INTRO

In its relatively young fifty-year existence, the University of California at San Diego has enjoyed a tremendous amount of success and has risen as one of the premier Universities in the world. The remarkable rate by which UCSD has flourished has been made possible by the contributions of many brilliant minds of academia and has been propagated by the efforts of aggressive research programs across multiple departments. Exceptionally, the Psychology department at UC San Diego has joined the company of Berkeley, Stanford and Yale as being within the top ten best departments in the nation. Further, UC San Diego is second only to Harvard University as maintaining the best Cognitive Science department in the country. A commonality between both the Cognitive Science and Psychology departments at UCSD are their respective policies that mandate their undergraduates to participate as subjects in research experiments. Participation opportunities are offered either by course requirement or for additional credit within selective courses within the Cognitive and Psychology departments. A notable inter-medium between students and experiment administrators at UCSD is the website known as *Experimetrix*. Curiously enough, this website has become infamous amongst Cognitive Science and Psych students as being particularly irritating to employ. From its insipid appearance, to the multiple ways the site's components consistently fail to be non-intuitive for users, Experimetrix stands as a stark anomaly in the presence of otherwise extraordinary research departments. The following research endeavor that took place over the last ten-week period was lead by a student research team. The objective of this collaborative project is to improve the Experimetrix website and eventually produce a unanimously preferred propositional product amongst students and experimenter users.

METHODS

We chose students and experimenters as our primary user groups because students participate in experiments, while experimenters conduct them. Initially, we approached the student users through a brief survey that we distributed in courses that require Experimetrix credits. However, after two weeks, we decided that the surveys were not going to be useful. At this point, we started contextual interviews with student subjects.

We approached the experimenters through email, asking professors in the Psychology and Cognitive Science departments if they had time to meet up and discuss the website, or to offer their thoughts via email.

The user groups were divided into novice and experienced groups, as we hoped to address the concerns of new users to the system. We quickly discovered that novice users were indistinguishable from experienced users after a few visits. Because of this, and a discussion with our IA, we later dropped the distinction between novice and experienced subjects, though the distinction remains in our interview notes and personas.

Before actually starting, we planned to give our subjects a reward for participating. However, we found that we had overestimated the difficulty of finding subjects, and that it was perfectly acceptable to recruit friends. Before beginning the interviews, we explored both the student and experimenter sections of the website and took notes on what we found simple or confusing. We created a list of tasks for each user group to complete as part of the interview. For students, we asked them to create an account, log-in, search for a suitable experiment, sign-up for it, cancel it, and log-out. For experimenters, we asked them to

log-in, edit header, create and post an experiment, assign experimentation credit, assign eligibility, check is the experiment is viewable by students, and cancel the experiment.

Five undergraduate students who had taken classes in Cognitive Science or Psychology and had used the Experimetrix website before were interviewed, along with five undergraduate students from other fields. This was done to get both experienced and non-experienced users of the Experimetrix website. Subjects were chosen based on their backgrounds, as well as willingness to participate in an hour long interview. Since there was no objection to using friends, many of the subjects were friends of our group members. Two group members were present during each session: an interviewer, and a note taker. During the interview, subjects were shown the spelling of "Experimetrix," and requested to find the website, sign up for an experiment, and cancel the experiment. All this was done without the assistance of the interviewers. To keep the appropriate context, interviews were conducted at the subjects' residences on campus using their own laptops. Another benefit of using personal acquaintances was that it allowed us easier access to their personal spaces. All interviews were conducted within the span of two weeks, each followed by an interpretation session conducted within 48 hours.

Whether they were experienced or non-experienced users, all subjects relied on Google search engine to find the website. The experienced subjects were displeased with having to re-login multiple times during their session with the website. They also found assigning credits to a course to be a nuisance. When asked to cancel their appointment, only two of the five experienced subjects found the link on the first try, due to ambiguously labeled links on the home page; the "Cancel Appointment" function was listed under "View Your Appointments".

The inexperienced subjects found the registration process to be tedious. The website instructs subjects to follow a link whereupon they are instructed to follow another link, without accomplishing anything on the intermediate page. Every subject also felt that waiting for the confirmation email took longer than other websites. Similar to the experienced users, this user group was displeased with having to re-login frequently; they had to engage in trial and error to find the correct section of the website where it gives the option of canceling their appointment. In conclusion, the interviews showed that the website was redundant, not friendly to new users, and unintuitive.

After fifteen interviews, we noticed that our notes were becoming repetitive. Many subjects were having the same problems, and so we decided that we had reached the point of diminishing returns and halted further interviews.

We initially mass e-mailed a simple questionnaire to all of the experimenters listed on the Experimetrix website, basically asking what they liked, disliked, and what they would like to see improved about the Experimetrix website. From those emails, we received 7 responses, and from that small group of responses we were able to interview two experimenters. The other three experimenters we interviewed were friends of group members. The few interviews we did conduct were extremely useful for our research and many of the complaints of the experimenters were identical in their nature, indicating that they were the main, universal problems.

Experimenter 1 was the first e-mail response we received; she was the most helpful and really got us started on the research. Not only did she provide us with screenshots of the experimenter's side of the Experimetrix website, but she also gave us the name and e-mail

address of the head of the Psychology Department so we could request an experimenter's account. After explaining our group project to the head of the Psychology Department, we were given an experiment account number and password.

With the account, we were able to see what it was that the experimenters were complaining about, and to see, through first-hand experience, how frustrating it was for the experiments to manage their daily tasks on the website. One of the main problems that experimenters had with the website was that the webpage used for adding new times for experiments was difficult to use and lacked features, such as the current schedule posted and a preview of the new sessions to be added. Other common complaints were the unintuitive layout, lack of notification for upcoming experiments, and the arduous process of assigning credits and penalties to participants. Smaller, but prevalent problems also included the placement of buttons, the frequent logins that were required, and the naming of pages that needed to be memorized because their name had little to do with their function.

Group members asked the experimenters to navigate, as they normally would, through the site and narrating as they went along. With those instructions, many of the experimenters led the interviews, showing us the main problems they had with the site as they tried to add new sessions or assign credits, the most frequently used features of the site. Since there are so many few daily tasks done on the Experimetrix website, complaints from the users were redundant and apparent after the third interview.

ANALYSIS

For the student's sequence diagram, we looked at the transcription notes and interview notes during the interpretation notes. During the interpretation notes, we examined how the users access Experimetrix and perform basic functions pertaining to the site. In the first task, we had the users sign up for an experiment. The users unanimously followed the same sequences; therefore forming the consolidated sequence model was obviated. First, the users typically searched Experimetrix through a search engine or used a bookmark. The amount of users using Google to access Experimetrix login was quite disturbing; the URL of Experimetrix necessitated Google searching or bookmarking. Next, the users utilized the tutorial which proved to be useless for the users. Then, the users opened the Registration Page and selected "New User", to create a new account. After the account creation, an email was sent to their personal email, which proved to be a breakdown. The lag time for the email was enough for the users to feel frustrated. The email links back to the main page, which the user uses to go to his or her profile page. Then the users sign up for an experiment by clicking on "Sign up for Experiment." From there, the users clicked on "Select Experiment" and proceeded to click on "Sign Up." This prompted a Login page, so the users had to log in again. This was another breakdown as the users had to waste time re-logging in.

We split the experimenter’s sequence diagram into three basic sequences: posting an experiment, adding available experiment times, and assigning credit to subjects. The first sequence: the intent was posting experiments on the website. The trigger was that the experiments need subjects to experiment on. First they would have to find the Experimetrix website through the URL or searching for it through Google. Then they will go to: homepage,

experimenter's area, log-in, experimenter homepage, and Edit Header. In the Edit Header option their intent is to edit description, experimenter information, cancellation contact information, and location. Next they click "Display to Students" and then select "Apply Changes." This option allows for the created experiment to be displayed on the experiment schedule. Some problems that the experimenter explained was that they could not remember or find the Experimetrix website directly. The Edit Header option was in an awkward location, and is a poor label for editing an experiment description. In addition, the "Display to Students" check box was misleading and experimenters would sometimes forget to click it because of its location at the top of the page.

The second sequence: the intent was to add available experiment times. The trigger was that experiments needed many subjects to experiment on. They would first go to the experimenters' homepage, "Add New Sessions", and there they can enter desired experiment date and times, number of sessions, duration of experiment, and maximum number of subjects per session. Next they click on "Add New Sessions" and "Click here to check"; the intent is to select if new sessions were added. One way to check and view their experiment is to click "View Schedule." The result was to create new sessions and confirm that the sessions were added. A problem came up when they tried to add new session times; they only had the choice of adding the times in minutes instead of hours because experimenters had to calculate how long each session was in minutes.

The third sequence: the intent and trigger were both to assign credits or penalties to the subjects. The experimenter went to the homepage and he had the option of assigning credit in three different ways. The first way was to click the "View Schedule" option; the intent for this

option was that experimenters may assign credits or penalties to subjects from past sessions. They would click on either the credit or penalty button and input the number of credits or penalties to be assigned and then click “Apply Changes” to save their input. The second way is to go to the “Direct Credit” option; the intent was to assign credit to individual subjects. They selected the subject’s first initial of their last name, and then their whole name. To enter the credit amount the experimenter needed to specify how many before clicking the “Apply Changes” button. The third way is to go to “Batch Credit” option; the intent is to assign credit to a group of students or subjects. Experimenters enter the subjects ID numbers individually and then select the credit or penalty box and input the amount they received and then click “Apply Changes.” All three ways result in assigning credits or penalties to subjects.

Our affinity diagram process was stressful, but was also engaging at the same time. First each team member wrote all relevant user quotes and problems about the Experimetrix website on yellow post-it notes. Originally, we mistakenly used blue notes for this process and had to change them later on to avoid confusion. We immediately noticed an accumulation of redundant information among the notes. We then split the notes between the two user groups, student participants and experimenters. One person read each of the notes one at a time and organized them into small, similar-themed groups. This way we revealed patterns and issues in our data. It also allowed us to filter out any mistakes or duplication of notes. Afterwards, we created blue notes which summarized the themes of the small yellow notes in the viewpoint of the user. The next step was to create pink notes that summarized blue notes with common themes. Finally, we created green notes that categorized the pink notes under general themes.

Once the affinity diagram was complete, we moved on to the "walking" process. We invited other people to walk the wall with us. We introduced our redesign goals and described what we had done so far. We also mentioned how they would help us by analyzing and looking at our data from an unbiased view-point. Team members alternated walking the wall with non-members, adjusting the wall during this process. In the end of the walking process, we added a few more notes, but did not take any notes away. The participants generally agreed with what was already present on the affinity diagram. Although we did not find many new findings, walking the wall did, however, solidified our research.

Personas were based on the user interviews we conducted. We created personas because we thought they were more of a full description of our user types (Student and Experimenter). If we were to create a profile about a single user, it would not be as complete or as full of data, whereas personas provide an encompassing view of the user. We also created goals and needs for each of the personas. We created a total of 4 personas for 4 user groups: novice and experienced student participants, novice and experienced experimenters. We created a different identity representing each user group, complete with a name, photo and brief description. This process helped us to always keep our users in mind. Although we referred to the book, Rapid Contextual Design, during this process, it was different in that we included goals and needs of the users, and also user tasks and their steps to complete those tasks. This step helped us visualize how they would use the new design.

Prototyping

We implemented our storyboards at the same time as our wireframes, using the online wireframing tool, gomockingbird.com. We divided into pairs and gave each pair four pages from the original site to redesign and make wireframes. Before coming together as pairs to work on the wireframes, we each made our own wireframes individually. This was to advocate our own design ideas. We then merged our wireframes with our partners'. Then the group critiqued each other's wireframes and we finally all met and combined the designs into one cohesive wireframe for the whole site. We challenged the product over and over, keeping in mind the personas and our interview data. Finally, we all agreed and we were ready to use the wireframes to perform paper prototype tests and to create the final mock-up of the website.

In the last two weeks, the group was divided into two teams of four, Red Team and Blue Team. The Red Team, Danna Lee, Channelle Washington, KrystinTani, and Joel Azpeitia, was tasked with conducting paper prototype interviews, writing the final paper, and creating the final presentation.

The Blue Team, Karen Yeung, Michael Kwon, Ryo Koyama, and Alex Dodge, was tasked with finalizing the wireframe designs, creating a functional specification spreadsheet, and making the final interactive prototype in PowerPoint. After the design of the site was finalized, the global elements, such as the header and the footer, still had to be copied to each page. The global navigation was also finalized during this stage. There were some missing wireframes that were specified in the site architecture that needed to be created. However, due to a glitch in the wireframe application, they were lost and needed to be recreated again.

The functional specification lists all of the features that are to be present on every webpage, for example: links, form elements, and tables. This was useful when we made the mock-up, as it acted as a checklist of all of the functionality for our website. The Blue Team's next task was to take the wireframes, storyboards, and the functional specification and make a high-fidelity mock-up in PowerPoint. We decided on a style guide (Arial, blue rounded shapes, and dark blue buttons) and divided the work up among the four blue team members. We refrained from hyperlinking the buttons until the very end when we consolidated our slides, since PowerPoint hyperlinks are dependent on the number of the destination slide. The design of the mock-up was based on the wireframes, adding color, images, and interactivity.

We decided to make a PowerPoint mock-up rather than an actual website due to time constraints and varying levels of ability between our members. In the end, we were satisfied with our mock-up as it not only took note of many of the problems encountered by users from both user groups, but also added new elements designed to help the user even more.

One of the first changes made was the URL of the website. From the student interview, we found that all subjects relied on Google search engine to find the website. To remedy this, we devised a much simpler URL, experiments.ucsd.edu, which follows the format of many other UCSD websites. To prevent multiple log-in issues, we created a portal page where users first sign-in into either the student or experimenter homepage. Assigning credit is much simpler than before. In addition, the course selection feature is integrated with the student's PID account to speed up the process of selecting a course to assign credits. "Cancel Appointment" is now easier to find and users can visit the "My Appointments" page to cancel their appointment.

The registration process has been made simpler as well. Although the user must input additional profile information, this will aid the user by filtering out experiments that do not apply to them. Additionally, in our redesign users are able to immediately use the website after registration without having to wait for an email confirmation.

During our interviews, we especially took note when experimenters mentioned a problem so we could fix it in our redesign. One problem that experimenters had was that they did not like the way they had to select the day of an experiment because it was tedious to add in through three dropdown menus, one for month, day, and year. To solve this, we copied the format of a popular airline booking website. We took their idea of using a pop up calendar for date selection. Another problem that experimenters had was that they often added incorrect time slots for experiments, often adding times such as "3:00 AM" rather than "3:00 PM" so we decided on a dropdown menu with predetermined time slots. Other problems were as simple as moving a button from the top of the page to the bottom of the page. For instance, the “Log Off” button needed to be move to the top right hand corner of the page. The most significant problem was that experimenters could not see the current schedule when adding new times. We solved this problem by simply adding the current schedule above the interface used to add new sessions; this way, experimenters could see the times already posted before adding more. We also incorporated an input space for the experimenter's initials because there is often more than one person in charge of the experiments and this way they know who is supposed to be running the experiment. Lastly, we added a preview feature of the old times and the new times so experimenters can see if their new times work with the old ones, as this was also a common complaint. After changes are applied, they are made apparent above the

input interface again. By listening to the experimenters, we were able to address and solve many of the main problems that they had with the Experimetrix website.

CONCLUSION

The methods listed in the book, Rapid Contextual Design, allowed us to investigate the various problems and inconsistencies present in the original Experimetrix website through the eyes of the users. It also allowed us to consolidate the massive amount of data acquired from the various interviews into a malleable form. By taking into account all of the user's complaints and specifications; we were able to produce a prototype. Though various phases of testing and alterations, we finally designed a new website that adheres to the user's needs. But ultimately, the book could only take us so far; through our own thoughts, ingenuity, and creativity, we were ableto solve many of the problems that users brought up, and produce a prototype that we are proud of.

The prototype we created was only a high-fidelity PowerPoint wireframe and not a full-fledged website. Some of the group members have suggested continuing work on this project during the summer to complete a working website that could be presented to the school as an actual replacement for Experimetrix. We believe this will not only benefit the users of the website, but will also increase the number of participants for experiments by having a more appealing experiment creation and sign-up process via the new website.