing and eager to help us. For example, one of the architectural professors at La Salle offered to introduce us to people and businesses around Barcelona that use a 3D printer. We have learned a lot about different 3D printers, what's being done with 3D printers, and who uses them. We have also learned more about architects and engineers and how they work. By being open to meetings with people or visits to places, even if they did not seem to have a direct correlation to our project, we learned a lot that was very useful, sometimes in surprising ways.

What Could Have Been Better

Researching Target Demographic Early

Although we met a lot of interesting people, we did not actively seek help and advice until later on our project, when it was a little late to change a lot of our designs. Luckily, the information we got from our target demographic complemented our project goals, but it would have been better to seek them out early and often. If we would have met with architects and engineers earlier in the semester, we might have come to a decision on our project deliverable a lot earlier.

Ordering and Receiving Parts

One of the challenges we had was ordering parts for our project. Since our project included creating several physical prototypes, we needed a lot of material that was not readily available at the Media Dome. Unlike at the ETC, ordering parts at the Media Dome required a slightly longer and more in-depth process. It took us a while to figure out the best way to request parts, since it had to go through a chain of people before the order was approved. The whole process of ordering and receiving some parts took upwards of about a month. This process was also elongated because we did not stay on top of the orders. When asked if we needed things immediately, we said we had other things to work on at the moment, and therefore getting the material wasn't as urgent. This turned out to be detrimental, because by the time we received the materials, we were behind on the progress for that particular part. We should have been more assertive in expressing our needs and clarifying our timeline, both to the people ordering parts as well as to ourselves.

Unclear Communication of Tech Capabilities vs. Tech Needs



There were a few times during the project when there was some miscommunication between what the tech *could* do and what we *needed* and *thought* the tech could do. This miscommunication was apparent not once, but several times. The problem stemmed from having a design team that was separate from the tech team. The design team, after having a basic understanding of the tech capabilities, thought they were designing around them. As the project went on, new things were learned about the tech capabilities that were not shared immediately with the design team. This lack of constant and explicit communication created several problems throughout the semester. We should have had more check in meetings to make sure everyone was still on the same page and to double check any changes on either the design or the technical end. It would also have been helpful to use diagrams, pictures, and even props when trying to explain our ideas.

Lessons learned

Working With a Large Company

We learned a lot this semester from working with Hewlett-Packard. Since it is such a large company we had to make sure that our project and our deliverable would appeal to a large audience. We were not just looking for the approval of our one client representative, but of a larger team. We learned how to anticipate questions and points of concern from the different members of the HP team. Scheduling with a large company proved to be very complicated. We quickly learned to look ahead in our schedule to give them more time to organize and find mutual meeting times.

Different Country—Different Schedule

We all knew that working in Spain would be a lot different than working in the US, but even then we were still surprised and sometimes frustrated. However, we adapted very well and quickly learned how to manage our time in order to take advantage of the resources here while they were available. It was difficult at first to get used to the longer break in the middle of the day, when everything was closed and people were at lunch for up to 2 hours, but soon we learned how to budget our time. We would go the store and schedule our meetings for the morning, and then try to keep the afternoons free for things we could work on individually.

Work Space Matters

Working in the Media Dome was tough sometimes because it could get very noisy very quickly. We were accustomed to working at the ETC where we could more easily control our environment-- we either had a private project room, or a choice of various private meeting rooms. It was difficult to find a quiet place to have a team meeting or even a client call. Luckily we were able to schedule our client meetings at a time when the Media Dome wasn't too busy. Not having access to quieter or more private spaces helped us realize how important a well-controlled work environment can be. It is essential for a team to have a private place where you can meet and focus on the task at hand. When you cannot escape distraction, it makes working a lot more difficult.