ConnectOrg:

Communication Technology Interaction Design

for UCity Family Zone

Table of Contents

1. Executive Summary

1.1 Overview

The ConnectOrg is a computing technology application design study executed with the aim to identify and solve the communication needs of the UCity family zone division of the University of North Carolina at Charlotte. The project was executed as semester-long project for the coursework ITIS 6400/8400: Principles of Human-Computer Interaction. The semester project kick-off was presented by Dr. *Mark J. DeHaven, Ph.D.,* from the College of Health and Human Service who briefly narrate about the current problems faced by the social good communities of Charlotte. Various need for technology was presented to the class and the need for design support are explained as the main mission statement. It helped us to get motived and to execute the project with complete involvement. Many of the co-student team worked on the community problems and we as the team of four want to distinguish our self and thought to help the social good community volunteers with innovation and technology support. Completing a detailed analysis and various brainstorming session with course professor and Dr. Mark J. DeHaven, we identified the lack of effective governance and networking capabilities was all too common among social activist. Lack of communication technology and the ability to adapt to the newer systems was highly challenging for the social good communities. So, our project goal was in bridging this gap by building an interactive platform design which can be later developed a communication application exclusively for social good communities from different domains to connect with everyone working towards serving the community without any impediments. Our design also focusses on how well the organizers can gather volunteers, set up events and plan accordingly.

Our team comprised of four master students from various technology background working with the course professor Mr. Nicholas Davis, Assistant Professor, Software and Information Systems department. We also received overwhelming support from various team members of UCity family zone and UNC Charlotte Urban Institute.

1.2 Lessons Learned

ConnectOrg app was initiated as an idea to help volunteers and organizations to connect with each other in a very efficient way. A huge amount of work went in to understand the real needs of the end-users. Results from these studies were closely analyzed and incorporated in finalizing the application design. We as a team experienced huge difference in thought process and capabilities to brainstorm as HCI Practitioner. The project process thought us how to gather the eclectic forms of data and to work on factual data. There was huge positive learning curve in understanding and applying HCI design patterns. Lessons learned in term of evaluation technique and multiple user interface design. During the project progress I was able to learn and apply various design and prototype tools like draw.io, proto.io, moqups, sketch which were very useful in developing story boards, wireframe and application prototype. Overall the project has been very enriching, and the one main lesson taken was that the usability of a solution is in the designer. The primary focus of the designer is to give the end users with an intuitive and user- friendly experience. To obtain this, it's critical to get as much feedback at an early stage to create the right building blocks for a successful solution. Minor changes can be provided once the functionality is built in a sound manner.

2. Introduction

2.1 Need finding

Having known the importance of need finding that it can serve as a dynamic platform for design, our initial focus was on to gather the effective techniques of need finding. Based on our initial analysis and research we employed different need finding techniques to gather data, requirements for our project which are as follows:

- Interviews
- Survey Techniques
- Observations

Need finding helped us to identify the ground reality about organizations. A good interview session can really help in elicitation of requirements from users. The process was enlightening at all fronts; may it be design, requirement or functionality. The entire process of need finding gave us an edge to capture the key areas of design. Based upon our analysis the key area of need is to bridge the communication gap.

2.2 Design Goals

This project aim was to provide one stop mobile application that provides a unified platform for various organizations to minimize the problems with the information flow and communication. The platform must be helpful, motivating and should have a simple interface. Organization heads, members and volunteers can install this application to their mobile devices for accessing information. Publish-Participate-Progress approach for organization to seek productivity is used.

The following are our concrete and vital design goals behind the implementation of this application:

By providing a unified platform to obtain information about organizations

The integral goal of this project is to display all the relevant information about various social good programs and organizations that are working for community. The relevant information includes contact details, volunteer names and vision of the organization. This section will be one-stop destination to receive well-organized manner information about the current activities of organizations, modes of communications and all the other necessary information.

By enabling the user to easily search for organizations

This design goal adds to the application functionality which will help the user to filter the organization based on specified criteria like area of interest, volunteer's strength and locations. All categories must be prelisted for the users to choose and receive information pertaining to the input filters.

Providing message broadcasting option

This will help individual organizations to make any sort of announcements to the users. These announcements can be of various formats like text messages, audio promotions, videos and documents. Broadcast Lists are saved lists of message recipients that you can repeatedly send broadcast messages to, without having to select them each time.

Providing functionality for effective planning

Organizations should be able to define, implement, and run business logic for their events. The notifications feature should enable you to monitor the incoming messages, queries and suggestions. Organizers must be able to create groups and add other members of their groups to assign tasks and share information

2.3 Review of relevant lecture

- Nicholas Davis. (2018). Human Computer Interaction: Need Finding [Lecture]. Retrieved from https://uncc.instructure.com/courses/73391/pages/jan-17-needfinding
- Nicholas Davis. (2018). Human Computer Interaction: Design Goals and Guidelines [Lecture]. Retrieved from https://uncc.instructure.com/courses/73391/pages/february-14-design-goals-and-guidelines

3. Methods

3.1 Design Options

We explored different types of applications with high fidelity mockups for a web application, a mobile application and a smart watch.

Design Alternative 1:

Modality: Web site

Interface: Web

Design Alternative 2:

Modality: Mobile application

Interface: Mobile and multimedia

Design Alternative 3:

Modality: Smart Watch

Interface: Consumer electronics and appliances

The evaluation matrix for mobile application meets all the design goals of our application. Therefore, we will consider mobile application for next step of clickable prototype development.

Mobile application design interface has the following advantages over others:

- Mobile phones are handy and portable.
- Customization for accessibility is available in mobile compared to web.
- “Anytime-Anywhere“ feature in mobile helps in providing high availability of information.

Over the course of the project we designed a number of high-fidelity mockups for mobile application, exploring fonts, colors, placement of items as well as background images and also the operating system.

3.2 Design Description and Design Rationale

1. Unified display screens for various organizations:
    a. The user must be able to view all relevant information about various social good programs and organizations that are working for community in a single platform.
2. Filter Options:
    a. User should be able to filter the organizations based on specified criteria like area of interest, volunteer’s strength, and locations. User should also be able to do a generic search by giving a specific keyword.
3. Message Broadcasting:
    a. User must be able to broad cast messages to various groups of his interest
4. Set Event / Notification / To-do Lists:
    a. User must also be able to create events, receive notifications about new events and must be able to add their to-do list items.

3.3 Prototype Design Selection

The design idea has been selected by comparing all the three design interfaces by the design rationale matrix and we have come up with the most familiar practice of using a

smartphone with a touchscreen user interface. Moreover mobile phone are ubiquitous and it is one or of the most familiar way to make it accessible to everyone. The user would use the touch screen to select the icons and filters and the output will also be displayed in the same screen. Moreover, since everyone can carry it along with them 24 hours a day and since mobile applications are handy, it is one of the best ways to make an application accessible.

3.4 How the prototype was built

We have used marvel app to build our prototype and it offers high-fidelity prototypes. This tool can be used to add gestures and transitions to make your prototype feel just like a real app or website. It is a great option to construct website wireframes, smartphone apps or a visual guide representing a skeletal framework of any application.

3.5 What the prototype does

The user will be able to sign up to the applications by using their credentials. This data is used to verify and allow the user to log in into the system. Once the user signs up, the user will be able to view different organizations icons which he is a part of or which he is interested in. By clicking on any one of the icons the user will be able to view the upcoming events, volunteer strength, vision and the contact details. The user will also be able to connect with the various social networking sites of the organizations like Facebook, twitter etc. The application can also be used to receive notifications of different events from other organizations, create post for events, add to-do lists, send broadcast messages etc.

3.6 Design Decisions

Our foremost goal in designing the design interface was to choose a design which is very familiar and to make it accessible to everyone in the easiest and efficient way possible without compromising our design goals. Due to widespread usage of mobile phones it is very

easy to have a greater number of potential users for this application. Since they are prevalent everywhere it is very easy to gain a greater number of potential users. Since these mobile applications are ubiquitous, it is very easy to hire programmers and testers to design and build them. Also, a mobile-based interface is a browser independent solution, eliminating certain constraints such as the compatibility of app to the operating browser. The application meets all the desired design goals.

3.7 Interface standards

It was very important for us to choose a modern design approach keeping the current trend of the technology in mind without compromising the simplicity and learnability features of the application. We have also looked for different options for designing and we have chosen a template which has addressed our needs effectively. We have used large sized icons to minimize user errors and more space was provided to reduce slips. We also want the user to be comfortable enough in using our application and we have used simple designs through the application. We also made sure not to include too many features which may increase the complexity of the application.

We also opted for a “consistency and standards” approach so the user would feel like they were working with a familiar design. It was also significant for us that the user focus on the result, i.e. to find details of the organizations of his choice, rather than being distracted with trying to figure out how the tool functions. This design grabs the user’s direct attention. When a user is currently searching for a type of organization they should know exactly what to do. They can also do a filter-based search or a keyword-based search to find what they intend to. Every page had good balance and much needed space which provides the user with an element of glance. We also focused on keeping the content condensed with the majority of

the application's features and data displayed above the fold. It has clearly marked exits. Users can make all the actions easily reversible and to provide user control.

3.8 Review of relevant lecture

- Nicholas Davis. (2018). Human Computer Interaction: Visual Design and Interfaces [Lecture]. Retrieved from https://uncc.instructure.com/courses/73391/pages/february-21-visual-design-and-interfaces
- Nicholas Davis. (2018). Human Computer Interaction: Prototyping [Lecture]. Retrieved from https://uncc.instructure.com/courses/73391/pages/march-14-prototyping

4. Results

To achieve the major user goals, a mobile design is chosen over the others. The user goals covered in this design are the major functionality like search for an organization by user interest, create or schedule events, view details of organizations etc. Some of the prototype deign screen are listed below. As mentioned earlier, we elected to use Marvel app to construct our interface high-fidelity prototype. The tool allows the user to navigate through the primary critical functionalities, although, the result set displayed to the user is hard-coded. This is not visible to the user and provides them the experience of a fully functional tool.

Link for our prototype: https://marvelapp.com/457f5j5/screen/41577468

Figure 1 : Login Mobile Screen for protoype

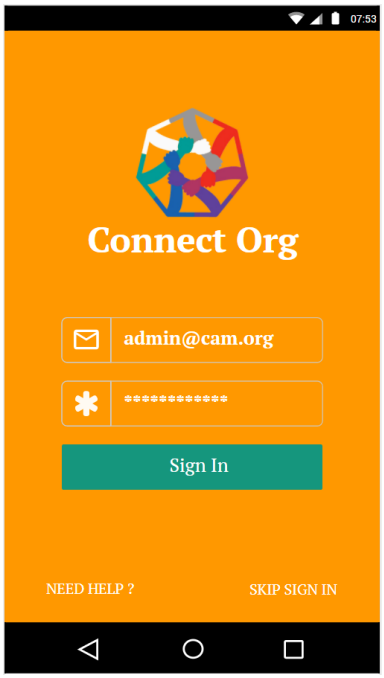


Figure 2 : unified display of organizations

Figure 3 : Detailed information of

Figure 4 : Share the details of the organization page

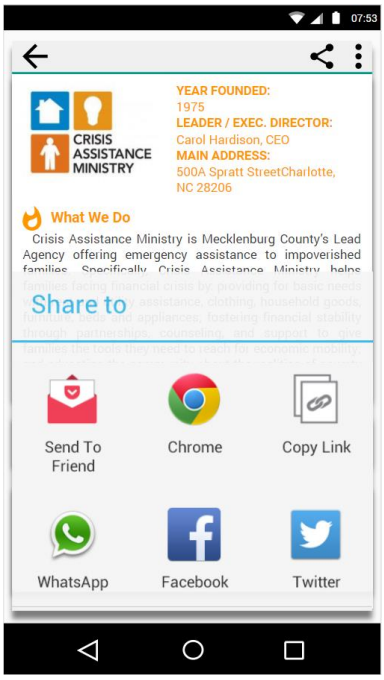


Figure 5: Filter Options

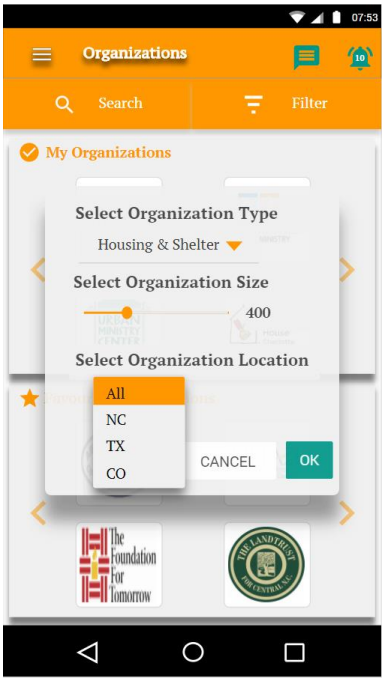


Figure 6: Search Results

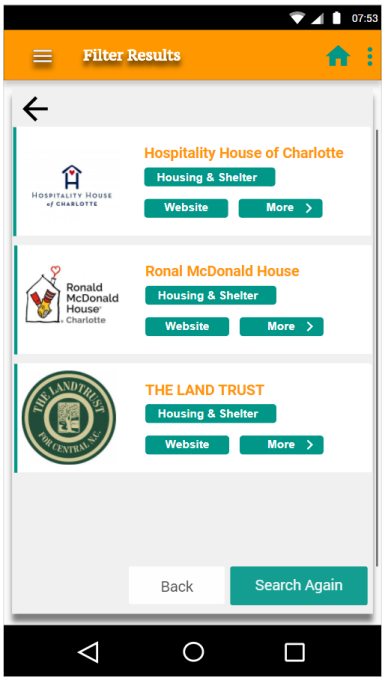


Figure 7: Broadcast Messages

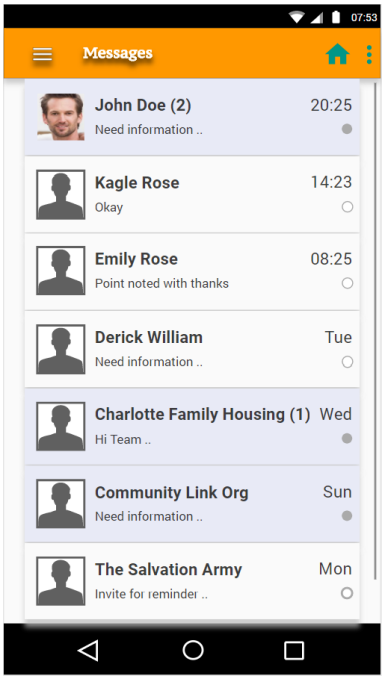
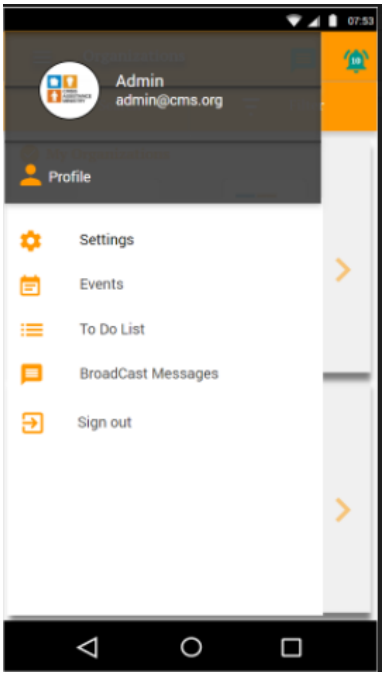


Figure 8: Set Event / Notification / To-do Lists



4.1 Evaluation on the prototype

Analytical evaluation of the final prototype was carried out by experts where inspection method of heuristic evaluation was used to validate and evaluate the effectiveness of our design. Improvements to our initial design was made to make our interface more reliable. A set of heuristics developed by Jacob Nielsen and Molich (1990) were followed as a guideline for analyzing the interfaces and identifying the usability problems of the final prototype.

4.2 Users and Settings

The users for the evaluation of the final prototype were the volunteers from Jamil Niner pantry (2 participants), activists from Jack and Jill organization of America (2 participants), researchers from UNCC urban institute (seeking solutions for social problems) (2 participants), and a fellow friend (1 participant). There were a total of seven participants who participated one at a time and were assigned a set of tasks. We insisted the participants to access the final prototype URL from their mobile phones. There were three observers during the entire process of evaluation. One of the evaluators was in charge for explaining the goal of this evaluation and was instructing the users how to proceed forward. Another evaluator was exclusively allocated to calculate the time taken to perform each task. The other evaluator was video recording the entire process which could be used later for analysis of results. We adopted an informal environment for testing the application. This decision was done so that the users would feel more comfortable in a personalized environment. The setting of a controlled environment would overweigh the opinions of the users.

Following are the general set of tasks which were presented to the user to perform.

Task 1: Login and view homepage

Task 2: Search for an organization by generic and filtered search

Task 3: Broadcast message

Task 4: Create a to-do list and view it

Once the participant had completed all the tasks, rating questionnaire was given for which they had to rate a series of statements. The ratings were: strongly disagree, disagree, neutral, agree and strongly agree. The statements are listed below.

- I was able to complete the tasks without difficulties.
- I was able to complete the tasks without any help.
- Terminologies and icons used were clear and easy to understand.
- The prototype provided the necessary functionalities to enable me to perform the tasks I was assigned
- It will take short time to master the usage of this tool.
- I kept on making errors while performing tasks.
- I enjoyed using this tool.
- I would like to use this tool in the future

4.3 Meeting the Design and Usability Goals

We were able to meet most of our Design Goals based on Evaluation results. These are concluded from the recorded from evaluation results and tasks given to the diverse set of users to test the prototype. Similar usability goals such as effectiveness, efficiency, utility, learnability, satisfactions and memorability also successfully incorporated in designing the prototype. Below are the results form user testing the prototype

Average Time Taken - User Vs. Tasks				
	TASK 1	**TASK 2**	**TASK 3**	**TASK 4**
USER 1	1:45	2:22	2:44	1:37
USER 2	1:32	2:15	3:12	1:45
USER 3	1:06	1:57	3:15	1:45
USER 4	1:40	2:45	3:00	1:55
USER 5	1:40	2:45	3:44	1:55
USER 6	1:40	2:45	3:33	2:45
USER 7	1:40	2:45	3:00	1:55
Total	**11:03**	**17:34**	**22:28**	**13:37**
Average	**1:34**	**2:30**	**3:12**	**1:56**

Average clicks - User Vs. Tasks				
	TASK 1	**TASK 2**	**TASK 3**	**TASK 4**
USER 1	10	15	22	12
USER 2	8	12	27	16
USER 3	11	16	27	14
USER 4	11	24	27	17
USER 5	16	22	28	15
USER 6	11	22	28	26
USER 7	11	22	16	11
Total	**78**	**133**	**175**	**111**
Average	**11**	**19**	**25**	**16**

We have also gathered the details with respect to the evaluation feedback statements given to each of the participant. Most of the users were satisfied with the overall experience of the application. A very few users (2 users) were facing difficulty in traversing through the application and they required help in sending a broadcast message with attachment

Feedback Identifier	**Evaluation Feedback**	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	**Total user count**
F1	I was able to complete the tasks without difficulties.	2	4	1	0	0	**7**

F2	I was able to complete the tasks without any help.	3	1	1	2	0	**7**
F3	Terminologies and icons used were clear and easy to understand.	1	6	0	0	0	**7**
F4	The prototype provided the necessary functionalities to enable me to perform the tasks I was assigned.	2	5	0	0	0	**7**
F5	It will take short time to master the usage of this tool.	3	3	1	0	0	**7**
F6	I kept on making errors while performing tasks.	3	3	1	0	0	**7**
F7	I enjoyed using this tool.	3	3	1	0	0	**7**
F8	I would like to use this tool in the future	3	3	1	0	0	**7**

5. Discussion and Conclusion

5.1 Prototype Current Functionality

The current prototype provides the user with a realistic example of the practical uses for this application and a full appreciation for the look and feel of the design that would carry over to the final product. The prototype provides access to all of the following functionalities in varying degrees:

- Login/Logout.
- View the user profile.
- Search for the choice of organizations based on the different filters.
- Display the organization detail page with different modes to share.
- Module for managing Events list functionality.
- Module for managing To-do list functionality.
- Module for Broadcasting Messages functionality.
- Separate modules for messages and notifications

5.2 Future Improvements

- Login the application using different social media platforms like Google, Facebook, twitter.
- Application to support more data view and easy movements
- Need to include FAQs as the part of the system

5.3 Conclusion

Overall this coursework helps me to understand human–computer interaction, interaction design, web design, software engineering, digital media, information systems, and information studies. It helped me understand the broader scope issues and methods related to digital computing design systems. I certainly believe this project afforded me an opportunity to learn and experiment more with design and evaluations process. I consider the project as a valuable addition to my current skill set. The project provided me and my team an excellent experience which we look forward to applying in real time IT industry and to have continuous knowledge improvement.