
Portalis: Using Competitive Online Interactions to Support Aid Initiatives for the Homeless

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Abstract

We designed a web-based system with game-like properties that utilizes crowdsourcing to facilitate the beneficial transfer-of-knowledge to case managers (CMs) working with the homeless. This has two significant impacts: First, Portalis allows CMs to make informed decisions in managing client cases. Second, it enables individuals who would like to volunteer their services but are limited by time constraints to contribute.

Keywords:

Online Games, CSCW, Distributed Knowledge Acquisition, Recommender Systems, Reputation Systems, Virtual Community, User Studies, Incentive Design

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Background

Despite a national commitment to address the problem [2], homelessness in the United States as defined in the McKinney Act of 1987 continues to be a prevalent social condition; an estimated 2.5 to 3.5 million people experience homelessness each year [3,4]. Homelessness exposes those affected to potentially

"I couldn't do my volunteer work regularly because of my schedule" - Liz



Figure 1: Affinity Diagram

fatal conditions [5] and ultimately denies them a basic human right [1].

Current solutions to alleviate the homelessness problem center on government policies like the 1968 Fair Housing Act, services provided by public service organizations (PSOs), and individual initiatives. Each of these approaches bears unique limitations: The implementation of policies takes time and often is not sufficiently comprehensive to address the problem due to the varying nature of homelessness from person to person. Individual effort through volunteering or direct alms to the homeless is limited because of time constraints and the lack of opportunity to utilize smaller portions of available time. The PSOs involved in tackling homelessness are in need of both human and financial resources. Overcoming these limitations will significantly enhance the scalability and efficiency of approaches that are most effective in addressing the problems of the homeless.

Our contextual inquiry indicates that PSOs provide the most comprehensive attack on the problems of homelessness, but the shortage of human resources, especially access to domain specific knowledge such as financial advice, impedes their success.

Our interviews revealed that people are aware homelessness is a significant problem and are willing to help, but are restricted by time constraints. However, studies on contributions show that contributing online is one way for those who cannot volunteer due to time constraints to do so: e-philanthropy has been gaining significant momentum within the last decade. For example, funds raised online by nonprofits have grown from \$250 million in 2000 to more than \$5 billion in

2006, and estimates suggest that online fundraising growth continues to exceed 30% per year [6]. In addition, research has shown that individuals are more likely to participate in online spaces when they are reminded of their uniqueness and when they are given specific and challenging goals [8].

Additional literature review indicates that fun online activities such as games can address complex problems through crowdsourcing.¹ Peekaboom² is an example of an online game that leverages the gaming time of several individuals to solve an image identification problem [9].

These findings informed our design goals and led us to examine ways to address the shortcomings of current approaches through socio-technical means.

Design Research

We used ethnographic research methods such as contextual inquiry and on-site observations to help define the problem and identify user needs. On-site observations of homeless shelters and CMs' offices revealed to us the needs of the homeless, and those of the CMs and would-be volunteers. For example, the presence of psychological, career, and medical consulting services indicated the critical needs of the homeless.

Along with the observations, we conducted 6 semi-structured interviews with CMs to understand their workflow and the bottlenecks in their processes. The

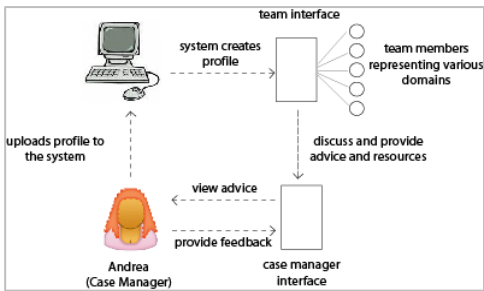


Figure 2: System Diagram

¹ Marshalling the knowledge of several individuals to address complex problems

² <http://www.peekaboom.org/>

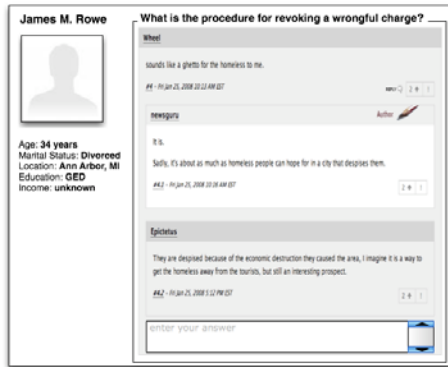


Figure 3: Client Profile Page

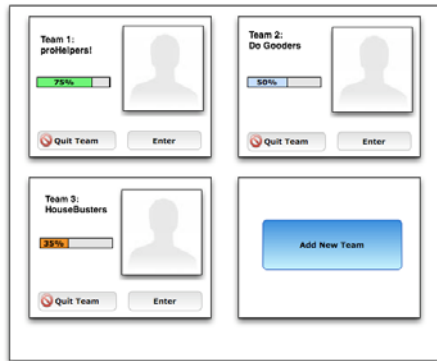


Figure 4: User Team Profile Page

interviews indicate that CMs spend much time communicating with other agencies to acquire domain specific knowledge relevant to their clients' cases: for example, working with rental agencies to place ex-felons. Furthermore, the lack of volunteers from professional fields such as law or career consulting impairs the CM's ability to comprehensively address their clients' needs.

Design Process

We used affinity and system diagrams (Figures 1, 2) to develop personas and scenarios. The personas and scenarios helped us determine the different experiences and end goals of the CMs and potential volunteers towards whom our system is oriented. Based on the personas and scenarios, we followed an iterative process to prototype and validate our design.

In order to understand how our design fits into our users' lives we conducted experience testing by manually passing objects (client profiles) between CMs and volunteers where the moderator acts like the system. Through this we discovered the type of information and the nature of the information flow between CMs and volunteers. Next, we used lo-fi prototypes to gather feedback on our proposed interface under different contexts of use.

Once we finalized the basic views, functional elements, hierarchies, and the data flow model for our system, we developed wireframes. We refined our wireframes through cognitive walkthroughs with our target users. We used the results of these to create hi-fi prototypes which we will validate with usability tests in the lab.

Design Goals

We identified that access to domain-specific knowledge benefits PSOs and that there are individuals with domain specific knowledge willing to contribute, but who only have limited time and no means to make use of that time to help the homeless. Our goal is to design a system that utilizes the limited time of would-be volunteers to channel domain specific knowledge to PSOs.

Target Population:

We target PSOs that have access to the Internet and people with knowledge in domains -- but not necessarily professionals -- such as career consulting, or housing who already spend time online on activities such as gaming or forum discussions and have a predisposition for charitable activities.

Proposed Design

We propose a web-based system which, through interactions in a virtual game-like environment, allows players to transfer specific domain knowledge to PSOs. For the successful implementation of the system we need to provide incentives for sustained participation and mechanisms for ensuring the reliability of the information.

How it works:

Portalis allows CMs to upload de-identified profiles of homeless clients along with domain specific questions they need help with (Figure 3). These profiles and questions are then made visible to the users of the system.

The user can search, browse, or select profiles based on recommendations by the system. She can then begin to tackle the posed questions either alone or as



Figure 5: The Game World

part of a team (Figure 4). For each answer that is voted up by other users or selected by the CM, the user is awarded reputation points. These points are publicly displayed in the game as an incentive for continued participation and competition.

User Scenario:

Ava selects a username and password at initial sign-up. Once she signs up, she selects and personalizes an avatar such as those found in online games like World of Warcraft. She also selects a domain, 'legal,' in which she has domain knowledge and would like to help. Specifying the 'legal' field, the system presents Ava with the option of taking an assessment test to certify her domain knowledge. Her score on the test increases her initial reputation points.

Once in the game, Ava's avatar can walk around a virtual world, interact with other avatars and explore profiles of homeless people to help (Figure 5). From the several profiles, Ava selects one to work on. She sees past answers or comments by other users for these questions and votes one of them down. Ava then posts her own answer to the question. The profile is then added to her portfolio of cases to which she has contributed.

Before she is done, Ava receives an invite to join a team as their legal go-to-person. Upon reviewing the team members' profiles, Ava decides that this would be a fun team to work with and accepts their invitation. At this point the system adds the team members to her contact book. She then strolls over to the location of the other members and after introductions they begin to discuss the case of a homeless person who cannot find housing because of the debt incurred by their divorced spouse (Figure 6). After posting their solution, Ava bids them farewell and logs off to go do her laundry.

Two days later Ava logs back into the system during her lunch break and notices that her points have

increased and that her team's rank has moved up 4 places. She is excited and messages her teammates about finding another case to work on.

Sustaining Participation

Continued participation is critical for the success of the system. Our design incorporates various incentive mechanisms for sustaining participation. First, the system is designed with game-like properties -- challenging, competitive and fun -- to engage users. The posed questions provide the challenge, the point system introduces a competitive aspect and the virtual environment -- self expression through avatars, social interactions and identification with the homeless profiles -- make it a fun experience.

Second, Portalis allows users to set their preferred location by asking them to enter a zip code at sign-up. This not only helps provide relevant information, but also helps to sustain interactions by inculcating a sense of community among players in the same region. In addition, it lends the reputation points more prestige in cases where the players know each other offline.

Third, we utilize Karau and Williams' Collective Effort Model (CEM) [10] and provide a way for team members to acknowledge the effort of individual team members which increases participation. We expect the team-profile relationship to last over time, so that, as the team learns more about a profile and what works for the person, they can not only provide better advice but also build a stronger relationship with the profile.

Ensuring Reliability of the Information

An important consideration for our system is helping CMs recognize and trust the received answers.

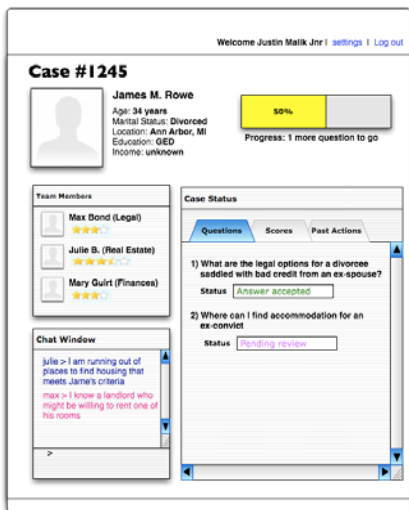


Figure 6: Team Profile Page

Reputation is one of the factors on which trust is based [12]. We designed a reputation system in Portalis to enable the building and identification of reputation. The reputation system gives CMs more confidence in the advice of people who have provided good answers in the past. This is done by a two step mechanism:

1. Feedback on current answers is captured and distributed to ensure that such information is visible in the future. It is important that this feedback is based on verified claims and transactions [12]. In Portalis this is achieved since the only people providing the feedback are CMs who can verify how useful the advice was.
2. Past feedback is made visible to others to allow them to make more informed decisions based on past answers.

The CMs can rate the answers depending on how useful it was for them on a five-point scale – their ratings translate into reputation points for the users.

In addition, Portalis provides an optional entry-level test tailored for domains which enables CMs to determine which users meet some minimum criteria of credibility.

Other Design Considerations

We designed Portalis to be used by people with diverse skills instead of limiting it to people with professional expertise in a particular domain. A professionals-only system would have provided reliable answers without explicit design mechanisms being built into the system to ensure such answers. However, it limits the system to a narrow pool of individuals. Opening it to a wider

audience enables access to a much larger group of people and could lead to potentially better and faster expert advice as people may tap into their own social networks of experts for information. This approach has two concerns: 1) it requires the verification of the reliability of the information and 2) the increased audience causes an information overload for the CM.

We addressed the first concern with the previously described reputation system and for the second, we designed a recommender system. The recommender system applies content-based filtering to retrieve the responses from the users based on their reputation score thus reducing the CM's searching cost for reliable answers. Furthermore, the recommender system can recommend profiles of homeless people that match the domain knowledge of a user and use collaborative filtering to recommend potential teammates based on the similarity between a user and other users of the system.

Conclusion

We used an iterative process to design a system with game-like properties that facilitates beneficial transfer-of-knowledge to PSOs. The system allows CMs to gather information from different knowledge domains and exposes them to various perspectives on the case of a client. By engaging users in a challenging, competitive and fun environment where they can help on cases of homeless people, Portalis also taps into resources that are currently unutilized by overcoming the time constraints and scalability limitations that individual initiatives face.

Even though final decisions concerning the case of a client will be made by the CM, the system has the

advantage of initiating discussions among a diverse group of individuals working towards a common solution. This is more likely to produce good decisions [11]. The system also aims to highlight the uniqueness of individual contributions by means of a rating system based on player and CM feedback. This will help users to see the difference they are able to make in the lives of others who need their help and to further motivate individuals to contribute.

We realize that Portalis is not particularly suitable to provide advice on critical issues such as medical diagnosis and treatment. This is mostly due to the inherent difficulties associated with telemedicine. Our choice of the Web as a medium also limits the availability of the service to those PSOs with Internet access. Similarly, only users with Internet access can participate in the game. However, with the increasing penetration of Internet connectivity we do not expect this limitation to be of concern in the long term.

Finally, through the gradual accumulation of verified knowledge in several domains we hope the game will allow us to build a large knowledge base. This knowledge base can then be used for various purposes including automated recommendations of solutions. Lastly, through the engagement of a large number of users, we hope Portalis will promote increased awareness of homelessness as a social problem.

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