Unequal Time for Unequal Value: Implications of Differing Motivations for Participation in Timebanking

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ABSTRACT
Timebanking is a service-based community currency, built on the principle that everyone’s time is valued equally. It has potential for community building and reenergizing neighborhoods, but it faces several adoption challenges. We report on the largest investigation of timebanking practices to date by analyzing a combination of service exchange records from the three largest hOurworld timebanks with over 3,500 members with 33,000 completed service exchanges, and a survey of 446 members of over 120 hOurworld timebanks. Our findings suggest that the ideal of ‘equal time, equal value’ that is at the foundation of timebanking is a source of tension between members with instrumental versus idealistic and altruistic motivations. We suggest that future peer-to-peer systems must incorporate different rewards and incentives in order to accommodate users with different motivations.

Author Keywords
Timebanking; community currency; peer-to-peer service exchange; use and adoption challenges.

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

INTRODUCTION
The emergence of the shared economy is disrupting conventional modes of business and transforming not only what we consume but how goods and services are exchanged, valued, and created [4]. Popular peer-to-peer (P2P) service exchange platforms such as AirBnB, Uber, TaskRabbit, and Kassi [19, 31] are rapidly changing the way we live our lives. Among these peer-to-peer (P2P) platforms, timebanking is a successful example of the P2P movement that has been around for decades. It is a service-based community currency—the time dollar—embodying the principle that everyone’s time is valued equally. In other words, my hour spent mowing your lawn is as valuable as your hour spent doing my tax return. So, the work produced by the less skilled is equally valued in this system. In a timebank community, one member can earn time dollars by performing a service for another, and use the earned time dollars to request for a service from another member.

There is a long history to the development of community currencies. Like a variety of P2P services based on sharing, bartering, lending, trading, renting, gifting, swapping, etc., they are concerned with community, and social capital creation, boosting local economics and valuing marginalized labor. This enables collaborative consumption to reduce environmental impacts of current lifestyles. Seyfang and Longhurst provided a review of the lifecycle and evolution of international community currencies and organized them into four main types: service credits, mutual exchange, local currencies, and barter markets [30]. Timebanking (a form of service credits) is the oldest and the most widely adopted service-based community currency.

Prior studies have detailed timebanking’s potentials in community building and reenergizing neighborhoods, but it faces several adoption challenges. For example, members prefer to offer instead of requesting services and the limited range of service on offer creates stagnation in members’ ability to exchange time dollars [1, 22, 25]. The majority of the earlier timebanking studies were reported in ethnographic fashion, based on interviews and focus group data. Given advances in timebank systems that track detailed transaction data, Collom et al. suggested future researchers to leverage detailed transaction logs combined with surveys to analyze trends that influence timebank participation [13].

In this work, we employ a comprehensive survey study constructed based on conversations and 50 formal interviews with timebank founders, organizers, founders, members. The survey was distributed to approximately 10,000 members in over 120 US timebanks. With the help of timebank founders, we have also obtained database records of the three largest US timebanks. Our exploratory analysis of database service exchange records across the three largest timebanks in the US that consist of over 3,500...
members with over 33,000 completed service exchanges is the most comprehensive characterization of timebank service exchanges to date.

We explore trends of member practices, only now tractable with our large dataset of service exchange transactions and survey results. In our analysis, we look for explanations of hindrances that have prevented timebanking from achieving mass adoption. Specifically, we focus on how differing self-serving and prosocial motives of timebank members affect participation. P2P services mediated by computer systems are exploding but little has yet been reported on what motivates participation (but see [3]; this venue). Here we present a close examination of an incumbent model of an established community currency practice to expose tension that could energize new designs for motivating P2P system participation in general.

**RELATED WORK**

Although the idea of timebanking was first conceptualized in the form of ‘labor notes’ in 1827 by Josiah Warren, the term ‘timebanking’ did not come into existence until Edgar Cahn coined it in 1986 [6] and subsequently founded the TimeBanks USA organization in 1995 [5]. Timebanking has evolved from earlier community currencies such as the Local Exchange Trading System (LETS), and a detailed history of timebanking and its predecessors can be found in [29] and [2]. In this section, we focus our review on the current understanding of timebank values and member practices in different domains, and the hindrances that prevented it from achieving mainstream adoption.

**Timebanking Values and Member Practices**

Since timebank transactions revolve around time-based services that require physical interaction and commitment, co-production (i.e., the provider and recipient jointly produce a service) is a direct outcome of timebank participation. In co-production, both parties engage in mutually beneficial exchanges and the shared resources and resulting social capital produce further intangible benefits to the whole community. Many see co-production and egalitarian values of timebanks as driving forces for reviving community engagement. For example, Cahn describes his vision of a successful timebank leading to “no more throw-away people” [5], and Seyfang sees timebanking as a mechanism to tackle the problem of social exclusion among the underprivileged [24].

To understand member participation, Seyfang surveyed 64 members in a timebank in South London. She found that the majority are low-income women in ethnic minority groups who are not in formal employment [25]. Over half the participants belonged to socially excluded groups, and many of them were referred to the timebank by their general practitioners for physical and mental health problems. They participate in timebanking for volunteering and informal mutual support, to access help for themselves, to get more involved in the community, to improve the neighborhood, to meet people and make friends, and to earn time credits. Gregory studied the timebank movement and its development in the UK and how it has been associated with the notion of co-production [16]. He argued that timebank-based co-production offers a tool for social policy to help deliver welfare services at a time of austerity, with potential to help re-engage and empower users of the welfare state. In both studies, timebanking has been used as a mechanism for underprivileged members of society to reengage with the community.

Besides benefiting the socially excluded, timebanking has also been appropriated in other domains. In the context of healthcare delivery to elders, Lasker et al. surveyed 160 members of a hospital-affiliated timebank [19]. They concluded that timebank participation may promote health and sense of belonging among low-income, older individuals who live alone. Timebanking has also been seen as a way to assist youth in transition. Marks found that youth participation in timebanking increased engagement and active participation in services as well as helping them gain the developmental assets they need to be successful upon discharge from formal systems [21]. In terms of sustainable consumption, Seyfang argued that timebanking offers great potential for carbon-reduction by sharing community resources and offering a supportive social network that meets participants’ social and psychological needs for recognition, self-esteem, and belongingness that might otherwise be met through material consumption [28].

Basing on a set of service exchange records (i.e., hours reported) and survey data at a US timebank, Ed Collom conducted a series of analyses aiming to unpack how members’ motivation affected their participation and eventual outcomes. Collom conducted a survey that assessed the motivations, engagement, outcomes, satisfaction, community experience, and demographics at this timebank [9]. He found that, in contrast to government-backed timebanks in the UK that focus on the socially excluded and underprivileged members of society, timebank members in this US timebank are predominantly well-educated, low income, politically liberal, Caucasian females who were motivated to join largely for needs and values-based reasons. Using social network and multiple regression analyses of the survey data in addition to timebank service exchange records, Collom found that needs and social-based motivations led to higher timebank participation, and lower-income and unemployed participants are more likely to gain social capital outcomes [10]. Using the same dataset, Collom identified four motivations to be the most salient predictors of differential participation: economic/instrumental, ideological/value, altruistic, and social motivations [12]. He found that economic/instrumental motivation led to higher timebank commitment, and ideological and social motivations led to more willingness to give time or money to the timebank.
These earlier studies typically concentrate analysis on a particular timebank site with a relatively small membership. This often led to inconsistent reporting of trends across different timebanks. For instance, Collom found that the elderly are underrepresented in the timebank that he studied (a mere 8% compared to 13% in the region according to US census data), and they exchange primarily with the nonelderly [11]. But many other timebank studies report a high percentage of elder participation [2, 19, 25, 33]. Given advances in timebank systems that track detailed transaction data, Collom et al. suggested future researchers to leverage detailed transaction logs combined with surveys to analyze trends that influence timebank participation at a more general level [13]. Following Collom’s suggestion, this paper reports on data from detailed database records of the three largest timebanks in the US. Our analyses may provide additional insights to timebanking practices.

Issues Hindering Timebanking Adoption

Previous timebank studies have attempted to uncover barriers to timebanking adoption as an alternative currency to money. In addition to the majority of prior studies that focused on assisting those in need, Ozanne studied a timebank in a relatively affluent community in New Zealand [22]. The members of this timebank have higher than average educational level and income relative to this region. She found that timebanking members in this community are motivated to participate by altruism but have a hard time recognizing what skills they have to offer, and recognizing that their skills have value and they find it hard to ask for help from other members. However, these challenges have also been identified across different timebank communities. For example, Seyfang’s study of a UK timebank identified obstacles similar to those in the more affluent communities in which people prefer to give time than spend their credits [25]. A related issue is that there exists only a limited range of services on offer. Bellotti et al. also reported similar challenges in an investigation of challenges that affected timebanking participation in US timebanks [1].

Scholars have attempted to explain the causes of these challenges from several different perspectives. The first cause is thought to be people’s lack of understanding of how timebanking works. Seyfang attributed these challenges to people’s unfamiliarity with the concept of timebanking compared to traditional volunteering, and to the small size of the timebank which limits range of services on offer [25]. Bellotti et al. found that aspects of the banking metaphor—for example, the prospect of going into ‘debt’ in order to actively ask for help—act as deterrents that compound natural reticence when it comes to asking for help [1]. The second cause has to do with people’s motivation to participate in timebanking. Glynos and Speed pointed to the complexity and nuances of differing needs in timebanking [14]. They analyzed how timebanking as an initiative that enacts principles of co-production can be used in the delivery of public services. They argued that co-production in timebanking is recognition-based (i.e., strengthening community and generating social value) whereas transactions involving healthcare services are market-driven (i.e., offering paid professional help), and could cause tension in practice. Similarly, Carroll articulated the differences between service exchange and co-production scenarios for conducting timebanking on mobile personal devices such as smartphones [7]. Carroll advocated that recognition generated from participating co-production activities should be explicit and designed into future timebanking systems. Other writers attributed these challenges to lack of organization and government support. Seyfang conducted a focus group study with 12 members of a timebank with 96 members in Glasgow, Scotland [26]. She found that nearly half of the members in this timebank were organizations and institutions representing many more participants, or individual staff who participated on behalf of organizations or institutions. She found that organization-led timebanks (e.g., most UK timebanks), such as this, have the ability to boost engagement in existing community projects and activities and promote social inclusion and community development, so they outperform one-to-one exchange timebanks (e.g., most US timebanks). Seyfang refers to lack of funding, understaffing, and lack of political support in public policy as primary obstacles to the wider adoption of timebanking [27].

To address these concerns, Seyfang argued that, for a new economics of sustainable consumption to be successful, there needs to be mainstream recognition of grassroots initiatives and community action as a previously neglected site of innovation, and top-down government support is needed to enable bottom-up initiatives to thrive [28]. Gregory proposed a slightly more radical integration with national currency and argued that timebanking should be taken up as an alternative system of exchange in local economies, beyond its role as a social intervention tool for community building [15]. To assist in sustainable development, local business should consider using time credits where one person’s hour equals another’s, rather than using an alternative currency that can be valued in terms of the national currency. For example, instead of seeing a ‘half price’ meal at the café, transactions could be viewed as the cost of materials paid for in cash, and the cost of labor in time. Other researchers have attempted to facilitate timebanking adoption with technological interventions. For example, Han et al. designed a mobile timebanking smartphone app and demonstrated in a user study that convenience and ease-of-use provided by mobile technologies could reduce duration of transactions, and enable location and time-sensitive timebanking activity support, and real-time coordination [17].

The main hindrances in timebanking adoption can be generalized into the following broad categories: people are not familiar with the concept of timebanking as opposed to...
traditional volunteering, the small size of a timebank limits the range of services on offer, some members prefer to earn recognition rather than time credits, and lack of support from organizations and government entities. The overarching visions of these earlier timebank initiatives typically involved the following: once people are more accustomed to timebanking, they will become more comfortable requesting services, and, when there are enough community members in the timebank, its internal marketplace will contain enough tasks to be self-sustaining and ultimately grow into a viable alternative social economy to displace the real money economy [27].

However, studies such as the above that have focused on timebanking obstacles do not unpack members’ differing motivations, reported in empirical studies on timebanking practices. As mentioned above, Collom found differing motivations to be the strongest predictors of differential participation [12]. In this paper, we attempt to bridge this gap by combining log data on participation with data and findings on motivations from a comprehensive survey study across over 120 US timebanks. This allows us to illustrate how differing member motivations could be a major cause of some of the aforementioned hindrances.

**STUDY DESIGN**

To understand user motivations and experiences with service exchange using time-based currency, we established a partnership with hOurworld, one of the largest timebank networks in the US; growing from about 8000 in 2011 to over 26,000 members in over 230 timebanks as of December, 2014. We acquired database transaction logs of hOurworld timebanking activities from the three largest timebanks in the US with a total of over 3,500 members in total. We also distributed a 120-item survey to around 10,000 timebankers in over 120 timebanks in the US between August and November, 2014.

**Data collection**

We obtained database transaction logs from the three largest hOurworld timebanks, located in Portland, ME (founded in September, 1997), Los Angeles, CA (founded in February, 2008), and Milwaukee, WI (founded in August, 2009). The dataset includes information about members, service types, service transactions, reported hours, and so on. Since each timebank has a different starting date, we only considered the most recent 4½ years worth of the data (between January 1, 2010 and Aug 31, 2014) to make the analysis comparable.

We constructed a 120-item survey¹ based on many conversations and 50 formal interviews with founders, organizers, volunteers, and members of hOurworld, TimeBanks USA and other timebanking networks. We also referred to Collom’s 193-item survey and included questions that are relevant to our study [9]. The goal of our survey was to characterize timebanking practices and to obtain quantitative data to complement and reinforce our qualitative interview data. The survey contained questions that spanned over topics such as members’ demographic information, motivations to request and offer services in their timebank, their experiences receiving and performing services for others, the hindrances they encountered and what mattered to them when arranging transactions. The survey items consisted mostly of Likert-scale (1 = strongly disagree, 7 = strongly agree) or categorical items followed with open-text questions for clarifications. The survey took about 30 minutes to complete, and the survey respondents received a half-hour timebank credit in their hOurworld account to compensate for their time.

**Data analysis**

We looked for trends, clusters, and correlations in the database transaction logs and the Likert scale survey items. Clustering is a standard way to identify statistically distinct and non-overlapping clusters in a sample [18, 31]. Since we were interested in identifying groups of people who showed similar patterns, we used k-means clustering to search for contrasting clusters among the survey respondents based on their timebanking motivations, concerns, and usage. Item intervals were normalized prior to clustering. To decide a starting point of k, we first performed the centroid hierarchical clustering on all survey items. Post-hoc multiple comparisons were made to identify specific items that contributed significantly to an overall difference.

To explore the problem of the limited range of services on offer [1, 22, 25], we coded the 367 timebank database transaction types into 13 categories as defined in previous timebanking literature [13]. As a part of this exploratory effort, detailed service exchange records by service categories will be discusses in the results section below.

Collom suggested that motivational differences could result in differential timebanking participation [12]. When coding open-ended survey questions, we coded motivations based on categories identified in previous work [12]: instrumental, idealistic, social, and altruistic. We paid close attention to differences in participants’ motivations for and concerns about offering and requesting services, and how those might have affected their timebank usage. Our findings are detailed in the remaining sections of this paper.

**Timebank transaction characteristics**

Table 1 shows the transaction records of the three timebanks in terms of the number of members, standing offers and requests, completed service exchanges, and hours reported for the completed service exchanges.

The Portland timebank has the highest number of overall transactions and hours reported. This is because it has been around for much longer (10+ years) than the other two

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¹ Due to space limitation, please contact the authors to obtain a copy of the survey items.
timebanks and has an established practice. The timebank in Milwaukee reported far fewer transactions than the other two, but it also has the highest hours per transaction ratio. This indicates that the services being exchanged are likely to be bigger community-related projects. One trend is that all timebanks contained more standing offers than requests, indicating that members prefer to offer services rather than requesting them. This is consistent with prior literature [1, 22, 25].

**Survey respondent demographics**
The 120-item survey was distributed to all 10,000 hOurworld members in over 120 US timebanks between August, 2013 and November, 2013. Overall, we received a total of 446 survey responses (4.5% response rate), consisting of 44 founders, 36 coordinators, 19 affiliated staff members, 187 members; 160 respondents chose not to indicate their role or affiliation. The respondents are predominantly Caucasian (89.9%) females (77.8%) who have earned at least a Bachelor’s degree (81.8%). The respondents have an average age of 49 ranging from 22-78 years old. Nearly half of the respondents (47.1%) have been actively participating in timebanks for longer than 1 year. Overall, 42.1% have received and 53.6% have performed at least 5 or more timebank services. The number of completed transactions correlates significantly with the length of respondents’ membership (r(215) = 0.57 for received and r(190) = 0.59 for performed service exchanges, p < .001).

As with any survey, self-selection bias may be present, and our survey sample could have been more representative of more active timebankers. To test this, we compared the number of transactions between the database transaction log data and the survey responses. The log data suggests that among users who timebanked in the past year, 54.9% have received and 55.8% have performed at least 5 or more timebank transactions; in the survey, these numbers are 42.1% and 53.6% respectively. These numbers are not statistically significantly different (t(3159)=1.25, p=n.s.), suggesting that survey respondents’ timebank usage is representative of the timebanking population as a whole.

**RESULTS AND DISCUSSION**
In this section, we first examined the patterns identified in the database transaction logs to show that the differences between offers and requests are not uniform across different service categories. Most notably, certified skilled labor is

<table>
<thead>
<tr>
<th># Members</th>
<th>Portland</th>
<th>Los Angeles</th>
<th>Milwaukee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,433</td>
<td>1,274</td>
<td>876</td>
<td></td>
</tr>
<tr>
<td># Offers</td>
<td>913</td>
<td>199</td>
<td>349</td>
</tr>
<tr>
<td># Requests</td>
<td>157</td>
<td>110</td>
<td>177</td>
</tr>
<tr>
<td># Translations</td>
<td>18,885</td>
<td>12,559</td>
<td>1,980</td>
</tr>
<tr>
<td># Hours Reported</td>
<td>52,347</td>
<td>36,860</td>
<td>12,224</td>
</tr>
<tr>
<td># Hrs./Trans.</td>
<td>2.77</td>
<td>2.92</td>
<td>6.17</td>
</tr>
</tbody>
</table>

Table 1: Timebank service exchange records.

the most lacking in these timebanks. We then presented the differences in motivations, concerns, and timebank usage among members observed from the survey study. Based on cluster analysis, we found significant differences between high and low timebank user groups. Qualitative data revealed that comparison with national currency (i.e., money) was the key source of concerns about participation in timebanking.

**Timebank services by category**
We first analyze log data from the three large timebanks on transactions by service category. Event organization and program support (e.g., assisting with community- and timebank-related project/events, attending committee meetings, etc.) are community-based events and logistics-related tasks that keep timebanks operational. They constituted 56.2% of the total hours reported, which is consistent with the percentage reported in previous timebank literature [13]. Since these community- and timebank-related events typically involve co-production activities that provide value to a community, this high percentage of reported hours is indicative of a healthy level of community engagement and participation in the three timebanks. Table 2 summarizes the remaining 43.8% non-timebank-related services (43.8% is the total, or 100%, of all the categories showing their percentages) and shows the relative percentages of the number of standing offers and requests, OR differential (standing Offers minus standing Requests, which is indicative of the balance of supply and demand), percentage of the number of completed service exchanges, percentage of hours reported across the three timebanks, and percentage of hours reported in a deceased timebank [13]. The service categories are highlighted in green (over 10% of the service transactions), yellow (between 5-10%), and pink (below 5%) based on the level of percent hours reported.

The high percentage of health and wellness services (e.g., physical therapy, mental health counseling, nutrition advice, family planning, women’s health, etc.) is consistent with prior literature that reported people using timebanks as a channel to receive health and mental care [16, 25]. However, some of our results differ from Collom’s report of Portland West Time Dollar Exchange (2002-2006) [13]. For example, sales and rentals of items accounted for the highest percentage of hours reported in [13] (17.7%) but was among the lowest in our dataset. This is likely due to member adoption of other online platforms such as Craigslist and eBay that became much more popular since 2006 to fulfill similar needs. Hours reported for Cleaning, Light Tasks, and Errands also appeared to be much lower in our dataset (6.8%) compared to that reported in [13] (12.4%). It is likely that there exist hindrances that prevented members from effectively completing services in this category. We will explore these hindrances in more detail below.
Although prior literature has consistently pointed out issues that hinder timebank service exchanges such as members wanting to offer services more than request them and having a limited range of services on offer [1, 22, 25], our dataset allows us to explore these issues in more detail. Our analysis of database service exchange records shows that the differences between offers and requests are not uniform across different service categories. In Table 2, we highlight in gray the service categories that may suffer from a shortage of offers (i.e., more people are requesting than are offering). General services such as office and administrative support, entertainment and social contact, and food preparation and service that require lower levels of specialized skills are the categories that have a surplus of offers with fewer requests, suggesting higher supply than demand. By contrast, services such as construction, installation, maintenance, and repair and health and wellness that require certified skilled labor are in higher demand than they are in supply.

In summary, we are able to leverage the service exchange records to identify that the issue of having a shortage of services on offer affects service categories that require skilled labor (especially when providers may have to be certified as in Construction, installation, maintenance, and repair). On the other hand, the issue of people preferring to make offers rather than requests is most applicable to service categories that involve lower levels of specialized skills. Below, we triangulate these findings with survey data, and aim to provide explanations for these core issues that hinder timebanking usage.

**Member motivations, concerns, and timebank usage**

Clustering classified the respondents into two groups (N=212 and 77, p < 0.001). Table 3 summarizes the differences between two groups. The two groups identified by the clustering algorithm could be generally characterized as High and Low timebank utilizing. The high utilizers are composed of 42 timebank organizers and 35 members who had been a part of a timebank for 1-3 years on average.

They utilized their timebank for service exchanges at least once a month on average. Timebank service exchanges made up approximately 66.4% of their overall service exchanges among other channels exchanging services such as personal favors from friends, social welfare services, and paid professional help. As high utilizers, they have completed an average of between 10-20 service exchanges. On the other hand, the low utilizers are predominantly members (133 members vs. 79 organizers) who had been in the timebank for 6-12 months. They used the timebank once every 2-3 months. Timebank service exchanges only made up 9.71% of their overall service exchanges. They also completed fewer service exchanges (an average of 5-10). A Chi-Square test showed significant difference in membership roles (\(\chi^2(1)=6.93, p < 0.01\)).

Our survey respondents identified a variety of motivations for participating in timebanks: instrumental (53.7%), ideological (30.3%), social (9.2%), and altruistic (6.9%) reasons. Figure 1 presents motivations by membership role. Organizers tended to participate in timebanking for idealistic reasons more so than members, and members

<table>
<thead>
<tr>
<th>Service Category</th>
<th>Offers</th>
<th>Requests</th>
<th>OR Differential</th>
<th>Service Exchanges</th>
<th>Hours</th>
<th>Hours [13]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and Wellness</td>
<td>9.4%</td>
<td>13.2%</td>
<td>-3.8%</td>
<td>21.3%</td>
<td>17.1%</td>
<td>9.2%</td>
</tr>
<tr>
<td>Tutoring, Consultation, and Personal Services</td>
<td>20.2%</td>
<td>16.9%</td>
<td>3.3%</td>
<td>13.0%</td>
<td>15.5%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Transportation and Moving</td>
<td>6.8%</td>
<td>6.4%</td>
<td>0.3%</td>
<td>13.2%</td>
<td>12.6%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Office and Administrative Support</td>
<td>14.3%</td>
<td>8.5%</td>
<td>5.8%</td>
<td>11.6%</td>
<td>11.4%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Construction, installation, maintenance, and repair</td>
<td>8.6%</td>
<td>18.4%</td>
<td>-9.8%</td>
<td>8.5%</td>
<td>10.5%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Art and Crafts Production</td>
<td>7.5%</td>
<td>7.2%</td>
<td>0.2%</td>
<td>5.2%</td>
<td>6.8%</td>
<td>6.9%</td>
</tr>
<tr>
<td>Cleaning, Light Tasks, and Errands</td>
<td>11.2%</td>
<td>12.8%</td>
<td>-1.6%</td>
<td>7.4%</td>
<td>6.6%</td>
<td>12.4%</td>
</tr>
<tr>
<td>Computer and Technology</td>
<td>6.2%</td>
<td>7.0%</td>
<td>-0.8%</td>
<td>6.0%</td>
<td>5.5%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Entertainment and Social Contact</td>
<td>9.6%</td>
<td>4.1%</td>
<td>5.5%</td>
<td>5.4%</td>
<td>5.5%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Food Preparation and Service</td>
<td>5.3%</td>
<td>1.8%</td>
<td>3.5%</td>
<td>5.8%</td>
<td>5.0%</td>
<td>7.3%</td>
</tr>
<tr>
<td>Sales and Rentals of Items</td>
<td>0.3%</td>
<td>0.6%</td>
<td>-0.2%</td>
<td>1.1%</td>
<td>2.3%</td>
<td>17.7%</td>
</tr>
<tr>
<td>Beauty and Spa</td>
<td>0.8%</td>
<td>2.7%</td>
<td>-1.9%</td>
<td>1.3%</td>
<td>0.7%</td>
<td>3.2%</td>
</tr>
</tbody>
</table>

Table 2: Percentage of standing offers and requests, service OR differential (standing offers minus standing requests), completed transactions, and hours reported by service category in Portland, Los Angeles, and Milwaukee timebanks.

<table>
<thead>
<tr>
<th>Use length (1=less than a month; 2=1-6 months; 3=6-12 months; 4=1-3 years; 5=3-5 years; 6=more than 5 years)</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.91 (1.37)</td>
<td>3.40 (1.32)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use frequency (1=once a year or less; 2= once every half-year; 3= once every 2-3 months; 4= once a month; 5= once every 2 weeks; 6= once a week; 7= once a day or more)</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.79 (1.26)</td>
<td>3.28 (1.28)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use for % of all service channels</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>66.4 (19.36)</td>
<td>9.90 (9.55)</td>
</tr>
</tbody>
</table>

# Exchanges (1=none; 2=1-5 exchanges; 3=5-10; 4=10-20 exchanges; 5=20+).

<table>
<thead>
<tr>
<th># Exchanges</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.83 (1.28)</td>
<td>2.95 (1.23)</td>
</tr>
</tbody>
</table>

Note: **p < 0.01; ***p < 0.001. Results are displayed in the format of Mean (SD).

Table 3: Timebank usage of high and low timebank utilizing.

<table>
<thead>
<tr>
<th>High (77)</th>
<th>Low (212)</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member role (0=member; 1=organizer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.55 (0.50)</td>
<td>0.37 (0.49)</td>
<td>7.05**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use length (1=less than a month; 2=1-6 months; 3=6-12 months; 4=1-3 years; 5=3-5 years; 6=more than 5 years)</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.91 (1.37)</td>
<td>3.40 (1.32)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use frequency (1=once a year or less; 2= once every half-year; 3= once every 2-3 months; 4= once a month; 5= once every 2 weeks; 6= once a week; 7= once a day or more)</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.79 (1.26)</td>
<td>3.28 (1.28)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use for % of all service channels</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

<table>
<thead>
<tr>
<th># Exchanges (1=none; 2=1-5 exchanges; 3=5-10; 4=10-20 exchanges; 5=20+).</th>
<th>F(1,287)</th>
</tr>
</thead>
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<tr>
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<td>2.95 (1.23)</td>
</tr>
</tbody>
</table>
people’s timebank participation. Figure 2 shows the timebank usage frequency over time. Indeed, the data shows that while timebank organizers were able to sustain a relatively consistent level of activities over time, usage frequency of regular timebank members dropped from utilizing their timebank at least once every 2 weeks to once every half-year over time, and the difference is statistically significant (F(1,386)=44.02, p < 0.001).

In general, our survey results showed that regular timebank members were more concerned with issues such as inconvenience, lack of trustworthiness, quality issues, and inability to determine their needs in advance than the timebank organizers. This significantly affected regular members’ ability and willingness to continue with timebanking.

**Issues with Inconvenience**

The issue that bothered the low timebank utilizers the most was the inconvenience of setting up and coordinating the logistics to carry out the service exchange. The majority of reports of inconvenience were due to issues having to do with transportation, and this is especially true in rural areas:

“We are a rural TimeBank and it can be hard to get in-person services conveniently as a result of distance from one another” (P74).

The inconvenience could be caused by a lack of planning or requests made on short notice:

“Sometimes I will get a last minute request for transportation needed in the next 5-10 minutes. That's hard to do. More notice would be helpful” (P17).

However, advanced planning was not always possible for timebank members because of their schedule and needs:

“I don't know my work schedule very far ahead, so it's hard to give advance notice of when I'm available. Much of the work I need help with is in my garden, so is weather dependent” (P439).

In summary, the concerns about inconvenience tended to involve transportation and schedule. This may have contributed to the relatively low hours reported in the Cleaning, Light Tasks, and Errands category previously mentioned above. While coordination can depend on a variety of circumstances that are difficult to predict, having

<table>
<thead>
<tr>
<th>Hindrances</th>
<th>High (77)</th>
<th>Low (212)</th>
<th>F(1,287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied with Service</td>
<td>5.55 (0.83)</td>
<td>5.28 (0.98)</td>
<td>4.47*</td>
</tr>
<tr>
<td>Availability issues</td>
<td>3.96 (1.30)</td>
<td>4.24 (1.21)</td>
<td>3.03</td>
</tr>
<tr>
<td>Inconvenience</td>
<td>3.47 (1.40)</td>
<td>4.56 (1.52)</td>
<td>30.05***</td>
</tr>
<tr>
<td>Lack of Trust</td>
<td>2.52 (1.21)</td>
<td>2.98 (1.24)</td>
<td>7.74**</td>
</tr>
<tr>
<td>Quality Concerns</td>
<td>2.02 (1.17)</td>
<td>2.93 (1.50)</td>
<td>23.36***</td>
</tr>
<tr>
<td>Unsure of needs</td>
<td>2.23 (1.45)</td>
<td>2.85 (1.52)</td>
<td>9.58**</td>
</tr>
</tbody>
</table>

Note: *p < 0.05; **p < 0.01; ***p < 0.001. Results are displayed in the format of Mean (SD). All items are 7-point Likert scale (1=strongly disagree; 7=strongly agree).

**Table 4: Hindrances between high and low timebank utilizers.**
a more intelligent system that is capable of making recommendations, such as service matching could mitigate some of these concerns (as suggested in [2]).

Issues with Service Availability
One issue that high and low timebank utilizers agreed on was that they shared mixed feelings about the availability of different services. This echoed issues raised in earlier research about the limited range of services on offer [22, 25]. Our earlier analysis of database service exchange records showed that there were service categories in short supply that required certified skilled labor, whereas those that required lower levels of specialized skills enjoyed a comfortable surplus of service offers. The concern of not having enough practical services on offer was commonly shared by our survey respondents:

“There aren’t many really practical services available. Most services are luxury/inessential services like massage and home organization. My needs are more pragmatic” (P56).

Even when a needed skill was offered in the timebank, the service exchange could still fall through because other obligations take precedence over timebanking:

“A guy advertised that he would fix Mac computers for timebank hours. He is a professional who does this for work and was also willing to do it for the timebank. I contacted him. He said he was too busy, but I should contact him at a later date. I contacted him at the later date. He said he was still too busy and would be free after another later date, but I should feel free to hire someone else for the job. I told him I had no one else in mind and would wait. I contacted him a couple of times after the later date and received no response” (P53).

Timebank members expressed the frustration of not being able to find people who are willing to commit to provide skilled work that was in high demand because time credits were not seen to be as valuable as money:

“My requests often go unanswered, even when I request a service that has been advertised. Some of the services that I most need/want people only want to take partially in Time $, i.e., handyman, electrician, home repair services ARE more valuable than Reiki, because fewer people are skilled in home repair and everyone needs home repairs, so the people who offer handyman services will usually only accept partial payment in Time $ and they want the rest of the payment in money (This has happened to me with at least five different people). This has made me feel discouraged, because I have lots of hours in the bank and it is difficult to spend them. As a result, I have not offered services for the past two years.” (P301).

For some service providers who possess highly sought after skills, they reported that they saw timebank as an escape from work, and they did not want to work outside of work:

“If I offered my skill as a tradesperson, I would be overwhelmed with requests. And I don’t like doing the work” (P312).

For others, being able to make money outside of timebanks in order to make the ends meet was too lucrative to pass up:

“For me, there’s been an imbalance between providing and receiving... / Sometimes I think to myself, ‘why take on client A for time dollars I won’t spend, when I can take on client B for money I desperately need to pay the rent?’” (P14).

Even when money was not a primary concern, the sense of equitable contribution in timebanks was still questioned by those who felt their efforts were unreciprocated:

“I sometimes feel as if I am allowing time bank members to take advantage of me, because the service I offer is quite popular (not to mention valuable, in that I would be paid well for it outside the time bank), but I have had difficulty finding members who offer the skills I had hoped to receive from the time bank” (P110).

Previous researchers such as Seyfang expressed hope that issues with the limited range of services on offer would be mitigated by mainstream adoption when people are more familiar with the concept of timebanking [25]. Based on our survey results, it is apparent that the lack of offers of certified skilled labor in timebanks is a conscious and deliberate decision made by certain timebank members. In fact, there appears to be a tension caused by the mismatch of motivations between high timebank utilizers who tended to be organizers who are more idealistic and low timebank utilizers who were mostly regular members who wished to fulfill more instrumental needs by utilizing timebank service exchanges.

DESIGN SPACE FOR TIMEBANKING
Prior work focused on timebanking as an alternative social movement. In our analysis, we reveal that the utility of an alternative currency such as time dollars depends greatly on negotiated values that are pegged to the universal monetary system. ‘Equal time, equal value’ is a fundamental element of time-based service exchange, and successful utilization could have a profound and transformative impact on how we engage and leverage civilian contributions at all levels of society. However, our data suggests that timebank members constantly struggle with this ideal, because of the perceived value of certified skill labor assigned by money, the universal currency.

Prior research on alternative and complementary currencies and exchanges has conceptualized the rise of different currencies as a mechanism to fulfill a variety of intrinsic human needs. Carroll and Bellotti (2015) suggest that their emergence serves to address the downsides of money [8]. Specifically, while money provides a universal platform for valuing goods and services, community currencies anchor exchange interactions and benefits in local communities.
and timebanks facilitate equality in access to currency and exchange, and thereby in opportunities to contribute, learn and benefit. Our study elaborates Carroll and Bellotti’s analysis of the strengths and weaknesses of timebanks [8]. We identify potential limits for timebanking in that, as a platform, it is effective at facilitating services that fulfill social, communal, and learning needs that demand lower levels of specialized skills, but it is less effective at providing work that requires certified skill labor. Cluster analysis reveals the existence two distinctive clusters of timebanking participation pattern that are largely distinguished by motivational differences. Table 5 represents a framework of differences between types of users. Service receivers are motivated by instrumental rewards, whereas providers have ideological and altruistic motives. High utilizers are drawn to social aspects of the experience, whereas low utilizers are not. For certified skilled individuals who are high providers, incentives must be purely ideological, altruistic and social; for low skilled individuals who are high providers, they use the timebank for self-development of personal skills as well as ideological, altruistic, and social reasons. In other words there is a missing self-development motivation for those with certified skills, which explains the short fall in those services, whereas the surplus for low skilled providers is explained by this same motive. This difference could help explain timebanking’s dual personalities—equal time, equal value versus a shortage of high value services—identified in previous timebank literature [22, 25].

Value comparison between alternative currencies and money is inevitable in day-to-day service exchanges. There exists a wide spectrum of a variety of motivations such as altruistic and instrumental (personal gains oriented) drives that afford a rich design space for future complementary currency systems. Our results reveal users with both mainly self-serving and mainly other-oriented motives and lessons can be drawn from timebanking for the long-term outlook and design implications for many P2P services. Emerging peer services such as TaskRabbit, Lyft, Yerdle, Neighborgoods, etc. address these other more self-serving motivations and some have been very successful focusing more on self-interest [3]. These new P2P services offer alternative motivational frameworks to timebank ideology, especially timebanking’s principle of equal value for equal time. P2P service designers must recognize the limitations of the equal time equal value model in serving instrumental ends, particularly for certified skilled members who will tend to prefer currencies that resemble conventional money—where some types of labor have higher value than others—unless highly motivated by idealistic, social, or altruistic incentives. For those that are not highly motivated in those ways, prosocial systems could offer recognition-based rewards to build reputation, but with careful design to avoid crowding out intrinsic motivations [23]. This could encourage those who are more instrumentally motivated to participate in co-production activities. They may be able to use service reviews and testimonials to build credibility of expertise in their disciplines in order to promote their businesses and attract new customers.

**CONCLUSION**

This study unpacks the motivational differences among timebank members that contribute to these issues. We found that the ideal of ‘equal time, equal value’ that is a foundation of timebanking [13] points to a tension between Members with instrumental versus those with idealistic and altruistic motivations for participation. We described a framework of motivations for community currencies researchers and system developers to consider when designing future P2P systems. Future systems could incorporate different rewards and incentives such as social recognition to encourage more instrumental users to leverage timebanking services for their gain.

**ACKNOWLEDGEMENTS**

This work was supported by NSF IIS-1218544 and NSF IIS-1406858.

**REFERENCES**


