

Heuristic Evaluation

Demographics and Protocol:

To perform this evaluation we asked one of our fellow designers to evaluate the application based upon the guidelines in Nielsen's ten heuristic model. This was appropriate as to allow for the team to perform a pseudo self-reflective exercise in honesty of the design quality of the application and how this related to the intended goals as well as to provide a viewpoint from the team to reflect intended usage and purpose of certain design features and aspects. Afterwards, the evaluation was reviewed by another independent party for confirmation and approval before final conferring with the entire design team as to the results of the evaluation.

Tasks:

For this evaluation all aspects of the application were observed and evaluated. Particular emphasis was placed on the social and individual areas of the app as these are its primary uses. Good attention placed upon the design qualities pertaining to the heuristics on each individual page, the pages within menus, and from menu to menu to given a good overview of how the application fulfills these evaluations at both level that is "within itself" and "without itself".

Results:

From the results we felt that our application was a good example of overall design as per Nielsen's guidelines as well as meeting our own expectations for what we wished to implement. However, there were areas in which we could have fared better such as the overall coherency in the design between the three main functions of the application. This was due to a semi lack of coordination between the group members during prototype implementation as we were more concerned with functionality in our design than overall design coherence. This however, isn't a big set back as it can be easily corrected in future and final implementations. Overall, our heuristic results as well as our own intentions and personal opinions on our mobile app reflect what we think is a well designed and high quality product.

Visibility of system status:

The application can be said to be comprised of three key features, social media and group activities, individual activities, and profile management. Beginning even from the home screen the visibility of these features and functions are made plain by its simplistic and straight forward design which lays out these three features as menu options that compose the majority of the home screen's layout. When navigating through the individual activities, the user is shown all of the particular activities that they can perform immediately in a neat scroll through fashion. Upon selection of a particular activity the user is shown a listing of subcategories of the activity they chose with the main category displayed in the top of the screen. This is repeated as the user moves forward and backward through categories and subcategories of activities which allows for a clean understanding of what stage of the activity selection process the user is in and where they

are in relation to the application as a whole. However, the only drawback to this design is that the if the user goes several layers deep into the system when selecting an activity there is the potential difficulty that they may forget where it is that they are in relation to the application, but this is nothing that cannot be easily corrected by hitting the back button in quick succession.

Like the individual activities feature of the application the social feature sections and profile section of the application is intuitive in its usage and most if not all users would not have any difficulty in understanding where it is they are located within one of the app's processes. The account creation and account editing functions are perfect examples of this. Although the user is explicitly told what stage of the process they are in as in the individual activities, the options and design are presented in such a way as to have the user be guided through the process in a step by step manner or allowing for quick entry and exit from one process to the next. A negative side to this however is that unless the user has prior knowledge features on these areas of the app, they may be unaware as to the full scope of options and features contained within these sections. However, this is applicable to only one or two features within the application such as finding the settings menu and creating a social event.

Match between real world and system language:

In this regard, the Better U application exceeds exceptionally! All areas of the system use terminology that are native and common-speak in either reference to the function/features provided or the activities in which they refer. In addition, this application makes good use of symbols and images to refer to the functionality of features within the system such as using common social media account, friends, and settings icons and buttons as well as using representative images for individual activity sections.

User Control and Freedom:

The application gives the users almost total freedom as to what they can and cannot do within the system while at the same time minimizing if not all together eliminating any area in which the user could make a "true error". The application's only real area of user restriction is having an account in order to use the app. However, beyond this the user is not blocked from proceeding into any of the application's features and functions and can easily reverse any of their choices or correct anything that they feel they have mistakenly inputted. This is true for the profile, individual activities, and social media/activities section. In all cases, to proceed forward is no more difficult than a tap and to go backwards, no matter how in depth into the menu the user is currently, is simply a tap of the back button at the top of each screen. On top of this, the back feature like many other mobile applications doesn't cause an error whenever it is used and easily cancels any input that the user may have entered. This last point, however, could be seen as a drawback potentially as the user may have always mistakenly pressed the back button. Beyond that, the user is presented with an application that very much feels like "this is my world/application" and can do whatever they please easily and uninhibited.

Consistency and Standards:

As far as overall application design consistency our Better U prototype does show variations across the app's three main functions; stated again: the individual activities, profile, and social media/activities. Though the color scheme remains consistent within each feature the design for each is noticeably distinct enough to where each functionality may be looked at as its own application. This distinction is shown clearly with the font sizes, screen layouts, and shown minimally in some of the item locations. However, within each functionality the overall design when navigating through is excellently consistent and coherent from page to page or activity to activity. Each of the three features independently contains its own standards as to how the interface is laid out and styled and when viewed from this way is a unique form of design. In this fashion, there is a strong standard in the interface design so much so that from page to page the features flow smoothly and have a lovely aesthetic all own their own. Again, it must be noted, even with this success it would be best to modify future implementations so that all of the app's designs for all of its features have an overarching and more interconnected design standard.

Error Prevention:

As far as this criteria is concern, this application has a pretty standard and through approach. There are very view areas where this would be necessary and in such cases the error prevention implemented is standard practice. Specific usages are user confirmation upon account creation or editing, confirmation when creating, editing, or joining a user event, and a user confirm message box when the user chooses to log out of the application

Recognition Rather than Recall:

As with many other popular and well designed mobile applications this app is a good example of how to implement this heuristic in a fashionable manner. Overall, the user need only remember their login information, but apart from that, usage of the rest of the app need only require recognition and intuition in order to navigate. In the individual activities menu, all options are displayed in a scrollable fashion meaning the user only has to find the desired activity in order to proceed. In the social media/activities menu, the user again need only find the appropriate icon, button, or image in order to proceed as all of the options take the user to another page. And lastly, the profile menu is most clear cut as all of the options to edit or change information are right next to the value that will be changed. So if the user needs to change anything they need only keep in mind the field/value they want to edit.

Flexibility and Efficiency of Use:

In this regard our application provides little to no design aspects that would qualify. The application itself is primarily designed for navigating through activities and creating activities and by this nature has little room or necessity for flexibility. Though, with this being said, one could say that some efficient means could be set in place. To this, it must be noted that since the application is on a mobile platform there isn't much room to optimize efficiency as touch screen functionalities are quite efficient and in design it is much easier to lower this than improve upon it: an already good thing as it were. However, it could be said that some aspects of the social

menu may qualify for this as the user can see their already marked as attending events, created events, and view their friends who are also using the application.

Aesthetic and Minimalist Design:

The color scheme for the application is lively, soft, fun yet elegant, and quite charming. For all the menus, the placement of colors is well suited to the page and is never made overbearing by its presence or distracting from any of the actual screen content. This gives a nice aesthetic quality to the application while also directing attention to appropriate menu items, content, and features almost intuitively while at the same time forcefully “demanding” the users attention. In addition to this, the overall design for the application and all of its menus is quite minimalistic in a way that emphasizes functionality and yet also emphasizes the aesthetics.

Help users diagnose and recover from errors:

Again, in this particular area of evaluation it must be noted that given the nature of the app there exist few places where such aspects could even be implemented. Though, areas where this would be appropriate which are entering/editing event information and entering/editing account information the features that fulfill this criteria are quite standard. If the user fails to enter a value into a required field or mistypes some information they are immediately notified of the error when they try to submit the form and cannot proceed until the appropriate changes are instantiated.

Help and Documentation:

As designed, the system is quite intuitive and straight-forward. As such, users, especially those of the target group will have little to no difficulty using the system and because of this the designers felt that no help or documentation was necessary. This sports a potential drawback and negative rating in this particular heuristic as in the rare event that a user is unable to navigate through the system they would be unable to find aid from the service itself and would need to ask for the aid of another experienced user or explore on their own to find the solution.

Cognitive Walkthrough

Study Protocol:

The Cognitive Walkthrough was conducted by asking people unfamiliar with our product to complete the series of tasks listed above. These tasks were identified for the reason indicated above, and were immediately broken down into actions. Testers ask the user to complete each task by reading the task first. Testers should observe subject choices as they try to complete the task. Testers should look for times when the walkthrough subject hesitates or the subject makes an action different from the actions listed under each task. Testers should ask the subject to complete the task. Before starting the tester in our case asked the users:

Do you often frequent activity apps?

Do you often frequent social app?

Describe demographics:

The first user was a female who does not regularly use activity apps, but does use social apps frequently. The second user was a male who indicated that he often uses activity apps, but does not use social apps.

Description of tasks selected and justification:

The tasks presented in the cognitive walkthrough are:

1. Create a personal account using your facebook credentials, then logout. Please make up all log-in credentials.
 - a. The create an account tests usability and speed of registration. If users are immediately deterred by a registration screen then their chances of using the application are reduced.
 - b. Asking users to register with their facebook credentials shows any difficulties in the users understanding what their app credentials are compared to their Facebook credentials.
 - c. Log-out is a functionality that seems to flow well with the past two tasks. It is important for security reasons that users are able to easily log-out of their accounts, an easily usable log out system will establish trust in the users that they can access their BetterU accounts on various devices and not have to worry about forgetting to log out/not being able to log out and their account be unwantedly accessed by others.
2. Add an interest to your public account page.
 - a. Log in
 - i. The user begins at the log-in screen, so they must first log in to their personal account. If this is implicitly understood by the user then it will be obvious that users associates their public profile and account with one another.
 - b. Select "Profile"
 - i. The user must then select "Profile" homepage button to alter attributes of their profile.
 - c. Add interest
 - i. Lastly, the user will be presented with a form where they can change information about their personal account. There are more options that can be changed on this form, but a user's ability to alter their interests means they will likely try the same action sequence for changing other profile information.
3. Begin the personal guided meditation video called "Sat Chit Anand"
 - a. Select "activities"
 - i. The user must select "activities" first, which will test the user recognition of the three main buttons on the home screen.
 - b. Select "meditation," select "guided meditation," select "Sat Chit Anand"

- i. The user then selects meditation and finally selects the meditation video “Sat Chit Anand.” Success on this action indicates that the menu-submenu sequence created in this app and used for all the activities is easily navigable and broken down into meaningful subcategories.
- 4. Create a meditation event in Meyers Quad for this coming friday at noon.
 - a. Select Social
 - i. The user will select the “Social” button on the homepage. This action tests the users ability to distinguish between the 3 homepage functions.
 - b. Select “Make An Event”
 - i. Users must understand the difference between the different event options listed on the Social page. There is a lot of text on this page, so this action will test usability vs speed.
 - c. Fill out event information
 - i. The user will lastly fill out the information about their event and save. There are multiple text inputs on this page, so completion of this action will be largely determined by a user’s ability to distinguish between the required information for each input field.

Task descriptions with action breakdowns are listed above. The tasks were chosen because together they envelope the 4 main functions of the app: Account creation/access, public profile management, audio function, social event function.

Discussion of results:

In the first walkthrough during task 1, the user was weary to type in registration information as the password field revealed user information. Finding the log-out button was a source of hesitation for the user. This could mean that the button itself is too small, not attention grabbing, or in a location too far from the usual user activity area. The app currently has a “gear” image for the settings button, but this symbol choice should be investigated further to ensure that most users associate gears with settings. The subject completed task 2 and task 3 quickly with no variation from the outline task actions above. During task 4, while making an event the user was presented with many text fields and spent time scrolling through the text inputs before finally inputting the required text. The user had to ask the proctor for clarification multiple times, this could mean that the application forces users to rely on recalling information rather than recognizing the correct information.

During the second walkthrough, for task 1 the user clicked the “+” icon thinking that it was a button rather than an aesthetic element. The user was hesitant to continue typing in their password because the password was displayed in plain text. This shows that as designers we should limit purely aesthetic items if they are near groups of functional items. After making it to the homescreen, the user had to squint to see the text on each button and therefore took longer to make a decision. This could mean that our color scheme does not fit well for mobile devices.

During task 2, the user struggled to find the “home” button as it was in a pull out menu rather than directly on the screen. After finding the pull out menu, the user expected the “home” option to be at the top of the list rather than at the bottom. The mapping of the application in this case was clearly different than the mental map of our user, and reordering of buttons should be considered. The subject could not easily find the option for altering their profile, so they went back to the home screen to search for a more fitting option. This indicates that the three action items on the home screen are not differentiated enough. The user likely thought “social” was the best option, when “profile” was actually the correct choice. The overlap in definition for these two button labels should be minimized. During task 3 and 4, the subject was able to easily navigate through the expected actions with speed and ease.

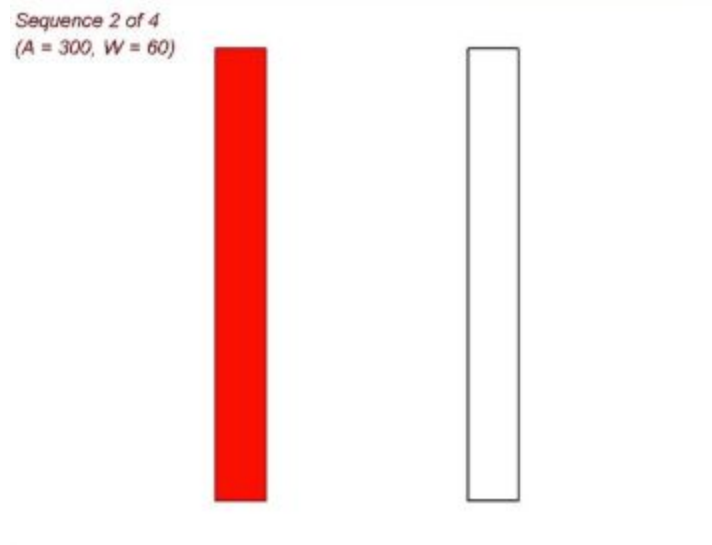
Predictive Evaluation

Our methodology and our tasks:

To establish a sort of “baseline” for all of our evaluations, we have decided to utilize a mixture of Fitts’ Law and the Keystroke Level Model for calculating the approximate times it would take for a user to complete three tasks: creating an account, finding a guided meditation activity to perform individually, and creating a new group event that others can find on their own BetterU apps. These three tasks were chosen because they greatly demonstrate the extent of our mobile application’s functionalities. In addition to this, they represent three key interactions that our users will have with BetterU. We had previously listed these three tasks as key benchmark tasks in Milestone 3, and we have chosen to use these three in not only our predictive evaluation, but also our other evaluations.

As one may recall, Fitts’ Law is described by the following: $T = a + b(\log_2(1 + \frac{D}{W}))$, where T (also called MT for movement time) is the average time taken to complete a movement, a is the start/stop time of a device, b is the inherent speed of the device, D is the distance from the starting point to the center of the target, and W is the width of the target measured along the axis of motion (Fitts 1954). While D and W are dependent on each screen that the user encounters, the coefficients a and b are constant values that are empirically derived. This varies from device to device, so a bit of experimentation was required in order for us to establish these values. Dr. Scott Mackenzie, author of *Human-Computer Interaction: An Empirical Research Perspective* and researcher at York University, created an application called “FittsTouch” for Android devices that can be used for researchers to figure out these constants for a specific device. The idea is that given a number of participants, each participant will perform a number of trials that require the user to touch two “bars” or “objects” on the screen of the mobile device as they light up. Based on the sizes of each target and the distances they are from each other, each trial provides a value for ID (index of difficulty). As the participant completes one trial, the times that were taken for the user to tap upon each target is averaged up, and the average found is

deemed the MT (movement time, as previously stated). Both the ID and MT are provided by the app after each trial. After all the trials are completed, researchers are provided with a set of data points with the ID as the x-coordinate and the MT as the y-coordinate. When all these points are plotted in a linear regression model, a “line of best fit” informs the experimenters what the a and b values. The point in which the line intercepts the y-axis is the value of a (in milliseconds), and the slope of the line is the value of b (Mackenzie 2018). Once these values are calculated, we are able to approximate the average times it takes users to go through each screen by using the various values of W and D , and once all the average times are calculated, we may add all of them up for a resulting estimated user time to complete a task. An example picture is provided below:



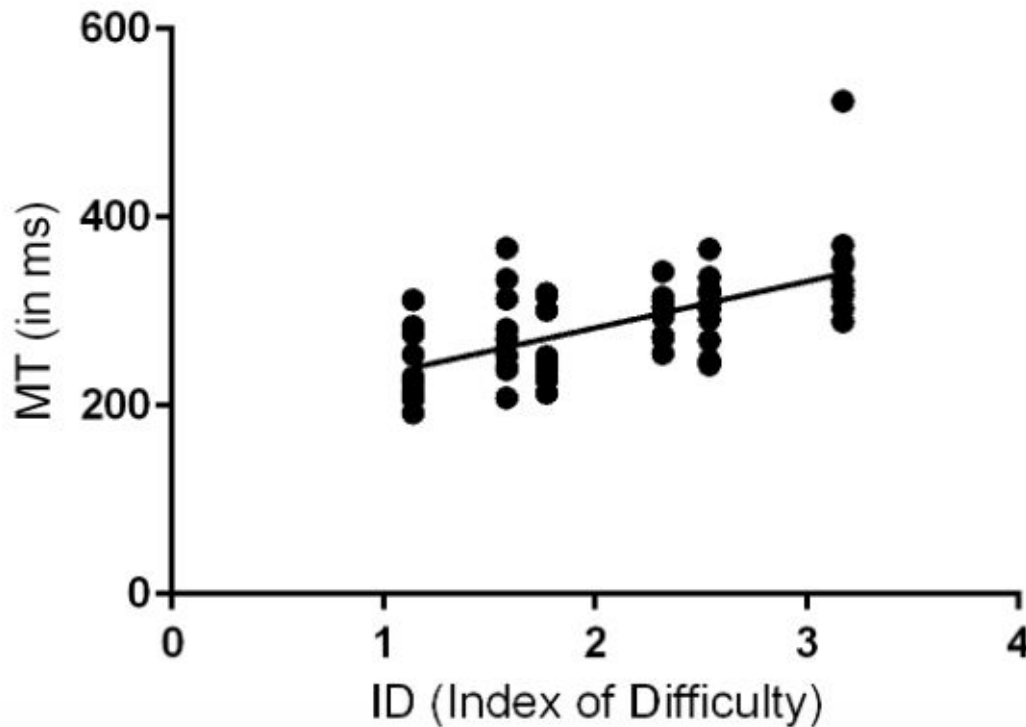
(Participant would need to tap each target as it turned red; MacKenzie 2018)

Pre-calculation experimentation:

Now that the concept of our methodology has been explained, we move onto the actual performing of our predictive evaluation. To establish the values for a and b , we gathered a pool of ten volunteers to complete the aforementioned task of tapping on targets in the mobile application FittsTouch. Because we designed BetterU using a mobile Android device display-sized workspace, we used a Samsung Galaxy S6 to gather our information. This experiment was conducted in an informal manner in order to not influence the speeds at which each participant completes each trial, so no scripts were used. We introduced the users to this app one at a time and informed him or her that their goal was to simply tap the targets that lit up red. There were a total of ten participants (separate from the other evaluations) that each performed six trials of tapping twenty targets per trial. The participants were all found within the age range of 18-35 years old (six male, four female), and the test group consisted of various ethnic groups, dominant hand preferences, and technological familiarity levels. As for the targets that each user tapped in the app, the target widths alternated between 60 and 100 pixels, and the target distances varied between 120, 240, and 480 pixels. After each trial, we recorded the numbers provided by

the app, and overall, we ended up with a total of 60 pairings of IDs and MTs that can be plotted in a linear regression model. The resulting linear regression model can be seen below:

Linear Regression



From this linear regression model, we were able to analyze the model and assign values to a and b that will be used for Fitts' Law calculations. The value of a was found to be 0.209 milliseconds, and b was found to be 0.037. Due to the small sample size, there was a bit of uncertainty that came with these results, so we looked into previous research in order to compare the values. We found a paper by Niels Henze and Susanne Boll from the University of Oldenburg that talked about how they published an app on the app store specifically for gathering data from users performing a Fitts' Law task. They were able to analyze 5,359,650 tasks from 63,154 installations, and they found that a was found to be 0.200 milliseconds and b was 0.040 (Henze and Boll 2011). However, looking at just the Samsung Galaxy S results, which consisted of 292,515 tasks from 4,873 installations, a was found to be .207 and b ended up being 0.029 (Henze and Boll 2011). These results confirmed the values that we derived, despite being higher than the study's results. It makes sense for the slope (b) of our results to be higher because the Samsung Galaxy S6 has a larger screen size than the Samsung Galaxy S, and as the difficulty of the tasks increase, it should be harder for participants to perform these tasks on a wider and longer phone than a smaller one. Thus, we were content with the values that came about from our little informal experiment, and we moved forward with our calculations.

Performing the Predictive Evaluation:

After all the previous steps that were taken to set up the Fitts' Law equation for calculations, we were then able to utilize the equation to calculate the total time it would take a user to complete all three aforementioned tasks. The formulation of Fitts' Law is now as follows: $T = 0.209 + 0.037(\log_2(1 + \frac{D}{W}))$. We chose to calculate the values of D from the center of the screen since this represents the ideal position for the thumb for both left-handed users and right-handed users, for this is the very center of the "thumb zone," coined by Steven Hooper. However, Fitts' Law only accounts for the time it takes for a user to move their finger to a button. So, there are two actions that do not have a specified time: pressing a button/typing and thinking. According to Holleis et al. at the University of Eindhoven, the average time it takes for a user to press a button/keystroke on a mobile device is 0.39 seconds, while a mental act such as making a decision takes 1.35 seconds (Holleis et. al 2007). The reason that we decided to use these measurements instead of the traditional keystroke-level model is that the KSLM was originally designed for computer interaction. Holleis and his team had taken this concept and attempted to revise it for mobile phone interaction. They had performed 7 studies, each one containing 9 to 19 participants, and from this, they were able to find these values (Holleis et. al 2007). Thus, each of the following calculations will consist of typically three different values of time, using both Fitts' Law and a modified version of KSLM: a mental act (such as deciding on an option), the time it takes to move the finger (calculated from Fitts' Law assuming finger is in center of screen), and a number of keystrokes/presses of a button.

Results:

Task one: Creating an account with Facebook

1. Pressing on "Sign up":
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to "Sign up": **0.29 seconds** (D = 192, W = 44)
 - c. Pressing the button: **0.39 seconds**
2. Pressing on Facebook icon
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to Facebook icon: **0.24 seconds** (D = 102.8834, W = 60)
 - c. Pressing the button: **0.39 seconds**
3. Entering Facebook information and pressing "Register"
 - a. Remembering username: **1.35 seconds**
 - b. Moving finger to "Username" field: **0.12 seconds** (D = 17, W = 95)
 - c. Pressing the field, entering a 9-letter username, and pressing "Enter": $11 \times 0.39 =$
4.29 seconds
 - d. Remembering password: **1.35 seconds**
 - e. Moving finger to "Password" field: **0.22 seconds** (D = 127, W = 95)
 - f. Pressing the field, entering a 9-letter password, and pressing "Enter": $11 \times 0.39 =$
4.29 seconds

- g. Moving finger to “Register” button: **0.31 seconds** (D = 258, W = 42)
- h. Pressing “Register” = **0.39 seconds**

Estimated total time: **16.33 seconds**

Task Two: Finding a guided meditation activity to perform (starting on user’s home screen)

1. Pressing on “Activities”
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to “Activities”: **0.26 seconds** (D = 280.1058, W = 110)
 - c. Pressing on the button: **0.39 seconds**
2. Pressing on “Meditation”
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to “Meditation”: **0.16 seconds** (D = 47, W = 113)
 - c. Pressing on the button: **0.39 seconds**
3. Pressing on “Guided Meditation”
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to “Guided Meditation”: **0.22 seconds** (D = 144, W = 128)
 - c. Pressing on the button: **0.39 seconds**
4. Pressing on “Sat Chit Anand”
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to “Sat Chit Anand”: **0.13 seconds** (D = 22, W = 101)
 - c. Pressing on the button: **0.39 seconds**
5. Pressing the “Play” button
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to “Play” button: **0.27 seconds** (D = 276, W = 90)
 - c. Pressing on the button: **0.39 seconds**

Estimated total time: **9.74 seconds**

Task Three: Creating a new group event

1. Pressing on “Social”
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to “Social” button: **0.25 seconds** (D = 254.5, W = 115)
 - c. Pressing on the button: **0.39 seconds**
2. Pressing on “Make an event”
 - a. Deciding what to press: **1.35 seconds**
 - b. Moving finger to “Make an event” button: **0.30 seconds** (D = 262, W = 44)
 - c. Pressing on the button: **0.39 seconds**
3. Filling out information and pressing “Create event”
 - a. Thinking of event name: **1.35 seconds**
 - b. Moving finger to “Event name” field: **0.30 seconds** (D = 200, W = 35)

- c. Pressing the field, entering “Group Meditation” (2 shifts for capital letters), and pressing “Enter”: $20 \times 0.39 = 7.80$ **seconds**
- d. Thinking of event location: **1.35 seconds**
- e. Moving finger to “Event location” field: **0.27 seconds** (D = 110, W = 35)
- f. Pressing the field, entering “Myer’s Quad, Athens, GA” (5 shifts), and pressing “Enter”: $30 \times 0.39 = 11.7$ **seconds**
- g. Thinking of event date: **1.35 seconds**
- h. Moving finger to “Event date” field: **0.18 seconds** (D = 20, W = 35)
- i. Pressing the field, entering “12/25/2018”, and pressing enter: $12 \times 0.39 = 4.68$ **seconds**
- j. Thinking of event start time: **1.35 seconds**
- k. Moving finger to “Start time” field: **0.25 seconds** (D = 70, W = 35)
- l. Pressing the field, entering “11:00 AM”, and pressing enter: $10 \times 0.39 = 3.90$ **seconds**
- m. Thinking of event description: **1.35 seconds**
- n. Moving finger to “Event description” field: **0.29 seconds** (D = 165, W = 35)
- o. Pressing the field, entering a forty-character (including spaces) description, and pressing enter: $42 \times 0.39 = 16.38$ **seconds**
- p. Thinking of event type: **1.35 seconds**
- q. Moving finger to “Type of Event” selection field: **0.33 seconds** (D = 236, W = 23)
- r. Pressing the field and choosing “Public”: $2 \times 0.39 = 0.78$ **seconds**
- s. Moving finger to “Create event” button: **0.31 seconds** (D = 320, W = 44)
- t. Pressing button: **0.39 seconds**

Estimated total time: **59.69 seconds**

Conclusions:

From these results, we were able to identify several takeaway points that might impact the user’s overall experience in performing benchmark tasks. For example, creating an event seems to take a great deal of time compared to the other two tasks. This is because of the lack of menus and submenus that contain predetermined options for the user to choose from. For example, in the “Event date” section, one must actually enter a date rather than selecting a month, day, and year from drop-down menus. A small factor such as this one has such an unsuspecting, yet large impact on a user’s interaction with the page. However, it appears that the process to navigate to a guided meditation activity is well-designed in terms of maximizing the user’s efficiency, since it requires the least amount of time out of all the tasks. This is because the pages appeal to Fitts’ Law very well. The buttons are large and wide, so not a great deal of precision is required to move from page to page. Also, the buttons are placed in such a way to allow minimal movement from the users’ thumbs to choose an option. A predictive evaluation may not be the most accurate method to evaluate a system since it is based solely on empirical

data (as demonstrated here as well), but it definitely opened our eyes to some of the smaller factors that we should watch out for. If we were to replicate this study in the future, a larger sample size would be needed for more accurate a and b values in Fitts' Law, and it would be a good idea to compare the estimated times to larger sample groups to get better comparisons. All in all, in theory, it appears that some of our designs need a few improvements, but the times for performing each task may not be accurately calculated. So, it is hard to say how troublesome our current designs truly are for our users in terms of timings.

Retrospective Testing Interview

Study Protocol:

In the first step of this retrospective testing interview, I gave the participants an overview of the BetterU application, explained the process, and the purpose for this evaluation. Next, the participants used the high-level prototype completed five tasks with no assistance. Lastly, the participants were asked to complete a questionnaire based on their experience with the application. It is important to note that these interviews were conducted individually as it was difficult to find a time to complete a group retrospective interview. In order to complete the study, the only material needed is a device that connects to the Internet to access the high-level prototype on the *Proto.io* website and the online questionnaire. Overall, the information was recorded through observation and questionnaires. The script I used and the tasks the participants were asked to complete is provided below.

Greetings User,

Thank you for participating in this retrospective testing interview of the BetterU application. BetterU is a social application that revolves around the idea of improving the mental health state of communities around the world. With how busy everyone's day-to-day lives have become, the amount of stress that exists has grown exponentially, contributing to a rise in mental health disorders worldwide. BetterU serves to be an accessible and interactive solution to this problem by encouraging individuals to come together and perform activities that promote healthier minds.

My team and I have created a high-level prototype, which means an interactive representation of the product in its closest resemblance to the final design in terms of details and functionality. The purpose of this is to evaluate how participants will interact with this system and how well it was designed. Below, there are a set of tasks for you to complete. After you have completed the tasks, I will ask you a few questions about your experience for further evaluation. Thank you so much for your time.

Task 1:

BetterU provides users with the option of signing up for the application through the world's top social media sites. Please create an account with a Facebook account.

Task 2:

After you have created an account, change the Name, Age Group, location, and interests associated with the profile.

Task 3:

Now, beginning from the home screen, it is time to create a public event that will be hosted on Myers Quad.

Task 4:

There is a Yoga Extravaganza happening nearby. Can you find the details and attendees of this event?

Task 5:

Imagine you just had a long and stressful day. Use the BetterU application to listen to a Guided Meditation

Demographics

In this retrospective testing interview, the five participants were African American females and undergraduate students at the University of Georgia. Their majors are Animal Science, Biology, Business, Advertising, and Chemistry. In addition, the participant's ages range from twenty to twenty-three years old and they are experts with using mobile applications. Overall, these participants were chosen to be interviewed because they all shared that they have experienced problems with mental health at one point in their lifetime.

Description of the Tasks Selected and Justification:

The BetterU application offers a wide-variety user functionality. The goal for this retrospective testing was to create a short compilation of the application's major functionalities to see how the user will interactive with the system. Overall, it is important to note that the participants are experts with using applications and they were all able to successfully complete the tasks with no assistance.

Task 1

- In order to access the BetterU application, users must have an account. So, the first task was to create an account through one of the social media sites the application provides. This task was chosen over giving the participant an existing username and password because it is more complex, and the goal is to evaluate how the participant can complete tasks with multiple steps.

Task 2

- In this application, the user's profile is very important because this is how the user is able to contact other users for joining group events. The prototype has an existing user account, so the purpose of this task was so to see if the user could easily find how to edit the profile information without giving explicit instructions.

Task 3

- The application provides the user with the opportunity to create and host the event of their choice. This task was chosen over having users view their events because I wanted to see how the user will interact with the system instead of just viewing information.

Task 4

- For this task, I decided to choose another functionality listed under the application's social tab. The purpose of this task is to test how user-friendly and organized the system is and if the participants are able to locate tasks that requires numerous steps.

Task 5

- For the last task, the participants were asked to figure out the steps to complete a guided meditation. This task was chosen because it is the only individual activity that is fully implemented in the prototype.

Results:

For the retrospective testing interview, the results were gathered from the Questionnaire created on Google Forms. The purpose of this questionnaire was to evaluate the efficiency of this application. Overall, this data gathering technique was beneficial because it provides quantitative data that can be further analyzed.

In *Figure 1*, the results show that all of the participants were able to easily navigate through the BetterU application and complete the task. From the results of this closed-ended questions, we can conclude that the interface is user-friendly. The results tell us that the design is user-friendly because it is intuitive, and it is easy for potential users to locate different options and/or functionalities.

In *Figure 2*, the results reveal the user's feedback for their favorite and least favorite aspect about the BetterU application. There were two participants, who expressed their liking of the application's design. In previous design steps, the group choose this functionality-based design from other options, so it is great to see that the users like the interface we decided on as a group. In addition, the other participants expressed their liking of the application's functionalities. On the other hand, there was a user that shared they did not like the idea of profile showing personal information. As a solution, for a future implementation, we can give users the options to hide their personal information. Also, there was a user who did not like the limited choices for the guided meditation and a user who did not like the idea of completing group activities with unfamiliar people. Overall, this tells us although the participants like the application there is still room for improvement.

In *Figure 3*, the results reveal that the participants feel that the BetterU application meets its overall goal, which is to improve the state of people's mental health. This tells us that the participants are satisfied with our application's implementations to promote mental health.

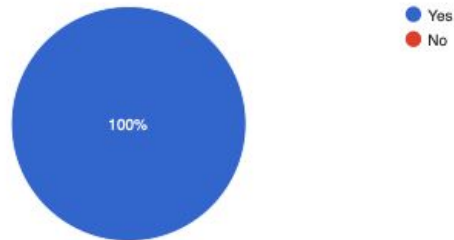
In *Figure 4*, the results reveal that the functionality that the participants are least likely to use is the option to create and host events. However, the functionality that the participants are most likely to use is the option to complete individual activities, such as meditation, yoga, journaling, and exercising. The second functionality that participants are most likely to use is the option to participate in nearby events. From the results of this ranking question, we can conclude that the participants would rather complete activities alone or participate in an existing group activity rather than create and host their own event.

In *Figure 5*, the results reveal that all of the participants would download this application but there is one participant, who would not recommend this application to a friend. From the results of this multiple-choice question, we can conclude that there is a demand for this application and if it was available in the current application stores, then the majority of the participants would download the application as well as recommend this application to a friend.

Figure 1:

Overall, did you find it easy to navigate through the BetterU application and complete the tasks?

5 responses



If you answered "No" to the previous question, then please explain the task you found difficult to complete. If you answered "Yes" to the previous question, then please type "N/A" in the answer box below.

5 responses

N/A

Figure 2

What did you most like about the BetterU application?

5 responses

The design

I like that you can meet up with users to exercise because this will encourage me to exercise.

The home screen with the animated heart is a unique design.

I like the purpose of the app because I don't know any other similar apps for this purpose

I like that you can use social media sites to sign up.

What did you least like about the BetterU application?

5 responses

I would not use this application to meet up with other people I don't know.

I don't like that the profile shows personal information

I don't like that there's a limited amount of selection choices for guided meditation

Figure 3

On a scale of 1 to 5, how would you rate this application's goal to promote the mental health of users?

5 responses

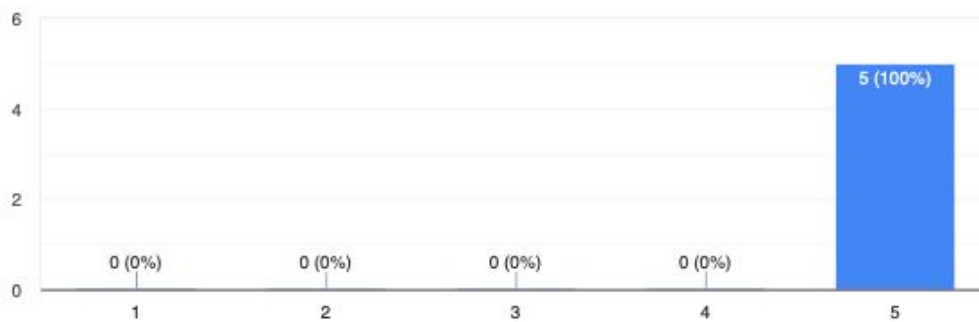


Figure 4

Please rank the following application's functionalities in order of importance, where 1 is the functionality that you would use the most and 3 is the functionality that you would use the least.

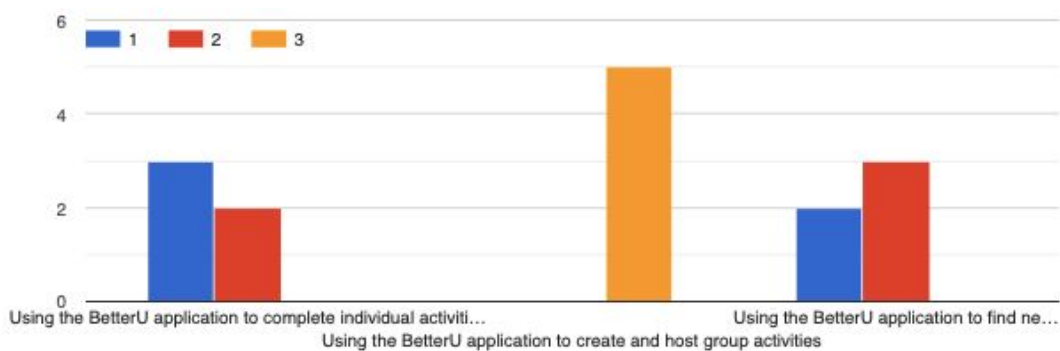
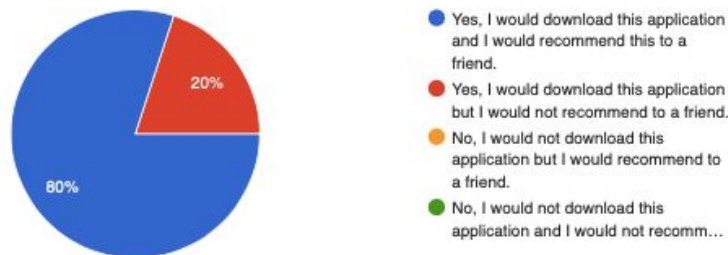


Figure 5

If this application was available in your mobile device's application store, would you download this application and/or recommend to a friend?

5 responses



Materials:

Questionnaire:

<https://docs.google.com/forms/d/e/1FAIpQLSeboAxx9HLpa-8Edg6BUXzv137KM6MamG8oa65ENSdWm6dLJw/viewform?vc=0&c=0&w=1>

Think Aloud Evaluation

Study Protocol:

For this study, I began with explaining the purpose of our app as well as giving a brief description of what the Think Aloud evaluation is. I did not use any materials other than the sheet with tasks on it and my laptop to record notes. I gave the user my iPhone so they could test the app using the proto.io app. I emphasized the fact that I am testing the interface of the app and not the user themselves. I also let them know they should always be stating their thoughts, intentions, and actions. I also made sure to not assist with the user in any way in order to not have any biased results. I did not use any video recording equipment, but I took notes as I deemed them relevant. I observed the user interacting with the screen and took note of any extremely slow or extremely fast reaction times, the navigation that they took to get to a certain task, any times they got stuck or had confused looks on their faces, and also how long it took them to complete certain tasks over others. I also asked questions that could allow me to probe their mind as they went along such as “What are you thinking right now?” and “Why did you do what you just did?” I made sure to keep my questions as unbiased as possible as to not sway the user to answer in a particular way. If the user got completely stuck, I would ask them to start over and look at the screen very carefully before they chose the buttons that they did on the app. If I did have to help the user, I made sure to ask the user what they would have done if I was not there. I also took note of what happened afterwards and if the problem was solved or not. The script I used is referenced below.

Script:

Hello! My name is Julia Idaewor. Today we will be testing the interface of the BetterU app in order to complete certain tasks related to the app's functionalities. To give a little bit of context, BetterU is an app that we created in order improve mental health by allowing users to not only perform guided exercises in one centralized location, but also to be able to express their interests through a social media profile and meet up with other users who have similar interests. Your participation today is completely voluntary and you will be able to stop at anytime if you get confused or frustrated. Remember that we are not testing you, but rather the interface of the app.

To do this, we will be performing a type of usability test called a Think Aloud evaluation. I am going to ask you to complete certain tasks in the app and I will observe you while you are doing so. I want you to walk me through all the steps that you go through in order to complete the task by talking aloud. If you stop talking at any point, I will prompt you to continue talking. I will not answer any questions, but rather just observe you as you navigate through the app. Pretend as if I am not here and you are just using the app by yourself. Please confirm that you understand everything that I am saying. (wait for user to nod head or give verbal confirmation)

As you navigate the tasks, do not only walk me through which buttons you click, but also be sure to point out certain things that stick out to you. As a reminder, I will not be able to answer any

questions as you complete the tasks, but you can still verbalize them so I understand why you are having the complications that you are. I will be giving you a separate sheet with all the tasks listed on them. Please read them aloud and let me know if you have any questions.

(user reads the tasks and asks questions if they are confused then proceeds to conduct the tasks one after the other)

Task 1

For this task, you will assume that you already have an account on the app and you are logging into said account. Go to your profile and edit the information and save changes.

Task 2

For this task, you will also assume that you already have an account on the app and you are logging into said account. Find a guided meditation lesson and listen to it.

Task 3

For this task, you will assume that you already have an account on the app and you are logging into said account. Find an event near you and register for it.

Describe demographics:

The demographics of all the users were college students who were aged 21 years old. There were 3 females and 2 males. They were all African-American and seniors in college. Their majors were Marketing, Management Information Systems, Biology, and Finance. Most of the users came from a single-parent household and the other two came from a nuclear household. They were all middle-class households with the exception of one user who came from an upper middle-class household. All of their households followed the Christian faith.

Description of tasks selected and justification:

I selected three main tasks to evaluate users on completing. The first task that I instructed users to do was to edit their profile. I selected this task over users creating their profile because it is simple for users to create their profile when they first create their account. Creating an account or profile is something that you will only have to do once. However, editing your profile is something that you will have to do multiple times so I wanted to make sure that users knew how to get to that option.

The second task that I asked users to complete was one of the most important tasks which was following a guided meditation. This is one of the main tasks in our app-- allowing users to

watch videos on yoga exercises, meditation exercises, and so much more, so it is extremely important that a user knows how to find the sessions from the app. There was no reason as to why I chose the guided meditation session over other exercises as they would all have been found on the same page.

The last task that I asked users to complete was finding an event near them and registering for (location) said event. This is arguably the most important feature because it is one of the elements that differentiates our app from most fitness apps. Users are allowed to use their location to find events near them and register for the event by themselves or with a mutual friend. It is important that the user knows how to locate the event, distinguish what type of event it is, and register for it. I chose finding an event and registering for it over a user creating their own event because I feel like users will mainly use the app like YouTube where you consume other peoples' content more than you create your own content. Therefore, I wanted to ensure that this part of our app was working efficiently and properly.

Results:

In the first task walkthrough for almost all of the users, the users felt that the login screen was not secure because they were able to see the password that they typed in and they also did not see any type of confirmation that their username existed or not. One user said that the account page had a lot going on and there were too many icons with no colors distinguishing them. Another user said that this was very limiting for users who do not possess any type of social media. A lot of the users said that the color scheme was not inviting and that the colors were too depressing and muted. They wanted a color that everyone can relate to such as a blue color because blue is not only inviting, but it is also common and stands out amongst other colors. One issue with the background image though was that users expected the image to be functional and interactional. A user felt like the giant tree as the background took up too much space especially since it was not functional. For the first task, most users found it extremely easy to find their profile and edit their information. However, one user had a hard time finding the pencil button on the profile as it blended in with the profile image too much. One user had an issue with navigating to find their profile as the tab did not stick out as much on the front page; they clicked the cogwheel for settings while they were trying to find their profile. I asked that user "Why did you click what you clicked?" and they claimed it was because they assumed the profile was built into the app and did not have its own separate tab.

In the second task walkthrough, a lot of users liked the interface for the interactive exercise sessions. However, one user said that the different sections in the app should have help and documentation because the tabs are not as intuitive. They would appreciate if we would have put a tutorial whenever a user logs into the app for the first time which documents how to navigate and use the app. They feel like that would have made a huge difference in their understanding how to navigate to the exercise sessions. Most users were able to find the exercise sessions with ease. However, when trying to interact with the session, one user tried to swipe left

on the tabs for the different exercises, but found that there was no functionality for that. They felt like implementing that would have allowed us to introduce a lot more interactions with the functions rather than the user just clicking it.

In the third task walkthrough, almost all of the users had an issue finding an event near them and registering for it. The issue mainly lied with the differentiation between the location pin and the actual event. Most users thought that the red location pin meant that there was an event going on. However, we meant for users to look for a specific icon that meant an event was being held there, but most users did not catch on to that. One user claimed that rather than just having a map to look for events, there should have also been a list of events nearby. This would ease the burden on the user because they would not have to keep on scrolling just to find an event. Most users thought that the *“Request to Join Event”* button should have been before the description of the entire event because it decreases the time for the user to find the button because most users would scroll down to look at the description anyways. Also, if users are already familiar with an event, it would save them the time of scrolling down because they could just easily click the button since it is at the top of the screen rather than the bottom. Most users though it would also be useful to add a filter of events so they can filter the events by location as well as other features such as time.

All in all, these walkthroughs were very useful to us in learning how our app is interpreted by the average users. Some tasks and actions that we thought were intuitive were actually way too complex and unnecessary for the task at hand. I learned that we need to make our app more user-friendly and more functional rather than just using a design-based implementation to aesthetically please the user. Our app had a good design, but at the cost of intuitive functionality which is something that we actively worked to prevent. This just goes to show the importance of user testing because it points out obvious mistakes that we would not have seen otherwise due to our bias as designers. If given more time to work on this project, I would definitely change the interface of the app to make sure that it is functional-based and not design-based. I would also give the users more control and freedom as to how they navigate the app so there is not just one specific navigation they have to take just to complete one task. This would improve our app’s usability tremendously as it was the area that we are weakest in.

Materials:

Questionnaire:

<https://docs.google.com/forms/d/e/1FAIpQLSeboAxx9HLpa-8Edg6BUXzv137KM6MamG8oa65ENSdWm6dLJw/viewform?vc=0&c=0&w=1>

Looking Forward

As of now, it appears that BetterU is in a very good spot. We have received numerous positive comments regarding not only the visual aspects of the app, but also the features that we have put into it. The idea of a social mental health mobile application appears to resonate very well with our target age group, so we as a group can celebrate these victories. With this being the final milestone for our project, it is time to look back on our progress and decide what we could have changed or improved if we could have dedicated another semester to this project. As all the students in HCI know, creating a user-centered design for an application is an iterative process. Going through the cycle of planning, designing, prototyping, and reviewing just once isn't enough to create an ideal design. It is the repeating of this process that results in a final product that many can appreciate. If we had another semester for this project, we would be able to go through this cycle again, perhaps even going through it more than once as a result of the knowledge we have gained in the process and the familiarity we have developed with the tools at our disposal. We would redefine our users, possibly incorporating a wider demographic since this app has the potential to aid persons outside of university lifestyles. We would also be able to make BetterU's design more coherent. There were many good ideas that resulted from creating all of our design alternatives, but upon creating a prototype of the app, instead of mixing all the ideas together, the prototype seemed to just consist of parts from each alternative. More time would allow us to better figure out how we can combine the elements together more fluidly. The last improvement or change that we would make, if given more time, would be to conduct stronger evaluations at the end of each stage of the app-designing process. We received a lot of feedback from the studio presentations and the "gallery walk," but it seems that it would be important to also consider what our target users might think or what individuals from other stakeholder groups might think about the information we gather at each stage of our project. After all, the goal of this project is to create a user-centered design. Despite all of what has just been said, we are very content with the way that BetterU turned out in the end. It's safe to say that this has been an interesting, informative process for all of us, and we will definitely remember this experience.

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