Co-Designing With and For Chaotic Lives: #Patchworks, a Catalyst Case Study.

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Abstract
This paper presents the Catalyst project model of a community-University research partnership by introducing #Patchworks as a case study. #Patchworks is an eight-month Catalyst sub-project or 'sprint' during which a team made up of researchers, homeless people, charity volunteers and DIY-bio amateur scientists worked together through a series of hands-on DIY workshops to investigate how digital technology could address homeless needs. As a result, a unique prototype was co-designed and developed which complements and extends the services provided by community organizations to those who are vulnerable and live chaotic lives.

Author Keywords
Co-design, community, citizen-led, vulnerable, homeless, multidisciplinary, health

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

General Terms
Design, Human Factors, Management.

Introduction

In this paper we describe the application of the Catalyst model to #Patchworks, one of the first Catalyst sub-projects or sprints. We describe the Catalyst model, which, we argue, goes beyond 'Research in the Wild' [14] by striving to create research partnerships between community groups and academics where both parties play equal roles in defining research questions and delivering research output. The #Patchworks team is a partnership between three 'communities': (1) a Lancaster-based cross-disciplinary team of academics comprising anthropologists, computer scientists, sociologists and bio-medical scientists; (2) staff, volunteers and homeless service users from Signposts - a local charity working with vulnerable people in the Morecambe area; and (3) DIY-Bio 'hackers' from MadLab, a Manchester-based not-for-profit community of innovators. The team engaged in an eight-month co-design and development process that produced #Pat a prototype for a low-cost open-source technology communication device that aims to improve support services for the homeless.

This paper presents a novel form of co-design process with vulnerable people. The key novelties are twofold: (i) the inclusion of the hands-on DIY skills workshops into the process; and (ii) the application with those leading 'chaotic' lives, and associated challenges.

The Catalyst Project

A recent trend in Human-Computer Interaction (HCI) is to take researchers away from the safety of their labs and ask them to carry out development embedded within a community. This so-called 'research in the wild' [4, 2, 9] is seen as a paradigm shift in HCI but 'in the field' research is already commonplace in the social sciences [9]. In this paper, we report on an attempt to go beyond RIW: RIW places control firmly in the hands of researchers since they decide the research agenda; in the Catalyst project [3], however, we draw upon methods from co-inquiry [8] and set up partnerships where academics and non-academics have equal status in defining and carrying out the research agenda.

Catalyst (Citizens Transforming Society: Tools for Change) brings together academics from a wide range of academic backgrounds to carry out research on citizen-led digital social innovation. It is a framework of sub-projects, each including multiple academic disciplines and non-academic communities, working in partnership with mutually beneficial goals to address a social need through novel digital technologies.

To reflect upon the ways of working, we apply PROTEE [7], a management process designed to ensure that projects learn from failure as well as success. PROTEE involves a series of dialogues with Sprint and Launchpad project teams to articulate insights to support innovation, project management and multidisciplinarity.

#Patchworks took the form of a Catalyst sub project (sprint) and ran over an 8 month period from March 2012 to October 2012. The #Patchworks team was formed with the aim of developing technology to improve the health and well being of chaotic lives.

#Patchworking

An early realization in #Patchworks was the need to explicitly identify and embed human values [14] in the digital innovation mandate of the project brief. An explicit mission statement, which posits the values of

Figure 1. #Patchworks workshop

'respect, trust, empowerment and mutual understanding' as fundamental research principles, has helped to overcome many of the misunderstandings and confusion that often arise in citizen-led research projects whose priorities and needs may not 'fit' standard University measures of impact, structures and procedures.

A series of 12 workshops were run, initially exploring DIY techniques, designing prototypes with persona techniques and building physical working prototypes. The original proposal for the project aimed to develop technology to improve the health and well being of chaotic lives. With this in mind early hands on workshops were held in diverse locations and topics from microbe laboratories to electronics construction and repurposing. The emphasis of the workshops was on making things together, with learning, and building trust through play along the way.

The co-design process can be described as comprising three key and overlapping phases: (1) Trust Building & Up-Skilling; (2) Prototype Identification, Selection and Design; (3) Iterative Prototype Production. The process aligned with Sanders and Stappers [12] description of co-designing, with (1) and (2) forming the "fuzzy front-end". The common denominator across phases was the emphasis on learning 'through making' to create a mutual understanding of the needs of the group and the skills within the team. Here 'up skilling' workshops were held as part of the process to bring greater awareness to the project team of technologies and working with those from different backgrounds.

The early workshop depicted by figure 1 introduced participants to practical skills such as soldering and repurposing embedded electronics – building DIY Biosensor kits and repurposing data and connections. Another early workshop was held in a microbe lab, where the team grew cultures of swabs taken from their homes.

To help the whole team appreciate prototypes from a client's perspective, design workshops used persona techniques [5]. Personas were used to explore problems, possible solutions and usability by projecting potentially too painful personal experiences of more vulnerable members of the team onto 4 semi-fictional characters chosen to be representative of Signpost's clients. The personas were constructed from anonymised description of Signpost's clients interactions and way of life, and were used as a reference when discussing and designing technologies.

Design and build workshops produced two paper based 'prototypes' using cardboard and other accessible materials. One was a microbe detector for testing air quality in housing, and one a system for reminding users of upcoming appointments. A decision to go ahead with the appointment reminder system was made, which was then built into a working prototype based on low cost open source technologies. The final prototype '#Pat' is currently located in the foyer of Signposts being tested out by their clients.

The more chaotic members of the team tended to dip in and out of workshops, and frequently they would commit time and show much interest one week and dropping out the next. As far as we can ascertain, this had as much to do with the timing of workshops coinciding with the payment of social security as the content of workshops – indicating shifting priorities and

disrupting commitments. However this made it somewhat difficult to maintain continuity through workshops and did impact the co-design process – with different faces present and some requiring catch up from sessions they missed.

#Pat

#Pat (Figure 2) is a reminder system, which uses RFID technology to identify the user, and prints out a 'receipt' containing a list of reminders personalized for the user. At its core is a Raspberry Pi [11] computer, connected to a RFID reader and thermal printer. #Pat runs a Linux with code written in Python to respond to user identification and print out the latest message. #Pat is encased in a brightly coloured laser-cut acrylic enclosure. The system is low cost, the sum of its parts amounting to approximately £100 GBP at retail prices.

The idea of #Pat stemmed from Signposts clients frequently 'dropping in' and using caseworker time to be reminded of upcoming appointments. #Pat was envisaged to be accessible to users 24/7, with a number of points located around the town, so users can get their reminders on their own timescales. Each user is identified by a low cost (~£1) RFID chip, which can take the form of a wrist band, credit card or keyring. If the user misplaces the RFID chip, then it is simply cancelled, and new one issued. The user can get as many printouts as they wish – they are printed on low cost till receipt rolls, so if lost they can be reprinted.

#Pat reminders are updated by Signposts caseworkers, who update messages whenever new information is available for that user. No personally identifiable information is held in #Pat messages and the only the caseworkers know who has a particular RFID chip.

Figure 2. #Pat reminder printer

The technologies used by #Pat are not in themselves a novelty, however this system was co-designed and co-prototyped by the community themselves in a process which has brought them together to learn from each other and deploy technology to a unique set of circumstances. It could be argued that reminders should be delivered by SMS or Smartphone, however such valuable possessions as mobile phones are often not held long by those leading especially chaotic lives. The located printer and low cost RFID chip solution avoids the need for the user to carry any other devices.

Testing has so far involved deploying the #Pat printer into the foyer of the Signposts drop in centre, and enrolling a handful of clients in the system. This initial testing is not ideal since the system is only available inside opening times, however it gives clients the opportunity to get involved in testing and informing the next generation prototypes.

Impact on lives

With the project engaging with the public and communities, a thorough methodology was required to enable on-going evaluation and capture of the impact the project was having. This took the form of recording and reflecting – transcripts were made of meetings, and video was produced at key workshops. The social science researcher conducted interviews with Signposts clients, volunteers and other team members with the aim of capturing stories of impact relating back to the project. Three Protee dialogues were held during the project lifecycle, these took the form of interviews conducted by specialist researchers (unconnected to the sprint) with the project team, prompting reflection on project process and methodology aiming to gain insight which would support innovation, project management and multidisciplinarity. Some of the stories and reflections are presented here.

"When we brought one of our service users back from Manchester…he said 'there is such a big world out there, and I'm wasting my life, I need to do something'. And to me that summed up what we're about. It was about opening doors to people that wouldn't think of walking through them in normal circumstances."
(Interview with Signposts director)

Throughout Patchworks clients, volunteers and academics valued the opportunity to work with people from all walks of life, and felt that this expanded their horizons, including improved networks of contacts and support. For individuals there were benefits such as personal growth, learning new skills and using imagination leading to increased confidence, more involvement in Signposts and the impetus to achieve more stability in life. It was significant that there was continued enthusiasm and involvement for the project amongst people with chaotic lives [1, 6]. This impact is extremely hard to measure because by definition clients at this centre are hard to reach.

At an organizational level the #Pat prototype has been integrated into Signpost's enrolment of new clients because it is anticipated that it will be reassuring for them, reducing stress and providing important information when staff are not available. Through increased familiarity with design processes the directors had the confidence to collaborate with designers on a new website design and to think more widely about networks and funding, eventually taking ownership of the #Patchworks project and applying for further funding with a consortium of local organizations. The project was also able to make Signposts and Madlab more visible to a wider audience through a launch event, radio interviews and an article published in the Big Issue[1], a popular UK magazine published on behalf of and sold by homeless or vulnerably housed people. Signposts are now also actively looking for future collaborations with University which is a complete reversal of originally held preconceptions of University people as 'distant' and irrelevant to their working lives.

Conclusion

Life for the #Pat prototype will continue, and it is considered essential that next generation prototype be placed outdoors and accessible 24/7. A consortium of organizations led by Signposts is exploring avenues to secure funding for this next phase.

[1] http://www.bigissue.com/mix/latest-issue/1824/issue-1033

The #Patchworks project had impact which reached far beyond the prototype developed. Joining the dots between organizations via the Catalyst model and working closely together has led to the increase in tech awareness within Signposts, and awareness of 'DIY' tech communities has awakened the desire of learning in some signposts volunteers and clients. The academic value lies not simply in the end prototype developed, but in the process of engaging and establishing the tools and network for community groups to be empowered to co-design their own solutions. Of course the practicalities of joining up different perspectives and ways of working have required empathy and facilitation, however #Patchworks has shown the methods and process employed have great value.

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