# Shared PI: Sharing Personal Data to Support Reflection and Behaviour Change

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#### Abstract

The potential of Personal Informatics data to support personal reflection is now well explored within HCI. However, there is still work needed to understand better exactly *how* to support people in making sense of and reflecting on their captured data. In this paper we discuss how sharing personal data with others, whilst often considered as of value for motivation purposes in PI systems, could also be a mechanism for supporting personal reflection on that data. We argue that the potential of data to support sharing of personal experiences is an underexplored space in PI and worthy of further research.

## **Author Keywords**

Sharing Experiences, Sharing Personal Data; SenseCam; Reflection; Behaviour Change.

#### ACM Classification Keywords

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

## Introduction

It is now possible to monitor via some application or device almost any aspect of our lives, and as new sensors and devices are developed, new possibilities

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Figure 1: Microsoft Sensecam (early prototype)



Figure 2: SenseCam Image viewer. (http://research.microsoft.com/enus/um/cambridge/projects/sensecam/ review.htm)

emerge. As a result we are beginning to experience living with access to personal data in a way we haven't before, and in addition with the ability to share this data with others. Ongoing research is investigating how to harness such Personal Informatics tools to enable us to understand more about ourselves for selfimprovement or to support us in changing our behaviours or attitudes in areas such as health, sustainability, wellbeing, time-management etc. This research has also revealed difficulties faced by people trying to make use of such tools, and highlights the need for better support throughout the whole process from deciding what data to collect using which tools, to support in organizing it on order to make sense of the data and reflect on it, and identifying actionable outcomes, if any [e.g. 7].

However, with the possibility these tools offer for people to share aspects of their data with others either via an application or through social media, Personal Informatics tools not only enable us to be more directly aware of what we ourselves are doing, but also of how that relates to what everyone else does. Exploring the potential of sharing personal data is still very much in its infancy: we argue that scholars in this field have not yet adequately explored the potential of sharing data in order to support people in making use of PI tools, in particular the stages of reflecting on data and identifying actionable outcomes. In this paper we will illustrate how sharing personal data in the form of firstperson perspective photographs can do this. We then go on to discuss how other tools have begun to explore and make use of data sharing to support reflection and behavior change, and opportunities and questions to be explored in this space in the future.

## Sharing data and reflection

Social Reflection around SenseCam Images. In previous work, we looked at the role photographs taken from a first-person perspective by a wearable camera could play in supporting teachers' reflection on their practice. Of all the ways images supported teachers' reflection, we were struck by the ways in which sharing and discussing them with others supported both teachers' own and others' reflection [2].

This research made use of SenseCam, a wearable digital camera, which automatically took 3-4 photographs per minute. Worn round the neck like a pendant (figure 1), the captured images were later downloaded to a computer and viewed using custom software that played them back like a sped up movie (figure 2)[6]. In order to explore SenseCam's potential to support teachers' reflective practice, teachers were asked to wear SenseCam for a 1-2 hour lesson and then later were observed reviewing the images. Many of these sessions were 'social reflection' sessions: the images were viewed by the teacher who had been wearing the SenseCam and either a peer or mentor. We observed two main ways in which sharing this image data about the lesson supported participants' reflection: firstly, other people supported them in making sense of and reflecting on the images they shared; and secondly seeing other people's images helped them put their own data into context and gave them new insights into how to do things differently.

1: OTHERS SUPPORT YOUR REFLECTION ON YOUR OWN DATA We found that the images supported the teachers in returning to the lesson, and in going through and remembering and explaining what was going on and what they were thinking at the time. In doing this, the



**Figure 3** The *Tidy Street Project* public floor display



**Figure 4** The competition page in the Fitbit iOS application

other person was both able to gain insight into what the teacher was doing or thinking, but also to question that, and to suggest alternate explanations for events. Images often illustrated or provided evidence for a point the teacher was making. But they could also be used by the other person to illustrate or provide evidence of an alternate point of view/interpretation of events. Finally the images often showed or revealed things that the teacher had not noticed at the time – and another person looking at the images could also point out things that the teacher had overlooked.

2: GAINING NEW INSIGHTS THROUGH SEEING OTHER'S DATA As we said above, images reminded teachers of the events of the lesson, and prompted them to share their thoughts at the time with the other person. As well as this opening up the teacher's thoughts to be questioned and challenged by the other person, this also gave the other person an insight into how the teacher did things, enabling them to contrast their own personal experiences with this. This sharing of experiences was very important for both participants to put their own experiences into context, and to suggest alternate ways of doing things.

All of these processes are important elements of reflection: transformative reflection, which is the type of reflection that can lead to behaviour change, is defined along the lines of "Revisiting an event or knowledge with intent to re-organise and/or do something differently. Asking of fundamental questions and challenging personal assumptions leading to a change in practice or understanding" [p3, 3].

Sharing other forms of personal data Data sharing has also been used to aid reflection and support behaviour change in other situations, for example energy use, health and fitness.

Smart energy meters, which give people feedback on their household energy usage, have been the focus of much HCI research in the past decade. There have been a few initiatives which have explored ways in which sharing this energy data can lead to reflection and behaviour change. For example, in 2011, The Tidy Street Project [1] encouraged people to log their household energy consumption and upload it daily to a database. The combined energy usage of 'Tidy Street', a residential street in Brighton, was then publicly displayed against the Brighton average via a chalk graphic on the street (figure 3). Sharing data in this way enabled residents to put their own energy usage into context as they could see how what they used compared to their local community and to the wider Brighton community. It also triggered discussion within households (members of the family reflecting on what was contributing to their energy usage and how this could be managed), and also discussion with passers by who were curious about the display. However, whilst this initially lead to a reduction in community energy usage of 15%, many households had reverted back to their previous usage after six months. Sharing data in this way also triggered a 'tendency to the norm' effect where people who used more energy than average were encouraged to reduce their energy usage, but also, people who used less sometimes increased their usage when they knew how their data fitted in context.

Research has also explored the benefits of sharing personal information that some might consider very personal – for example personal health records [5]. PatientsLikeMe is an online patient community which allows patients to post data on their current treatments, symptoms and outcomes and use this as the basis of communication between them. This was found to have various benefits to the patients including supporting them in sharing their experiences and health advice with each other, and in understanding their own condition in the context of others with a similar condition.

Activity trackers (such as the *Fitbit* and *Jawbone*) automatically quantify and record the number of steps taken each day, and in addition they also include many embodied social features. Some work has shown that trackers may not always be reliable, sometimes preventing users from always counting steps [10]. Therefore more work is needed to understand the value of sharing personal data, especially if users have an incomplete record. Social features allow users to share data on social networks or use built-in functionality to chat, compare personal data and compete against each other [3,8]. However, the implementations of social functions in these systems vary considerably depending on the system: from those that only allow sharing of recorded data onto other social networks (e.g. posting to Facebook), to complex communities and challenges built into the personal informatics system itself. Many of the underlying assumptions behind the design of these sharing features are to do with motivating behaviour: the ways in which these functions can support reflection as described above and the difference in effectiveness between these approaches is still little understood, and research is needed in order

to understand what the implications of sharing personal data in this way are.

For example, the "challenges" feature offered by Fitbit allows users to create time-based challenges (from one day to one week) with up to ten friends, providing a leaderboard and group feed. When a user takes part in a challenge they are presented with a feed of activity showing data from themselves and all other competitors in the challenge: with messages, stepcount and leaderboard updates (figure 4). Through this functionality competitors' activity is presented in a more salient manner than a leaderboard alone and it offers users the ability to annotate their activities (e.g. posting comments explaining their routine or what has contributed to their daily count, etc.). Such annotations are one way in which these systems may help encourage other users to reflect on their own behaviour and consider alternative ways of reaching their own targets, along with giving the opportunity to "cheer" and comment on others' activity.

#### Conclusions

Therefore, sharing personal data is not a new concept and research in a number of different fields, of which we give only a brief snapshot here, has suggested that it can be a powerful mechanism for supporting reflection. In this paper we hope to highlight this potential and flag it up as something to consider for the future of PI tool design.

#### Acknowledgements

Daniel Harrison is funded by an EPSRC DTG studentship.

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