Social and Mobile Interaction Design to Increase the Loyalty Rates of Young Blood Donors

Marcus Foth[1] **Christine Satchell**[1] **Jan Seeburger**[1] **Rebekah Russell-Bennett**[2]
[1] Urban Informatics Research Lab, School of Design; [2] QUT Business School
Queensland University of Technology, Brisbane, Australia
{m.foth; christine.satchell; j.seeburger; rebekah.bennett}@qut.edu.au

ABSTRACT
Young adults represent the largest group of first time donors to the Australian Red Cross Blood Service, but they are also the least loyal group and often do not return after their first donation. At the same time, many young people use the internet and various forms of social media on a daily basis. Web and mobile based technological practices and communication patterns change the way that young people interact with one another, with their families, and communities. Combining these two points of departure, this study seeks to identify best practices of employing mobile apps and social media in order to enhance the loyalty rates of young blood donors. The findings reported in this paper are based on a qualitative approach presenting a nuanced understanding of the different factors that motivate young people to donate blood in the first place, as well as the obstacles or issues that prevent them from returning. The paper discusses work in progress with a view to inform the development of interactive prototypes trialling three categories of features: personal services (such as scheduling); social media (such as sharing the donation experience with friends to raise awareness); and data visualisations (such as local blood inventory levels). We discuss our translation of research findings into design implications.

Author Keywords
Blood Donation, Social Media, Mobile Applications, Urban Informatics, Persuasive Technology, Interaction Design.

ACM Classification Keywords
Human-centered computing → Empirical studies in HCI; Empirical studies in interaction design; Applied computing → Health informatics

General Terms
Human Factors; Design

INTRODUCTION
According to the Australian Red Cross Blood Service, only 1 in 30 Australians donates blood, but 1 in 3 will require blood or a blood product in their lifetime (7 million Australians). In the year 2010/2011, over 194,000 blood products were administered in Australian hospitals [1].

Young adults (16 – 25 years) make up the largest group (29%) of first time donors, but they are also the least loyal group [2]. In 2010/2011, donors from this age group made around 150,000 donations, however, only 61% of these donors made a second donation. This is particularly problematic as there is a growing demand for plasma donations (with a short shelf life of only 5 days), and people have to have made at least one successful whole blood donation before they can be considered to convert to donating plasma.

At the same time, many young people in Australia use the internet and social media on a regular basis. Web and mobile based technological practices dramatically change the way that young people interact with one another, with their families, and communities. Combining these two points of departure, this collaborative research project between the Blood Service and Queensland University of Technology (QUT) seeks to identify best practices to engage young people with mobile apps and social media in order to enhance the loyalty rates of young blood donors.

Recruiting a new donor from the public costs the Blood Service over AU$1,000. Retention strategies are therefore a much more cost-effective way of keeping the donor pool sustainable, particularly in view of the high need for plasma conversions. Plasma – which is best from younger males in particular – is increasingly needed to service the growing needs of patients giving the ageing population and the increased prevalence of illnesses such as cancer (which require blood and plasma products) in the older population.

The research phase of the study reported in this paper had two main aims:

1. Undertake a qualitative approach to deliver a more nuanced understanding of the different factors that motivate young people to donate blood in the first place, as well as the obstacles or issues that prevent them from returning.
2. Conduct a participatory design approach that informs the development of interactive design interventions across three categories of features: personal services (such as scheduling); social media (such as sharing the donation experience with friends to raise awareness);

C&T'13, June 29 - July 02 2013, Munich, Germany

ACM 978-1-4503-2104-4/13/06$15.00.

and data visualisations (such as local blood stock inventory levels).

Recent human-computer interaction (HCI) research into ways to bring about behavioural change towards environmental sustainability (e.g., reduction of domestic energy consumption) found that "one size does not fit all" [3], that is, different people are motivated differently, and as such, persuasive technology and motivational approaches that seek to identify one blanket solution are likely to fail, or only work for a small sub-group of people.

The hypothesis of our study's approach was two-fold. First, we argue that mobile devices, social media and data visualisations offer an unprecedented opportunity to create a shared experience around the donation itself, and we want to find out what impact this might have on the loyalty rates of different types of young donors. Second, we argue that it is imperative to embrace the "one size does not fit all" principle and thus exploit the capabilities of ubiquitous computing that now allow us to design for instance, one smart phone application that provides tailored experiences across different contexts, at different times, for the different needs and preferences of different users and communities.

In this paper, we report on the two main aims of our study, and discuss our translation of research findings into design implications, as well as future research steps.

RELATED WORK

An extensive body of literature has been published around the question of what motivates people to donate blood. Masser et al. [4] provide a review and overview of existing research in this area. As the focus of this paper lies on HCI related issues and solutions towards motivating people to donate blood, only relevant findings from this body of literature are presented in this section.

A study by Lemmens et al. [5] among non-donors found that campaigns to recruit new blood donors should try to improve self-efficacy, attitude (i.e. blood donations are not painful, costly, or unrewarding), and personal moral norms regarding blood donations, and subjective norms (i.e. approval of social circle). Steele et al. [6] found that while high levels of altruism, empathy, and social responsibility motivates people to donate blood, these indicators are not related to donor frequency. Instead, they propose that recruiting efforts should also address convenience of blood donations, community safety, and personal benefits gained by donating blood.

In terms of personal benefits, research on the impact and effects of donating blood on donors found that the majority of effects are positive and long lasting, such as feeling satisfied or an increased sense of wellbeing [7]. Nilsson Sojka & Sojka [7] also propose that these effects should be communicated to recruit prospective blood donors in order to remove fears associated with blood donations and to make it more attractive.

Ringwald summarises key elements that encourage blood donors to return [8]:

- Communicate with the blood donors right from the beginning;
- Support the role of the blood donor's identity;
- Make blood donations convenient;
- Motivate and educate blood donor service staff;
- Reduce/prevent adverse events and the blood donor's anxiety;
- Increase the satisfaction with the blood donation process;
- Use appropriate incentives;
- Ask temporarily deferred blood donors to return;
- Use personal aspects to motivate blood donors;
- Work on enhancing the reputation of the blood donation service.

Ringwald [8] concludes that identifying oneself as a blood donor is a major goal that will encourage blood donors to return.

To the best of our knowledge, there has been no research published at the intersection of human-computer interaction and blood donations. Only Ojala et al. [9] conducted a field trial utilising Bluetooth to measure the efficiency of proximity marketing sending messages to recruit blood donors resulting in a response rate of 3.1%.

Scholars who studied social media usage of the Red Cross in the United States concluded that services such as Facebook and Twitter are used by the organisation *"to develop relationships focused on recruiting and maintaining volunteers, updating the community on disaster preparedness and response, and engaging the media"* [10, p. 41]. While the American Red Cross maintains a dedicated Facebook page[1] to share stories about donors and blood donations to engage the community, LifeSouth Community Blood Centers in Florida created a Facebook application[2] titled "I give Blood" which allows donors to share their donation history with friends. SocialBlood[3] provides a web service utilising Facebook to create connections[4] between blood donors and blood transfusion receivers which also utilises location-aware technology to find donors nearby in the event of an emergency. However,

[1] http://www.facebook.com/RedCrossBlood

[2] http://apps.facebook.com/igiveblood/

[3] http://www.socialblood.org/

[4] Such direct connections are not permitted in Australia.

these apps have not been subject to any academic scrutiny to date.

Besides utilising social media services, various smart phone applications have been released to the public around the topic of blood donations. Mobile apps by the Swiss and the German Red Cross enable users to search for times and locations to donate blood, wayfinding to the blood donation centres, reminder services via text message and email, access to a web portal and social network concerning blood donations, sharing of the donation experience with others, as well as educational information and videos about blood donations. iDon8, an application by The Blood Alliance, which services hospitals in North-East Florida and portions of Georgia and South Carolina, offers basic scheduling options but also provides a visualisation of available blood stock.

The Irish Blood Transfusion Service released a smart phone application titled giveblood.ie enabling existing and potential donors to monitor the national blood levels by blood type. The application also allows people to check their eligibility to give blood, search for the nearest clinic either by date or location, and to share their experience via Facebook, Twitter, and email.

Our review revealed that some efforts have been undertaken to utilise social media and smart phone applications to make blood donations more convenient, offer additional services, and create communities around donating blood. The literature presented around the topic of what motivates people to donate blood provides us with first insights into the types of design interventions using social and mobile media to encourage blood donors to return. The next sections add our own findings to this discussion of opportunities for mobile applications, social media, and data visualisations.

RESEARCH APPROACH

The findings reported in this work-in-progress paper are based on the analysis of empirical data derived from two research phases: After ethical clearance, we worked in collaboration with the Blood Service to recruit study participants from the pool of first time blood donors, with a particular focus on young people (16 – 25). Existing screening and sampling procedures were used as best as possible to simplify the recruitment, and to make participation in the study easy and convenient for study participants. We recruited 19 participants, 7 in Brisbane and 12 in Melbourne. We conducted one-on-one open-ended interviews. This qualitative interview strategy allowed us to quickly identify themes to gain a better understanding of the underlying factors that contribute to a positive donation experience as well as those that prevent young people from donating or returning.

Second, using the Stage 1 data as a point of departure, we conducted a participatory design approach involving study participants from Stage 1 who agreed to participate in follow-up research. Two participants in Melbourne and six participants in Brisbane from the 18 – 25 donor group were recruited through the Blood Service. They participated in two locally held design studio workshops (one each in Melbourne and Brisbane) which were used to discuss and refine the results from Stage 1 as well as to brainstorm and evaluate a range of possible features that correspond with the needs and issues previously identified and which can be incorporated in mobile devices, social media, and data visualisation solutions. The data from these workshops was analysed. We used these findings to inform the development of a range of interactive design prototypes to be trialled in the next phase of our study. In this paper, we focus on the translation of our data analysis into design implications, and present some early design sketches to help illustrate these design implications for wider debate and discussion.

In consultation with the Blood Service, as well as through our review of other blood donation apps, we anticipated at the outset of the study to include a range of pragmatic and service-oriented features including but not limited to:

- Reminders when user can next give blood;
- View locations of the user's closest donation centre or mobile station;
- Update personal details;
- Schedule appointments;
- Accessing a template donor questionnaire to fill in before the appointment that is sent to the collection centre in advance to streamline the process;
- General public announcements as well as individually targeted requests such as urgent needs of specific blood groups that match the user's blood group type;
- Capability to receive and return research surveys;
- Tracking of individual donation behaviour through a donation history including charts;
- Information on blood and the blood donation process.
- Appointment booking facilitation.

These service-oriented features will be useful, necessary, but – we expect – not sufficient as persuasive technology to provide enough motivational stimuli to increase loyalty rates. In response to the research questions and aims identified above, we also wanted to explore new features that are not just service-oriented, in order to gauge what impact they may have on increasing loyalty rates. Examples discussed at the outset with our research partners at the Blood Service included the following ideas:

Social Media Features

- Posting blood donation experiences on social media sites such as Facebook, Twitter and FourSquare to raise

awareness, solicit praise and encouragement from friends and peers, and to help blood donors connect with each other;

- Integrate and support existing frequent donor schemes such as Club Red that are similar to frequent flyers including status tiers, badges or titles for public recognition and reward;
- Option to create and join teams of blood donors that contribute to "virtual blood stocks" which are visualised on their social media sites, similar to virtual running or walking teams that are using pedometers to measure their collective progress (image of "walking around the equator");
- Receive anonymous thank you messages from blood recipients.

Data Visualisation Features

- Display the local blood stock levels for the user's area;
- Visualisation of donations on a city map ("leave your foot print");
- Visualisation of the prevalence of different blood groups across the city.

RESEARCH THEMES AND DESIGN IMPLICATIONS

Three *user archetypes* emerged from the study: Technologists interested in the systems and the machinery behind the process; Biologists wanting to know more about the role of the blood after donating; Escapists looking for distractions to help them cope with donation anxiety. Furthermore, the study revealed three distinct *approaches to donating blood*: Silent, Spontaneous, and Sharers.

The first part of this section presents the user archetypes, and describes how they led to corresponding user needs and design implications. The second section describes the three approaches to donating and how the different habits can be best supported by technology. As the needs and approaches of these different groups are not mutually exclusive, the third section looks at key design implications that are shared across all users.

Technologists

The Technologist users are intently fascinated by the 'process' of giving blood. They noted that a deep understanding of the process meant that they were more likely to be engaged and as such, continue donating. On the other hand, they revealed that a lack of knowledge meant they were more likely to give up after an initial donation.

"The Red Cross has a deep knowledge about what they are doing. If they share this, I would be more likely to engage. I like understanding systems."

"Would like to know more about the geographical journey my blood took."

User Need: This user group requires a high level, abstract, yet informative explanation of how the machinery that supports blood donation works. This is distinct from the Biologist user archetype who is interested in the representations that show what happens to the blood in a more graphical way.

Design Implication: A number of design implications can be generated from understanding the user needs of this group. The first being considered is an interactive display that informs the users about how the process works. The user can click on any part to find out more about a particular aspect of the process, increasing transparency.

Biologists

This user group has no aversion to blood. In fact, they have a deep appreciation for its life giving properties.

"At the start I was the first one who could not look at the needle, now I am more like the Dexter archetype, the blood going into the bag. It's really cool."

"I wonder how quickly it is distributed? How thorough are they in processing it?"

"Tracking stuff is good fun – this could apply to blood."

User Need: The desire for information about the blood itself not only relates to what happens to the blood once it is donated. This user group celebrated the iconography that relates to the blood giving process.

"A blood drop that fills up every time you give blood and then, when it's full, you get a badge."

Design Implication: A display was discussed with study participants that provides a more detailed description about the process of giving blood than would be given to the Technologists. In order to avoid alienating the other user archetypes, this would be best displayed on a user's personal device.

Another way in which the user needs of this group might be met is through the implementation of a digital platform that presents the user with their donation history. It is important to note that a digital account of the user's history appeals to users across all archetypes, as will be discussed below. These spaces could be personalised by users and include a design template that incorporates the blood drop iconography as a reoccurring motif or badging for providing data feedback to the user (e.g., Fig. 1).

Escapists

The Escapist does not want to migrate too far away from the medical experience. They do not want to escape by trying to pretend that the experience is something it is not, e.g., health spa like surrounds were not reported as being a desirable form of escapism. This is primarily because there is a sense of reassurance that comes with the medical nature of the donation environment provided by the Blood Service, which makes Escapists feel safe.

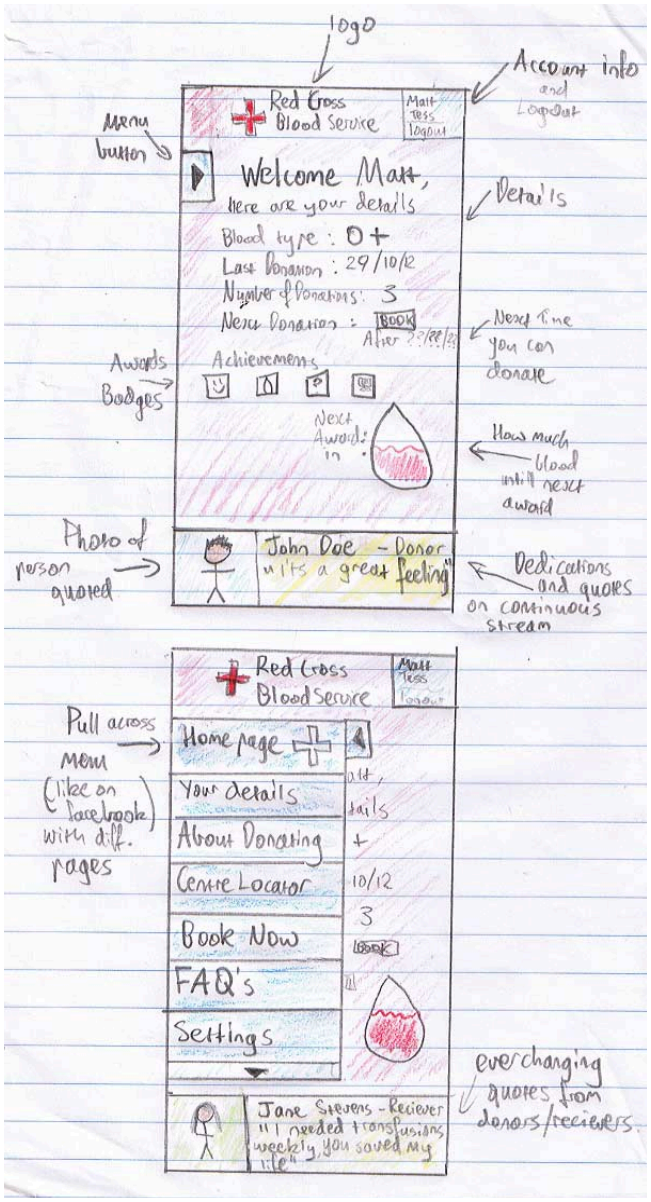

Fig. 1. Interface sketch by a study participant in the design workshop

"The interaction with the nurses who know about the different facets of donating distract me when I'm actually giving blood."

This user group also reported a high level of engagement with social media via their mobile phones as a form of escapism while donating.

User Need: To a certain degree the needs of the Escapists represent a user need that can be met with the design solution for the Technologists and Biologists. Specifically, an account of the technology behind the process provides a way of removing oneself from the actual process of the needle going into the vein. However, unlike the Biologists in particular, there is also a need to provide a form of escapism that takes this user away from the immediate bodily / physical donation experience causing anxiety.

Design Implication: An informative display about the blood donation process can act as a form of distraction coupled with means of reassuring the user. Similar forms of 'analogue' displays are already in use in some parts of the Blood Service (Fig. 2). Information displayed to this user group would have to be presented at the most abstract level. This would make it suitable for embodiment by a shared display.

Social media would also provide a useful platform for this process:

"Would like to see what you have done regarding donating on Facebook. Like Farmville. So and so has now donated ten times. This means 1 motorcyclist, 2 pregnant women, etc. In fact, it could end up bringing out the competitive spirit in me. If my mate was on 8 and I was on 7, it might challenge me to get to 12. I would put rules in place. Only plasma, only whole blood."

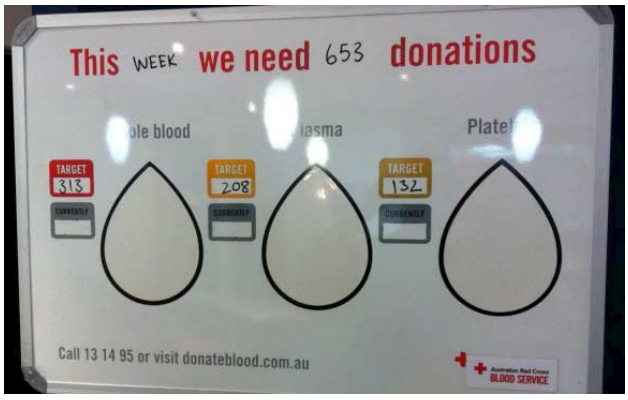

Fig. 2. Analogue displays used at donation sites of the Blood Service: tallies (above) and wall of fame (below)

Three Approaches to Donating Blood

In addition to the three user archetypes, our study revealed three approaches to donating blood. Understanding the

nuances of the users in these categories provided additional insights for design.

The Silent Type

For the silent type the donation not only transcends financial reward – it transcends recognition.

"The act of giving blood itself, that is a thank you for giving blood."

Other reasons donors avoided talking about their experiences was to avoid the perception of big noting.

"No one ever talks about it. When I say I give blood it sounds like you are bragging."

"People might think that I was bragging if it came up on Facebook. OK, hero."

Users also wished to avoid distressing people with needle aversions. Other reasons not to share included an awareness that only certain people can give blood.

"It's a weird thing in that you want to feel good about giving blood and people will think it is a good thing. But you don't want to make non-donors feel bad."

These findings highlight the importance of design outcomes that respect the rights of users who do not wish to publicise their good deeds. Silent donors highlight the importance of a default setting on a social media or other sharing platform such as Facebook which is 'opt in' rather than 'opt out.' Yet, Silent donors, despite being discreet about their donations, did make exceptions. They were more open about sharing donation stats with other donors, and were not averse to significant donation milestones being recognised and shared.

"A milestone is more something you would share."

"A tenth donation would be significant though."

The key to maintaining integrity for these users would be for them to be in control over what data they revealed and to whom.

Spontaneous

The spontaneous user embodied a Generation Y attitude. They preferred to donate on the fly when a convenient moment presented itself rather than be locked into an appointment at a predefined date.

"I'm just not a planning type of person."

Spontaneous users were willing to give blood but there was a sentiment amongst this group that they were being penalised for their spontaneity. This was especially in regards to the time they had to wait and the process of form filling which first time donors reported seemed to take more time than it did for regular users (as first time donors are required to answer an additional set of questions).

The study indicated that there is a need to do more to engage with the spontaneous user. Potentially through the use of a digital form that allowed them to fill out some of the information just before they donated. As well as an app based reminder with a presence that remained on their handset screen and told them when they could donate again. *"A text (provided at an earlier date) gets forgotten in a string of texts, but an app is always on your screen. I would like an online app that tells me when I can donate."* Finally, a proximity based information system would provide easier interaction with the blood services. Letting the user know when they are near a donation centre or when a mobile donation van is in the vicinity.

Sharers

Sharers were generally heavy users of social media and made use of these platforms to share their donation experience and galvanise others to do the same.

"My Instagram pic [of two mates giving blood] generated lots of interest. A lot of people don't give blood because they don't know about it, the more people that know, the more people that donate."

Sharers noted that being a blood donor said a lot about their identity and signified the type of person they were.

"I do like the donor card, I like pulling it out when I'm asked to show ID, they think that you are good, because you give blood. You get into the club." This made the digitisation of the donor card, with a link via a highly visible icon on the user's smart phone screen a very appealing option.

Sharers also noted that the process of exchanging information amongst other donors made the experience less intimidating and highlighted the need for a platform that allowed them to interact with other donors. This also has relevance for the Escapist archetype.

"I would give blood no matter what, but having friends is really good for the before and after. It makes it much more appealing, friendlier, and less intimidating."

Linking donors was also important to help ensure users continued to participate. When previously established groups of donors, e.g., from high school, started to fragment, they became less likely to continue to donate, and establishing new networks was often problematic.

"I don't know many people that give blood. I'm having difficulty finding people in real life to go with me."

"I don't have a huge social network in real life that I go out with regularly, but I have about 400 Facebook friends, some of them would be Red Cross donors. I could get them to go with me in a group."

What is needed by this user group is a way of saying – ahead of time – that a user is going to donate and to please join in. The use of a social network such as Facebook to do this would be helpful for all groups. It couples social interaction with a legitimate and a sincere way for users to

share their experiences, without venturing into the 'look at me' territory.

Shared Design Implications

Access to personal blood data: A uniting feature reported across all user groups was that the Blood Service has important information about a vital part of their human self: their blood. Users want access to this information.

"It would be nice to look at your own stats."

Most importantly, the study showed that any platform that contained the user's personal donation history had to be able to be customised. How and when the information was shared, was vital. Many users expressed a desire for the interface to borrow from gaming style personal score histories with badges and icons and a top score section. Other users wanted it in litres or in the form of blood drops. Turning to the literature on sustainability about the representation of data to see what is the most meaningful could be a useful way of exploring this concept further.

Reminders: Users agreed that technology could provide reminders that let them know when it was time to donate again. An often stated idea was for an app whose icon changes when you have not donated for a while. Again, the user would need to be in control. For example, having the ability to turn off a flashing app indicator if you cannot give blood so as to avoid feeling guilty (or irritated).

Scheduling: Conventional scheduling is a problem for users. Being able to view appointments online was reported as desirable. While an app would provide this information on the go, it could also provide a location-aware service such as a "Donate Now" feature. Ideally, this platform would contain the user's donation history making it more compelling to the user. Finally, the integration of a social media function that allowed the formations of blood donor groups would help ensure that, the chances of sustained donation amongst young people were increased.

DESIGN SKETCHES

In this section, we present some of our design sketches that illustrate how we translated our emerging research themes into design implications. We employed a participatory design approach. The study's user archetypes as well as the review of related literature and existing mobile apps informed several design features that we want to trial in the next phase of the study for use by our study participants before, during, and after the blood donation process. The motivation for primarily targeting a smart phone app stems from our collaborating partner's desire to explore such opportunities in the mobile space. However, our research also unveiled many other insights and findings relating to the donation process which we fed back to the Australian Red Cross Blood Service for their consideration.

A digitised blood donor membership card plays a central part of the proposed design sketches for the Red Cross Blood Service and functions as a foundation for features described in this section. Apple released the Passbook feature in its latest operating system software update to the general public enabling developers to store data such as membership details in a location-aware digital wallet. This feature can be utilised in the design sketches to store a donor's personal information and blood donation statistics as well as providing access to real-time donation data. Fig. 3 shows such a digital membership card.

Fig. 3. Digital membership card within the smart phone application

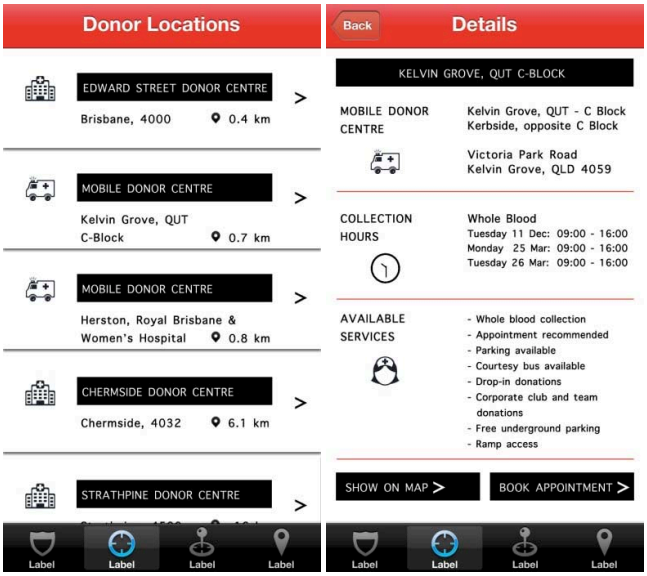

Fig. 4. List of donation centres (left) and a detailed view of a selected donation centre (right)

The literature review showed that blood donations should be convenient so that blood donors return [6, 8]. Additionally, our own data shows that spontaneous blood donors would like to donate 'on the spot' and that conventional scheduling is a problem. Therefore, the basic service-oriented feature to browse a list of nearby fixed and mobile donation centres as well as booking an appointment to donate blood has been designed. The left side of Fig. 4 illustrates a list of nearby donation centres utilising a device's GPS. A user can tap on the desired location to get more details about the donor centre location, collection hours, and available services. Due to the digitisation of the membership details as shown in Fig. 3, no forms have to be filled out to book an appointment, and tapping the "Book Appointment" button and selecting a date and time is sufficient.

Once an appointment has been created, users have the opportunity to share this information with their social circle on Facebook through a status update. This is optional so that the needs of both the Sharers and the Silent Types are met. Additionally, users have the opportunity to automatically create a Facebook event and invite friends to join in to donate blood at the same time.

The user-centred design approach and the qualitative interview strategy revealed that blood donors want to be informed and reminded through technology. The iOS notification service can remind blood donors about certain key steps before the blood donation appointment. Fig. 5 shows two such notifications before the actual blood donation appointment reminding donors about nutrition and hydration.

Once the blood donor arrives at the chosen blood donation center, the context-aware iOS Passbook application (see Fig. 3) automatically displays the digital membership card on the device's lock screen. The nurses at the blood donation centre can scan the barcode shown on the digital membership card for check-in.

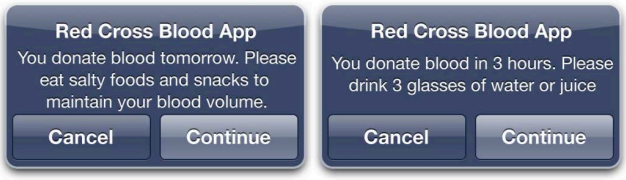

Fig. 5. iOS notifications before donation appointment

The proposed design sketches provide ways to keep track of a user's donation history. The left side of Fig. 5 shows a blood bag and the number of litres donated which has been designed with the Biologist user archetype in mind. The left side of Fig. 6 also displays the number of people who have been helped with the user's donation. Users can share these statistics of their donation history with other people via Facebook, Twitter, or email. Additionally, users can access a score card / leader board in order to compare their donation statistics with their Facebook friends who are also registered blood donors.

To meet the needs of the Technologist and Biologist archetypes, a visualisation of the process of blood donations and how they are used has been designed. This visualisation is shown on a shared display mounted in the blood donation room. Fig. 7 shows this shared display where the QR codes embed URLs linking to additional information describing the respective process of the blood donation journey in detail. The shared screen can also be repurposed for the Escapist user archetype to display entertainment, social media content, or more abstract flowcharts of the blood donation process.

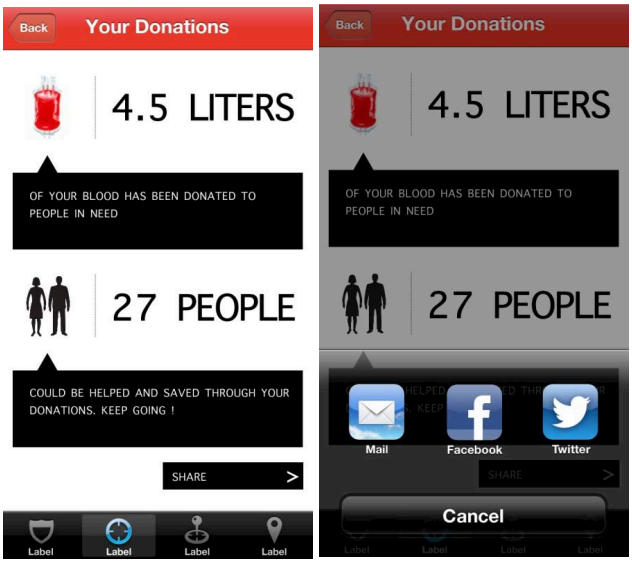

Fig. 6. Illustration of donation history and possibility to share these statistics

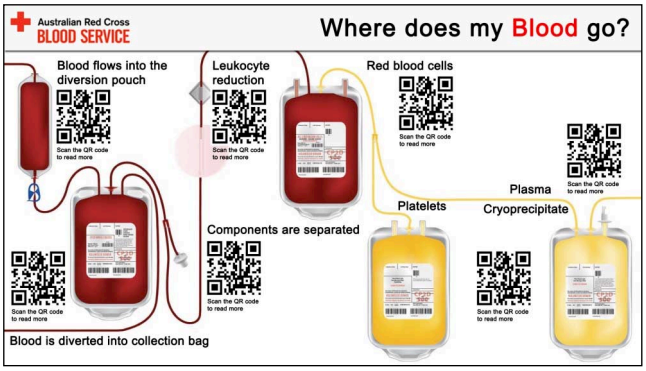

Fig. 7. Shared screen explaining the journey of blood donations

To help the Escapist user archetype to focus on the positive outcomes rather than focussing on the actual donation process, an additional feature for the proposed design contains the sharing of the experience of blood donors and people who need blood. The sharing of experiences can be realised with the shared screen mounted at a donation centre, or on the donor's personal, mobile device.

Another way to support the Escapist user archetype is to establish a connection between the mobile device and the shared display enabling a blood donor to control the content on the shared screen with their mobile device. Possible use cases include for example, opinion sharing [11], an online video jukebox [12], or gaming [13]. The shared screen can provide the Biologist user archetype with the possibility to upload blood related imagery such as pictures of their blood bags, needles, or patches from their mobile device onto the shared screen.

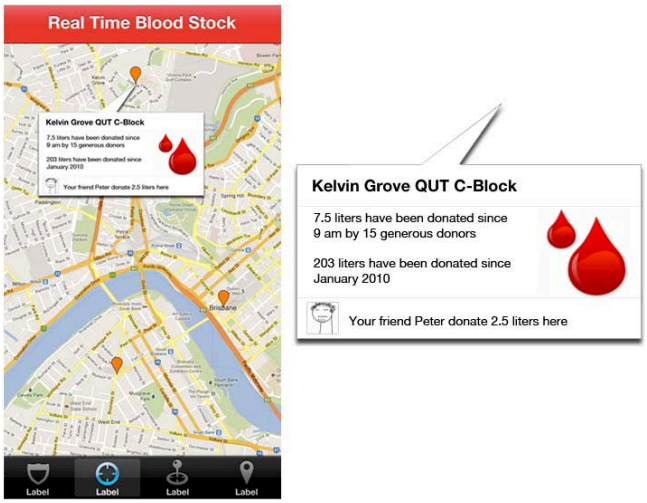

Fig. 8. Real-time visualisation of blood donation in the city

Integrating design solutions as described in this section into the donation process in combination with the digital membership card, affords real-time visualisations of blood donations what has been designed for the Technologist and Biologist user archetypes. Fig. 8 shows such an approach to real-time blood donations in the city. The right side of Fig. 8 shows an enlarged version of the details presented to the user, also including information about who donated the most at a particular donation centre based on Facebook friend connections.

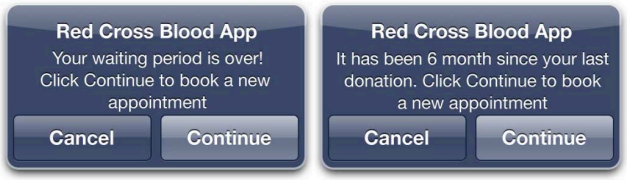

Fig. 9. Post donation notification to remind users about donating blood

The proposed design can also be used to remind users about certain events post donation which might encourage the Spontaneous donors to donate blood on the spot. These notifications also respond to Ringwald [8] who states the importance of asking temporarily deferred blood donors to return. Furthermore, the interviews revealed that study participants would like to be reminded once they are eligible to donate blood again. Fig. 9 shows two such notifications to remind blood donors that they can donate again and that a certain amount of time has passed since the last donation.

CONCLUSIONS

Engaging young donors is crucial for sustaining the blood supply for the Red Cross Blood Service in Australia and internationally, as they are needed to replace aging donors who eventually donate less frequently, stop, and may turn into blood recipients. Therefore, by engaging with young people to make their first donation, and donate regularly throughout their lives, the shortage of blood supplies will be alleviated. For every young person that donates blood, three lives can be saved.

Our study is exploratory in nature. The design focus of the research opted to work in-depth with a relatively small number of study participants, much smaller than what is usually required or considered rigorous in randomised controlled trials that are common in conventional health or market research. However, for the purpose of exploring interaction design options into both social media and mobile application design, the in-depth engagement with study participants resulted in useful insights.

Our study found three distinct user archetypes and three approaches to donating blood. Following on from a differentiated appreciation of the needs of these user archetypes, we presented both a range of shared design implications as well as individually tailored design implications. The former include the use of shared displays that could provide information into the mechanism of the process and the journey that the blood goes on while users are donating. We found that personal mobile technology can provide a form of individual escapism during the process. Social networks provide a dual function both persuading others and supporting group donations leading to the formation of local communities of donors. Artifacts that act as a badge of honour best embody incentives – be it physical or virtual. Additionally, we presented a range of design sketches that are tailored to the respective requirements of each of the three user archetypes: Technologists, Biologists, and Escapists.

In the next phase of the study, we will translate the design sketches – both our own as well as those created by study participants – into a set of functional features that are combined into one prototype app (Fig. 10). This app will be made available to our study participants for evaluation and further refinement. To date, we plan to evaluate the following features:

- Weekly goals set by the Blood Service;
- Map of donation centres near the user's position;
- Booking an appointment;
- A "Donate Now" button for spontaneous donors;
- Personal donation statistics based on historic data;
- Personal information on any blood analyses performed;
- Blood Type Bingo to find out compatibility between different blood types, e.g. A neg with AB pos, etc.

- A personal profile as outlined above;
- Further explanations of the donation process;
- Heads-up questions about the requirements to donate blood, so donors do not arrive in vain;
- A visualisation of local blood stock levels; and
- A survey page to collect feedback on the prototype.

We hope to report evaluation results in an upcoming paper.

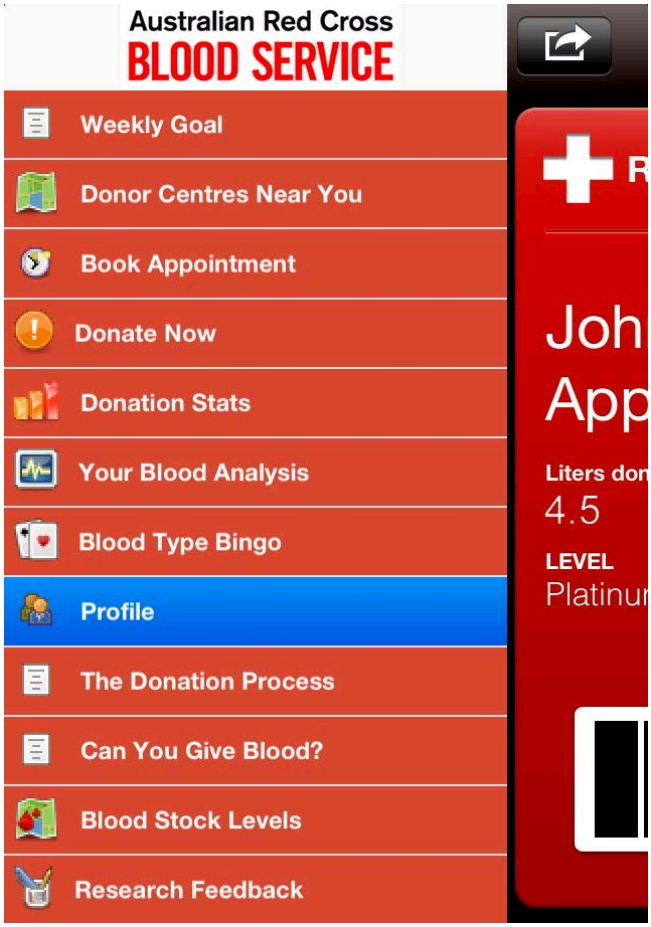

Fig. 10. Prototype showing range of features to be trialled

ACKNOWLEDGEMENTS

This study was funded by a research grant from the Australian Red Cross Blood Service. Ethical clearance was received from the Human Research Ethics Committee of the Australian Red Cross Blood Service (file number 2012#13). We thank Dr Geoff Smith, Senior Research Fellow, and Jane Hayman, Research Fellow, Australian Red Cross Blood Service (Research and Development), for the collaboration, for valuable comments and advice, and for constructive feedback on earlier versions of this paper. We also thank our study participants for their time and contributions.

REFERENCES

1. AIHW: Report. Australian Institute of Health & Welfare (2011)
2. ARCBS: Annual Report. Australian Red Cross Blood Service (2008)
3. He, H.A., Greenberg, S., Huang, E.M.: One size does not fit all: applying the transtheoretical model to energy feedback technology design. Proc. of CHI, pp. 927-936. ACM, Atlanta, Georgia, USA (2010)
4. Masser, B.M., White, K.M., Hyde, M.K., Terry, D.J.: The Psychology of BloodDonation: Current Research and Future Directions. Transfusion Medicine Reviews 22, 215—233 (2008)
5. Lemmens, K.P.H., Abraham, C., Hoekstra, T., Ruiter, R.A.C., De Kort, W.L.A.M., Brug, J., Schaalma, H.P.: Why don't young people volunteer to give blood? An investigation of the correlates of donation intentions among young nondonors. Transfusion 45, 945-955 (2005)
6. Steele, W.R., Schreiber, G.B., Guiltinan, A., Nass, C., Glynn, S.A., Wright, D.J., Kessler, D., Schlumpf, K.S., Tu, Y., Smith, J.W., Garratty, G., Retrovirus Epidemiology Donor, S.: The role of altruistic behavior, empathetic concern, and social responsibility motivation in blood donation behavior. Transfusion 48, 45--54 (2008)
7. Nilsson Sojka, B., Sojka, P.: The blood-donation experience: perceived physical, psychological and social impact of blood donation on the donor. Vox Sanguinis 84, 120--128 (2003)
8. Ringwald, J., Zimmermann, R., Eckstein, R.: Keys to Open the Door for Blood Donors to Return. Transfusion Medicine Reviews 24, 295--304 (2010)
9. Ojala, T., Kruger, F., Kostakos, V., Valkama, V.: Two field trials on the efficiency of unsolicited Bluetooth proximity marketing. Proc. of Mobile and Ubiquitous Multimedia (MUM). ACM, Ulm, Germany 1--4 (2012)
10. Brionesa , R.L., Kucha , B., Fisher Liua, B., Jinb, Y.: Keeping up with the digital age: How the American Red Cross uses social media to build relationships. Public Relations Review 37 (2011) 37-43
11. Schroeter, R.: Engaging new digital locals with interactive urban screens to collaboratively improve the city. Proc. of CSCW, pp. 227-236. ACM, Seattle, Washington, USA (2012)
12. Seeburger, J., Foth, M.: Content sharing on public screens: experiences through iterating social and spatial contexts. Proc. of OZCHI, pp. 530-539. ACM, Melbourne, Australia (2012)
13. Vajk, T., Coulton, P., Bamford, W. and Edwards, R. Using a mobile phone as a 'Wii-like' controller for playing games on a large public display. Int. J of Computer Games Technology, 2008 (2). 1-6