E. Evaluate: User Test

Introduction

Cognitive Walkthrough Findings

- Tasks that involved using multiple filters - bike storage and theft - felt disjointed since these filters could not be applied at the same time from the same map view.
- The language used, specifically for “Past Incidents”, was unclear and users felt that they would not be able to report new incidents while viewing past ones.
- Adding friends and reporting incidents used the same add button, however on different map views. The dual-purpose of this button was confusing for users.

Test Objectives

1. To determine if individuals feel the consolidation of safety services - resources, incidents, location sharing, and SOS - is useful and preferable to existing services.
2. To ensure that individuals are able to utilize safety services in an efficient and error-free manner to determine their usefulness in everyday and emergency situations.
3. To investigate if individuals are able to reconcile the two search modalities - the map and chat - and determine if either modality is preferable in specific use cases.

The 1st goal is crucial for validating the core concept of UHUB as a unified safety platform. The cognitive walkthrough highlighted the fact that having services on different map views was confusing and so these have been consolidated. We aim to assess whether our approach aligns with user expectations and how it compares to current standalone services. The 2nd goal is to assess the usability of the UHUB system. The cognitive walkthrough revealed that language and action mapping was crucial to understanding the conceptual model. After these changes, we want to determine whether users can use safety services without errors and in a quick and effective manner. The 3rd goal focuses on the app’s functionality and user interaction with its two search modalities: the map and chat. Understanding user preference and effectiveness of these modalities in different contexts is key to refining the interface design and ensuring a user-friendly experience.

Interactive Prototype

User Test Methods

Test Materials

- Consent form (see Appendix A)
- Interview questions (see Appendix B)
- Evaluation template (see Appendix C)

Test Procedure

1. Brief introduction of project
2. Consent form signing

3. Pre-evaluation interview
4. Open UHUB prototype on computer
5. User performs tasks on prototype
    a. Participants asked to *Think Aloud*
    b. Researcher uses *Constructive Interaction*
6. Post-evaluation interview

Task Examples

1. Find area with highest theft
2. Find bike storage in low theft area
3. Report new incident with a) map and b) chat
4. Add new friend with a) map and b) chat
5. Share your current location
6. Use emergency SOS service

The task examples selected for this evaluation extend from the task examples used in the cognitive walkthrough. In that walkthrough, we provided low-level, step-by-step instructions to the user being studied, whereas here we only provide high-level tasks. At this stage, we want to evaluate if the prototype enables users to complete tasks without using low-level instructions. These tasks best encompass the functionality of the system and enable us to validate the conceptual model.

Recruitment & Methods

The participants recruited for this evaluation were students who were familiar with UBC's campus. This was done to ensure familiarity with existing safety services and understanding of the need for such services on campus. The three participants were recruited through convenience sampling due to the time sensitivity of this deliverable. Lastly, think aloud and constructive interaction methods were chosen to elicit as much feedback from the limited participant group as possible.

User Test Results

Findings for Objective #1

The findings for this objective were primarily ascertained through interview questions, as this required subjective input from the participants. All participants reported having used some form of location sharing service, however none had used a UBC-specific service. When asked, all three participants appeared to like the consolidation of safety services, with one participant responding:

"Yeah, it seems useful. Once I was comfortable with the app it was easy to use. I certainly would like to familiarize myself with it before attempting to use it in an emergency situation. But once I was comfortable, I would definitely use this app."

This response echoed something we had considered earlier, which was the learning curve required for understanding such a feature-packed app. It appears, however, that performance improved once participants were familiar with the interface and that onboarding could speed up this process. All three participants said they could see themselves using this app, with one participant stating:

"Yes, I think it is very useful to share my location easily. The SOS feature is very easy to use. I like that a lot. The location sharing is about the only thing I would personally use it for. Or actually, the areas with high threats are also interesting if I am walking alone at night with my headphones in."

Strengths of Design

- Usefulness of consolidated services
- Efficiency once familiar with interface

Weaknesses of Design

- Onboarding required for learning
- Some services may be unused

Findings for Objective #2

The findings for this objective were primarily uncovered through task examples, as this required measuring time and errors per task. As stated above, there was an initial learning curve required to understand the interface, since none of our participants had seen it before. Task 1 took the most time and caused the most errors, however the following tasks greatly improved (see Table D1).

Task 1 took an average of 125 seconds and had 8 total errors with one participant requiring help. The confusion for this task was attributable to unfamiliarity with the interface. Two users selected "Incidents" at the bottom, which navigates to a list of self-reported incidents, while one user selected "All Incidents" at the top, which makes all incidents visible on the map. No users were able to immediately find the layers icon button on the map, likely because it had no text to imply its functionality. Eventually two users discovered the layers button, while one user required assistance.

Interestingly, Task 2 required using the layers button for two purposes: bike storage and theft. Although this task required more user input, all three users were able to quickly use the layers button and complete the task. Two users stated that a map legend would be effective to differentiate the types of incidents, since all use the same icon. The only other issue occurred for Task 5, where one participant required help finding the share location button. This button, like the layers button, appears on the map as an icon with no text, likely causing confusion for the user.

Strengths of Design

- Efficiency once familiar with interface
- Error-free use of emergency services

Weaknesses of Design

- Map icon buttons are unclear
- Legend required for resources

Findings for Objective #3

The findings for this objective came from both the task examples and interview questions. In order to directly compare the map and chat search modalities, we created two task examples which

required first using the map and then using the chat. Referring to Table D1, Task 3 - report new incident - took the same time on the map and chat, however one error occurred for the map. Task 4 - add new friend - was faster using the chat, while one error occurred for the map. Regarding these quantitative findings, it appears the chat provides for slightly better time and error metrics.

When we asked participants which UI they preferred when performing certain tasks, the findings weren't as clear (see Table D2). User 3 preferred using the chat for all tasks, with the exception of the SOS task. Users 1 and 2, however, preferred using the "Incidents" view to report incidents over both the map and chat. Lastly, User 1 preferred adding friends via the chat, while User 2 preferred doing this via the "Friends" view. Regardless of their preferred UI, all users were able to understand the connectedness of these separate elements, showing alignment with the conceptual model.

Another interesting takeaway from this analysis is that only one user used the create icon button on the map to add a friend. No one used this method to report an incident. Like the layers and share location button, this button appears on the map as an icon with no text. It's clear that users generally had difficulty identifying and using these buttons. One user went as far as reporting:

"It seems unnecessary and confusing to have an add button on the map screen and in the Friends and Incidents sections as well, since they all do the same thing."

Strengths of Design

- Both search modalities are useful
- Alignment with conceptual model

Weaknesses of Design

- Map icon buttons are unclear
- Redundant map create button

Issues & Next Steps

A list of all the issues uncovered in this user test can be found in Table D3. A total of 8 issues were discovered during the test with 4 additional issues, marked with asterisks, surfacing from user suggestions. We have decided to include all discovered issues in the medium-fidelity prototype, leaving the suggested issues if time permits. Considering most users were confused with the map icon buttons, these will be addressed first. Based on talk aloud feedback, we will add a legend to the map and interactive onboarding to increase learnability and memorability of the interface.

Reflection

Balancing comprehensive features with simplicity emerged as a key challenge, as some functionalities led to user confusion while others were underused. Diverse user preferences, particularly in the use of map vs. chat interfaces, illustrated the necessity of designing for varied interaction styles. The feedback included points towards specific improvements, such as clarifying map icon buttons and reducing feature redundancy, illuminating the high and medium priority issues to resolve for the medium-fidelity prototype. Overall this testing phase was crucial in refining UHUB, ensuring it is not just a functional safety tool, but an intuitive and user-friendly application.

Appendix

Appendix A. Consent Form

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Consent Form

Human-Computer Interaction Course Projects

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Student Investigators: Basso, Luke, lukejbass@gmail.com; Eckmann, Timo, eckmanntimo@googlemail.com; Volosiuk, Aleksandr, aa.volosiuk@ubc.ca

Introduction: Thank you for considering participating in this study. This work is affiliated with the UBC course "Human Computer Interaction" (CPSC 544). Please note that we are seeking students from the UBC Vancouver campus.

Purpose: The overall purpose of this research is to gain insights into the usefulness of UBC's safety services and resources. Having developed a low-fidelity prototype of a consolidated solution for these services and resources, we would like to perform a usability evaluation.

What you will be asked to do: After you have read this document, I/we will respond to any questions or concerns that you may have. Once you have signed this consent form, you will be asked to:

- Answer interview questions before and after the evaluation
- Think aloud while interacting with the low-fidelity prototype
- Be observed and probed while performing the evaluation

This should take about 30 to 45 minutes and be completed in 1 session.

The sessions may also be video and/or audio recorded. You have the option not to be video/audio recorded.

How the data collected will be used: Data collected (including any audio/video recordings) will be used for analysis and may also be used for class project presentations and other research presentations. Although only a course project in its current form, this project may, at a later date, be extended by one or more of the student investigators to be submitted as a research publication.

Compensation: There is no compensation for participating in this study.

Confidentiality: The results of your participation will be reported without any reference to you specifically. All information that you provide will be stored in Canada. It will be treated confidentially and your identity will not be revealed in reporting the study results. The two exceptions are: (1) excerpts from the video/audio recording in which a participant can be identified may be presented in a class project presentation (but any other presentation venue, such as a scholarly conference, will require that participants be non-identifiable in the video/images), and (2) we request but cannot enforce focus group members to keep discussions from any focus group confidential.

Data retention: Identifiable data and video/audio recordings will be stored securely in a locked metal cabinet or in a password protected computer account. All digital data will be encrypted. All data from individual participants will be coded so that their anonymity will be protected in any reports, research papers, and presentations that result from this work.

Contact for information about the rights of research subjects: If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Indicate your agreement to **one** of the following options by providing your **initials**:

- I consent to being video/audio recorded for this study. _____
- I consent to being audio recorded only (no video) for this study. _____
- I do NOT consent to being video/audio recorded for this study. _____

I, _____, have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I hereby consent to take part in this study. However, I realize that my participation is voluntary and that I am free to withdraw at any time.

_____

Participant's Signature Date

Appendix B. Interview Questions

Pre-Evaluation

1. Are you familiar with any of UBC's safety resources or services?
2. Have you ever used a UBC safety resource or service in the past?
3. If so, what was your experience using the safety resource or service?
4. Have you ever used a location sharing service with friends or family?
5. If so, what was your experience using the location sharing service?

Post-Evaluation

6. Was there a task in the evaluation you found easiest or hardest to perform? Why?
7. Were there tasks that you found easier to perform on the map, chat, or other? Why?
8. Did you feel the consolidation of services was useful and preferable to existing services?
9. Could you see yourself using this app in emergency and non-emergency situations?
10. What further improvements could be made to the interface? Did we fail to include a safety service or resource you consider necessary?

Appendix C. Evaluation Template

Task	Notes	Time taken to complete task (in sec)	Errors (number of mistakes or wrong assumptions)	Required Help (Yes/No)
Task 1				
Task 2				
Task 3a				
Task 3b				
Task 4a				
Task 4b				
Task 5				
Task 6				

Appendix D. Evaluation Findings

Metric	Task 1	Task 2	Task 3a	Task 3b	Task 4a	Task 4b	Task 5	Task 6
Average Time	**125s**	22s	15s	15s	14s	10s	24s	12s
Fastest Time	45s	12s	6s	8s	10s	8s	7s	7s
Slowest Time	240s	31s	25s	20s	23s	12s	57s	8s
Total Errors	**8**	1	1	0	1	0	1	0
Required Help	**1**	0	0	0	0	0	**1**	0

Table D1: Summary Statistics for User Task Examples

User	Theft Search (Task 1)	Bike Storage (Task 2)	Report Incident (Task 3)	Add Friend (Task 4)	Location (Task 5)	SOS (Task 6)
User 1	Map	Map	**Incidents**	Chat	Map	Map
User 2	Map	Map	**Incidents**	**Friends**	Map	Map
User 3	Chat	Chat	Chat	Chat	Chat	Map

Table D2: Responses for Task Example UI Preferences

Issue	Priority	Effort	Med-Fi	Solution
Interactive onboarding tutorial	High	**High**	Yes	Add walkthrough and tooltips
Legend required for resources	High	**High**	Yes	Add legend to resources
Layers filter button is unclear	High	Med	Yes	Add label to layers button
Share location button is unclear	High	Med	Yes	Add label to location button
Reported incident location unclear	Med	Med	Yes	Drop map pin for location
Search bar isn't functional	Med	Low	Yes	Connect search bar to chat
Add button is rarely used	Low	Low	Yes	Remove the add button
Add friend code sending unclear	Low	Low	Yes	Add text explaining use
Share location for time period*	Low	Med	Maybe	Select time when sharing
Share location with selected friends*	Low	Med	Maybe	Select friends when sharing
Crime hotspot mapping*	Low	**High**	Maybe	Add option for hotspot map
Ability to create custom filters*	Low	Med	No	New flow for filter creation

Table D3: Issues Discovered in Usability Evaluation

** User suggestions obtained through post-evaluation interview*