SETREADY.

PLAN EASY. PLAY HARD.

Low-to-Mid Fidelity Prototype Testing and Refinement

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Overview

Many college students wish to stay active, but organizing group sports can sometimes be a daunting task. As school work fluctuates from week to week, students require flexibility and the ability to avoid commitment in the case of last minute changes to their schedules. Current methods of organizing activities are inadequate. People organize primarily through text, email, and Facebook. With text and email, it is difficult to tell if everyone has received your message, and plans made through Facebook tend to be seen as less “binding.” We have designed an application that solves these problems by focusing only on planning group activities. We also provide the user with the ability to check who has replied to an event, easily update an event, and check facility availability.

Prototype Description

The prototype we designed is intended to allow the user to quickly access all functions of the application. There are two buttons that are included on every screen, a home button that takes the user back to the front screen, and a notification button that allows the user to see any pending requests or updates. The home screen is laid out with the event buttons at the top, followed by the contacts button, the bookmarks button, and finally the map button. The buttons are ordered by how often we expect a user to be accessing each function.

The events area includes a “create event” button, a “search events” button, and a “my events” button. The create events button takes the user to a screen where they can enter a name, location, date, optional description, and friends to invite to the event. The search events button allows the user to search all public or accessible private events to find activities in their area. The “my events” screen is partitioned into lists of events the user is attending, is invited to, and is hosting. Users can quickly reply to an event on the invited screen. Selecting an event takes the user to the page for that event. If the user is hosting that event, they can make changes to the event, and check whether or not their friends are attending their event.

The contacts button has two tabs, one for individual contacts, and one for groups. Contacts are listed in alphabetical order, with favorite contacts listed in a separate area at the top of the screen. The bookmarks button leads to a screen with two tabs - one for friends and another for locations. Selecting a location takes the user to the information page for that location, allowing the user to quickly check if the location is available or not. Similarly, by selecting a contact, the user will go to the profile page for their favorite friend. From there, the user can invite the friend to an event or simply discover his/her friend’s information including past event activities, preferred sports, and pictures.

The map button takes the user to a scrollable map of their campus. Locations are color coded based on their availability for quick reference. A slide out legend is located in the lower left hand corner that explains the colors and icons used on the map. A user can select a location to either bookmark it for later or access the location page for more details.
Testing Methods

The participants used in the study were students at the University of Maryland who had no prior knowledge of the project. All participants were active in non-varsity sports to some degree, representing the intended audience for our application.

Due to scheduling problems, several testing environments were used; however, the test was set up in a similar manner each time. No one besides the team members and the participants were present in the testing rooms. The participant was seated at a desk, and had a paper cutout of the home screen placed in front of them. A camera was mounted to the table, and focused on the cutout, and on the user’s hands. Team members sat nearby, to observe the user’s actions, and to note their comments.

The user was presented with three tasks, some of which had multiple parts. The first task was to find the tennis courts, and to determine their availability. The participant was expected to be able to find the tennis courts on the map, and to be able to identify their availability by either immediately understanding the color codes used, or after opening the legend if the color code was unclear. Once that was done, the user was asked to bookmark the tennis courts.

The second task required the user to create an event, and to invite four friends to the event. Three of the friends were listed under favorite friends, and one was not. The user was asked to enter an event name, location, date, and description, and add the four friends to the event before sending out the invitation.

The final task required the user to change an event that had previously been created. After selecting the appropriate event from the “My Events” page, the user had to update the title, location and date, as well as add an update message. Once the changes were confirmed, the user had to locate the update manager for the event, and check which friends had received the changes.

After each task was explained to the participant, they were presented with the home screen of the application. As they navigated the interface, a team member counted the number of button presses needed to complete the task. The participant was asked to explain their thought process throughout the process, and a team member noted any relevant comments the participant made. If a participant became extremely confused by the interface, a team member noted what caused them to be unable to complete the task, and the participant was given guidance on what to do next. This was done to ensure that all parts of each task were completed, and that as much data as possible was collected from the evaluation.

After the user completed each task, they were asked if they had any further comments about the interface, which were recorded by a team member.

The number of button presses required for the participant to complete the task was recorded. While this provides quantitative data on how long it took the participant to complete the task, the more useful data came in the form of comments from the participant on what was confusing them. Simply measuring errors is insufficient to determine the quality
of the interface, so the participant feedback was required to improve and clarify the interface.

5. Testing method

One analyst was performing the interaction with the participant and handling the prototypes on the run. The second analyst was taking down notes and looking out for every detail including participant’s gestures, participant’s comments, number of button hits, etc.

Once the participant has read and signed the consent form the camera was set up focusing on the prototype and participant’s hands. The first analyst then will explain the goals and standards of the testing procedure to the participant. After explaining the basics to the participant the same analyst will proceed to describe the first task. The second analyst is ready and the user-application interaction begins.

A task procedure would be as following. We have the participant think aloud, and notify us in case of ambiguity or if a certain step during the completion of the task can’t be completed. The participant may ask questions are any point in time. At every button press the interaction analyst swaps the current screen with the one just selected by the participant. This goes on and on until completion or failure to complete the task is achieved.

e. Test Measures (500 words) -

The second analyst was in charge of recording as much feedback as possible through the following test measures. The number of button hits to complete a task, the total number of errors, recording whether the task was completed or not, verbal feedback, feedback through emotional gestures and body movement. All of these measures were used when evaluating how comfortable the participant felt at every task and what level of difficulty was faced by the participant.

Testing Results

After thoroughly examining each conducted session and closely taking notes, the final results indicate both significant positive and negative remarks. After recording all of the usability tests we have seen the following:

All of the results showed completely different task completion approaches and ease of use at each task among all the participants. The results were also not consistent for some of the tasks while other tasks yielded extremely similar results.

Task 1, the easiest task, proved itself to be not so easy to accomplish for some participants. The participants that took the largest amount of button hits in order to accomplish task 1 took 14 hits, while the quickest one took 5. When examining closely the first part of task 1, checking for the availability of an on campus field/court, we noticed that the confusion or non-intuitive behavior that the program’s interface triggered on the user could be potentially improved by just changing a button label. Part
1 involved pressing a home screen button labeled as ‘Map’ with an arrow next to it in order to bring up the University of Maryland campus map along with all the fields/courts in it. Three out of four of the participants hit at least one or two buttons before hitting the map and told us that a more descriptive label would have triggered an immediate feeling for them to press it. The second part of task 1 which prompts the user to add the selected field/court to their favorites’ list took between 2-3 hits (This is included in the number of hits listed above). In effect, we then agreed to change the label of the Map button to “Check Field Availability”.

On the other hand Task 2 showed to carry a more consistent number of button hits throughout all four of the participants. In addition, participants did not have any negative feedback rather positive comments about some of the icons and button labels. The average number of button hits ranged between 8-9 throughout all participants and one participant managed to complete the task successfully in a “no errors” run. An ideal “no errors” completion of a task does not merely pertain to the number of hits or what we think would be the ideal number or shortest path to it. Rather a “no errors” run, means that the participant showed to have a very intuitive interaction with the interface. This includes a very quick identification of the right button, no questions asked while completing the task, a very positive and bias-free loud thinking, and therefore a very satisfied gesture after completion of the task. One of the participants also mentioned that the “Create Event” screen was very intuitive and user-friendly.

The third and hardest task to accomplish according to our expectations, did scored the highest number of button hits on average and found certain button labels not very intuitive. Task 3 averaged 13-15 button hits all throughout all 4 participants. Participants had to first hit the “My Events” button to access an event that needed to be updated or edited, 3 out of the four participants hit a different button before going into “My Events”. We assume that such behavior would have to be learned by the user. Furthermore, all participants found the “Update Monitor” button label rather confusing and half of them failed to press it right when they were supposed to. Such button’s function was mainly to check whether the attendants of the recently updated event have gotten the notification or not. After analyzing the results we decided to change the label to “Review Status Update”.

Overall, the results shown by the usability tests of our four participants generated meaningful and constructive feedback. As a result of all of the analysis on the tests we then proceeded, as already mentioned, to look for better ways in making the interface considerably more intuitive and accessible. These changes were made in order to make the “error-free” completion of an event more likely. Of course we acknowledge that in a real life environment “no errors” is rather subjective and relies on each person’s perception of technology and sports/activities terminology. We just seek to make the “no errors” goal as attainable as possible; and if there are errors, we want the user to be able to correct and identify the error as simply as possible.
**Interface Revisions**

After reviewing the collected data, many changes were made to the interface to clarify the function of each button. Borders were added to the buttons on the home page, so users know that they are clickable, and a back button was added to the bottom left of every page, so user no longer have to go back to the home screen when they make a mistake. On the map screen, the legend was moved to the top left under the home button to make it more visible, and to make room for the back button.

Many edits were made to the map screen to reduce user confusion. The map button was renamed to “Check Availability” to make its function more clear. A sliding bar was added to each location to represent its capacity, and the color codes are now used to differentiate the different facilities. An exception is the color gray, which is used to represent a closed facility.

Events now have a time displayed next to their name and location. The “Update Monitor” button was renamed to “Review Status Updates” to clarify its function. A confirm button was added to the contacts page when inviting friends to events, fixing an error in the original interface. On the home screen “Bookmarks” was renamed to “Favorites” to keep terminology consistent within the application. The names of locations have been made to be more detailed, to differentiate between similar locations on campus, as well as to allow for locations from multiple campuses. Events now have a name and a type associated with them to allow for differentiation between events of the same type.

On the event creation page, drop down menus have been added to allow users to select the time of the event. A popup dialogue box has been added when user update events, informing them that they are about to send out a notification. The notification box has been updated to show more information on pending notifications.

**Summary**

The evaluations made us realize that there needed to be some major re-thinking of some portions of the interface and some small refinements to the existing structure. While working on this project, we have seemed to have unintentionally developed assumptions beyond what a typical user would think of. A new set of eyes on our project keeps us in tune with first time users that are not predisposed to think a certain way.

Though someone may need think that terminology could not impact the app in a material way, we discovered that improper wording was a major flaw in our design. But thanks to the evaluation, we were able to properly addressed the issue. For instance, if we didn’t change the legend within the map page, many users would have never have comprehended the full functionality in that part of the app.

Smaller things also fell through the cracks. Even though it may seem obvious, back buttons are so widely needed and improved the usability of the program, but we
did not include them. It seemed incredibly obtrusive to place back on every page, but without them, it materially impacts the value of the app in a negative way. No back buttons make it so that one small mistake by the user can be a nightmare to correct. In all, we found out that the home button is certainly not a sufficient substitute for actual one step back buttons.

When looking back at the evaluations, we felt that some user error occurred not strictly because of errors and incidents of the UI but rather because of the structure of our user testing. The user testing was structured around the tasks. We were forced to in some degree make assumptions where the test and the tester would take the paper prototype experiment. Although we considered many different deviations of how the UI changes due to interaction, we didn’t account for all variations because in the video the tester would have to re-explain the problem; these are areas where there were critical incidents. We, as developers of the testing, did not account for unusual habits or past experience with technology, and a result, new user testing helped us would help us in providing cues for the user to achieve a particular task in every area of the application.

Video Report

General Description
To perform the video interviews, we contacted four potential users with varying technical skills considered to be in our project’s target user group. One of the users owned a Blackberry; another used an iPhone; one carried an Android; and the last participant did not even have a smartphone. We also made sure to feature college students (between the ages of 19 to 21) with moderate levels of knowledge and interest in sports. Moreover, we deemed it significant to include both sexes in the study. Because from the early stages of brainstorming the app, we principally intended to simplify the process of finding a fun and enjoyable sporting event, we decided not to focus our taping the facial expressions of the users. It was more important to log the sequence of steps needed by the users to complete our three tasks. For that reason, three of the interviewees were only recorded in the context of their interaction with the interface. One interviewee though was still guided through the process without actually recording his interaction with the UI. Instead, we kept the camera on his face only.

Filming Procedure
In all cases, we tried to intervene as little as possible to ensure that the tester was not influenced at all. Because new users will not have a person to aid them during their initial experience with the application, interfering would impede our effort to understand all the potential usability problems. In addition, if there was a problem, it was critical to observe the time needed to correct the problem and find the correct solution. Perfect use right off the bat is not realistic; however, if the UI is intuitive and well-designed, it is reasonable to expect that the user can quickly figure out his/her issues. We also tried to give the user as much room as possible to use the prototype to mimic a real experience.

In addition, to ensure reliability in our results, we deduced that the testers may be performing the second task considerably faster than the first task since they would have
developed a sense of comfort with the interface by the time that they were asked to perform the second task. So we occasionally switched the ordering of the first and second tasks. We never however began the experiment with the task involving the modification of an event because in a real life situation, a user would never have to modify an event before the user created that event.

Lessons Learned
In retrospect, we learned an inordinate amount about the app’s design simply by conducting the basic testing. For instance, during the facial interview, there were often clear signs in his face that a particular task or portion of a task was confusing. So at the end it was very easy to drill down on specific parts of the design and ask for suggestions. In addition, by examining the user errors and comparing them to the better understood parts of the app, it was relatively easy to rationalize the user’s mistake and hypothesize with the user on possible solutions.

More specifically, in the face interview, you could sense that the user was particularly frustrated by the inconsistency in creating and modifying an event. After event creation, he was taken to the page with the users’ new event to confirm its creation. It seemed like he expected the same for modification but it was not the case and instead, he was taken to the home screen. Similarly, there seemed to be trepidation in clicking the “update monitor” button; the mapping to its functionality seemed totally dubious. People would click it before even needed. Accordingly, we surmised that the “update monitor” button may not even need to be visible until an event is actually updated.

In all, the interviews really pinpointed errors in the conceptual design and flow of the UI. We are neither technically inexperienced nor capable of thinking exactly like someone from the female sex. So without the user testing, it would have been almost impossible to change perspectives and imagine the user interacting with app in a fundamentally different way than originally envisioned. Finally, our recordings also allowed us to identify some small missing details in the app necessary to make it functional (e.g. we did not have a mechanism to set the exact time of the event after the date is selected in the event creation framework.)
Appendix A

- Search Events
  - Suggested
    - Name: Beestown
    - Location: Tennis Rd
    - Time: 5:00
  - Filter
    - Name: Beestown
    - Location: Tennis Rd
    - Time: 5:00

- My Events
  - Attending: Btc
  - Invited: ERC
  - Hosting: Btc

- Bookmarks
  - Locations
    - Tennis Fields
    - Eppley Center
    - School Gym
    - Basketball Courts

- Contacts
  - Friends
  - Groups

- Create Event
  - Event Name
  - Make Location
  - Location
  - Description (optional)

- Drop down filter to predetermined sports (basketball, soccer, etc)
- Buttons are created by user when selecting field from map screen, functions same as the buttons on the map page
- Initially "At a glance" can only show immediate availability at time of access
- Icon to the right of the event name is the icon that will be shown in events
- Location button will direct user to map page to choose location
- The create event screen changes into a "my hosted event" once created, the user can come back to his hosted event by selecting it from the my events page. Any changes to the event will cause the confirm button to change red. A confirmation of the event change will be pushed to those invited, and a update monitor will appear on the bottom left, so the user can keep track of who has received the update.
Appendix B
UPDATES on B

1. Working Notification Page: This addressed the issue of accepting friends, which was overlooked in previous UI builds.

2. Contacts page: The add friends button in the create event page forwards him to a modified contact page. A confirm button is introduced to confirm selected friends and to redirect him back to the create event page.

3. Back button: allows for users to return his/her last recently accessed page. The home button was originally intended for this operation but affordances were not strong enough to convey that.

4. Map Page, now Check Field Availability: the term map was re-labeled because the term did not correlate with the major feature of checking the crowdedness of any open field on campus. Secondly, We've added a progress bar to each open field to represent capacity, since we found that users didn't get that color represented capacity. Colors for each field now represent either open or closed. Icons either represent attending events or open/invited events for consistency.

5. Event categorization: we've added a new column for events that signify the type of activity. This allows all events to have a unique event name and the sport being played.

6. Confirmation boxes: This adds a layer of certainty. Users will understand that confirming will notify all those invited, which reduces error.

7. Added a 24 hour time dials previous overlooked when assigning a date for an event

8. See 5

9. See 3, this allows users to reject any changes to an event modification.

10. Bordered home page to enforce the affordance of that icon being clickable

11. see 5, This change is uniform with all pages that show Events in list form

12. Review Status Updates, previously update monitor. We found that users were confused by the previous title. Previous title implied that the button indicated an action which would modify existing information, now the word “Review” affords the ability to look at the status of those receiving the updates.