CommuniTech: A Skill-Sharing And Buddy-Pairing Platform

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Abstract
Our team partnered with the Achievement Club program of the United Way to create a prototype system to help assist their members share skills, find personal support in the form of a buddy system, and foster a sense of community amongst members. An initial survey was done of our targeted primary users, specifically, the current members of the Achievement Club, and based on their information and later feedback a web-based system named CommuniTech was designed. Initial user testing was used to evaluate the prototype, and it was found to have a high learnability and memorability, but at the cost of specific systems within CommuniTech, such as our proposed system of time credits and the purpose of the buddy system, being frequently misunderstood.

Author Keywords
Community; Skill Sharing; Buddy Program; Social Support.

ACM Classification Keywords
H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

Introduction
The mission of the Achievement Club (AC) program of the United Way (UW) is threefold: "We help them; they help themselves; then they give back". The program focuses on

supporting AC members in setting and achieving goals that provide lasting benefits to them. Our goal was to design a system to help aid the AC in their mission, and thus we propose a system called CommuniTech, a platform for sharing skills and increasing a sense of community amongst members of the AC. Currently, the AC coordinators are heavily involved in facilitating growth and success for the members in achieving their goals, while our system tries to place the emphasis more on members helping themselves and others.

Our system was designed based on an initial survey of the UW and AC needs, and survey of some of our intended primary users, current members of the AC. We drafted multiple prototypes on various platforms and after receiving further feedback from AC members and administrators decided on a web application platform. A simulated prototype of our system was then created and we were able to evaluate it by observing its use. Our prototype was designed to demonstrate three of its primary tasks, allowing users creating a profile to offer help and skills to other members, seeking help from another to complete their goal, and registering for our buddy system that pairs members for mutual, more personal support.

Related Work

Sharing Skills

In order to promote greater interaction between the AC members, we view skill sharing - where members help each other in return for some mutual benefit - as an ideal form of interaction that will foster interaction, apart from helping the members achieve their goals. A study[1] on sharing resources at two Ghanaian cybercafes shows that sharing between users, especially people with low technological background, was majorly motivated by the incentive to pick up technical skills.

Skill sharing can be performed in many ways including exchanging favors for a form of currency. Bolton et al.[2] compared the efficiencies of direct exchange of favors with exchange of favors for currency, and found largely that direct exchange of favors was socially inefficient compared to matching benefits to favors. This leads us towards using a currency for enabling the exchange of skills. Using time as a form of currency (time-credits), for exchange of services has been implemented in both online and offline settings, as in TimeRepublik[6] and TimeBanks[5]. Seyfang et al. have shown "community currencies" like time, to be effective in building sustainable communities[17].

In designing an online platform for sharing skills certain design considerations come to the foreground like establishing trust and matching demand and supply of skills/services among others. In a study to design a TimeBank for inclusive research[7], researchers found that for the specified domain, it was easy to match the demand of services with the supply in a group of 21 participants, suggesting that a group size of 20 may be enough to find and match skills in a given domain. Studies[13][7] show that establishing trust is a major concern for users of a services/assets sharing platform. Pick[13] suggests that trust can be guaranteed by a trusted system or party, which in our case, can be the Achievement Club moderators, who can certify a member's identity, or CommuniTech itself, which may be adapted to incorporate features that allow a user to add a proof of their skill to their profile.

Building and Sustaining a Community

Skill sharing being the underlying theme of CommuniTech, we aim to build a community in which members can rely upon each other for instrumental, informational, motivational and emotional support. With the rise in popularity of social networks, much has been written and researched on

how to create a successful online community. Just building a site for an online community, even to fulfill a specific needed, does not guarantee the creation of a "successful" community, especially if the members aren't convinced of the value of that community [12]. One of the most common reasons for the failure of an online community has been the lack of active participation. Active participation is an indicator of how engaged the users are with the system. i.e. how many posts/comments/messages etc. the members make on the platform. Higher engagement implies more posts/comments/messages. There is a direct relationship between the amount that members post to an online service and the sense of community between the members in that group [8]. It has also been found that ensuring faster response times to queries posted on community forums is one of the primary ways to retain the members [21]. And this response time is directly dependent on the the level of engagement of the users.

Active participation occurs most often when members are incentivized by social and hedonic benefits [19]. Studies have also shown that in order for a knowledge sharing platform to thrive and have sufficient user engagement, it needs to provide motivational context and boost the morale of the users [9]. The time-credits aspect of CommuniTech aims to provide exactly this. Time is money (quite literally in our case), the user needs to earn time credits by helping another person in order to seek help himself. We believe that to most users, this idea of "earning" time-credits will provide the impetus to keep the system rolling and active.

The Value of Having a Buddy

Our system aims to build a community and affect behavioral change at a more personal level through its buddy program, in which a current AC club member is paired with another AC club member in order to encourage and support each other in accomplishing their goals. Clinical programs have successfully used buddy programs to help clients engage in healthier behavior such as quitting smoking [20], engaging in regular physical activity [3] and reducing Body-Mass Index (BMI) and waist circumference [15]. However some studies [16] have shown that a buddy may have a negative effect if they enforce cultural norms that are counter to the aims of the program. To reduce the possibility of this happening in our system, the buddy program could be redesigned to pair a current AC member with either an AC graduate or a more senior AC member rather than another current member. Studies have shown that this mentor-mentee paradigm can be a helpful alternative design for a buddy program. The Nigah et al. study, for example, successfully paired new employees with a more senior employee in order to ease their social transition into the office [10]. In Burrage et al. HIV positive clients were paired with a volunteer rather than another client to provide the needed emotional and other support [4].

While these studies have shown that subjects can be paired equally well with a buddy who is a mentor or a colleague, subjects have shown a preference to pair with a buddy who is a member of the same community and has similar goals [11]. If the design of our system is amended to ensure buddies are selected from other members of the same club, then both of these requirements can be met. By being members of the same club, buddies are assured of physically interacting on a regular basis, enabling them to provide non-verbal support as well, an equally important component of demonstrating social support [18].

Method

We followed the four step design process as outlined by Rogers, Sharp and Preece [14]:

- Identify needs and establish requirements

- Develop alternative designs that meet those requirements
- Build an interactive prototype
- Evaluate the prototype

Requirements Analysis
In order to glean insight on our user population we resorted to employing varied techniques. Each of these provided us with a view to different aspects of user characteristics, behavior and requirements. Summarized below are the methods used.

Overview from the Achievement Club moderator: We started off with an interactive session from United Way's Achievement Club moderator. She gave us a peek into what the Achievement Club does, the social/economic/financial status of the members of Achievement Club (these members are essentially our users), what the members currently gain from being a member of Achievement Club and the primary pain points that the members and managers of Achievement Club face at present.

Literature Review: We individually researched, selected, and studied two papers from renowned conferences that relate closely to our user population and circumstances. Following this, we discussed what we had learnt from our respective papers and how these can be applied to the design process of the system we planned to build for the Achievement Club.

Existing Systems Analysis: We also researched and found existing systems that aim to achieve the same goals as we envision for the Achievement Club. We studied each of these (both individually and as a group) and analyzed what works well and what doesn't. This gave us an idea of what we should and should not incorporate into the design of our system. Goal and Demographic data - An Excel file containing a sample of all the goals and corresponding member details (sex, age) was provided to us by the Achievement Club. This gave us a sense of what kind of goals they usually set and the most common goal topics/trends.

Interviews: We interviewed eight candidates (4 were of the opposite gender as compared to us. And the other 4 were older than us by at least 10 years) with questions pertaining to what the Achievement Club aims to provide their members. This gave us the perspective of what people outside of our primary user population currently do and would like to have/see in order to achieve the same task put forward to the club members. The gender and age aspect to this also contributed to the richness of the data gathered.

Survey: We compiled a list of ten questions pertaining to the theme of "skill sharing" and generated a survey questionnaire that was administered to the Achievement Club members during one of their weekly meeting sessions. 8 participants in total answered the survey, which constituted 7 members and 1 moderator. This helped us gain a deeper understanding of how the users' currently feel/practice this and their level of comfort in doing so.

Naturalistic Observation: We observed one workshop session (live) organized by the Achievement Club for the members at their venue. This gave us first-hand information on how the members currently interact with the moderator and amongst themselves, how comfortable/cordial they are with/towards other members, and whether they have any space/location constraints.

Alternative Designs
Based on the observations and analyses done, we realized that what the members of Achievement Club lack the most is a sense of community. i.e. they rely more on their mod-

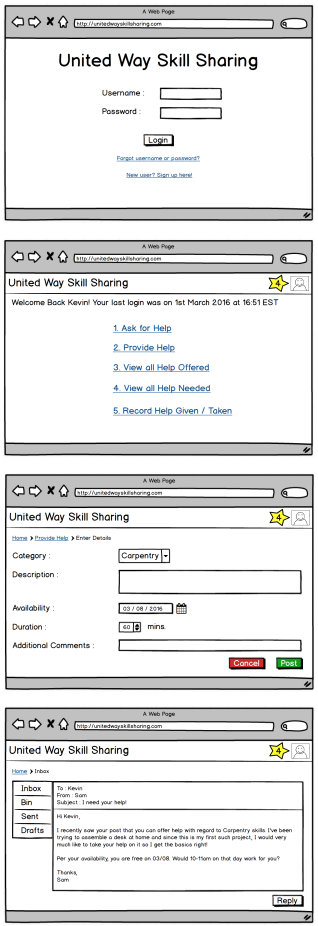

Figure 1: Web Application Mockup Screens

erators than amongst themselves. In order to bring about a sense of belonging (to a community) among the members, we aimed to provide a system that encapsulated two main features - skill sharing (i.e. members can teach other members a skill that they are good at, or learn a skill from another member) and a buddy program (each member is paired with another member on whom they can rely on for motivational and emotional support in order to accomplish their goals). We came up with three designs on different platforms in order to support both of these features.

Web Application: Our first design was that of a web application that seamlessly supports both the functionalities. We aimed to provide this to each member via a personalized profile that is created for them upon signing up with the system. Each member profile is also tied to a bank of time-hours. A Credit will add an hour (or a fraction of an hour) while a Debit will deduct an hour (or a fraction of an hour) from the profile. Members receive time-hours for helping another member, and will use these time-hours earned to seek help from another member. Members can make a post either asking for help in order to learn a skill, or offering help in order to teach a skill. Members will also be able to contact each other via an in-built messaging system in order to discuss and decide amicably on how they plan to meet and teach/learn the skill. Once this barter of skills is complete, members can log the interaction in the system so that the teacher is credited with appropriate time-hours while the learner is debited with the same number of time-hours. To each member, the system will also provide a suggestion list of all the other members who might potentially be a good match with them as a buddy.

This suggestion list is populated on matching criteria based off their goals. Members can select anyone from the list in order to establish the relationship and will be able to use

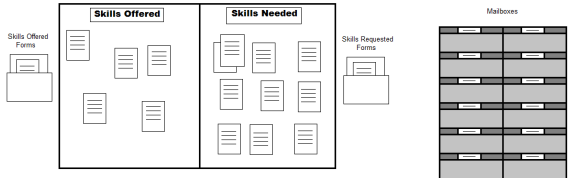

Figure 2: Bulletin Board Mock-up

the in-built chat platform to communicate with them at their convenience. A few screen designs are provided in Figure 1.

There were several reasons behind why we chose the web platform. The Achievement Club is aiming to establish a computer lab at the United Way venue in order to give members access to a computer with internet facilities. In addition, all members are also provided a smartphone with a data plan. Hence members can access the web application both via a computer at the lab, as well as their smartphones. In addition, results from our survey and the naturalistic observations indicated that majority of our users have access to the internet almost always and are comfortable using web applications.

Bulletin Board: Our second design was that of an entirely paper based system. This system will function as a bulletin board with pre-made forms to offer or request skills, and a system of personal mailboxes to be able to communicate between members of the Achievement Club. This system does not have as much overhead and management, and is more of an opt-in system. For example, there is no overarching system that tracks number of hours a person has similar to the web application, but people can exchange skills simply to build community bonds with one another.

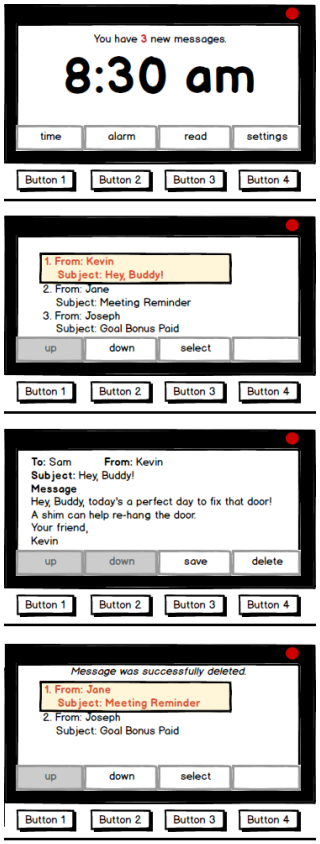

Figure 3: Personal Device Mockup Screens

Additionally there is no database tracking or storing messages between members beyond the physical mailboxes and papers. There will be pre-made forms on either side of the board that members can fill out requests for skills or offer skills they have and leave their contact information. If a member wants to offer a skill they should first check the board and see if a similar (or the same) skill is already posted, and there will be a place on that skills page for them to add their contact information as well. The mailboxes for communication will simply have personal names written and be used to deliver and receive messages of any kind from fellow achievement club members.

We decided to go with a paper based system since all members of the Achievement Club have some experience filling out paper forms (even if they do so with assistance in cases of lower reading level). We also noticed during the naturalistic observation that many activities during the meetings are currently highly reliant on paper based worksheets. Hence this is a familiar system that does not require much learning on their part and prior knowledge with regard to technology. The cost of the system is also relatively low, since the only initial investment is that of the board itself, the mailbox system, paper and ink. Figure 2 shows the design mock-up of such a Bulletin Board with mailboxes on the side.

Personal Device: Our third design was that of a small personal electronic device that would be custom-made for United Way to buy and give to Achievement Club members. It would be used to complement the system's main interface (possibly web) rather than as a replacement. This device would be made from a low-cost Arduino or Raspberry Pi board, an LCD screen, an LED light, four buttons and a plastic shell to contain all the components.

The device would be similar to a pager in that it would have a limited feature set, but fast access time for the features it does offer. The main features of the device are the ability to be notified that a user has new messages in their web interface account and the ability to view those messages. Since the device must be on at all times in order to check regularly for new messages, the device would have a few secondary features, such as being able to see the current time and set an alarm, to aid in its usefulness. While all of the functionality of this device can be done through the web interface, and, in fact, the device requires the web interface in order to create messages, the device fulfills a specific need that the web interface does not. As a specialized device, the personal device has faster access time than the web interface for its limited set of features. Unlike the web interface, the personal device is a "push" not a "pull" mechanism. In other words users are immediately alerted to new messages by the device rather than having to login to the web interface to discover if they have new messages.

The device can be built for approximately $50, less than the cost of a non-contract smartphone (approximately $100). Since the device would remain at home and has no street value, it would also be less prone to being lost or stolen. The device could also be passed on to other Achievement Club members without the same privacy concerns as reusing a smartphone. Figure 3 shows the mock-up screens for the personal device.

Prototype

We presented the above three designs to the Achievement Club managers, moderators and volunteers during a poster session at their venue. Based on the feedback received and several considerations, we decided to zero in on the web application. The web platform provides the most comprehensive feature set while also allowing for the highest efficiency. The bulletin board, while requiring no additional

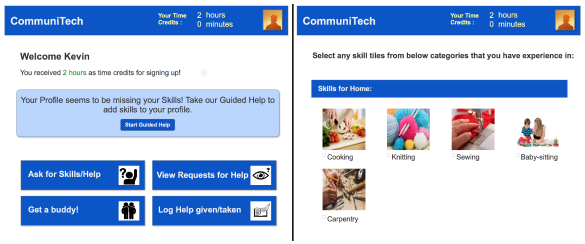

Figure 4: Prototype 1 Screens

learning from the members, poses real estate constraints and requires a fair share of management by the Achievement Club moderators in order to periodically organize the flyers on the board, and weed out old flyers that are no longer needed. The personal device on the other hand, while providing an extremely targeted system in order to receive messages, does not support all the features. i.e. it has to be used in conjunction with another main system (like a web application). Add to that the initial cost of setting up the manufacture and assembly of the device.

We built high fidelity prototypes of the web application using the Axure RP 7 tool, which generates rapidly developed interactive mock-ups in HTML format. The generated mock-ups run on a web browser and can accurately simulate a website's look and feel as well as support all types of interactions a web application is expected to provide. We built three prototypes, to support three different tasks that the web application aims to provide. On each prototype, the user is able to click through various buttons to navigate to new screens, and interact with the program in a guided manner. The prototypes all start from a common home screen but each can only perform the task it was designed for, allowing for a guided analysis of the tasks. While the prototypes were expected to run on any major browser, we

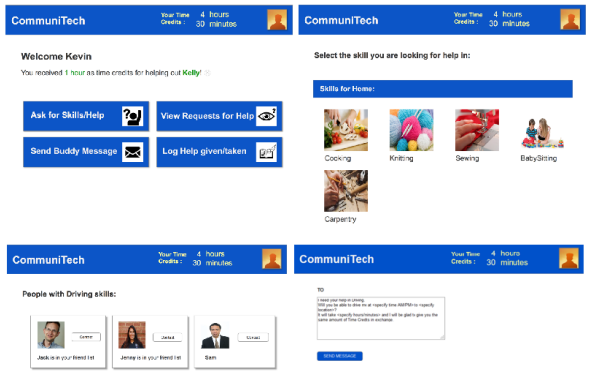

Figure 5: Prototype 2 Screens

found them to run most successfully, without any problems on Mozilla Firefox.

Prototype 1: The first prototype is designed to allow the user to build up their skill profile to begin offering skills. It includes a guided help wizard that lets users step through and select from a generated list of example skills. Prototype 1 is shown in Figure 4

Prototype 2: The second prototype allows the user to request help from other members for a particular skill. The user has earned a certain number of credit hours to spend, and is trying to find someone offering the skill he/she needs. Prototype 2 is shown in Figure 5

Prototype 3: The third and final prototype deals with the buddy system. Users are asked to sign up for this system of CommuniTech and select a buddy from a list of members enrolled in the buddy program (dummy data). Prototype 3 is shown in Figure 6

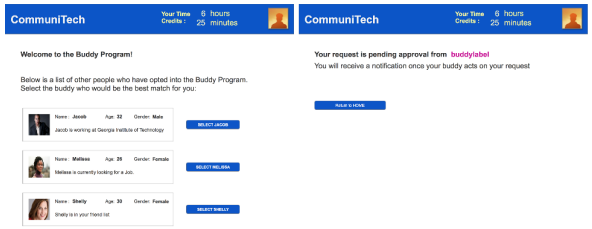

Figure 6: Prototype 3 Screens

Evaluation

In order to evaluate our prototype of the CommuniTech system, we employed the method of usability studies that included a combination of observation, questionnaires and interviews. Our aim was to investigate how typical users (i.e. the users for whom the system is designed) perform on typical tasks (i.e. things that the system is designed to be able to do) [14]. The study involved 11 participants, 4 males and 7 females ranging from less than 20 to 50 years of age. Only one user who participated in the study was an Achievement Club moderator. Not being able to conduct the study with Achievement Club members themselves was one of our major limitations. Though we could not get a representative population of users from the Achievement Club, we aimed to get a good balance of gender and age.

The two core features that CommuniTech offers are Skill Sharing, and the Buddy Program. Hence we picked three tasks for our users to perform that were closely related to these concepts - a) Set up Skill Profile using the guided help wizard, b) Browse and select to ask for help by sending a direct message, and c) Opt-in to Buddy Program and view/select from the best-match suggestions provided.

Pre-Questionnaire: Prior to asking the users to perform the three tasks outlined above, they were administered a questionnaire with a couple questions directed towards understanding: a) how socially active and engaged they are on websites they use the most (eg. Facebook, YouTube, Craigslist, Amazon etc.). i.e. do they merely look at posts, or do they like/rate posts, or do they make posts/comments, or do they chat/message their friends etc., and b) how reliant they are on a social support system (of friends/family) in achieving their goals.

We were looking to get a sense of these characteristics of the user before they use CommuniTech in order to compare and contrast our 11 different participants on the basis of their personality and how this affects the choices they make (eg. choosing a buddy) with our system.

Task Performance: In order to provide the same user experience to all our 11 users, we presented them with a fixed scenario prior to each task .i.e. they were asked to imagine themselves in a particular scenario, and then complete the task at hand. After reading the scenario for each task, and before getting started with using the system to complete the task, we showed the users the Home Page of CommuniTech and asked them to verbally tell the evaluator which button they thought should be clicked in order to get started with the task. We gave them two attempts at answering this, failing which the evaluator prompted the participant with clues, or gave them the answer. We did this in order to ensure that the interface provided for the Home Page (perhaps the most important screen of the system, since users are always taken to this screen upon login) is simple, intuitive, easy to understand and learn. As the users got started with performing each task using CommuniTech, we noted the following based on their interactions with the system:

- *Number of actions to complete the task:* To gauge if

all the users followed nearly the same path to complete the task; To compare with other similar systems (available in the market) on how deep the navigation is in order to complete a task. The underlying notion being that deeper the navigation, harder and more time-consuming the task.

- *Time taken to complete the task:* To get a sense of the approximate time a user would take to complete the task.
- *Number of doubts asked in the process of completing the task:* To understand if the interface, at each step towards completing a task, offers ample affordances and feedback to the user.

In addition to the above, we also noted any task specific information that we wanted to capture. For the second task (Browse and select to ask for help by sending a direct message) - whether the user edited the pre-populated message before sending it to the person they were seeking help from, and whether the user understood the concept of time-hours and offered a lower number hours than what they had in their time-credit bank. For the third task (Opt-in to Buddy Program and view/select from the best-match suggestions provided) - name of the buddy the user chose from the list, and verbal description from the user on why they chose that particular buddy.

Post Questionnaire: Upon completing the tasks with the system, the participants were administered another questionnaire. This aimed to give us a sense of the following:

- *Ease of Use & Learnability:* Overall, whether the participants found the system easy to use in completing the three tasks. Among the three tasks, which they found the hardest and which the easiest to complete.
- *Memorability:* How confident the participants were of remembering how to complete each task after a week. Utility: Provided the participant were an actual user of the system, would they opt-in to the buddy program. i.e. do they think it would be useful/beneficial to them.
- *Conceptual Model (Metaphor):* Whether the participants were able to relate CommuniTech to any other system they've used prior to this.
- *Clarity:* In performing the second task, whether the concept of time-credits was clear to them.

Results

During the Requirements Analysis phase, a survey administered to a group of 7 AC members and one AC volunteer informed us of the design considerations we should incorporate into the design of our prototype.

According to the survey, some of the problems the members faced were - "no way to get to the DMV" and "lack of info to get into school". We noted that these and many other obstacles the members faced in achieving their goals, may have solutions in the AC community itself. For example, the person who faced the problem of getting to the DMV, only needed to reach out to a friend who could drive him/her to it.

We also noted that on a Likert scale of 1 - Never to 5 - A Lot, with respect to how often the AC members socialized outside of the regular meetings, the participants scored 2.1, indicating low levels of interaction outside of the club. We hypothesized that this could be the reason why members were unable to get assistance from other members and were mostly dependent on the AC moderators in helping them achieve goals. Hence, the system we propose

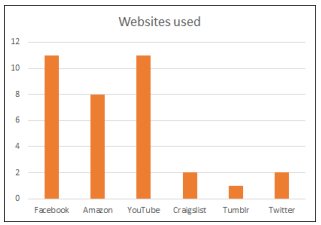

Figure 7: Websites usage

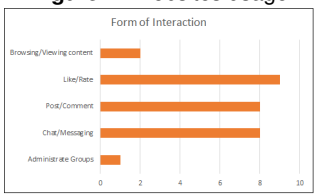

Figure 8: Level of interaction with websites

focused on enabling skill sharing to imbue a sense of reliability and community within the members.

Responses to other Likert Scale based questions measuring the comfort level with which members would give or receive help were also positive. Participants scored 4.25 on a scale of 1 - Not at all to 5 - Very Comfortable when asked how comfortable the members would be learning a skill from another member. On the same scale, participants scored a 4.4 on how comfortable they would be to help other members. This indicated the members were open and willing to assist each other to mutually benefit from each other.

Some results indicated motivation and social support plays an important role in achieving goals. 75% of the participants said lack of motivation was a challenge to achieving goals and half the participants believed that having people to motivate them can help in achieving goals.

The design interface for one of our design alternatives, and subsequently, our final prototype, was influenced by 50% of the survey participants voting for web application as the technology they are most comfortable with compared to mobile applications and wearable technology (eg. smartwatch). Also, the survey results indicated that all the participants had knowledge of and used the Internet to gain information.

Following the design of our final prototype, we performed a user evaluation yielding objective as well as subjective results compiled and presented further in this section.

Objective Data

The demographics of our user study are depicted in Figure 9 with the number of users plotted against respective demographic indicator:

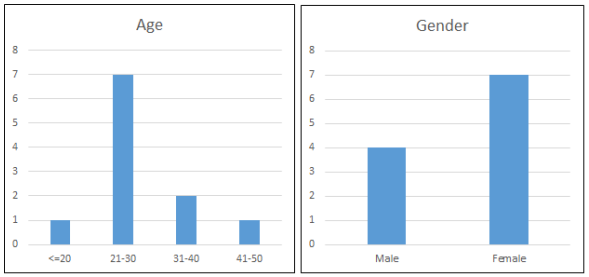

Figure 9: Age and Gender demographics of User Evaluation Study

The pre-questionnaire gave as information about the users' experience with websites and their level of interaction with them, specifically with focus on social media websites. Figures 7 and 8 indicate these.

With a view to understanding how often the users relied on their social support system to help them achieve their goals, we asked the users to think of a goal and then mark how often they relied on their social support system. Figure shows a chart depicting the distribution of the estimate given by our users:

During and after the evaluation, we captured a variety of metrics as a measure for the usability criteria of our system. Each metric is associated with a benchmark, which is in some cases a calculated/observed value or in others, a desired value. Benchmarks for "Avg #Actions per User" & "Avg Time to Complete per User" for each task were generated by the system designers (4 of us) posing as the user and evaluating each other to obtain average estimates. Another benchmark for "Avg #Actions per User" is a comparison with a current existing system, namely, TimeRepublik for Tasks 1 and 2 (tasks as described in Section 1). Task

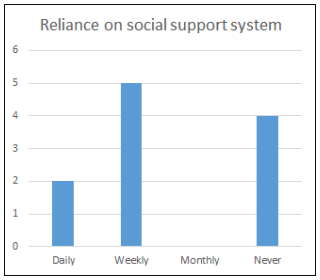

Figure 11: Reliance on social support system

Metric/Measure	Task 1	Task 2	Task 3	Benchmark/ Desired Value	Associated Usability Criteria
# Users selecting correct Starting Button on Home page in 1st try	8	9	11	11 (100% of users)	Learnability, User's Conceptual Model
Avg #Actions per User	4	5	2	Task 1: 4 Task 2: 5 Task 3: 2	Efficiency, User's Conceptual Model
Avg Time to Complete per User	85.53s	84.16s	40.98s	Task 1: 32.75s Task 2: 59.75s Task 3: 16s	Ease of Use, Learnability
No. of queries/ errors committed during the task	6	9	1	0-2	Ease of Use, User's Conceptual Model
No. of users having queries/committing errors during the task	4	7	2	0-2	Ease of Use, User's Conceptual Model
Easiest task rank score (on a scale of 1- easiest to 3- hardest)	Rank 2 (1.7)	Rank 3 (1.9)	Rank 1 (1.6)	N/A	Ease of Use - task wise
Avg response to Remembering steps 1 week from now (on scale of 1- certainly forget to 5- certainly remember)	4.4	4.5	4.5	5 (Ideal)	Memorability

Figure 10: Task wise summary of results

3, being more of an experimental task to gauge the user's choice and with the possible number of steps being 2-3, did not warrant a comparison with another system in terms of number of actions. Figure 10summarizes the results:

Table 1 shows a comparison of Task 1 & 2 generated benchmarks with an average number of actions required to complete a similar task on TimeRepublik. The number of actions in TimeRepublik is 5+, based on the number of skills added. But our system is better because while TimeRepublik makes users select a skill and then add it, (2 actions per skill), we let the user select all skills first and combine the adding action into one step. This way we are cutting down the number of actions by almost half.

	Avg #Actions	
Task #	*Benchmark*	*TimeRepublik*
Task 1	4+	5+
Task 2	5	7

Table 1: Table showing comparison of Avg #Actions for prototype benchmarks with TimeRepublik

When evaluating user actions or generating benchmarks, each mouse click was considered one action. Similarly, continuous text entry/filling one field with text was also considered one atomic action.

For Task 3 (Opting into Buddy Program and selecting a buddy), we also asked the users the reason for selecting a particular buddy. Results are shown in Fig:

For the overall system, we analyzed a few statistics based on the data from the post questionnaire as summarized below:

- Avg. score for Ease of Use: 4 (Somewhat Easy) *(on a scale of 1-Very Difficult to 5-Very Easy*
- Avg. score for likelihood of opting into the Buddy Program: 4 (Somewhat Likely) *(on a scale of 1-Very Unlikely to 5-Very Likely*
- Avg. score for clarity of Time Credits concept: 3 (Neutral) *(on a scale of 1-Very Confusing to 5-Very Clear*
- No. of users who could relate our system to an existing system they had used before: 5

We conclude this subsection withe figures we derived for the main usability criteria we were evaluating:

- *Efficiency:* The number of actions on average were the same as the benchmarks generated and therefore is a very good result.
- *Learnability:* 80% users were able to correctly navigate to the starting point on the home page. The weightage per task for calculating this was decreased from Task 1 to Task 3 as it would become obvious by Task 3 which button to press.
- *Memorability:* Users scored a 4.5 on remembering the tasks, one week from having used the system. *(on a scale of 1-Certainly Forget to 5-Certainly Remember*
- *Clarity:* On average, users scored a 3 (Neutral) when asked how clear the concept of time credits was to them. *(on a scale of 1-Very Confusing to 5-Very Clear*
- *Satisfaction:* Users scored a 4 on how likely they were to opt in to the Buddy Program. *(on a scale of 1-Very Unlikely to 5-Very Likely*
- *User's Conceptual Model:* 45% users responded saying they could relate CommuniTech with an existing system (various)

Subjective Data
Based on the feedback given to us by the users, during interviews and via questionnaire we note the following points:

- *Positive feedback:* Users who found the system easy to use, generally had positive things to say about the User Interface. Some comments made by the users include:
  - "The buttons were large and fewer choices made it easier."
  - "Intuitive, obvious labels on buttons."
  - "Very simple and easy to learn"
- *Negative feedback:* Most users had difficulty understanding the system and task description rather than the interface. But a few users also had complaints with some UI elements. These were users who caused errors during evaluation or clarified the tasks a few times. They found the system difficult to use and stated:
  - "The hardest task was trying to remember what the task."
  - "For some reason the scenarios didn't stick with me, so I had to re-refer [the task description] to complete the task."
  - "Didn't have enough background to know why I was doing stuff."
  - "Words being used on button should be simpler (clearer/obvious)"
  - "The Guided Help button is so small, you noticed the others first."

  4/11 users found the concept of Time Credits confusing.
- *Suggestions for Improvement:* A few users gave us their preference on the user interface and also what features they believed could enhance the system's usability. We received most feedback in this aspect from an Achievement Club volunteer, who was one of our users, predictably as the volunteer knew more about the goals and working of the club as well as the

nuances involved. Below is a list of all the suggestions we received:

- "Make it [the Guided Help button] a different color or bigger."
- "Maybe change the wording [of the button]. Maybe shorten the button name to Skills/Help."
- Suggestion to include an "Admin view", so the moderators could get an overall view of what help the members need.
- Incorporate more functions to add goals, track and update status of goals.
- Support user data privacy.
- Apart from showing time credits, show targets of time credits that can be reached by users.

Discussion

Generally it is clear that there is a good understanding of the high level operation of our system. Responses from users indicate that they generally found the tasks performed with the prototype to be easy, and they indicated that they expect a high degree of memorability with how to perform each task. Furthermore, most users were able to identify the correct button to start every task on their first attempt. It is therefore clear that with a description of an intended task, users are able to navigate through our system on their own.

On a more specific note it is suggested from our data that while the operation and navigation of our prototype is clear, the mechanics of our time credit system and buddy system are not clear. One user specifically commented that they did not know what the buddy system was even after searching for a buddy as one of our tasks. Additionally, one user while performing the second task of requesting help offered more hours in payment that their profile actually had, indicating a misunderstanding of the time credit system. It is possible that this was due to the brief nature of the introductory description of our evaluation, where the concepts of the buddy system and time credits were described. In a future prototype or the final system there could likely be an introductory message which better explains the mechanics of the two systems.

One other specific implication of our data is that the buddy finding algorithm should strongly prefer suggesting people who have already completed the goal a user has. It is possible that this was partly due to the nature of the goal, finding a job, that someone who already has a job would have more resources available than someone who has completed a goal in generally. However, nearly every user when asked to select a buddy from a list selected Jacob, who was placed on the list of available options as someone who had already completed the user's goal of finding a job.

It should however be noted that there were certainly limitations to the possible testing done on our prototype. Most of our users were fairly technically proficient users from the 21-30 age range, due to both limitations in time and availability of real world end users. The intended users, Achievement Club members, cover a wide range of demographics but from our initial research and surveys of real users do not seem to be as technically experienced or from the same age range. Some of our results are likely generalizable, for example the choice of buddy for the buddy system does not have any immediately obvious correlation to demographics of the user, but the understanding and learnability metrics of our system might have been artificially inflated compared to the end user owing to our experimental user's high technical experience.

Another limitation to our study is the detail of personal understanding obtained from the subjects. When designing our study, our goal was to have our prototype testing run as quickly as possible for the users, ideally being able to run a study from start to finish in ten minutes or less, including the pre-study questionnaire and post-study survey. For this reason we did not as as extensive open ended questions for our evaluation, or ask users to think aloud, as we wanted to observe the system being used more naturally.

Conclusion

With this final report we have successfully concluded the first iteration of the design of our system: exploratory interviews of target users, creating and analyzing design alternatives and, finally, evaluating a prototype of one design alternative with a set of users, though not necessarily typical future users of the system. Were we to continue on with this project, the results of our evaluation coupled with our research into studies with similar functional goals would inform revisions to our design. Based on this data, clarifying the time credit system and the buddy program would be the focus of the revised design. Small changes would also be made to the user interface to improve the user's experience. After revising the prototype, the next step would be to evaluate the updated design with another set of users, ideally users more representative of the system's target user population.

Although this second iteration of design will probably never come to fruition, this first iteration has not been without merit. Through our efforts, we have shown that skill sharing and buddy pairing are two tasks which can be of use to a program like AC, and that they can be implemented in a web-based application using a simple and straightforward design.

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