



# Connect and Meet People (CAMP)

Phase IV: Final Report  
CS 3724: Introduction to Human Computer Interaction  
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# Record of Changes

Version	Date	Comment	Name
0.0	12/2	Doc creation and maintenance	Kashan & Jordan
0.1	12/2	Started a few sections	All
0.2	12/5	Started Discussion section	Karthik
0.3	12/5	Started Introduction	Harrison
0.4	12/5	Started Methods	Kashan
0.5	12/6	Started Results	Kashan & Campbell
0.6	12/6	Finished Intro	Harrison
0.7	12/7	Started Analysis	Kashan
0.8	12/7	Worked on Discussion	Karthik
0.9	12/9	References, CIA Table, general maintenance	Jordan
1.0	12/9	Added summaries for each section in the report	Campbell
1.1	12/9	CIA table and explanation	Campbell
1.2	12/9	Finished Discussion	Karthik

# Introduction

Connect and Meet People (CAMP) aims to get people outside and interacting. CAMP must have a well organized events page. It will include links to all resources and reminders for all upcoming events. Most users should be able to join a guild in under 5 minutes. CAMP must be platform agnostic, as to not limit or restrict membership. The levels of commitment to CAMP must be variable to encourage prospective members to test it out. Finally, CAMP should engage members by providing exclusive customization options to frequent users.

We agreed upon the above system concept statement after completing the Analyze, Design, and Prototyping phases of the UX wheel. The following is a detailed recap of what our team has done throughout the semester for this HCI design project.

During phase one (Analyze), we defined the project theme, gathered observation and interview data through contextual inquiry, analyzed the contextual inquiry data, then set design requirements. First, we defined the theme for this project as “how to disrupt people from what they enjoy due to overusing technology.” This helped us select the outdoor club space, where we would then conduct our contextual inquiry.

We then conducted several interviews with Virginia Tech outdoor clubs and took observations at club meetings/events. Before conducting the interviews, we collectively made a [standard set of interview questions](#) to ask during each interview. The goal of these questions was to gather information about the outdoor club space. For our observations, we went to a climbing event and observed how members use the Crimper’s Climbing facility and interact with each other.



Figure 1 - Crimper's Climbing Observation

From the interview and observation data we collected during contextual inquiry (see appendix A), we were able to iterate through the creation of a work activity affinity diagram or WAAD. During each iteration of the WAAD, we refined our groupings to help us best understand the most common barriers faced in the field. In the final WAAD groups we concluded that member engagement, retention, and communication are key barriers in the outdoor club space.

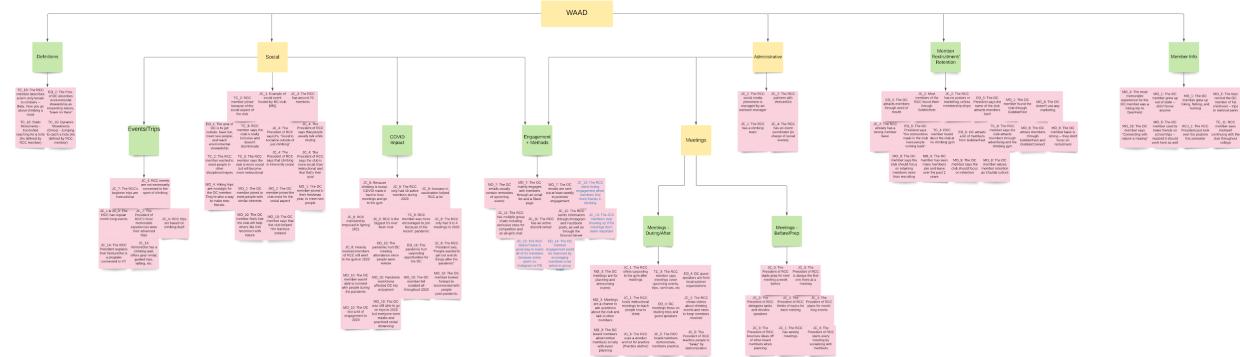


Figure 2 - Final WAAD (Click image link)

Creating design informing models, especially the social model, helped us determine relationships in the organizations. This is important, because we need to understand the social components of this field in order to devise a solution to the project theme of social isolation.

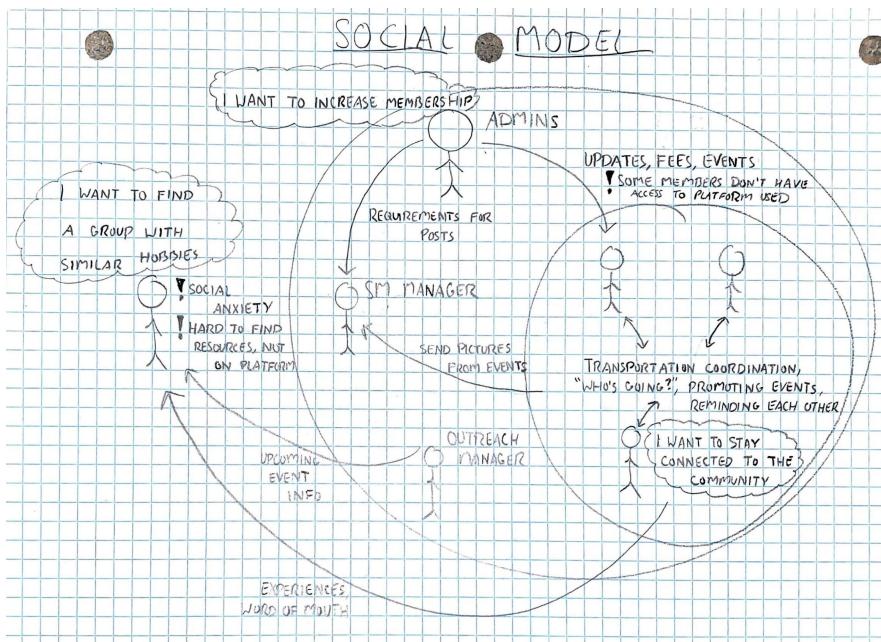


Figure 3 - Social Design Informing Model

Finally, using all of the data and models from this phase, we established design requirements for the following: engagement, advertisement, platform agnosticism, variable commitment, resources and reminders.

For phase two (Design), we created personas, ideated then critiqued and refined our ideas, developed mental models, created storyboards, then finally made a wireframe. In each part of this phase, we drew from knowledge we gained from phase one then iterated through the creation process. The goal of this phase was to select an idea to pursue and have a rough idea of what a prototype for that idea would look like.

To create five realistic personas, we used our contextual inquiry knowledge. To pick primary and secondary personas, each team member presented two personas on whiteboards, describing their likes, dislikes, hobbies, and user classes. We then began discussing each persona, narrowing down which personas would be considered secondary personas and which would be our primary persona. Our target persona embodies the characteristics of an introverted gamer homebody. Other personas include a club president, a graduate student, an extroverted undergrad student, and a very active high schooler (see appendix A).

Keeping the target and secondary personas in mind, we started the ideation and critique phase. We held a total of four ideation and critique sessions. During each session, we presented ideas to the team. Next we grouped the ideas into categories. Finally, we critiqued these ideas by deciding if these were both practical and beneficial to each of our personas, as well as fitting into the design requirements made in Phase 1. For example, we found that there was one category of ideas that used negative reinforcement to impact the users decision to go outside. We agreed in our critique session that such ideas were counterproductive, and always would hurt our target users more than help. Ideas that did not pass these tests would either be scrapped or reworked for the next session. We repeated this process until we came up with one hundred ideas. In our last ideation and critique session, we made our final decision to an app that gamifies going to events.

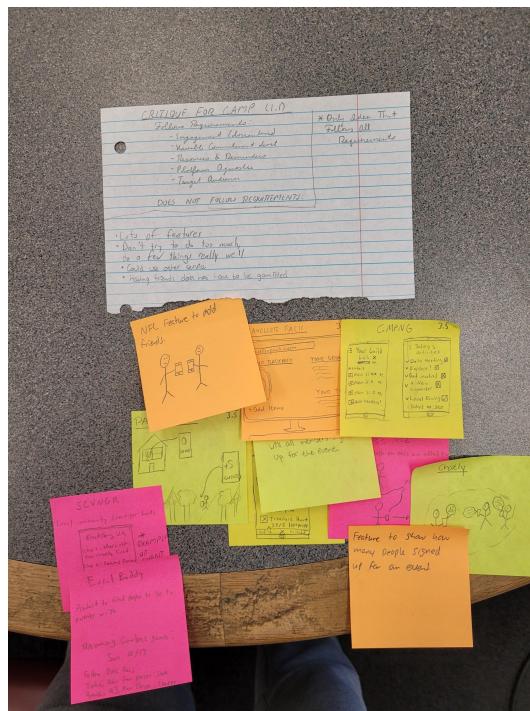


Figure 4 - Idea Finalists

Next, we considered the designer's and user's mental model for the idea we chose. TEXT.

To contextualize our idea, we iterated through creating interaction, ecological, and emotional perspective storyboards. In these storyboards, we try to capture how a prospective user would experience each perspective. For example, the interaction storyboard shows a typical workflow of a CAMP user selecting and attending an event. Doing this helped us better understand how users would interact with CAMP and the kind of impact CAMP should make on users (see appendix A for other storyboards).

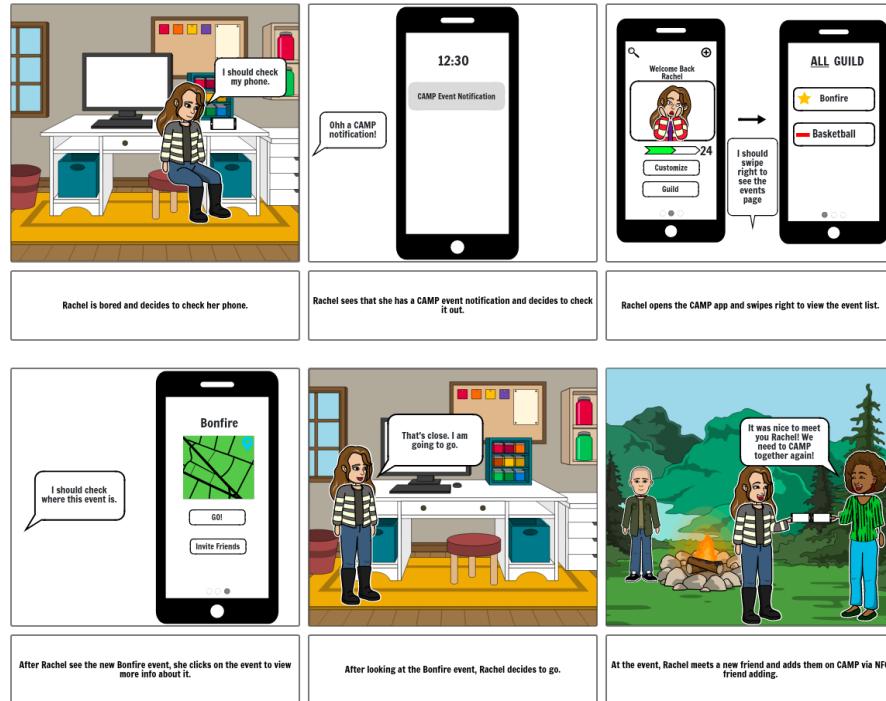


Figure 5 - Interaction Perspective Storyboard

In the final part of Phase II, we used an iterative approach to create a wireframe for CAMP. In our first iteration, we made a pencil and paper wireframe that outlined the main interaction points of our home page. This page was very cluttered and sketchy. To refine our wireframe we made a Balsamiq project and separated the first wireframe into three pages: [home](#), [events](#), and [navigation](#). For our final iteration, we added a new screen to display events that are exclusive to your guild. We felt like this was an important addition in order to expand the community aspect of the app.

In the third phase of this project (Prototype), we had to define the scope of our prototype, craft four key design questions, create the prototype and explain that process, showcase our prototype, propose evaluation methods, and run a pilot test. The objective of this phase was to create a functional prototype with all critical workflows implemented and devising evaluations methods for heuristic feedback.

To start the third phase, we used our interpretation of the project theme to identify the main goal of CAMP as “connecting people with each other and the outdoors.” From this goal, we determined that implementing the following workflows would accomplish this CAMP goal: “Add friends”, “Add friends to a guild”, “Attend an event”, and “Add an event”. To implement the workflows while still giving testers an immersive experience, we decided to create a T-shaped

prototype. A T-shaped prototype provides breadth by representing all features and depth by having fully developed workflow progression for the determined critical workflows. Although implementing five workflows gives testers a good idea of what CAMP has to offer, this prototype is still only medium fidelity, due to the time and resource constraints we faced. Additionally, we created a UX Target table to give us measurable goals to test against our prototype (see appendix A).

Before creating the prototype, we came up with four key design research questions that are the following:

1. Does CAMP encourage users to do events with friends?
2. Are users enjoying CAMP events?
3. Does CAMP cultivate an inclusive environment for existing and new users?
4. Do all features make sense to CAMP users?

These four key design questions were critical when creating our prototype, because feedback on these questions give a good indication on whether or not CAMP is meeting the design goals we previously agreed upon. If the answers to any of the key design research questions is consistently no, we will need to reevaluate and iterate the CAMP prototype until our goal of connecting people with each other and the outdoors is met.

Next, we created the prototype. Our prototype started out on paper, where we drew out each individual page that contained an important feature of our app. These early prototypes were ultralow fidelity, having little detail, no functionality, and no workflows mapped out.

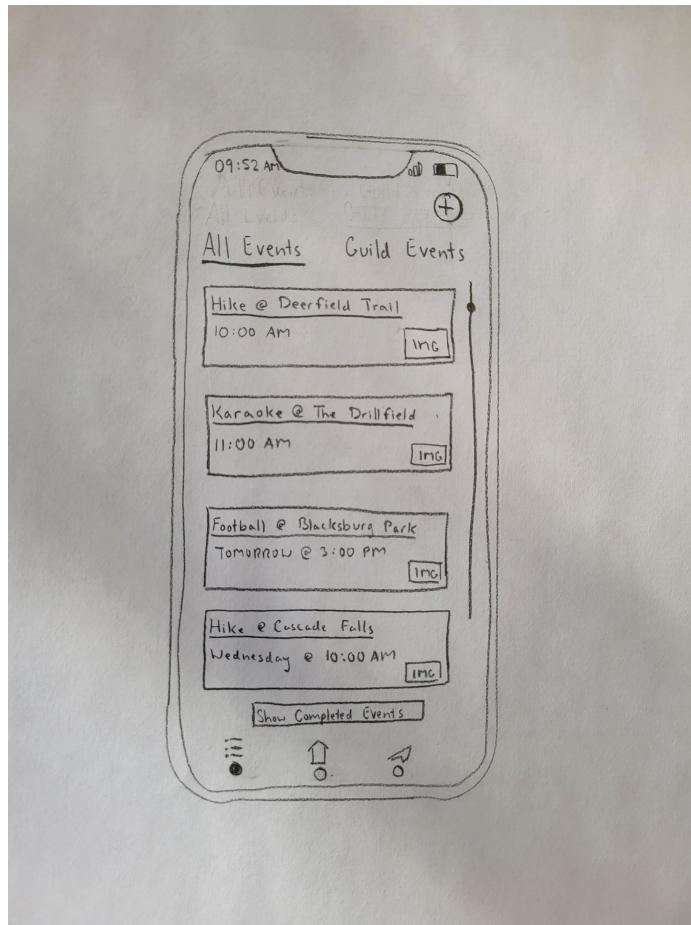


Figure 6 - First Paper Prototype

After discussing prototyping software with Devin (Our UTA coach), we explored the options we had available and decided on using Marvel. Once we had settled on using Marvel, we began to explore its features more in depth. We started by figuring out how to properly create and link application pages. Adding on to this, we fleshed out the pages and created functional buttons to implement all critical workflows. Features that were not implemented in the prototype directed to a “feature in development” page that we created. To showcase the CAMP prototype, we made a [demo video](#) and shared an [interactive prototype link](#).

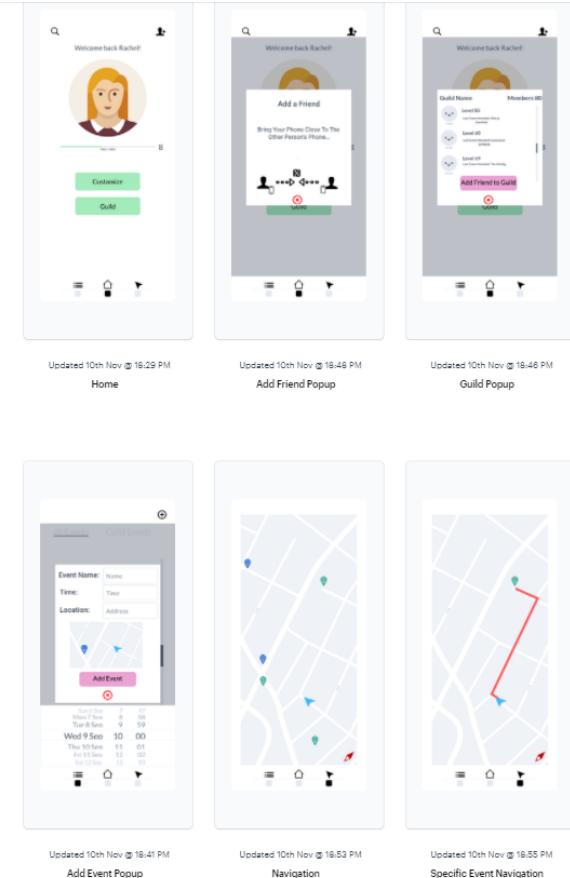


Figure 7 - Marvel Prototype Screens

Finishing out the last phase, we proposed a heuristic evaluation method and ran a pilot test to make sure our targets were reasonable. For our evaluation plan method, we decided to conduct a heuristic evaluation using the benchmark tasks within our UX target table, along with an accompanying questionnaire. We referenced the reading from week 11 (Nielsen's 10 heuristics) as well as textbook chapter 13 in order to create our questionnaire, while also being sure to pick heuristics that matched our UX Measures from our target table. Our questionnaire is designed so that each evaluator will have a chance to answer all heuristic-based questions for each task that they are asked to complete. The final question for each task section is always an open ended question to gather opinions and recommendations for the designers (see appendix A for script). Finally, we ran a pilot test with a non-expert and determined that the UX targets were reasonable.

The following report will contain four sections. The first section is the Methods section, and it will describe the physical and mental processes that went into the creation of this Phase IV report. Next, the Results section will highlight the results we were able to gather from our heuristic evaluation. In the Analysis section, we will share our interpretation of the results. Finally, we will discuss what plans we have to address our findings and share what we have learned during this fifteen week human computer interaction design lifecycle.

# Methods

For our evaluation plan we decided to conduct a heuristic evaluation, using the benchmark tasks within our UX target table (See Appendix A), along with an accompanying questionnaire. We referenced the reading from week 11 (Nielsen's 10 heuristics) as well as textbook chapter 13 in order to create our questionnaire (See Appendix A), while also being sure to pick heuristics that matched our UX Measures from our target table.

Our questionnaire is designed so that each evaluator will have a chance to answer all heuristic-based questions for each task that they are asked to complete. The final question for each task section is always an open ended question to gather opinions and recommendations for the designers. After all evaluators have completed their evaluation for all of the benchmark tasks, they are asked to come together and merge their "result lists". Using their recommendations, the evaluators then brainstorm solutions.

## **Proposed Method Explanation with Timestamps**

0:00 - 0:05 } Introduction, explain the evaluation to the evaluators including how to start and how to fill out the questionnaire.

0:05 - 0:30 } The users will have 4 tasks to complete, with approximately 7 minutes each. While the tasks themselves should take far less than 7 minutes to complete, the evaluators are also expected to fill out the corresponding questions on the questionnaire for each task.

0:30 - 0:35 } Introduce the next stage of the evaluation, where evaluators will brainstorm the different problems they encountered or recommended solutions/improvements, and will merge these recommendations together until they have just one recommendation for each problem.

0:35 - 0:55 } The actual brainstorming, where evaluators will merge their problem sets, discuss their proposed recommendations, and come up with one main recommendation for each problem.

0:55 - 1:00 } Debrief, conclusions, last minute comments

## **Materials (Appendix A)**

Camp: UX Evaluation -- The document presented to the evaluators which contains links to the Marvel prototype, the questionnaire and the heuristic evaluation report. Make sure that the evaluators have access to these documents by sharing it with them (Giving them permission within the google docs).

Questionnaire -- A Google Forms questionnaire that asks heuristic-based questions and allows for open ended feedback about problems/recommendations. (Evaluators need access to this doc)

Heuristic Evaluation Report -- A report to be completed after all of the evaluators have completed their tasks. This report follows the format displayed within textbook chapter 13. (Evaluators need access to this doc. If you're planning multiple sessions with different groups, be sure to have multiple copies of this document so each session starts with a blank report)

### **Results/Edits From Pilot**

From our original pilot test we realized that the pace of the evaluation would be heavily dependent on the number of evaluators that we have present. This is because after completing their questionnaire and the benchmark tasks, the evaluators are supposed to compare their answers, discuss the problems, and fill out the heuristic evaluation report together. During our actual evaluation, we only had two evaluators, which also proved to not be enough for an in-depth brainstorming session. However, this meant that our original evaluation plan has not changed much, since the timestamps and pace of the evaluation are designed for a group of evaluators (Which we now know must be a group at least larger than two).

### **Answering our research questions**

This proposed method addresses our research questions by judging our prototypes performance in terms of heuristics that are reflected within our research questions. The first question, "Does CAMP encourage users to do events with friends?", is judged by feedback related to heuristics seven and eight from the "Our Heuristics" list that can be found at the top of our Heuristic Evaluation Report (See Appendix A). The second question, "Are users enjoying camp events?", is judged using feedback related to heuristics one, two, and six. Our third question, "Does CAMP cultivate an inclusive environment for existing and new users?", is judged based on feedback related to heuristics three and five. Our last question, "Do all features make sense to CAMP users?", is judged based on feedback related to heuristics four, seven, and eight. Based on our evaluators responses and the heuristics they mention, we can determine how well our current prototype is doing in answering those questions.

# Results

## Notable Events

- Evaluators started looking through the provided materials much faster than intended, and were already logged into Marvel without any real explanation.
- Around the 5 minute mark, one evaluator seemed confused about their permission to edit a file. They thought they needed to edit the “CAMP: UX Evaluation” doc and sent a request to edit. However, they quickly realized that they wouldn’t need to edit this doc to complete the evaluation, and saw that they were able to edit the doc that they actually needed (The heuristic evaluation report).
- Once the evaluators had completed the benchmark tasks and questionnaire, we explained how they should go about completing the heuristic evaluation report (By talking about their responses to the survey and filling it out together). However, the evaluators only talked briefly, and were checking each other’s responses instead of formulating them together.
- Our evaluators noticed that two of the questions on the questionnaire had their Likert scale flipped. Unfortunately, this was after the questionnaires were complete and so we asked the evaluators what their intended responses were. For the two questions where one evaluator answered “Strongly disagree” while the other answered “Strongly agree”, the one that answered with “Strongly disagree” intended to respond with “Strongly agree”.

## Key Findings (All Raw Data can be found in Appendix B)

- 83% of evaluator responses to the questionnaire were the same, and these responses were always “Strongly Agree”.
- When evaluator responses weren’t the same, they were always within 1 number of each other on the Likert scale.
- Only one question received responses other than “Strongly Agree”. It was “The design made it clear what actions were required to complete this task” and received different answers for two benchmark tasks (three and four).
- Useful advice received from questionnaire:
  - “The events icon should be changed to prevent confusion because it looks like an options icon”
  - “For add your location, there could be an option to select your location instead of typing your address”
  - “Have back buttons if I want to go back to a certain page, currently I have to click the home button”
  - “Possibly having a larger plus button to add a new event”
- Most Positive Result from Heuristic Evaluation Report:
  - **Result #5:**
    - Name of Heuristic: Flexibility and Efficiency of Use
    - Reason for reporting as positive or negative: Positive

- Scope of problem: Adding a friend
  - Severity of problem: 0/10
  - Justification for severity rating: The app provided multiple methods to accomplish the same task with the add a friend section. It had a shortcut of adding a friend through connecting phones, and another way to add a friend through the use of walkthrough-buttons. This provides flexibility for both new users and experienced users of the app.
  - Suggestions to fix problem: No changes
  - Possible trade-offs incurred from fix: None
- Most Critical Result from Heuristic Evaluation Report:
  - **Result #8:**
    - Name of Heuristic: Help users know/learn what actions are needed to carry out intentions
    - Reason for reporting as positive or negative: Negative
    - Scope of problem: Sometimes, I did not understand what some of the actions that I was supposed to do
    - Severity of problem: 3/10
    - Justification for severity rating: An example I found is when I go to the navigation tab, I am confused about what action or intention I am supposed to carry out
    - Suggestions to fix problem: Create an info button to describe what each action does, or scatter tips and tutorials to help new users
    - Possible trade-offs incurred from fix: This will create clutter around the design as well as take more time to implement these features
- Results from Marvel:
  - Evaluator #1
    - Misstab percentage: 20
    - Screens: 80
    - Duration: 34:44
  - Evaluator #2
    - Misstab percentage: 40
    - Screens: 90
    - Duration: 33:33

# Analysis

## Conclusions reached from “Notable Events” in Results

- Our Camp: UX Evaluation document is extremely easy to understand and was almost too efficient. Evaluators were able to login and use the prototype before we gave them any direction. Perhaps the document should have a note about waiting for instruction so we can make sure everything is set up correctly before they open the prototype.
- One of our evaluators was confused about which documents they would need to edit, perhaps we should mention this at the top of the document.
- It seems that in small groups our brainstorming session is not as effective as we would like. Even when reminding evaluators that they should be talking to one another while completing the heuristic evaluation, conversation was minimal. Perhaps our presence at the table influenced this, and we should have given them more space. Alternatively, we could have attempted to guide the discussion in a way similar to a socratic seminar.

## Conclusions reached from “Key Findings” in Results

- Evaluator answers were almost always the same and were almost always extremely positive. When answers were different the prompt was always “The design made it clear what actions were required to complete this task”. From this we can tell that our design needs improvement in terms of clarity and connecting buttons and actions on the screen to certain workflows. Specifically, answers were different for this question when evaluators completed benchmark tasks three and four, which asked the user to add a new event and add a new friend to their friends list, respectively. This specific question was geared towards heuristic 8, on the “Our Heuristics” section of the Heuristic Evaluation Report - “Help users know/learn what actions are needed to carry out intentions”.
- One evaluator mentioned that the current icon for “Events” may be confused for an “Options” icon. The icon in question is the one on the bottom left of the home screen and actually is commonly used in apps and websites to denote a list, menu, or options tab. So it seems we inadvertently used a design pattern that is commonly associated with an options tab for our events button. We should probably change this to be something more related with the act of going to an event.
- One evaluator suggested that there should be a back button, instead of having to press the home button to go back. One aspect of our design that we weren’t able to show when using Marvel is that the user should actually be able to swipe left or right between the three main screens. This design pattern has become common on social apps such as Instagram and Snapchat, and we thought it would feel familiar to users, but were unfortunately unable to show that feature in the prototype. One course of action would be to make a prototype that showcases this feature and another that uses back buttons and see which one is more preferred in another evaluation.
- Another suggestion was that the plus button for adding an event should be larger, which is an easy fix and would enhance ease of use.

- From the completed heuristic evaluation report we can see that our prototype has many features that users enjoyed and spoke about positively. Out of the eight heuristics that we selected for our evaluation, our prototype received positive feedback for six of them. These heuristics were: “Visibility of System Status”, “Match Between Systems and the real world”, “Consistency and standards”, “Flexibility and Efficiency of Use”, “Aesthetic and Minimalist Design”, and “Help users plan tasks by providing a clear model of how users should view the system in terms of tasks”. The entries on the completed heuristic evaluation report tell a more complete picture while also giving exact information about which features evaluators approved of and would therefore not need to be changed in future versions.
- From the completed heuristic evaluation report we can see that our prototype received negative feedback on two occasions, relating to two different heuristics: “Help users know/learn what actions are needed to carry out intentions” and “User Control and Freedom”. In the first case, the evaluator suggested that we place an info button on the home screen to explain what certain buttons do. In the second case, the evaluator was talking about the lack of a back button, which we’ve discussed previously.

### **Connection to Research Questions**

1. Does CAMP encourage users to do events with friends?
  - a. Connected Heuristics:
    - i. Help users plan tasks by providing a clear model of how users should view the system in terms of tasks
    - ii. Help users know/learn what actions are needed to carry out intentions
  - b. Feedback received from evaluators:
    - i. For the first heuristic listed (i) we received positive feedback with one evaluator saying that, “The navigation buttons to go through each task had labels that helped give a clear model about what the button would do”. From this we can conclude that our current prototype does in fact help users view the system in terms of tasks, and that we don’t need to recreate any of those features, or others mentioned in the completed heuristic evaluation report, “Result #7”.
    - ii. For the second heuristic listed above (ii) we received negative feedback (See Result #8 of the completed heuristic evaluation report) with one evaluator saying that, “Sometimes, I did not understand some of the actions that I was supposed to do”. This tells us that our current prototype does not provide enough information to the user about the different actions they can take from a particular screen. The evaluator recommended an information button or some kind of tutorial or tips.
2. Are users enjoying CAMP events?
  - a. Connected Heuristics:
    - i. Visibility of System Status
    - ii. Match Between System and the real world
    - iii. Aesthetic and Minimalist Design

- b. Feedback from evaluators
    - i. For the first heuristic listed above (i) we received positive feedback (See Result #1 of the completed heuristic evaluation report) about requests successfully going through and this being visible on screen. With system status being clear to users, they will be able to know when an event has been added, when one is in progress, etc; and all of this will make the process of attending events easier for the user and more enjoyable.
    - ii. For the second heuristic listed above (ii) we received positive feedback (See Result #2 of the completed heuristic evaluation report) with one evaluator saying that, "The layout of the prototype has a fluid flow with natural order". From this we can conclude that our current layout will promote ease of use and satisfaction for the user, which will make signing up for and attending camp events more enjoyable.
    - iii. For the third heuristic listed above (iii) we received positive feedback (See Result #6 of the completed heuristic evaluation report) with the evaluator complementing our choice of color-scheme and clutter-free design. With an organized and attractive design users are more likely to come back to the app and attend future camp events.
3. Does CAMP cultivate an inclusive environment for existing and new users?
  - a. Connected Heuristics:
    - i. User Control and Freedom
    - ii. Flexibility and Efficiency of Use
  - b. Feedback from evaluators
    - i. For the first heuristic listed above (i) we received negative feedback (See Result #3 of the completed heuristic evaluation report) with the evaluator mentioning the addition of a back button for easier navigation and control when using the app. This feedback is mentioned in multiple other places within the report. One issue is that we weren't able to showcase how navigation should actually work within the app (By user swipe). However, this does tell us that our current prototype can be improved and that a back button may be more intuitive. After all, the evaluator did not recommend "swiping", they requested a back button.
    - ii. For the second heuristic listed above (ii) we received positive feedback (See result #5 of the completed heuristic evaluation report). The evaluators response was as follows: "The app provided multiple methods to accomplish the same task with the add a friend section. It had a shortcut of adding a friend through connecting phones, and another way to add a friend through the use of walkthrough-buttons. This provides flexibility for both new users and experienced users of the app". This response tells us that our current prototype is friendly for both new and existing users, and directly answers our research question.
4. Do all features make sense to CAMP users?
  - a. Connected Heuristics:

- i. Consistency and standards
  - ii. Help users plan tasks by providing a clear model of how users should view the system in terms of tasks
  - iii. Help users know/learn what actions are needed to carry out intentions
- b. Feedback from evaluators
- i. For the first heuristic listed above (i) we received positive feedback (See Result #4 of the completed heuristic evaluation report), with the evaluator commending us on our “high quality” prototype and stating that “Each functionality has been thought out thoroughly”. This response implies that functionalities of our T-shaped prototype that were fully developed were easy to use and of high quality, our conclusion is that as long as all other features which were not implemented in this prototype are given the same attention and planning, they should also be easy to use and of high quality.
  - ii. Feedback from heuristics (ii) and (iii) were evaluated for question 1 and can be easily applied to question 4 in order to answer if the features of CAMP make sense to users.

Problem	Imp.	Solution	Cost	Priority Ratio*	Priority Rank	Cuml. Cost	Resolution
Users are confused about what actions they should take on certain pages (See heuristic eval. report, result #8)	3	Make courses of action clearer on certain pages	3	1000	4	7	Fix in following versions (may require testing)
No Back Button	4	Add a back button	1	4000	1	1	Fix in current version
Events icon is confusing	2	Update button image	1	2000	2	2	Fix in current version
Guild add friends is hard to find	3	Change location of feature	2	1500	3	4	Fix in later version
Some buttons are small	1	Increase button size	1	1000	5	8	Fix in current version

\*priority ratio = importance/cost \* 1000

**Figure 8- Cost-Importance Analysis (CIA) Table**

# Discussion

Our design started with observations and interviews at a worksite and developed into a functional T-shaped prototype. Our iteration through the UX Design Wheel and our work on each phase contributed to where our design is at right now. Below is a brief summary of our work during each phase.

## **Phase 1 (Analyze):**

During this phase, we conducted our contextual inquiry and analysis. When we were presented with the theme of isolation, we immediately thought of physical isolation. Ever since the beginning of the pandemic, people have become more physically isolated in an effort to protect themselves from COVID-19. We decided to interview and observe members and officers from the VT Climbing and VT Outdoor clubs because we wanted to see how these clubs combatted physical isolation (Appendix A). What we learned for our contextual inquiry was that these clubs needed a new, innovative tool to retain and recruit members. They also wanted to use a platform other than GobblerConnect to promote their events. After the creation of our WAAD and DIMS, we formulated some interaction design requirements such as engagement, target advertising, and variable commitment levels. These helped us in our work for Phase 2.

## **Phase 2 (Design):**

The majority of our time spent on this phase was during our ideation and critique sessions. We had 3 in total and we came up with over 100 ideas. From a drive-in theater on wheels to shoes that unlock new designs the more you walk, we thought of some very creative ideas. After our critiques and keeping our interaction design requirements in mind, we narrowed it down to CAMP. Additionally, during this phase we came up with our target persona, which is an introvert who enjoys spending their time gaming. Finally, we drew storyboards and made wireframes in Balsamiq to portray possible workflows, such as going to an event, creating an event, and adding a friend.

## **Phase 3 (Prototype):**

We spent most of this phase creating our T-shaped prototype. We used the online software called Marvel because our UTA coach recommended it. We used our Balsamiq wireframe as a foundation and we split up different screens and workflows. Before we created our prototype, we created a UX design table which listed UX goals, UX measures, and UX metrics for different work roles. Also, we made benchmark tasks that specified certain workflows that our prototype is capable of. Finally, for this phase, we created an evaluation plan and tested that plan on Jordan's roommate to see if it was feasible.

## **Phase 4 (Evaluate):**

The week after Thanksgiving Break, we presented a live demo of our prototype to the class. We made a brief PowerPoint presentation describing the previous three phases and we showed our walkthrough video to our class. After our presentation, we conducted our heuristic evaluation

with our partner group. We had two participants complete our evaluation which included benchmark tests and a questionnaire.

In the methods section, we first chose to conduct a heuristic evaluation by using benchmark tasks from our UX target table and a questionnaire. The questionnaire includes questions that allow the evaluator to answer all the heuristic-questions for each given task to evaluate. The questions each allow the evaluator to answer on a 1-5 scale, 1 being strongly disagree and 5 being strongly agree. We then added a short answer question that allowed each evaluator to share their thoughts and ways we may be able to improve our design.

In the results section, we had several notable outcomes from our evaluations. The first being that 83% of our evaluator responses were the same as other evaluators. When the answers were the same, they also happened to always answer "strongly agree". The biggest takeaway from our evaluation was that only one statement received an answer other than "strongly agree". That statement was "The design made it clear what actions were required to complete this task". One of the most positive responses we received was for the flexibility and efficiency of use heuristic. The most critical result was regarding the help users learn what actions are needed to carry out intentions.

In the analysis section, we had several conclusions we reached from the notable events and key findings from the results section. Firstly, the evaluators answers were almost always the same and the feedback was almost always positive. The only answers that were different led us to determine that our design needs some improvement in terms of clarity and connecting buttons/actions on screen to improve workflow. One heuristics gave us negative feedback upon evaluation which was, "Does CAMP cultivate an inclusive environment for existing and new users?". The remaining questions all received positive responses from evaluators.

## **Future Design:**

If CAMP was a real system we were developing, we would iterate through most of the wheel again, starting at the analyze phase. The source of our contextual inquiry was a great starting point for us. We gained a lot of valuable information from our time with officers and members of the VT Climbing and VT Outdoor clubs. However, we believe we can expand our sources of contextual inquiry based on our current design of our app. Since any one individual or organization can host an event on CAMP, we would conduct more interviews and observations with community leaders and organizations who host public events often. One aspect of our initial contextual inquiry we were lacking in was observations. We only conducted one observation at Crimper's Climbing Gym in Christiansburg. We didn't get the amount of information we wanted because we were only there for about a half hour and it was pretty empty. To improve on this, the next time we do a contextual inquiry, we would interview multiple people and observe multiple worksites for an extended period of time. For example, we would observe events held by other VT organizations such as the athletic and wellness center. We

would interview people who come to those events to get a sense of why they came and what they are trying to get out of it. We believe this additional information will give us a better understanding of how CAMP can be utilized to make people's experiences at outdoor events better.

If we iterate through the wheel again, we would skip the design phase because we are confident in the overall idea of CAMP. We believe that having a mobile application that is similar to an RPG game achieves what we are trying to do the best in our context.

Next, we would revisit the prototype phase to further flesh out the current prototype we have. Before tweaking the prototype itself, we would edit our UX Target Table to reflect our new findings from the analyze phase. Some of these edits may change our User Classes and UX Goals. We would also add more benchmark tests to reflect the higher fidelity of our prototype. The main changes we would make in the re-iteration of this phase is making our prototype more sophisticated. Currently, it is functional for 3 workflows, adding a friend, adding an event, and attending an event. We want to completely flesh out the other features such as creating a guild, customizing your profile, receiving XP, and any other features we add. We would also consider using a different platform other than Marvel. This is because Marvel is limited in its ability to help create a high-fidelity prototype that can function similar to a real mobile application. Also, we would use Photoshop and other editing/animation tools to create better UI elements.

## **Future Evaluation:**

As for reiterating through the Evaluation phase, we would want to also conduct an empirical evaluation. While an analytical evaluation can give us proper feedback for an initial, low-fidelity prototype, we believe that properly evaluating a higher-fidelity prototype requires an empirical evaluation. Our rigorous UX evaluation would have the following steps:

1. Gather participants from the Blacksburg area
2. Make the participants sign a consent form and follow the proper procedures for handling participants
3. Our UX Lab would be a computer lab where each participant has access to their own computer
4. Hand the participant a guide on how to complete the evaluation. This will consist of steps on how to complete certain workflows that encompass our design research questions such as adding a friend, creating a guild, creating an event, personalizing your avatar, etc. (\*Note how there are more benchmark tasks, which reflect the higher fidelity of our prototype\*).
5. Record quantitative data related to the benchmark tasks (time of completion)
6. Record qualitative data related to the benchmark tasks (ease of use, behavior, emotions, difficulty completing tasks)

7. Collect critical incident data by having participants fill out a survey/questionnaire asking them about ease of use, the probability they would use this product, UI design, and UX elements.
8. Compensate participants with \$20 Amazon gift cards

Following these steps will give us a better understanding of how CAMP will operate in the real world. Obviously, a rigorous UX evaluation is done in a controlled environment, however, we would be able to figure out how people from different backgrounds can use CAMP. This cannot be accomplished with an analytical evaluation because they are not “real users” who satisfy our target and secondary personas.

As we iterate through the wheel multiple times, we believe that this evaluation plan can change. In the short term, we want to be able to determine what people think of a higher-fidelity prototype. After that and after possible redesigns, our evaluation sessions would seek to determine how people would access and use CAMP in their day-to-day lives.

For our CIA table we determined the 5 most important current issues with our design based on the input we received from our evaluators. The problems are some buttons are small, events icon is confusing, guild add friends is hard to find, users are confused as to what actions they should take on certain pages, and the lack of a back button. I listed the problems in order from least to greatest importance to fix. The first course of action was to come up with a solution to each of these problems and then how and when the problem will be fixed. Most of the potential solutions we came up with are very simple UI changes to make the design easier for new members to navigate. For example, simply increasing the size of the buttons or changing a button icon to be more obvious as to what its purpose is. After calculating the priority rank for each problem we determined that 3 of the 5 should be fixed in the current version of the design. This is either because the fix is very simple to make or it is a top priority fix. Problems with less priority and more difficult solutions we decided should be fixed in a later version of the design.

### **Conclusion/Reflection:**

This class was refreshing for every member of our group. With our busy schedules and coding-intensive classes, it was a welcomed change when we had a class where we could learn more about the importance of human-centered design. The main takeaways from this class for our group were the importance of teamwork, how to properly conduct contextual inquiry, and how to effectively design a human-friendly product. All of us have worked in groups before, but for many of us, this was our first semester-long project. This highlighted the importance of working together, delegating tasks, and holding each other accountable. As we became more comfortable with each other, we worked better as a group and trusted each other more. We noticed this shift in phase 2 because we spent a lot of time together doing the ideation and critique sessions. Being more comfortable with each other allowed us to identify strengths and weaknesses and made it easier to delegate tasks. We also had to deal with some hurdles as a

group as one of our members tore his ACL early in the semester. This forced us to improvise and adapt. We made sure the member was kept up to date and that he had all of the resources necessary to do his part. This really highlighted the resilience of our group and it is something all of us will carry on to future projects.

Contextual Inquiry was very unfamiliar to us when we were first introduced to it. We were familiar with conducting interviews, but most of us never did observations at worksites. Going into it, we were all unsure what to expect. However, after doing the observations and interviews and gathering all of the usual information, we realized the importance and effectiveness of contextual inquiry. The thing that surprised us the most was how many data points you can gather from a few interviews and observations. Then, using those data points to make informed analyses and reach conclusions. Most of us want to pursue a job in software engineering and design, so we believe this experience will definitely come in handy in the future.

Furthermore, this was all of our first design class, so focusing on human-centered design was new for us. In our other CS classes, we are taught and encouraged to produce working results. In most cases, that is embodied by a program that runs without errors and passes all of the necessary tests. Until now, we were seldom taught how to make our programs and code human-friendly. We are encouraged to use coding practices such as commenting and modularity to make it easier for humans to understand, but we are mostly rewarded for accuracy. So, having a project where human-centered design is paramount was very new to us. This forced us to think more about social, ecological, and interpersonal aspects, rather than technical aspects. Also, it allowed us to be more creative and explore our abilities in UI design. We found ourselves making design choices for our prototype such as which fonts, colors, icons, and alignments to use. A great example of how we were creative was when Harrison suggested that we should make our buttons the opposite color from the background. So he got the hex value of our background color, calculated its opposite, and imported that color into Marvel. This is one of many examples of how we worked as a team to think outside of the box to create a human-centered design.

We hope to take what we've learned from this class and apply it to our future workspaces. The mix of analytical and creative thinking we had to do for this class can definitely be improved upon and utilized in our futures. This class taught us a lot of new concepts, and we will find ways to make use of them.

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# Appendix A - Notes

## Observations and Interviews

### **Interview 1:**

Emily Sellards, President of the Outdoor Club

Date: 09/22/21

We decided to interview Emily because she is the president of the Outdoor Club and she would be the best person to talk to about the club. We knew that she would be able to discuss the theme of isolation because she had to organize a club that largely relies on person-to-person interactions in a time where face-to-face contact was greatly hindered. The interview was conducted by Jordan. Emily spoke about why she joined the club, why she went on to pursue a leadership role in the club, some of her experiences, and what the club's goals are and how they accomplish them. She heavily spotlighted the connections that people make in the club. She discussed how the community that she found in the club was a large part of her decision to keep returning to the club.

### **Interview 2:**

Jacob Zippel, President of the Rock Climbing Club

Date: 09/22/21

We reached out to Jacob because we were interested in the Rock Climbing Club and he is the current president. Jacob is a first year president and he talked about his role in the club, how they promote themselves, what they do, and his goals for the club for this semester. Kashan and Karthik went into the interview having a general idea of what the club does, but wanted to learn more about how they promote themselves to people who are hesitant to join and their approach on making the club social. Jacob explained how meetings consist of instruction, social events, and visits to the local climbing gym. He emphasized that the climbing gym is the place where most of the people socialize and build relationships.

Also, he talked about how they use Gobblerfest and social media in order to attract members. He explained how the club usually just lets interested people come to them and they make sure they do everything they can to get them on board. As for people who may feel isolated, he mentioned that the club pushes carpooling to increase engagement. In fact, he himself felt isolated freshman year and he said that the social aspect of the club really helped him. Finally, we asked him about the pandemic's effects on the club and he had both good and bad things to say. He said that it was tough in 2020 because there were only around 10 active members and conducting meetings was hard. However, the club is currently bigger than ever and Jacob credits that to people wanting to socialize even more after being isolated for the past year and a half.

### **Interview 3:**

Thomas Langley, Member of the Rock Climbing Club

Date: 09/23/21

We decided to interview Thomas because he is a member of the rock climbing club and he is a transfer student who joined Virginia Tech this semester. We thought he may be able to relate to the theme of isolation because he is a new student who may be trying to find ways to fit in. Karthik, who is also his roommate, conducted the interview. Thomas explained why he joined the club, his background in climbing, and what they do in the club. He emphasized that one of the main reasons he joined was because he wanted to meet new people. Also, he talked about how the pandemic's effect on clubs last year made him want to join the club even more because he missed having the socialization opportunities. Furthermore, he explained how the climbing club can help people who may feel physically isolated because climbers are one of the most accepting demographics when it comes to sports. They do not discriminate based on talent or experience. Overall, Thomas helped us understand the reason why he joined the club and the social benefits of joining.

**Interview 4:**

Matthew Alexander, Member of the Outdoor Club

Date: 09/27/21

We wanted to gain more information on the Outdoor Club, so we reached out to Matthew Alexander, a friend of Karthik's. He provided us with great information about the club from a member's perspective. While Emily was able to describe more of the administrative side of the club, Matthew gave us a nice and honest overview. He described why he joined the club, memorable moments, what happens during meetings, and the pandemic's effects. He also talked about his childhood and how that influenced him to join. He spent a lot of time with his dad and grandpa hiking, fishing, and hunting. The club reminds him of his childhood and the trips he goes on brings him that same joy. Additionally, Matthew opened up about his struggles with isolation from moving often as a kid to the effects of the pandemic. The club helped him overcome this and he believes it can do the same for others.

**Observation 1:**

Rock Climbing Club

Date: 09/28/21

To better understand how the Rock Climbing Club operates, we went to Crimper's Climbing facility. This is where members of the Rock Climbing Club meet to do indoor climbing. We were able to walk around the facility, take pictures, and observe how the facility operates. While at the climbing facility, we realized there are different walls focused towards different levels of climbers. For more beginner climbers, there are flat surfaces "slabs", and for more advanced climbers there are steep overhangs. Additionally, each wall has safety mats at the bottom. Depending on the height of the wall, the type of safety mats are different with higher walls having thicker safety mats below. Finally we observed the climbers observing other climbers. Since space is limited in the facility, climbers closely watch their fellow climbers while they wait. Sometimes after a climber finishes, their friend might make recommendations to them. Shown below are pictures of the facility.

## Personas

Persona 1 (Target):

**Name:** Bob Williams

**Age:** 18

**Work role:** Student

**User class:** Introvert - Inactive

**Bio:** Bob is a freshman at Virginia Tech. He is originally from Utah and is anxious to go to college. He wants to try to meet new people; however, he spends the majority of his day indoors, playing video games. He feels isolated from his peers due to a lack of interaction with them. He's always been shy and introverted and this has led to a lack of social skills. He's also physically overweight and doesn't exercise regularly. Recently, he's noticed how this affects his health more and more, as simple tasks become difficult. He is looking for a tool to make the socialization process easy and fun.

**Tagline:** "I want to start going outside and meet new people."



### Personality

Open to new experience	-----x----- -----	Closed to new experience
Organized and thoughtful	----- -----x-----	Impulsive and unstructured
Social and outgoing	----- -----x-----	Shy and quiet
Honest and kind to others	----- -----x-----	Disagreeable and uncaring
Worried and anxious	-----x----- -----	Relaxed and laid back

### Goals

- Improve social skills
- Be more active
- Make more friends

### Frustrations

- He wants to be outgoing, but his lack of social skills is preventing him from doing so
- He feels like most outdoor clubs cater to people that already like going outdoors
- He's self-conscious about his physical abilities

**Persona 2:**

**Name:** Heather Williams

**Age:** 21

**Work role:** Student

**User class:** Leader

**Bio:** Heather Williams is the president of the Outdoor Club at Virginia Tech. She is a junior studying environmental science and biology. Her passion for the outdoors started at a young age when her father would take her hiking, fishing, and hunting. She wants to eventually work at the US Fish and Wildlife Service to help protect animals and the environment. Heather believes that it is her calling to serve the planet and introduce others to the beauty of the outdoors. Her responsibilities as president of the club include conducting meetings, managing other officers, retaining members, and helping recruit new members. Unfortunately, it has been tough for her to recruit new members. This year, only 5% of the members of the club are new. She is looking for a tool to help her reach out to people who may be introverted and do not recognize the positive effects of being outdoors. Hopefully, she will reach a 20% threshold of new members after using this product.

**Tagline:** "I want to recruit as many good people as possible to my club!"

**Personality**

Open to new experience	--x----- -----	Closed to new experience
Organized and thoughtful	-----x----- -----	Impulsive and unstructured
Social and outgoing	--x----- -----	Shy and quiet
Honest and kind to others	-----x----- -----	Disagreeable and uncaring
Worried and anxious	-----x----- -----	Relaxed and laid back

**Goals**

- Recruit new members
- Help people

**Frustrations**

- Frustrated with lack of new recruits
- Worried she's at fault for lack of interest in the club

Persona 3:

**Name:** Zhong Li

**Age:** 25

**Work role:** Graduate

**User class:** Inactive - Extrovert

**Bio:** Zhong recently graduated from college and has moved into a new city to begin work. He retained a few friends from his time in school, and he's content with that. However, he wants to meet more people in his area that are active. He believes that people who have the initiative to get outside and do things make good connections. He's not all that interested in the outdoor activities himself, but is more there for the people. Zhong isn't necessarily looking for friends, but isn't opposed to meeting them. He's inexperienced with outdoor activities but is in decent shape from his good diet and walking to work.

**Tagline:** "I want to network with active people"

### **Personality**

Open to new experience	-----x-- -----	Closed to new experience
Organized and thoughtful	-----x--- -----	Impulsive and unstructured
Social and outgoing	-----x--- -----	Shy and quiet
Honest and kind to others	----- ---x---	Disagreeable and uncaring
Worried and anxious	----- ---x---	Relaxed and laid back

### **Goals**

- Build a network
- Meet unique people

### **Frustrations**

- Worried people will find out he's not outdoorsy
- Thinks this may be a waste of time

#### Persona 4:

**Name:** Danny Day

**Age:** 20

**Work role:** Student

**User class:** Inactive - Extrovert

**Bio:** Danny Day is a college student in his 20s. He attends one of the largest universities in his state and thrives from the busy and social environment. Danny has always been an extrovert, and this characteristic makes him well liked among his peers. He joined a fraternity in his freshman year and now, in his junior year, he's the fraternity historian. This role works well with his outgoing nature and gives him an excuse to attend every event the fraternity holds. Despite his social nature, Danny is an excellent student. Although he may at times put his social life first, when it's time to work he can focus for hours on end. When he's not socializing at different campus and fraternity events, Danny likes to watch tv, play pool or darts with his friends, and go out to eat/drink. Although he appears to be pretty fit, Danny doesn't regularly work out or play any sports. Most of his social events are also indoors and don't involve any strenuous exercise. However, if any of the clubs he's a member of hold an outdoor event, Danny is always there.

**Tagline:** "I want to attend more outdoor activities to get active"

#### Personality

Open to new experience	----- -----x---	Closed to new experience
Organized and thoughtful	---x----- -----	Impulsive and unstructured
Social and outgoing	-x----- -----	Shy and quiet
Honest and kind to others	-x----- -----	Disagreeable and uncaring
Worried and anxious	-----x--- -----	Relaxed and laid back

#### Goals

- Get Active
- Socialize
- Make connections

#### Frustrations

- Wants more outdoor/work out events
- Needs social events to motivate his work outs/outdoor activity

**Persona 5:**

**Name:** Rachel Monroe

**Age:** 16

**Work role:** Student

**User class:** Active - Extrovert

**Bio:** Rachel Monroe is a teenaged high school student living in a small town in rural Virginia. Most people in her community know each other and greet Rachel warmly. She's active in her school's student government and even plays on the school's soccer team. Outside of soccer, she enjoys going on hiking trails with her friends and biking. Occasionally, Rachel enjoys playing video games with her family as a way to unwind and bond. She also always tracks her physical activity when she's out of the house. She uses a smart watch to track her steps and heart rate. This is especially useful for her when she's going on a new trail.

During her time as student body VP, Rachel initiated a campaign to get more of her peers outside, hoping it would improve their mood, physical health, and mental health. She found that many of her peers were not motivated to get outside and would rather socialize by seeing a movie, going to the mall, or eating out. Rachel wanted a way to motivate her peers to be more active while maintaining that social interaction.

**Tagline:** "I want to help my peers go outside more often and build community"

**Personality**

Open to new experience	-----x----- -----	Closed to new experience
Organized and thoughtful	--x----- -----	Impulsive and unstructured
Social and outgoing	-----x----- -----	Shy and quiet
Honest and kind to others	x----- -----	Disagreeable and uncaring
Worried and anxious	----- ---x---	Relaxed and laid back

**Goals**

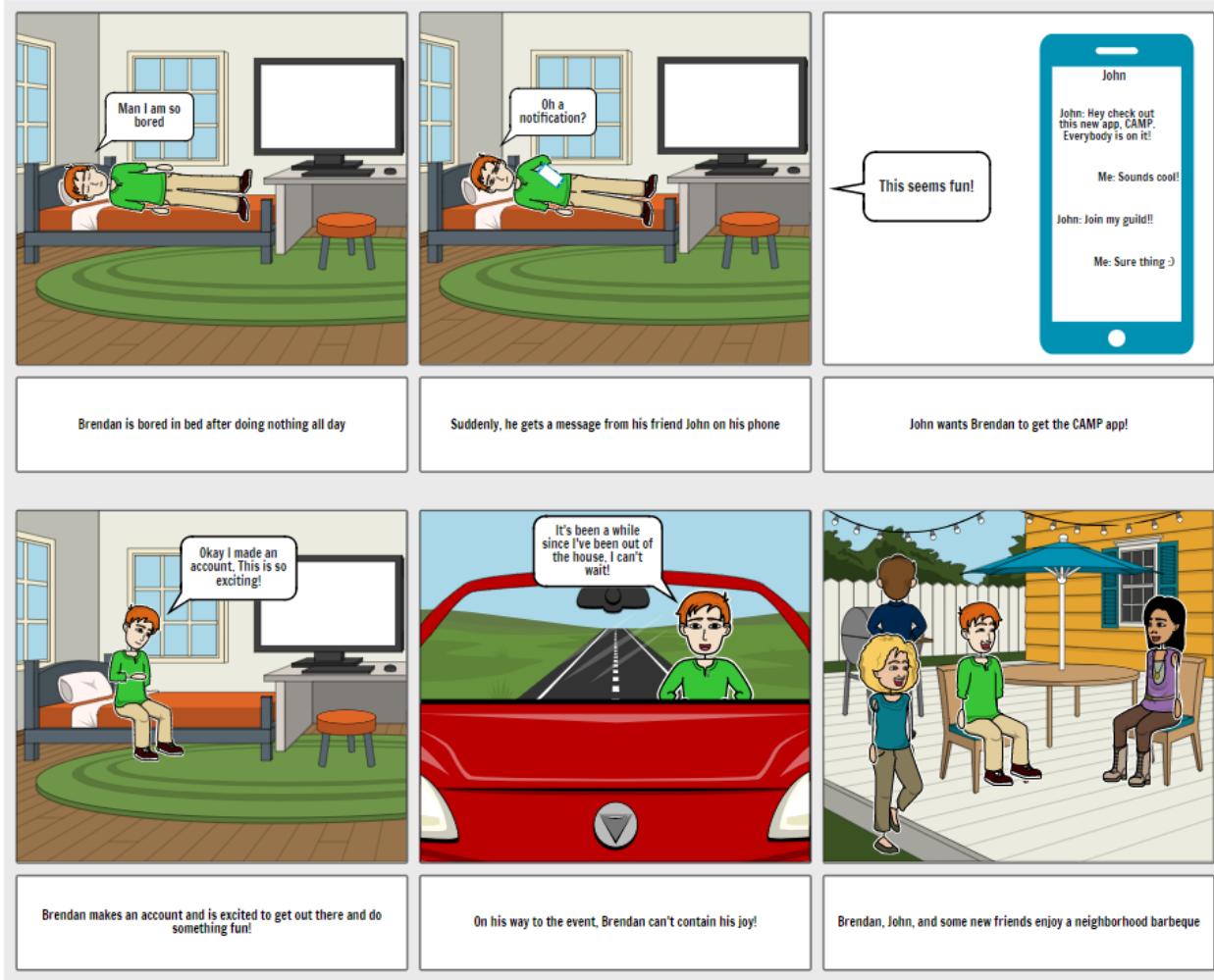
- Help peers get outside
- Organize growing community

**Frustrations**

- Wants an easy way to organize outdoor events

## Storyboards





## UX Target Table

Work role: User Class	UX Goal	UX Measure	Measuring Instrument	UX Metric	Baseline Level	Target level	Observed results
Game Player: Introverted User, New user, looking for new activities and friends	Ease of Use (Flexibility and efficiency of use)	First Impression	Specific questions in a user survey	Average score on survey questions about app's ease of use		Agree	
Game Player: Casual User looking for a new app	Fast learning	Learnability	BT5: Create a group for some (or all) of your friends within the app	Average Time		5 minutes	
Event Manager: Experienced user, looking for people to come to their event, leader of an organization	Ease of Use	Learnability	BT3: Create an event	Average Time	5 minutes	3 minutes	2 minutes
All work roles:All User Classes	Low Error rate for successful completion (Help users plan tasks...)	Initial Performance	BT2: Complete your first event	Average number of errors	2 errors	< 2 errors	1 error
All work roles:All User Classes	Customer Satisfaction	Long-term user satisfaction	Specific questions in a user survey	Average score on survey questions about satisfaction		Agree	
All work roles:All User Classes	Low Error Rate (Help users know/learn	Initial Performance	BT4: Add a friend using NFC	Average number of errors	2 errors	< 2 errors	0 errors

	what actions...)						
Game Player:Guild Members	Guild member satisfaction	User satisfaction	Specific questions in a user survey	Average score on survey questions about guild customizability and rewards		Agree	
Leader of Organization:Guild Manager	Fast Learning	Learnability	Time needed to delete an existing guild	Average Time		2 minutes	
Game Players: Users looking to go to an event	Reliability	Initial Performance	Location accuracy of GPS feature	Measured location vs. actual location		<200 ft	
All work roles:All User Classes	Ease of Use	Learnability	BT1: Time needed to add friend to your group	Average Time	2 minutes	1.5 minutes	1 minute

## Evaluation Script

### **Introduction (0:00 - 0:05)**

"Welcome evaluators, and thank you for taking part in this UX evaluation. In front of you you should see a Google Doc that outlines our plan for the next hour and contains a link for using our prototype. Below the prototype link you should see a separate link for a Google Form, which will serve as a questionnaire. Please click on both of these links and open them in new tabs, returning the page they were originally opened from. Below the questionnaire link you should see 4 benchmark tasks. These tasks are to be completed one by one, in the order you see them. The questions on the questionnaire follow this order. You will be using the prototype to complete these tasks. After each task you will complete the corresponding questions on the survey. If you have any questions, please let us know now."

### **Evaluators are completing tasks and questionnaire (0:05 - 0:30)**

Answer questions if they arise.

### **Introduce Brainstorming session (0:30 - 0:35)**

"Now that everyone has completed the tasks and the supporting questionnaire, we will begin a brainstorming session between evaluators. Please go through each benchmark task as a group, discussing your answers to the questions for each task, and what problems you encountered,

along with what recommendations you have. As a group, please merge your different recommendations for each specific problem into one concise recommendation. You'll be using the Heuristic Evaluation Report form to do this.

**Evaluators are brainstorming (0:35 - 0:55)**

Answer questions if they arise.

**Conclusion (0:55 - 1:00)**

"Thank you all for your participation in this evaluation. If you have any questions about the evaluation, please let us know... yada yada yada"

Questionnaire

[CAMP - UX Evaluation - Google Forms](#)

Camp UX Evaluation

[CAMP: UX Evaluation - Google Docs](#)

Heuristic Evaluation Report

[Heuristic Evaluation Report - Google Docs](#)

# Appendix B - Results

**Completed Heuristic Evaluation Report:** [Heuristic Evaluation Report - Completed](#)  
**Questionnaire Responses:** [CAMP - UX Evaluation - Google Forms](#)

The image displays two side-by-side screenshots of a heuristic evaluation report interface. Both screenshots show a summary table, a screen analysis table, and a 'Screen Suggestions' section.

**Top Screenshot (Opera):**

- Summary:**

Duration	Mistaps	Screens	Hit Goal
34:44	20%	80	n/a
- Screen:**

Duration	Mistaps	Name
0:50	2	Home
- Screen Suggestions:**
  - Mistaps:** The participant missed a hotspot 2 times. Take a look at where they got stuck.
  - Duration:** The participant spent 0:50 on this screen which is below the industry average of 1.5 minutes.

**Bottom Screenshot (Chrome):**

- Summary:**

Duration	Mistaps	Screens	Hit Goal
33:33	40%	90	n/a
- Screen:**

Duration	Mistaps	Name
0:16	3	Home
- Screen Suggestions:**
  - Mistaps:** The participant missed a hotspot 3 times. Take a look at where they got stuck.
  - Duration:** The participant spent 0:16 on this screen which is below the industry average of 1.5 minutes.