How can we help those with lower confidence increase their confidence with a convenient Android application?

BeProud Product Solution by Allison Van Pelt, Roxanne Brittain, Lauren Wardlaw and Carina Rammelkamp

BeProud, an Android Application, helps you track all the positive actions you take on a daily basis, such as giving a gift to a friend or completing a homework assignment. Using BeProud boosts your confidence while allowing you to assess whether your daily actions fulfill your most regarded life values. To achieve this, tracked actions can be associated with these values, such as mental health or education. The ability to edit, delete, and tweet entries give you control over your actions and accomplishments. Daily tracking and assessments will allow you to be proud of your progress towards reaching any goals you may have while giving you the chance to revise your current daily actions!

Prior to completing the final prototype of BeProud, we passed through the following design steps:

1. Brainstorm
2. User Analysis: Scenario-Based Design
3. Problem Scenarios
4. Task Analysis (First Iteration)
5. Identifying Problems Via Interaction Scenarios and Prototyping
6. Task Analysis (Second Iteration)
7. Summary
8. Quantitative Results
9. User Reviews

1. Brainstorm

To get started on a product idea, we decided to brainstorm. Here we documented multiple ideas and decided on the project that we all agreed on. The following depicts the main three project ideas we had:

(1) FoodJournal:
Keeps track of daily food intake. Incorporates the yummly free api so we can provide recipes for users on the food they eat most. Includes a Calendar view, and a Pro-Con list view.

(2) MoodJournal:
User enters hourly or daily mood rating, and MoodJournal shows the weekly/monthly/yearly mood charts.

(3) BeProud:
Self-esteem/Self-help app. Boosts your confidence by having you list 3 good things that you accomplished for the day. You can set an alarm for when you want to be reminded to fill in your 3 accomplishments. It also has a Calendar view to look at older accomplishments. You can set up (or maybe we hardcode) a list of core values, and each time you enter something you did you can assign it to the core value it fulfills. For example a core value could be *kindness* and then if you did a favor for a someone you would mark it as fulfilling that value. Then we could display a pie chart showing the values you have fulfilled the most. This might add to a more creative UI.

We decided to implement the third idea - BeProud - because it was the project idea we felt most passionate about and had the most room to incorporate the design concepts we had learned in our course in Human-Computer Interaction (CS185). We took an iterative approach to designing this application, which will herein be referred to as BeProud.

2. User Analysis: Scenario-Based Design

With the goal of catering BeProud to all types of users, we felt that it was best to target the following audience:

- Age: 16-40
- Person with low self-confidence
- Person wanting to become more optimistic
- Person who wants to better assess how their actions fulfill their   core values

We decided to build our design towards first-time and novice users so as to maintain simple and easy-to-use layouts that every user can enjoy. Expert and frequent users will also benefit from our design because they will be able to use our application at a much faster pace, and be able to add much more content.

3. Problem Scenarios

- Male student, age 20, has low self-confidence. He does positive actions on a regular basis but often forgets how much he's doing. He minimizes his self-worth by thinking he doesn't do enough with his life.

- 30 year old woman feels as if their daily life isn't fulfilling her life values. She has a general idea of what she values in life but does not have a good way to assess if her actions are meeting all these values.

- A young woman wants to start a journal where she writes down her accomplishments so she can stay more positive. She does not want to lug around a large notebook, but she does carry around her Android cell phone everywhere she goes.
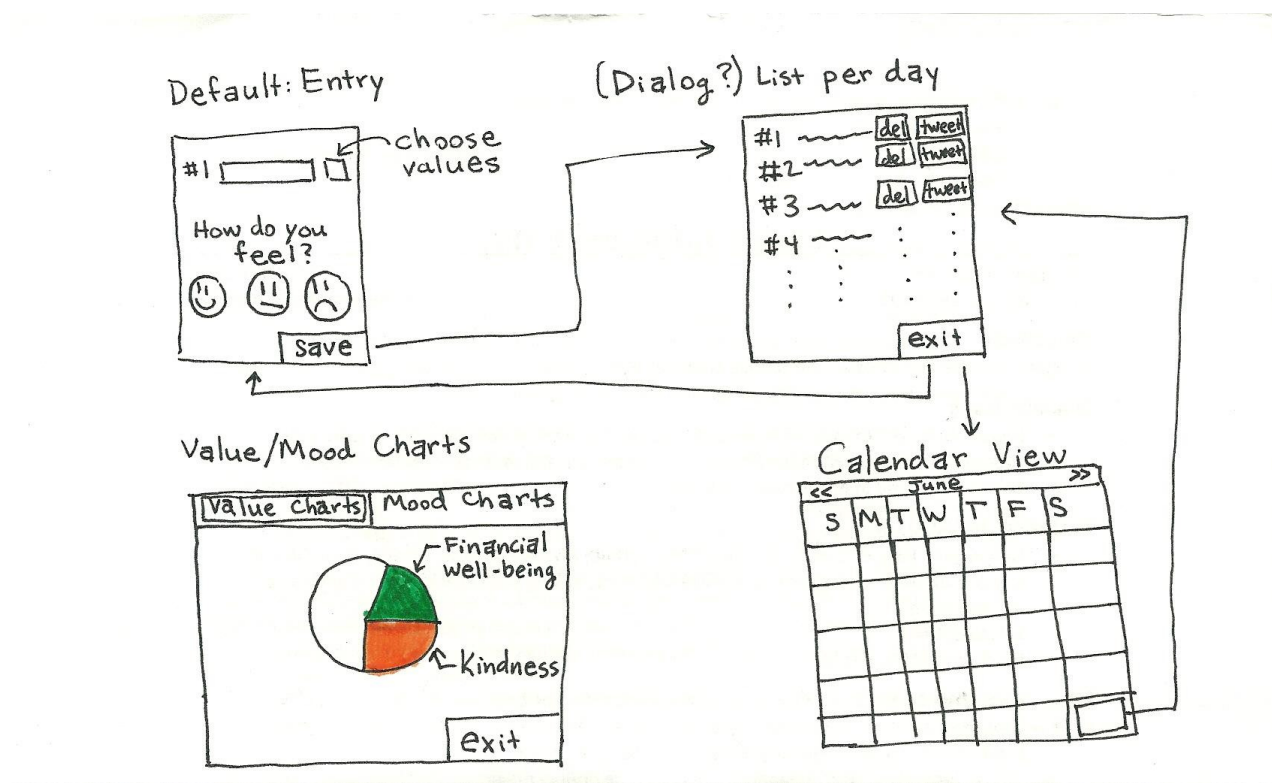
4. Task Analysis (First Iteration)
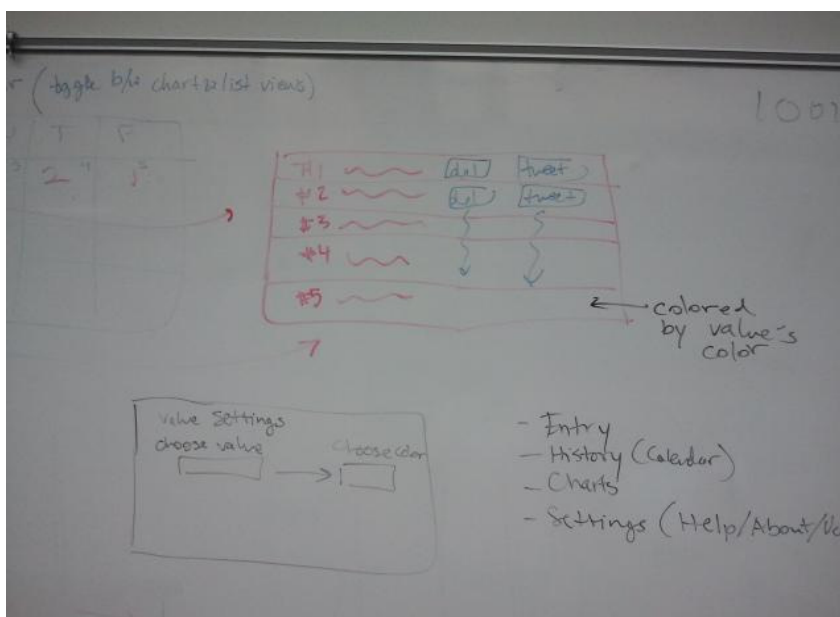
These whiteboard sketches represent our initial idea about the layout of BeProud.

The following image shows a clearer view of our work:

It was at this point in the development process that we decided two important aspects of our project. Firstly, here we decided that the user should be able to navigate the tasks using swipe-able tabs, since we felt that this would be the fastest way in which the user could move through the tasks. Secondly, we decided to focus on three tasks: Entry (which, in this iteration, was the

default screen), Calendar (displaying the user's older accomplishments), and Charts (displaying the user's values and moods).

a. Entry (First Iteration)
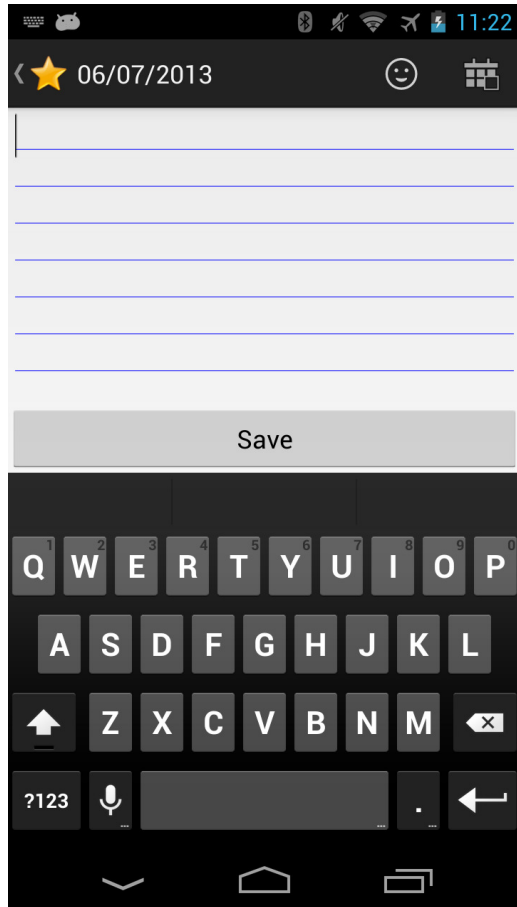
In this first Task Analysis, the user opens our application to the Entry Page as the default page, where they would enter in one of their daily accomplishments. Initially, in our brainstorming stage, we agreed that the work flow for our application began with the user entering up to 3 accomplishments. This decision was short-lived as we soon realized we wanted to give freedom to the user to choose how many accomplishments (at any length) that they wanted to enter into the application. Accommodating user freedom complies with the Golden Rule of Supporting Internal Locus of Control because the user has control over how many accomplishments they enter in as well as the length of text associated with each accomplishment (just as they would in, say, a text message application).

In this view, the user is also be able to edit and enter in their accomplishment, and chooses a value to associate with their accomplishment. From this Entry view the user is be able to navigate to the Calendar View to see the many accomplishments they had entered over the month (displaying the number of accomplishments per day). They would also be able to navigate to the List view to see a list of the many accomplishments they have entered in BeProud.

In the second iteration of the Entry view, we took out the ActionBar transition to the Calendar view because it conflicted with tabs that were more user-friendly. What stays consistent between the first and second iterations is the notebook layout for the user to input their entry. This personal notebook theme reflects the personal information being inputted into the application, so we believed it was a good fit.

b. List (First Iteration)
In the list view, the user can see all their accomplishments over the day. After selecting an accomplishment, the user chooses to tweet, edit or delete it. In this first iteration, we only allowed the user to see their accomplishments over the day. This was clearly a huge design flaw because the user may not want to enter in any accomplishments a certain day, so we needed to propose a solution that would allow the user to view all their past accomplishments. Please also note that in this first iteration, the user could only get to this List view by pressing

'save' on their current accomplishment. We realized that this was another design flaw and resolved this issue in the next version.

c. Calendar (First Iteration)
The user can see their various accomplishments on a monthly calendar view. After clicking on a certain day, a list of their accomplishments for that day is displayed. The user can also navigate back to the entry view from this calendar view.

d. Chart (First Iteration)
Here we decided to display to the user their statistics with regards to the how many of the different categories they have fulfilled over the course of using BeProud. Statisticians generally regard pie charts as a poor method of visualizing data. However, we decided to use a pie chart for representing the amount of user accomplishments respective to each category because there are only five categories, making it easy for visual encoding. Each of the five categories that we provide to the user are associated with a color. Additionally, we decided to use a pie chart to represent the data because all four team members felt it was the most visually appealing. After a quick Google search we encountered multiple articles expressing the idea that circles are an overall more appealing shape. In fact, an article by the web designer Sarita Harbour states: "The eye is drawn to circles and the information contained within, and they are faster and easier for the brain to process than hard-edged squares and rectangles"[1]. Thus, we used the principle of Association in our design process by incorporating visual variables such as colors (one color per category) and shapes (circles).

e. Mood (First Iteration)
There is a clear association between user mood and user accomplishments. Thus, we added the Mood factor to our first design so that users could track their mood and view statistics regarding their mood. In this first iteration, we were planning on adding these mood statistics in additional graphs added to the overall Chart view.

5. Identifying Problems via Interaction Scenarios and Prototyping

It was through testing the first prototype of our application that we were able to detect the numerous flaws in our first design. We mimicked how a user would use the application, and came up with the following scenarios to detect our errors:

1. Allison opens BeProud. She does not want to enter anything in the app (she has already entered in 4 accomplishments today). Instead, she just wants to view the accomplishments she has previously entered. She has already decided that she does not want to enter in an accomplishment, and after opening the application, she also has to press an extra button to navigate to the List view to see her previously-entered data. Allison is now irritated because when she opens the app she does not immediately receive the most essential information.

2. Lauren opens BeProud. She enters in a few accomplishments and associates each accomplishment with 2 values. She then navigates to the mood page and does not understand why she also needs to track her mood. She feels that it is very tedious entering in a lot of information to BeProud. She never uses BeProud again.

3. Roxanne opens Beproud. She has never used it before and wants to enter in some accomplishments. She adds two accomplishments then decides to check out the other features of the application before entering in another accomplishment. She has trouble navigating back to the task she wants to do because not all the available tasks are shown in any one task's view.

From Scenario 1 we realized that our solution to our project problem statement was clearly not being met: upon opening the application, instead of providing users with the immediate information that would help their self-esteem, we were providing them with a blank screen. Additionally, with Scenario 2, we understood that we were overwhelming the user with self-help functionality, instead of just focusing on the main functionality that our application was developed for. By applying the principle of Occam's razor we eliminated the Mood logging functionality of BeProud, making the interface cleaner and easier to use.

6. Task Analysis (Second iteration)

To solve the problem that was introduced in scenario one, we made sure to include the list view of previously inputed accomplishments as the first view. This insures that the user is initially presented with the most important task, that is to view their accomplishments. As previously mentioned, this motivates the user while also providing a logical workflow. From this view, the user can add a new accomplishment via a "+" button (this is a design choice that corresponds to the user's mental model- that a user will probably recognize the association between an addition symbol, "+", with adding a new entry. This also adds predictability to our application). Furthermore, the user can navigate to another tab.

Interaction scenario two introduces the problem of cluttered work flows, increased entry time, and an overwhelming amount of tasks and choices. To deal with this, we decided to exclude the task of associating a mood with a particular day, or time of day. With this, we discard distracting tasks that may take away from achieving the goal at hand. Additionally, input time increases and the workflow becomes more obvious as less irrelevant tasks, such as mood, are taken out.

Upon examining interaction scenario three (that includes Roxanne as the actor), it is obvious that tabs are essential to creating an obvious work flow that users can easily navigate without having to guess or feel lost. Thus, in our final design we incorporated three labeled tabs (not icons) for easy navigation between views and quick access to the desired task.

The sketch on the right-hand side is a simple depiction of BeProud's second iteration task flow.

a. Entry (Second iteration)

In the Entry view, we kept the same icon as in the first iteration and used this icon to implement a date-edit option for the user, so that when editing an accomplishment, the user can also change the date associated with that accomplishment. This organizes the user's accomplishments nicely, which is not only convenient for the user, but also allows the user to recall accomplishments faster if they are able to associate them with a particular day.

As described earlier we decided to remove the task of choosing a mood in the Entry view. Eliminating mood functionality takes into account Hick's Law because we are not overwhelming the user with choices. Due to the fact that, within the context of Hick's Law, as the choices available to the user increases, the time to decide on a selection increases, we are able to make BeProud Android application a lot faster for users as we adhered to this Law.
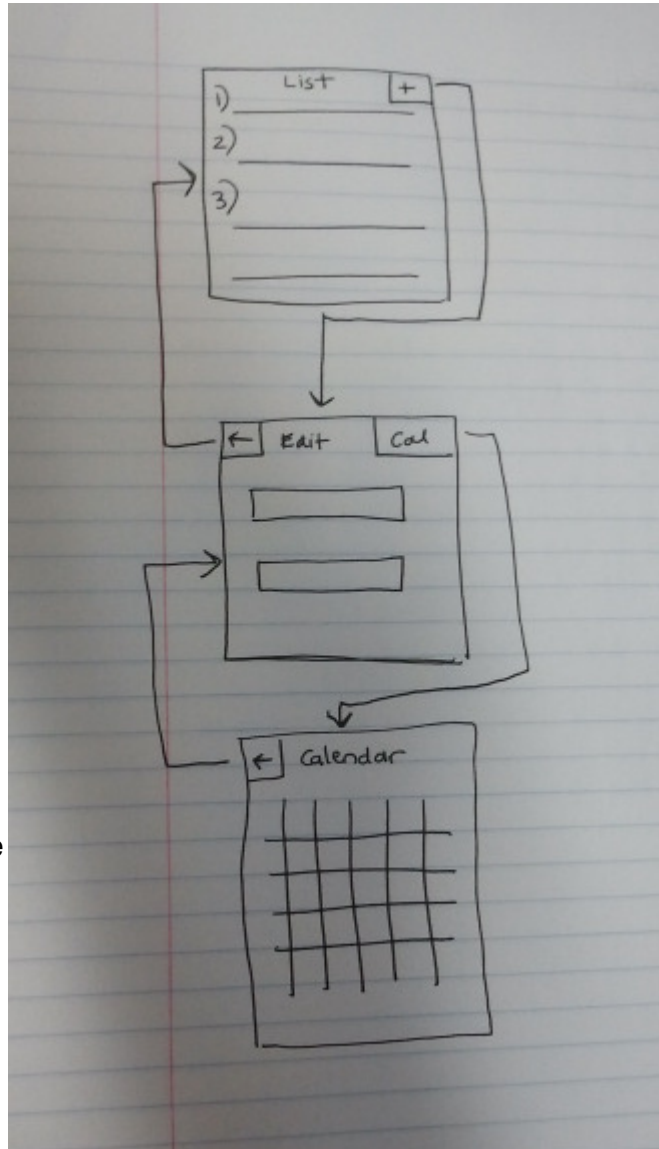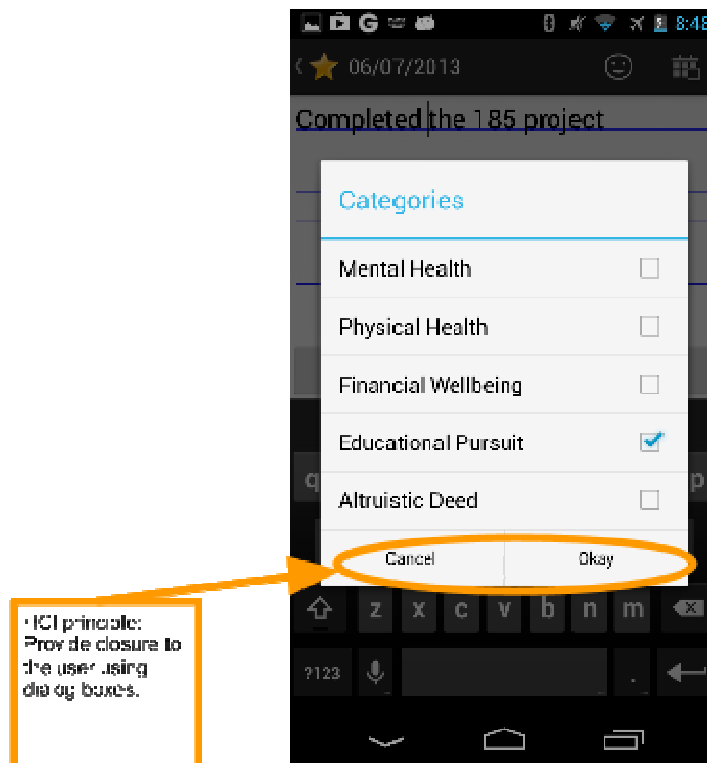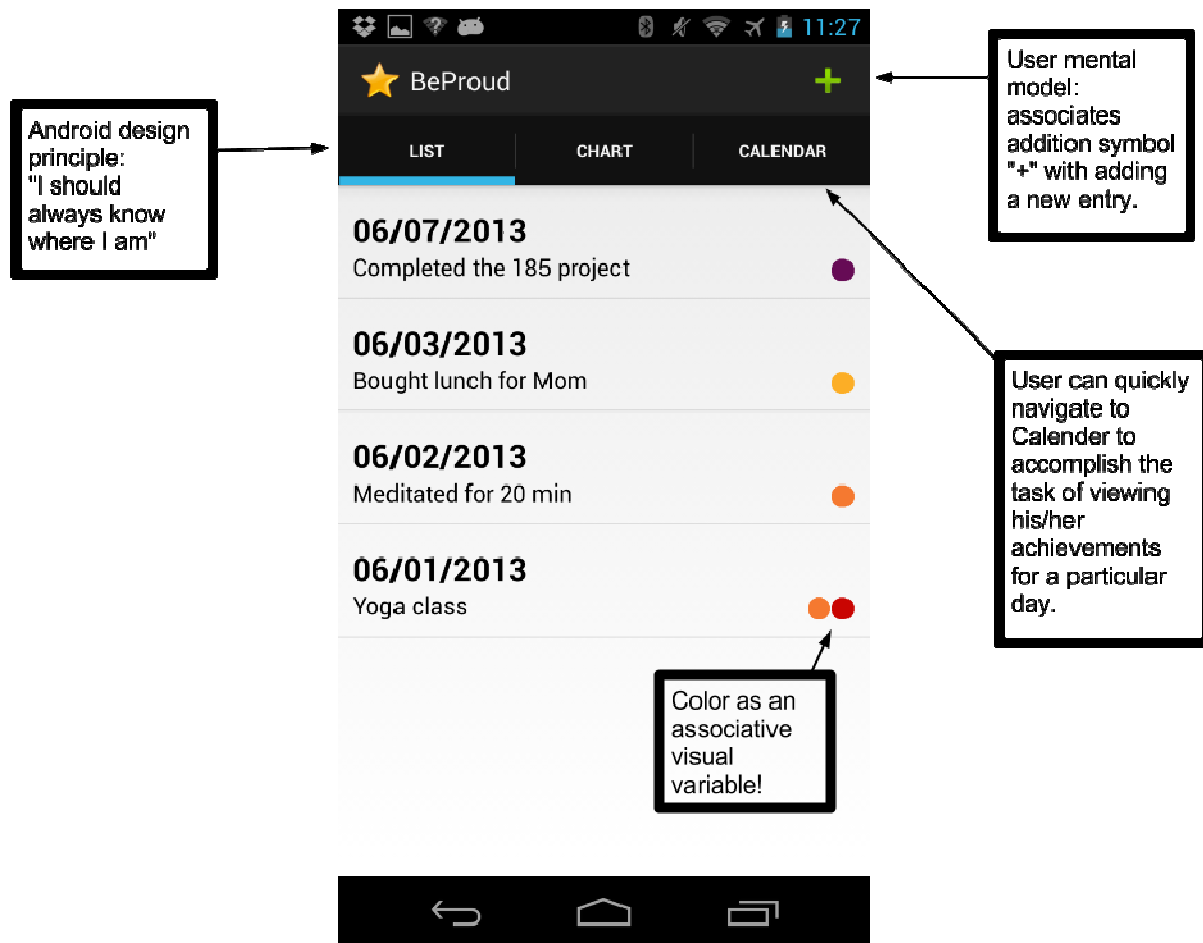
As noted previously, the above screenshot shows that Hick's Law also took part in the decision of providing the user with five associated values. We allowed the user to choose one or more of these values which are associated with the current accomplishment that they are entering.

We also resolve a design flaw that we explained in the first iteration in which the user is brought to list view after pressing 'save' in the Entry view. Although this makes the work flow apparent because it transfers the user to the next view directly, the user loses freedom and more likely the user will want to view their accomplishments without entering one. Thus, we made sure to just let the user decide what task they want after inputting a new entry; they must decide between the tabs which are appropriately labeled.

b. List (Second Iteration)

In the List view, we decide to display all recent accomplishments rather than just daily accomplishments. Thus, each entry has an associated date with it, that is visible in every element in the list.

Android design principle: "I should always know where I am"

User mental model: associates addition symbol "+" with adding a new entry.

User can quickly navigate to Calender to accomplish the task of viewing his/her achievements for a particular day.

Color as an associative visual variable!

Also, upon choosing 'edit' from the options provided to the user after clicking on an element in the list view, the user is able to associate a value with their accomplishment. We decided to adhere to Hick's Law and only provide a handful of value choices that are most common. We also associate a color with each value (some of the colors reside within the user's mental model and use colors that are most likely associated with that value. For example, we use green for a 'financial' value. This also forces the user to memorize less).

Once back in list view, the user is able to view their accomplishment with preceding colored dots that represent the values associated with that accomplishment. The user must memorize these colors (but can refer to them of course if necessary), so that is why we provided very few values and tried associating colors that a user's mental model might correspond with a certain value. We chose to correlate each value with a color because color is an associative visual variable, more so than shape. However, a better choice might be an icon for each value, which would reduce user recall and enhance user recognition. However, icons may clutter the list view, which could distract the user from the task that they want to complete.

c. Calendar and Chart view did not change for this iteration. We felt we succeeded in the initial design for these two views. We continued to work on the implementation of the functionality of these two.

7. Quantitative Results

KLM Analysis:

Scenario 1: Open application and edit recent accomplishment from "ran 10 miles" to "ran 11 miles"
- Click on BeProud application icon: P + MK
- Choose/Click on accomplishment you wish to edit (do not need to include scrolling because accomplishment is recent): P + MK
- Choose/Click "edit" when dialog box appears: MK
- (user redirected to edit page)- Click on "10", delete 0 and change to 1: P+K+H+K+K
- Click save: P+MK
- P+MK+P+MK+MK+P+K+H+K+K+P+MK
- Total time: 11 seconds

Scenario 2: Open application and add new accomplishment "Completed finals!" and associate this accomplishment with a value (Educational Pursuit):
- Click on BeProud application icon: P + MK
- Click "+" button to add new accomplishment: P + MK
- (user redirected) - Input "Completed finals!": MK+length(completed finals!)-1*K
- Associate accomplishment with a value: P + MK + K + K
- Click save: P + MK
- P + MK + P + MK + MK + length(completed finals!)-1*K + P + MK + K + K + P + MK
- Total time: 15.95 seconds

Observed values (T-test) - Comparing BeProud's first iteration interface to the second iteration interface:

User test: Open application and add new accomplishment "Completed finals!" and associate this accomplishment with a value:
Interface 1:
- Aubrey (novice user): 22.8 seconds
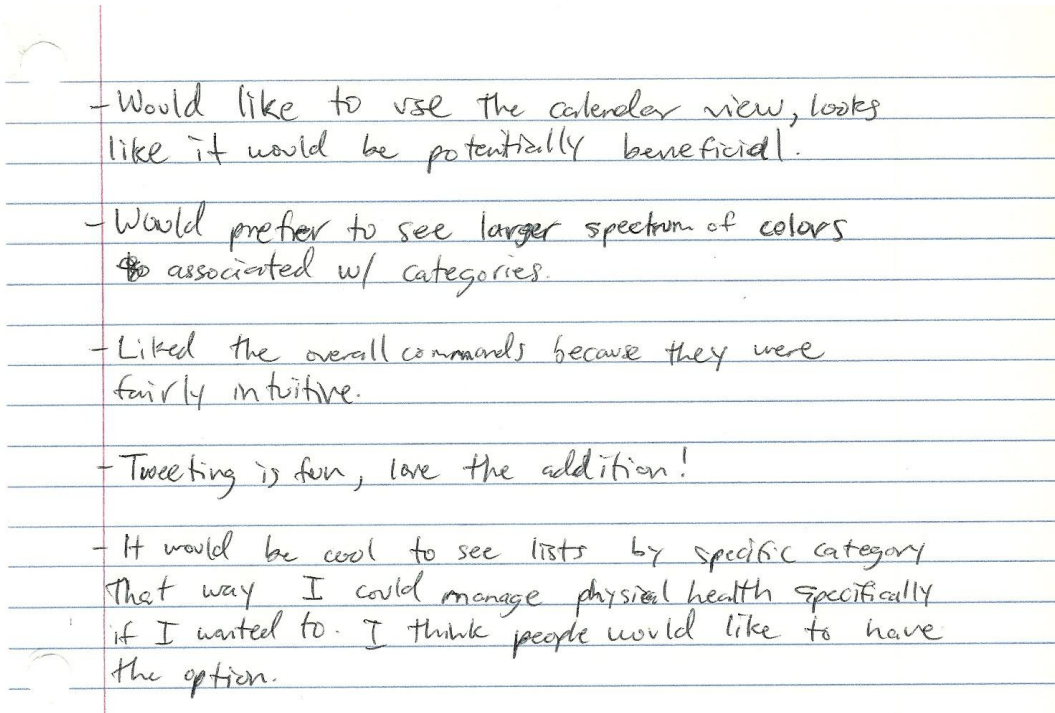- Cody (semi-expert user): 17.9 seconds

Interface 2:
- Aubrey (novice user): 19.2 seconds
- Cody (semi-expert user): 15.7 seconds

TTEST (paired) result: 0.11

Here, we see that our results are not statistically significant. This may be due to the fact that we were only able to gather statistics using two subjects. Had we gathered more data on a variety of users, our results may have yielded a significant difference between the two user interfaces.
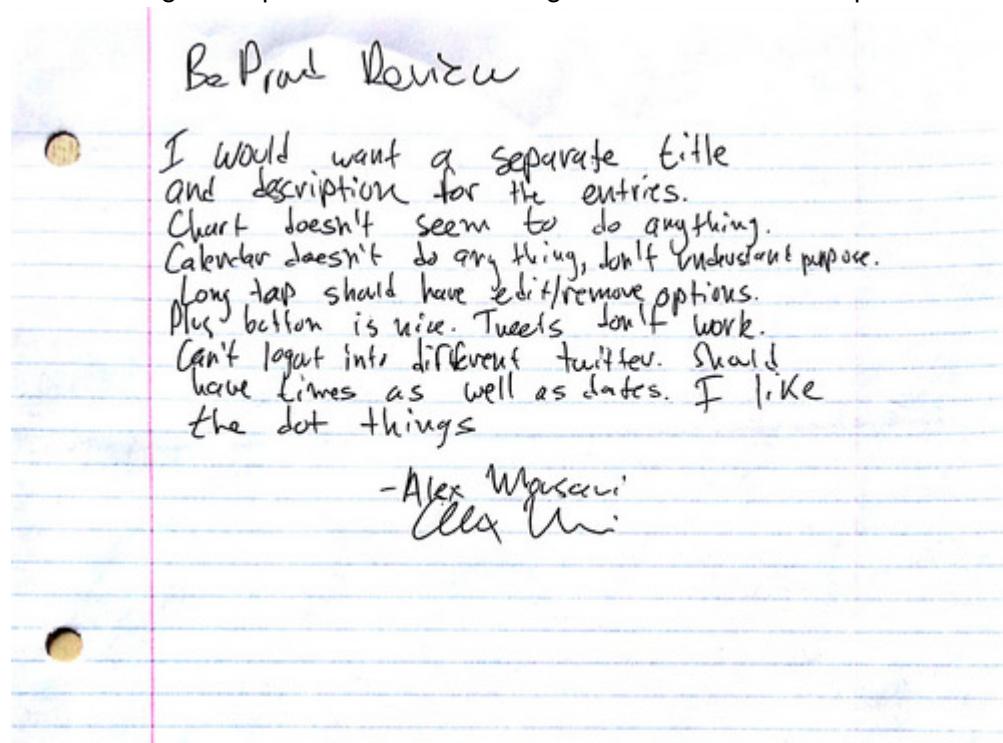
8 User Reviews:

- Would like to use the calendar view, looks like it would be potentially beneficial.

- Would prefer to see larger spectrum of colors associated w/ categories.

- Liked the overall commands because they were fairly intuitive.

- Tweeting is fun, love the addition!

- It would be cool to see lists by specific category. That way I could manage physical health specifically if I wanted to. I think people would like to have the option.

This user performed a user review on the prototype used during our presentation. To summarize, he felt that BeProud was straightforward, however he wished that the Calendar view had been thoroughly implemented (which has been implemented for the final version). Additionally he mentioned another great possibility for BeProud's functionality: to be able to sort on values. We felt this was very helpful for developing future iterations of BeProud.
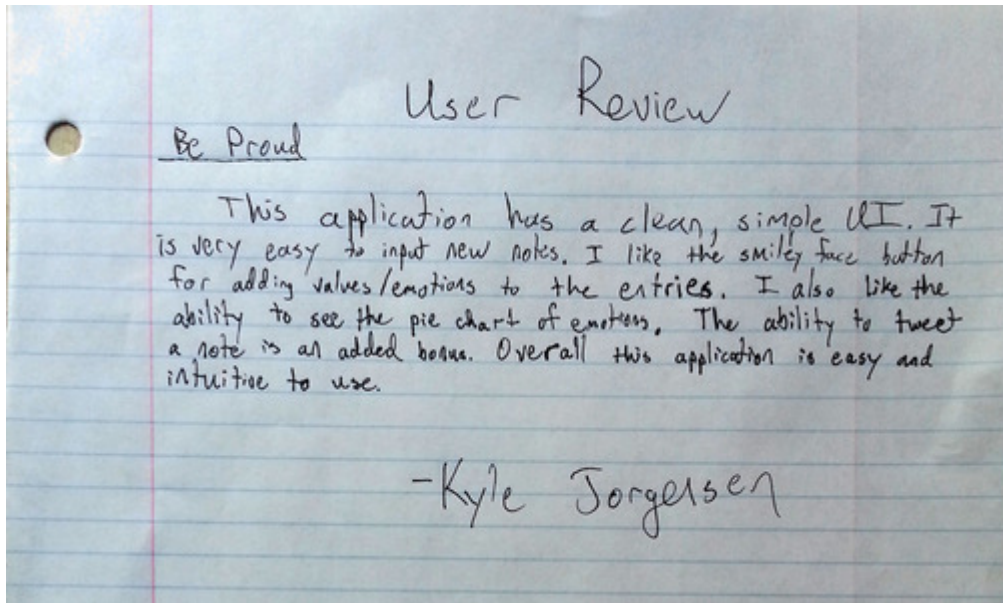
Here we see the user is very satisfied with BeProud's clean user interface. He feels that the smiley-face icon is a great representation for adding values to each accomplishment.

This user review was written before the Charts were implemented. This was the user review that led us to test our Twitter Functionality further, since it had been working throughout our development process (as seen in the presentation demo on June 7, 2013). Then, by checking the Twitter development site we saw that we used the Twitter API v1, and now (as of June 11, 2013) it is obsolete. Here is a snapshot taken off the Twitter development website (https://dev.twitter.com/blog/api-v1-is-retired):

After downloading the appropriate libraries and updating our build paths, we managed to get Twitter working again with BeProud. We updated the library we were using to Twitter4J 3.0, which seemed to solve all the difficulties we encountered.

9. Summary

Our last iteration included changes to the representation of values that users associate with their inputted accomplishment. As stated earlier, using colored dots to associate with values involves user memorization. Furthermore, a user's mental model may not associate our chosen colors to the values. Thus, we decided to implement icons; when a user sees a book icon, he/she will quickly associate that with the value "Education." This was the last crucial change we made to our application.

Our application is quicker to navigate through and the workflow is apparent (although it really is dependent on the tasks that the user has in mind because the user chooses what he/she wants to do next). Through the careful use of visual variables, Hick's Law, recognition over recall methods, and analysis of user navigation through tasks (such as KLM for expert users), users think less, memorize less, and work faster. While also residing within the bounds of HCI principles, we attempted to achieve Android Application Principles. For example, the user always knows their location within the application because of our consistently labeled and viewable tabs. This follows suit with the Android principles of "I should always know where I am." Additionally, on the back-end of our application, we use JSON serialization to store the user's data on their SD card -- which, in the future, will instead be stored in a database. This corresponds to Android's principle of "never lose my stuff".

Works Cited

[1] Harbor, Sarita. "Stop Being So Square." *Mobile, Responsive Design, Web Design*. Nov 6, 2012*. Web Designer Depot. Web.*
<http://www.webdesignerdepot.com/2012/11/stop-being-s
o-square/>.