Timebanking with a Smartphone Application

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1. INTRODUCTION

Timebanks use time as a form of currency to encourage service exchanges among timebank members in the same community. Timebanking formalizes community-based volunteering by tracking service transactions amongst local community members in terms of the time taken to perform the services [Cahn, 2000]. It is based on two concepts: "paying it forward" and "co-production," as people can offer help to and receive help from others continuously and both the provider and receiver work together to achieve desired outcomes [Cahn, 2000; Carroll, 2013]. Members can "earn" time by providing a service and "spend" it by receiving a service. It does not require reciprocal service exchanges, but members can give and receive services in a flexible way. For example, a person who has a vehicle can give a senior citizen a ride to and from the hospital and be compensated with time credits. The earned time credits can then be used to ask a different timebank member to fix her computer. Unlike conventional monetary systems, time created from any type of work has equal value. At its core, timebanking encourages people to use their own unique and valuable skills to help others, which helps timebank members develop a sense of self-efficacy and achievement, trust, collaboration, and collective efforts, regardless of their professional or income level [Cahn, 2000; Collom et al., 2012].

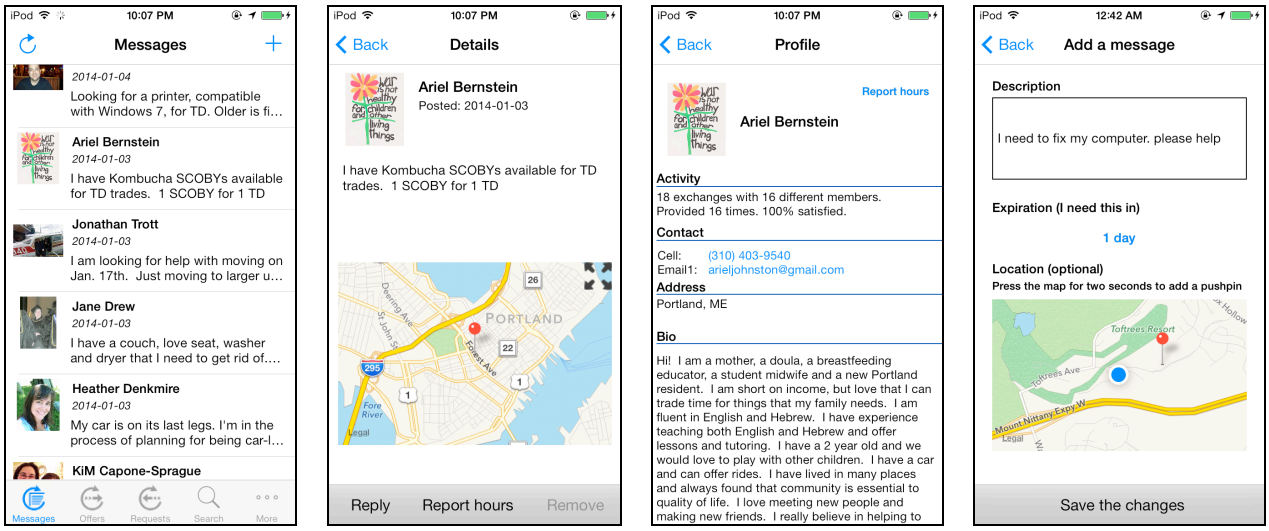
Timebanks are one of a number of non-profit peer-to-peer exchange systems that offer many social and practical benefits to their members [Seyfang and Longhurst, 2013]. Since they use time as a form of currency to manage and facilitate exchanges between members, instead of using paper "time dollars," many timebank organizations have started to leverage technology, for example, developing web-based software platforms to set-up and sustain a timebank as well as reduce the amount of face-to-face coordination for brokering and monitoring of services for both coordinators and members. However the current web software mostly relies on advanced planning and scheduling for timebanking tasks, lacking support for small exchanges in near-real time situations.

We have proposed that timebanking systems need to adopt a more fine-grained model of time and unplanned tasks, as well as high mobility and accessibility to support broader ranges of exchanges among people in the same community, which could be accomplished by leveraging opportunities from mobile technology [Bellotti et al., 2013, 2014; Carroll, 2013]. A number of timebank organizations also regard access to timebanking through mobile devices as an urgent challenge, but little has been achieved in practice, mainly because of limited budgets and resources. Smartphones are becoming pervasive throughout society and a growing number of people are adopting them [Smith 2013], offering the possibility of greater accessibility and support for highly mobile peer-to-peer exchanges in the context of timebanking. To explore this possibility, we have designed and implemented timebanking smartphone applications to not only facilitate conventional web- and paper-based timebanking activities but also support more fine-grained and spontaneous ones with more temporal and spatial flexibility. In this note we introduce the design rationale of the timebanking smartphone application. We also describe our ongoing studies of mobile timebanking. In particular, leveraging the collective intelligence that is embodied by a system that incorporates people and other environmental

and contextual elements is a key focus of this research, as it will help facilitate more opportune timebanking transactions.

2. TIMEBANKING SMARTPHONE APPLICATION

Our design approach is to leverage and extend back-end database services of existing timebanks. We are collaborating with hOurworld (http://hOurworld.org/), one of the largest national non-profit timebanking organizations that has over 140 affiliated local timebanks with about 13,000 members and rising at the time of writing, and were able to obtain a test account from hOurworld to investigate the fundamental functions that should be provided by a smartphone application. We worked closely with the web developer in hOurworld and created an open API to enable information transmissions between the server and any compatible mobile clients. This supports a seamless user experience across the web and mobile platforms.



(a) (b) (c) (d)

Fig. 1. Screenshots of the hOurworld smartphone application. (a) a list view of timebanking services posted by members; (b) a detailed service information page with a map and reply and report hours functions; (c) an user profile page including name, activity history, contact, bio, etc.; and (d) a service creation page allowing users to specify time and location information.

The smartphone application has been designed to support real-time timebanking as an extension of the web-based asynchronous model that has existed up to now. It also has compatible core functions such as user authentication, checking one's user profile or activity history, checking the list of available services nearby, requesting services, reporting hours, exchanging text messages, joining groups, and so on as depicted in Figure 1.

The current version of the application leverages location and time information to present timebanking services. More specifically, it takes advantage of location information about where users can participate in timebanking transactions, depending on where they are located and specify geo-coordinates of requested or offered services by adding a pushpin on the map. It also allows users to indicate the expected expiration date of the task (e.g., "this task needs to be done in three days"), displaying a different icon as an indicator of task urgency. This design approach is expected to enhance current timebanking interactions, but also make possible a wider range of timebanking interactions, namely, time- and location-sensitive interactions right from the mobile device in the wild.

We have iOS and Android versions that are now available on the two platform's app stores. As of early January, 2014, two months after release and still prior to planned promotion efforts, there are approximately 450 downloads in total and 100 active users who use the application regularly.

3. ONGOING AND FUTURE WORK

We have been studying some of the largest timebank organizations and platforms, including hOurworld, TimeBanks USA and Community Forge, over a year. Based on the data collected from our fieldwork studies [Bellotti et al., 2014], we have reported that most timebank systems place too much emphasis on tracking time debits and credits from giving and receiving personal services and do not dispel some members' discomfort with asking for help, which can deter participation. Our planned UX design measures are intended to alleviate this problem by highlighting broader social and personal rewards for existing and new members more clearly.

Some of our design ideas can be applied into both web and mobile systems; for example, gamification [Deterding et al., 2011] can be applied to both platforms as a way to increase the attractiveness of and engagement with timebanking interactions. Members could earn participation points and badges for special appreciation, and special status can be awarded to some members, based on their participation and ratings from others. To increase confidence in the quality of a service on offer, we can also show a timebanking resumé listing task completions and comments/recommendations from other users who received a service from this person. We could even use historical data to provide expected task completion time based on a history of a member's task completions and his or her specialties to allow flexible management of task and service transactions. Another opportunity is to foster relationship formation between parties to a transaction to help build stronger communities. So instead of simply recommending a person with the right skills to complete a task to its owner, we can recommend someone who is in the same age range or with similar interests described in their personal profile.

We are also planning to leverage the capabilities of smartphones to the fullest extent by developing intelligent, context-aware and proactive capabilities. The next version of our app will be designed to target people with task recommendations, based on their present situation and predicted activities and locations. For example, a timebank member could be targeted for notification of tasks involving buying and delivering an item on her way home when she is at a grocery store. We are just starting to promote the smartphone application to hOurworld timebanks. Increasing adoption will allow us to investigate if timebanking on a smartphone platform will facilitate timebanking activities and create more opportunities for users to provide or receive community-based volunteering tasks or services through greater accessibility and mobility to the application. We are also interested in challenges that members may encounter while using the mobile application.

As more people acquire smartphones, a smartphone application particularly one that fosters collective intelligence, may attract more people to timebanking. Like many positive outcomes from conventional timebanking, mobile timebanking shows great potential to facilitate community exchanges and create and reinforce social connections and social capital among members of a local community.

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