

Fedosov A., Cheok M., Huang E. (2021): Designing for Local Economies of Personal Artifacts. In: Proceedings of the 19th European Conference on Computer-Supported Cooperative Work: The International Venue on Practice-centred Computing on the Design of Cooperation Technologies, Reports of the European Society for Socially Embedded Technologies (ISSN 2510-2591), DOI: 10.18420/ecscw2021_p06

Designing for Local Economies of Personal Artifacts

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Abstract. Many non-profit resource sharing organizations and collectives (e.g., libraries of things) and local peer-to-peer exchange initiatives leverage underutilized personal resources, such as household tools, to optimize their use. These local sharing initiatives and arrangements often suffer from challenges of continued participation, visibility of members' interactions as well as interpersonal trust among the membership, which prevent their sustainable development. In prior work, we engaged in a field study of Pumpipumpe, a local resource sharing community in Switzerland to identify members' needs and requirements to support sharing practices among neighbors. Following insights from this study, we conducted a generative participatory workshop with six community members and design and sustainability experts to approach these emergent challenges. We present the design artifacts that we have developed for the co-creation workshop as well as three design alternatives that our participants conceptualized to address issues of visibility of social interactions and trust among neighbors.

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Background

Resource sharing organizations, such as tool libraries or community-owned workspaces, and peer-to-peer informal exchange arrangements (e.g., sharing with neighbors) play a key role in supporting environmental sustainability efforts in two important ways: (i) by maximizing the use of artifacts (e.g., tools) and thus minimizing the consequences and effects of manufacturing new things (Blevis, 2007) and (ii) through promoting acts of DIY repair, re-use, and renewal of things (e.g., a broken chair) and places (e.g., the home), over disposal and acquisition of new things (Thackara, 2006). They also encourage social value in the sharing economy, where community members jointly own and develop services and resources. Furthermore, Light and Miskelly (2015, 2019) emphasize the importance of grassroots sharing initiatives in developing social cohesion, resilience, resourcefulness in neighborhoods, and promoting sharing cultures among people. Nonetheless, there are several interpersonal and organizational challenges pertinent to such resource sharing initiatives (Fedosov et al., 2019b). For example, poor visibility of activities within sharing communities (Odom, 2014), and emergent issues of trust and reciprocity among membership (Cheshire, 2011; Lampinen et al., 2013).

Prior research has identified the need to support designers within the context of the sharing economy to address these challenges (Fedosov et al., 2019a; Fedosov, 2020). Prior work has also examined the challenges and opportunities of local peer-to-peer exchange systems (Suhonen et al., 2010), identified a mismatch between peoples' attitudes regarding what they want to borrow and what they are willing to lend in their local communities (McLachlan et al., 2016), and called for further exploration of informal economies of underutilized personal artifacts, such as household goods, hardware tools (Dillahunt et al., 2017). We draw on this prior research as well as on our own fieldwork with one local resource sharing community in Zurich, Switzerland (Fedosov et al., 2021), which uncovered practical aspects of how borrowing and lending are orchestrated, and how trust is established within the community.

To this end, we conducted a co-design workshop with six participants to explore opportunities for design within this space. We focused on two design strategies elicited from our prior field study (Fedosov et al., 2021): (1) fostering willingness for interpersonal encounters, and (2) leveraging online information to promote participation. The contribution of this work is twofold: we developed a set of design materials to illustrate design strategies for local economies of personal artifacts, and we conceptualized several design alternatives in the workshop to address the community's emergent challenges. In this short paper, we describe our case study, the workshop procedure, and present the three conceptual designs, which we plan to field-test in the future.

The Pumppumpe Sharing Community

Pumppumpe¹ is a volunteer-driven sharing community that promotes the co-use and re-use of underutilized household assets (e.g., bikes, tools, sports gear) while encouraging face-to-face encounters among neighbors (Fedosov et al., 2021). To start sharing items with the community, one is required to order a set of stickers that can be affixed to a mailbox to signal what one is willing to share (Figure 1). The images on the stickers vary from common household items to rarely used kitchen appliances and leisure equipment. Pumppumpe offers supporting digital tools, such as a map (<https://map.pumppumpe.ch>) of what's available where, but it leaves it to members to agree on how to arrange sharing, terms of use and return. The initiative was founded in Bern, Switzerland in 2012 and has since attracted participation from over 24 000 households, primarily in central Europe. Earlier we conducted a field study of this sharing community in Zurich (Fedosov et al., 2021), and uncovered: (1) the members' accounts of orchestrating sharing events; (2) functional aspects of the supporting digital tools; and (3) the symbolic meanings of the mailbox stickers. In this paper, we report how we conceptualize those findings through a co-design workshop with a varied set of stakeholders and domain experts.

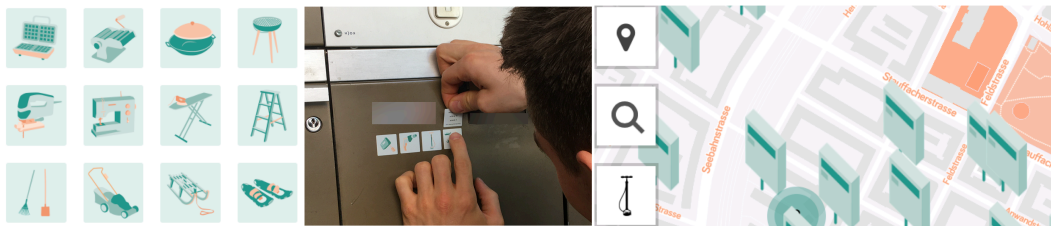


Figure 1. Stickers emblematic of the resource sharing community on a member's mailbox and the online map of participating households in a neighborhood.

The Workshop Procedure

We conducted the workshop following participatory (Simonsen and Robertson, 2013) and co-design methodologies (Sanders and Stappers, 2008). We aimed to explore how community interactions (e.g., tool requests and exchanges) can be made more visible to community members, as well how can we improve interpersonal trust (Cheshire, 2011) within the community membership, i.e. the confidence between individuals and their willingness to be accountable to each other. We recruited six participants for the 2-hour co-creation session. Four of

¹ The name Pumppumpe stems from a delicate interplay of two German words: “eine Pumpe” that means a pump (e.g., a bike pump) and “pumpen” that means both to borrow something from someone and to lend something to someone.

them had participated in the Pumpipumpe community: two members, one co-founder and one volunteer. Additionally, we invited two experts to take part in the workshop, both had heard of the community but had not explicitly engaged in its activities. One expert had a background in product design, another in the sharing economy and sustainability. We adopted the Sharing Economy Design Sprint (Fedosov et al., 2019a) format as it is valuable for creating conceptual designs in the context of the sharing economy.

Materials

The workshop was conducted online. The tools and materials included video conferencing software, a virtual whiteboard with vector design elements and prompts, and digital workshop materials such as post-it notes, drawing tools, a canvas, as well as shared textual documents for note-taking. We also developed input resources for the sprint, namely: a design brief, three personas and a scenario (Appendix A and B). Three prototypical personas were drawn from our previous empirical inquiry with the community and described the distinct attitudes of the Pumpipumpe members: a pragmatist, an idealist, and a supporter. The personas (Appendix A) and the envisioned scenario (Appendix B) aimed at evoking empathy in our workshop participants when conceptualizing their ideas. Finally, we created a set of design cards (Appendix C), which aimed to provoke reflection and contemplation on the underlying challenges and opportunities in the community, and to foster design of potential solutions.

The deck consisted of 20 cards (Appendix C) spanning the two main categories of design considerations identified in the previous field research (Fedosov et al., 2021): (1) fostering willingness for interpersonal encounters and (2) leveraging online information to promote continued participation. For example, the cards in the first category illustrated social barriers in the community (e.g., of approaching strangers, discomfort of indebtedness and fears of being a burden), highlighted the importance of surfacing shared interests when selecting the sharing audience, emphasized the value of incremental involvement in the community and encouraged expression of borrowing needs. In the second category, the cards showed the value of reflective practices with a view towards re-use of underutilized resources, offered design strategies to engender trust by presenting available information about the shared resources (e.g., through providing detailed descriptions of the tools) and experiences of the peers (e.g., through capturing and annotating the histories of prior use (Fedosov et al., 2018)), and suggested challenges related to the low-frequency of community interactions. Finally, we added a special card entitled “Sustainability” to promote reflection on conscientious consumption of resources, and a wild (blank) card, which could be filled in based on the personal experiences of our participants.

Activities

We drew on the design sprint methodology (Knapp et al., 2016), one of the most widely used approaches in professional design practice, in which designers create concepts within a limited time and with limited resources. We adapted the Sharing Economy Design Sprint format (Fedosov et al., 2019a), tailoring its activities to meet the specific context of our research (e.g., we used our own cards).

After getting familiar with the design brief, the personas, and the envisioned scenario (see Appendix A and B), we prompted participants to reflect on the ways of approaching strangers when borrowing an item based on their own experiences with the community or outside of it. We also solicited ideas on potential digital content which could represent activities in the community. We collected a number of ideas related to the information that could be made available about a neighbor to aid an exchange (e.g., a user profile, preferable contact time), to visualize successful and failed exchanges among neighbors, as well as a set of strategies that would lower the hurdle of approaching a stranger (Figure 2). We then asked the participants to identify possible breakdowns that could occur at different stages of the sharing process (Figure 3).



Figure 2. The filled canvas for the mapping activity.

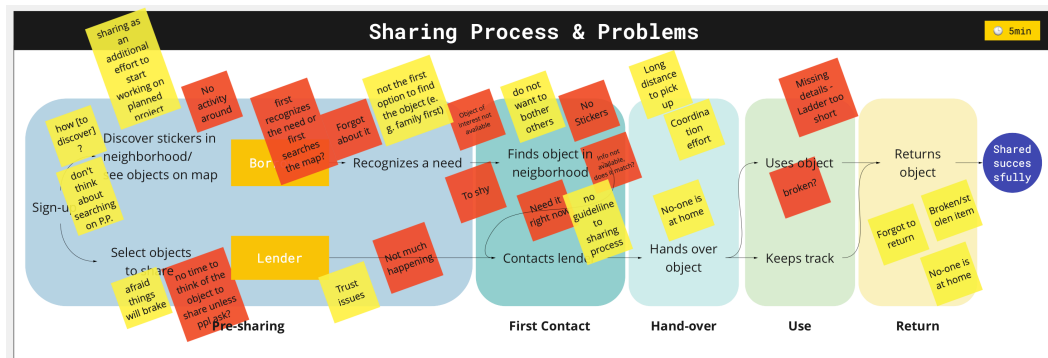


Figure 3. The potential breakdowns in the sharing process identified by our participants in the offered scenario (red post-its) and overall (yellow).

During the co-creation exercise we asked participants to sketch ideas for our design challenge and offered a toolbox template that participants could use during this phase (Figure 4). Next, we asked participants to pick a few Pumpipumpe design cards from the deck to reflect upon their ideas to improving their initial sketches and to justify their design choices in the relation to these cards.

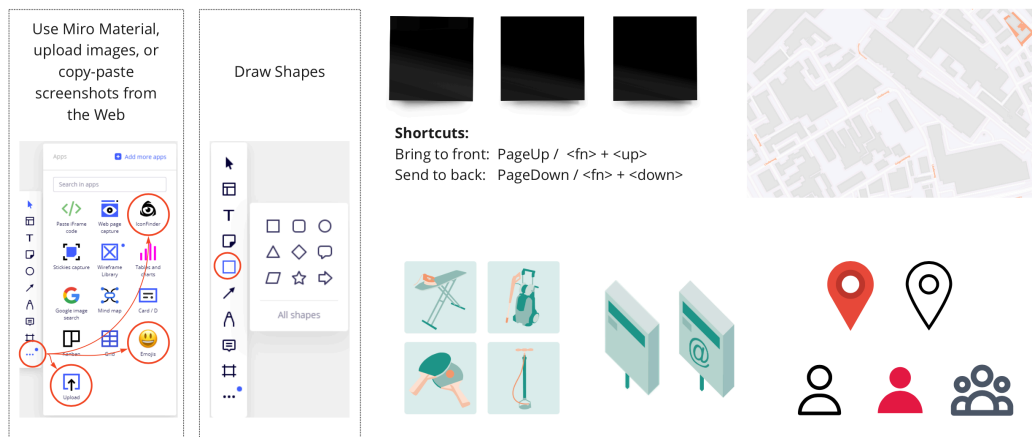


Figure 4. Toolbox template for sketching user scenarios: a subset of the Pumpipumpe stickers, the icons for mailboxes, users, a map template and a few additional materials (e.g. pins for the map).

Design Alternatives

During the participatory co-design session, several ideas for service features emerged that explored the visibility of community interactions and offered opportunities to increase trust among neighbors. We describe three such ideas below: *Community Feed*, *Neighborhood Promenade*, and *Onboarding Assistant*. Note that these initial ideas, which elements have been inspired from the

contemporary digital platforms, do not necessarily solve all the emergent challenges of the community at once, but rather offer a few avenues for designers to start approaching them in the broad context of collaborative consumption.

Community Feed

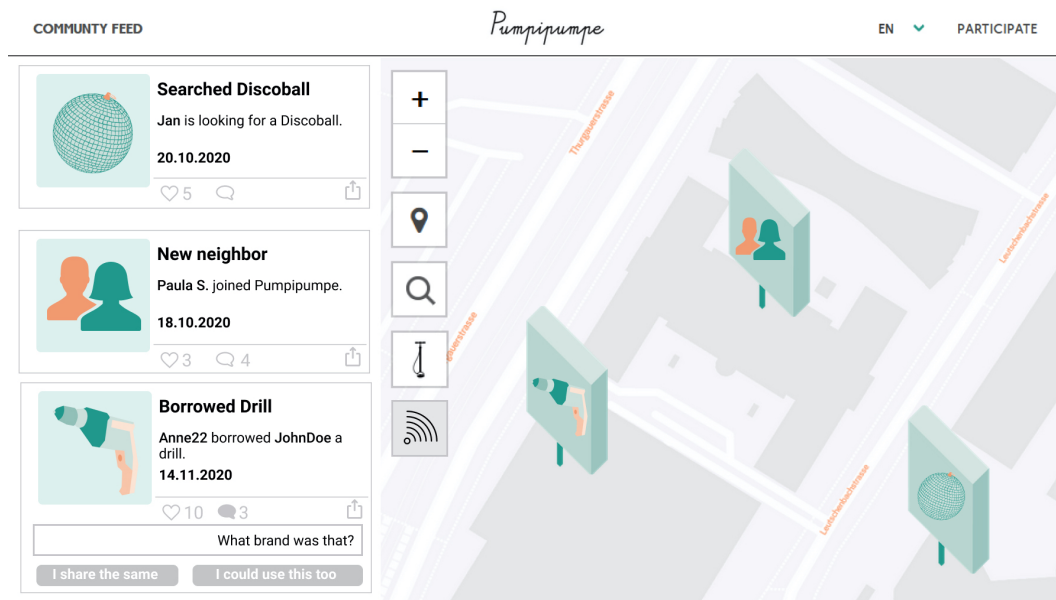


Figure 5. Community Feed displays the most recent interactions on the platform: search queries, new members in the neighborhood, currently borrowed items, etc. It encourages reactions on entries.

The *Community Feed* feature reflects recent members' interactions on the Pumpipumpe platform and could be positioned next to the map interface (Fig. 5). The activities on the feed include but are not limited to searching for an item, displaying newly added, requested and shared items, as well as recently registered members in the area. The participants agreed on the importance of showing these activities not only based on their immediate location (e.g., within neighborhood), but also in a larger geographic area (e.g., city, country). In turn, members may opt-in to receive proximity notifications from the feed. The benefit could be two-fold: (1) members would see new objects available nearby; and (2) notifications would indicate activity in the neighborhood – a signal that is important for building and sustaining a sense of social presence in exchange communities (Suhonen et al., 2010). Members could adjust granularity and levels of visibility of their disclosures. Additionally, the participants recognized the value of reacting and commenting upon messages in the feed (Figure 5), e.g., using upvoting mechanisms, or mentioning that they share the same item or could imagine lending that item in the future (e.g., based on frequently searched items in the area). Finally, the community feed can interface with the social media platforms

(e.g., Twitter) to increase visibility of the Pumpipumpe community and spark an interest in the sustainable consumption values and practices among wider audiences.

Neighborhood Promenade



Figure 6. Neighborhood Promenade visualizes community interactions (a) on the map, (b) using AR interface and (c) provides suggestions to explore items in the neighborhood based on histories of use

The participants emphasized the value of seeing feedback on successful and failed community interactions in a playful way. The *Neighborhood Promenade* feature would display traces of the contextual micro interactions within a neighborhood over time (e.g., successful exchanges, failed attempts to borrow items, outdated stickers on a mailbox). The visualizations could take the form of virtual footprints and messages overlaid on the existing map interface (Figure 6a) or even using augmented reality technology (Figure 6b). Making these traces visible may engender trust and create curiosity within the community and also serve a practical purpose – allowing a borrower to leave a note about an (attempted) visit. These spontaneous in-situ interactions when a lender is not at home at a time of a visit, found frustrating by would-be borrowers (Fedosov et al., 2021), can be easily addressed by this platform’s feature. Specifically, the service can use a

geofencing mechanism determining a proximity of a lender's mailbox, while preserving privacy, and allow a borrower to write a virtual message to a lender with contact details.

Furthermore, neighborhood promenade may support creation of new social ties among unknown members based on successful and verified exchanges with the community using the transitive relation. For example, one participant illustrated this in Figure 6c. The platform suggests a *trusted circle* between Alice, Bob, and Tom. Since both Alice and Bob successfully exchanged previously objects with Tom, they could explore possibilities of sharing with each other. This further creates an opportunity to design for transferring trust between peers and among different sharing economy platforms.

Onboarding Assistant

(a) Onboarding Assistant Registration Process:

- Message: Hello, I am the Pumpipumpe Onboarding Chatbot and will guide you through your profile setup.
- Question: What's your First and Lastname?
- Input: Grete Dumont
- Question: Hi Grete, where do you live?
- Input: Apfelsinenhein 98, 8000 Zuerich
- Question: What is your email address?
- Input: Grete.Dumont@example.com
- Question: Great, select items you would like to share?
- Selection: A grid of 8 items including a stethoscope, mixer, scale, fruit, book, pot, keyboard, and pasta maker.
- Question: You want to share a mixer, a cake tin and a pasta maker (yes, no)?
- Buttons: No, Yes

(b) Wish-list Feature:

WISH-LIST

A grid of 9 items is shown, with a hand cursor pointing to a pasta maker.

PASTA MAKER

Added to wish list on 06.06.2018

3 people borrowed this item nearby

25.12.2020	Anne S.	350 m
06.09.2019	Peter P.	550 m
18.01.2019	Rando N.	700 m

Figure 7. (a) Onboarding Assistant guides a new member through the registration process; (b) Wish-list feature keeps tracks of the items one wants to buy and suggests to borrow them in the vicinity

The participants conceptualized the idea of *Onboarding Assistant* to start sharing with the community. The assistant (e.g., a chat bot) can be triggered upon scanning the physical stickers spotted in the neighborhood, or through visiting the community's website. It will guide new members through the registration process, aid in creating personal inventories (Figure 7a), provide tips for reaching out to neighbors, as well as follow newly registered users through the privacy settings at the supporting platform. This feature addresses the need for providing guidance identified in the prior research, where members need instruction within the sharing process due to the social barriers of meeting unknown people (Fedosov et al., 2021). The assistant can also prompt existing members to reflect on their consumption patterns (e.g., buying vs. sharing), provide ideas for repairing objects, or encourage trying a new activity (e.g., snowshoeing) through borrowing available items nearby. The assistant can also implement a "*wish-list*" (Figure 7b). For example, if someone in the community shares a new item, the others who have that item on their wish list can see that it's now available. The service could broadcast a notification to the interested parties, for example, when a neighbor wishes to dispose of some household items (e.g., books).

Conclusion and Future Work

In this work, we presented design artifacts created in a co-design workshop with one local sharing community in Switzerland. We also discussed three design alternatives geared towards increasing visibility of membership activities and improving interpersonal trust among neighbors. We seek the ECSCW community feedback on further developing these preliminary ideas.

We aim to iterate on these design ideas with key Pumpipumpe stakeholders to establish a ranked list of technological features to align with their existing digital tools. In the future, we will implement some of these features in the form of interactive prototypes, and field-test them with the community. Specifically, we plan to conduct a longitudinal diary study to examine how the features can shape community members' needs for engendering trust, afford collectivity (Bødker et al., 2020), and continuous participation in the community using digital tools. Based on the results of this study, we will provide recommendations for integrating value-added features to the Pumpipumpe platform and create conditions for continuous maintenance and support of these features.

Acknowledgments

We are grateful to our workshop participants for their generous contribution to the co-creation session. This work has been supported by the Forschungskredit of the University of Zurich grant No. FK-20-021.

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Appendix A: Design Sprint Materials (Personas)



"I don't like it when working tools are thrown away. I rather give my unused stuff away or gladly pick up tools from the others and give them a second life."

- Cares about others and is always willing to help
- Enjoys the company of others but is also happy to retreat back to his solitude
- Often walks around the neighborhood
- Stumbled upon Pumpipumpe online when he needed a circular saw for a project
- Uses an older Android phone for phone calls and text messaging

Henry

54 years old / early retired because of chronic medical conditions / receives social benefits



"I like Pumpipumpe because it encourages people not to buy things that they hardly ever use."

- Is very social, has always people around her
- Passionate sharer of things and services
- Shared via Pumpipumpe
- Got introduced to Pumpipumpe by a friend (Fabian)
- Uses a Fairphone 3, a tablet and a notebook,
- Always connected

Nora

28 years old / Ph.D. candidate in Sociology / Lives in a shared flat with like-minded people



"I expect things to work out of the box; I don't want to spent too much time figuring out how something is supposed to work."

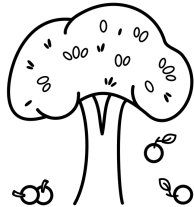
- Is a reserved person
- Sticks with his friends, does not participate much in neighborhood activities
- It doesn't bother him to buy new eco-friendly things
- Got to know Pumpipumpe through a newsletter of a sustainability-focused organization
- Joined two years ago
- Has not lend or borrowed something via Pumpipumpe yet
- Uses newest Apple devices for work and for leisure

Fabian

43 years old / writer from Basel / lives alone in a loft

Appendix B: Design Sprint Materials (Scenario & Design Brief)

Scenario



On a warm spring day, **Henry** decided to work on his garden. He would need a ladder to cut branches of a cherry tree. At that moment, he thought about Pumpipumpe – the service he signed-up a few years ago but never used since that time. Henry wasn't sure if there are any active Pumpipumpe members in the area and checked the map. Luckily, there were, and he found a ladder a few streets away.

It took Henry a few days to gather enough courage to go and knock at the neighbor's door. What a disappointment when he realized that he could not find a mailbox with stickers at a location. It took Henry another three days until he tried to search again. This time he was lucky. He discovered a shared flat, and one of the tenants was fortunately at home. **Nora** opened the door, and they quickly discussed and agreed that Henry will bring back the ladder on the same day, once he would be done.

Henry then used the ladder during his gardening activities. Once the work was done, Henry went right back, rang at the door, and met another tenant of the shared flat who took the ladder back. Henry thanked him and, satisfied, returned home. He was happy with the idea that he could rely on the service once in a while.

A few weeks later, Henry was sitting in the garden under the cherry tree when Nora passed by. She stopped and greeted Henry. They had a quick chat. Nora wanted to know how Henry learned about Pumpipumpe. Her friend **Fabian** recommended her a platform. Henry also wanted to know how often Nora lends stuff and if she knows many other Pumpipumpe members. Nora told him that she rarely gets approached for things and doesn't know many other members are around. Both were curious about how much sharing happens in their neighborhood.



Design Challenge

Client: Pumpipumpe Community

Design Challenge: Foster interpersonal encounters by **encouraging people** to be curious and interact with each other

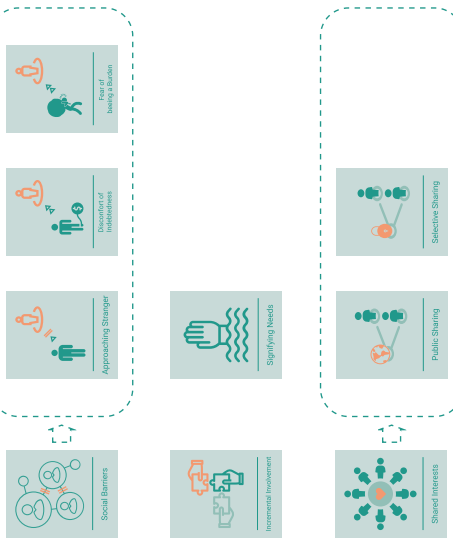
and at the same time

keep members engaged on the platform by providing them useful details based on available information at the Pumpipumpe platform.

Deliverables: Design a feature that offers an **overview of community interactions** and increases feelings of **trust** among neighbors.

Appendix C: The Pumpipumpe Design Cards

Foster Willingness for Interpersonal Encounters



Leverage Online Information to Promote Continued Participation

