

**DESIGNING COMMUNITY-DRIVEN, SOCIAL
BENEFIT APPLICATIONS USING LOCATIVE,
MOBILE AND SOCIAL WEB TECHNOLOGIES**

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Keywords

crowdsourcing, information delivery, interaction design, locative media, mobile design, not-for-profit, online communities, participatory design, practice-led research, responsive design, social benefit, social capital, social inclusion, social networking services, social networks, user-generated content, web apps, web development.

Abstract

Providing information, connecting community members, and improving access to support services and resources is important to individuals in times of personal need, and to entire communities in times of crisis. Through providing information, connecting people and improving access to resources, community organisations can help to counter social disadvantage, support communities and foster individual and collective resilience. In recent years, many non-government organisations (NGOs) and not-for-profit (NFP) agencies have taken advantage of online information communication technologies (ICTs) to broaden their reach. Now, emergent technologies such as mobile applications, locative media and social web technologies present new opportunities to improve access to relevant resources by aggregating, filtering and meaningfully displaying the burgeoning amount of information available online. They can also help to build social capital by enabling community members to actively participate in support services and contribute resources for the benefit of others.

However, achieving the goals of improved access to local information, resources, services, events and support; participation in community initiatives, local networks and supportive online communities; and capturing knowledge and resources from community members to build social capital requires new interaction design frameworks and models. This research project focuses on the design of interactive applications that harness new technologies to achieve these goals for social benefit.

This project has employed a practice-led, ‘effective’ design methodology. The research was predicated on a set of design principles that were derived from a research base drawn from a literature review of concepts such as online communities and persuasive media, and a contextual analysis of social benefit applications. Two tangible social and locative media applications were realised through the application of the established design principles together with agile, participatory methods which involved collaboration with community organisations and stakeholders. Share Our Sunshine and Upraxia, are presented as project outcomes that operate as instantiations of the research findings. From the evaluation and analysis of these

demonstrational applications, the propositional set of design principles has been tested and consolidated. The principles provide a contribution to the field of interaction design, particularly web communities focused on aggregating local information.

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Definitions used in this thesis

Community in this research project, refers to like-minded people, local suburbs and neighbourhoods, or a nationwide context, in online and offline forms. Community is described by Fry (2009, 114) as a bond that accommodates personal differences and connects us to others to counter-act the isolation people feel as individuals.

Community disadvantage is “the complex cluster of factors that make it difficult for people living in certain areas to achieve positive life outcomes” (Hayes, Gray and Edwards 2008, 2). A broad definition of those who are socially disadvantaged is provided by the Australian Institute of Health and Welfare (2009, 4) as, “socially excluded Australians who experience complex and multiple forms of disadvantage related to income, work, health, education, safety and support.”

Community organisations include **not-for-profit** (NFP) and **non-government organisations** (NGO), terms that are often used interchangeably with “community sector”. A common feature of such organisations is the nurturing role they play in communities (Felstead and Stockdale 2012, 134). NFP and NGO agencies provide support and services related to health, education, welfare and advocacy to communities free or at minimal cost.

Data in the context of this research project, refers to automated ‘background data’ such as time-stamps and location identification, analytics of use, which establish frequency of use and perceived usefulness of content, and the online contributions made by users to application databases, including specific details and locations.

Locative media is “location-aware technology”. Various types of locative media (web, mobile) provide a means for displaying data geographically and adding a layer of information to the data in the form of social annotation (geotagging sites with content and meanings); commercial annotation (geotagging with specifically commercial content); location-based services (providing information on surrounding businesses and sights based on GPS location); navigational

annotation (providing directions which is otherwise known as 'wayfinding'); and location-based gaming (Collis and Nitins 2009). This project primarily focuses on social annotation and location-based services.

Mobile design in this project refers to applications developed for mobile platforms, including apps for smartphones, in addition to websites that are optimised for view on smartphones and other mobile devices. There are two main types of smartphone apps: **native apps**, which are developed using a platform's coding languages and have access to hardware; and **web apps**, which are websites that have been optimised for access through a smartphone (Stark 2010, 1).

Persuasive media focuses on how experiences with technology can be improved through captology or “planned persuasive effects” and “built-in persuasive intent” of technology (Fogg 2003, 16-17).

Responsive web design involves techniques used to design a single website across multiple sized devices including mobile phones, tablets and desktop computers (Lawson 2012).

Social networking services (SNS), or social media applications, are predominantly designed to support individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view and traverse the connections of others within the system (Boyd and Ellison 2007, 2).

Creative practice

Share Our Sunshine <share.social-goodness.com>

Upraxia <social-goodness.com/upraxia>

Visit social-goodness.com/desdoc for further design documentation.

Publications arising from the research

BOOK CHAPTER

Gough, Kathryn, and Jillian Hamilton. 2013. “Improving the design of online applications for social benefit through a behaviour change model”. In *Persuasive Technology*, edited by Shlomo Berkovsky and Jill Freyne. Berlin: Springer.

CONFERENCE PROCEEDINGS

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Statement of original authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

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1987 - 2013

Introduction and background to the research

Providing information, connecting people, and improving access to support services and resources is essential for communities in times of crisis, such as in the event of a natural disaster. It is also crucial to individuals who experience life challenges such as unemployment, homelessness, domestic violence or illness, as well as those experiencing long-term social disadvantage.¹ In all of these circumstances, there is no doubt that government agencies, non-government organisations (NGOs) and not-for-profit (NFP) agencies, as well as individuals, have a role to play in ensuring effective access to information, connection within the community, and short or long-term support. Such contributions help to foster the capacity of individuals and whole communities to face challenges, resolve problems and cope in the short and long-term. Price-Robertson and Knight (2012, 6) argue that when “organisations, services and community members work interactively and transparently to ensure correct information is communicated in a timely and effective manner” they become an “enabler of community resilience”. That is, community agencies and volunteers not only provide a safety net, they can enable individuals and entire communities to bounce back.

Historically, the distribution of community information has been achieved through word of mouth, public advertisements, printed information brochures or mainstream media. The capacity of online mediums is not only in extending the reach of support, but providing up-to-date and targeted information dissemination. In recent years, many NGOs and NFP agencies (that is, agencies that provide free or minimal cost health, education, welfare and advocacy support and services) have broadened their information reach. They have extended beyond traditional communication mediums (such as brochures, newsletters, and face-to-face advising)

¹ Long-term social disadvantage is defined by the Australian Institute of Health and Welfare (2009, 4) as “socially excluded Australians who experience complex and multiple forms of disadvantage related to income, work, health, education, safety and support.”

into online information communication technologies (ICTs) and what Notley and Foth (2008, 9) describe as the one-to-many, many-to-many, and one-to-one forms of communication made possible by the Internet.

Access to both generic and local, context specific information is undoubtedly important in times of need. During natural disasters for example, mainstream media is relied upon by communities for general alerts and updates and, for individuals, some of the most valuable information is produced at a local level and distributed online (Poblet 2013). An example is the floods that occurred in late December 2010 and early January 2011 in Queensland, Australia. Three quarters of the state was declared a disaster zone and many central community service organisations' infrastructure, buildings and warehouses were inundated and therefore unable to function. In response, community members collaborated online to provide resources and support to those affected (for example, distributing household goods and offering help to clean up). This was primarily driven by social networks such as Facebook groups and Twitter (Bruns 2012, 145).

However, such efforts to provide wider and more diverse sources of information online have inadvertently led to an unanticipated problem. The sheer amount of information now available to those facing a crisis is unprecedented, and it can be overwhelming. Not only is the quantity of online information now vast, it is also disjointed—scattered across service providers' web pages. As each of these has a different layout and system of categorisation, the information is not consistently presented. Furthermore, information and advertised service provision may be geographically restricted or temporally limited in its applicability. While social media may provide more timely and individually relevant information, because social media posts are not aggregated, moderated or checked before being published, information may be scattered, inconsistent, inaccurate or even malicious.

For individuals who are already under pressure, sifting through a diverse array of formal and informal information sources can be time-consuming; finding sources that are current, appropriate to their locality, and relevant to their specific needs can be frustrating; and confidence that information is trustworthy can be compromised.

In 2009 the Knight Commission² explained this dilemma in a report entitled *Informing communities: sustaining democracy in a digital age*. Establishing that the most common approaches that people take to finding information about local community services are using the Google search engine; searching local websites; and tapping into informal social networks (Thierer 2011, 61); this report went on to point out that there is not a problem with the amount of information now available to communities and individuals via such means per se, but that strategies for finding what is relevant are potentially time-consuming and inefficient. It concluded that the problem that has arisen in relation to information provision is to recognise that a profusion of information must be organised in a meaningful way (Thierer 2011, i). The report therefore recommended that each community should offer at least one, well-promoted, online aggregation portal, which filters the range of information and sources of support that are locally available (Recommendation 15, Knight Commission on the Information Needs of Communities in a Democracy 2009, 16).

That is, to improve access to information, what is needed is a centralised synthesis of resources, which aggregates information into that which is contextually relevant (locally appropriate and current); inclusive (taking account of vision impairment, access to technology and platforms and so on); and trustworthy and reliable (authoritative and verified). The need for a centralised service or online application to consolidate, verify and filter a sea of information into a logical and abridged display of what is locally applicable, helpful, and credible became clear during the Queensland floods.

While such events highlight a pressing need for an aggregation service during community-wide crises, such an application would, of course, also benefit those facing day-to-day crises. The need for support is something that individual people experience every day, not just during natural disasters. At one time this was an issue in my own life, as I searched for appropriate community support agencies during a period of need. My experience of a community crisis during the Queensland floods, and a personal crisis during my youth have together driven my passion for this design research project. In different ways, they have highlighted the need for a tool

² The Knight Commission was set up by the Aspen Institute, an American education and policy think tank, for the purpose of examining the information needs of communities. <<http://www.knightcomm.org>>

that aggregates formal and community produced information, support and resources and presents them in a way that is both accessible and contextually relevant to individuals and communities in times of need.

HARNESSING NEW TECHNOLOGIES FOR EFFECTIVE INFORMATION DESIGN

The emergence of technical advances in the form of data aggregation, locative media technologies and the mobile web presents an unprecedented opportunity to produce such an online aggregation portal. In the context of this research project, data refers to the online contributions made by users to application databases, including specific details and location. New data aggregation capacities enable the collation of diverse content forms into a database, and ‘metadata’ tagging and annotation tools enables identification and clustering of content types and categories, thereby giving meaning to data sets. This can be supplemented by automated ‘background data’ such as time-stamps and location identification, which enables further category types, while analytics of use can establish frequency and perceived usefulness of content.

New forms of information display can enable the meaningful display of such collated data. Locative media is a particularly powerful development for aggregating information and presenting it in a context-specific way. A relatively new, and increasingly popular online mapping approach, it draws together digital capacities (such as GPS positioning systems and digital cartographic technologies such as Google Maps and Google Earth) and affords the geo-tagging of content (in the form of image, sound and text) with spatial coordinates (Hamilton 2009, 2). It can be harnessed for the purposes of filtering and presenting geographically specific information through mapping interfaces.

Data aggregation and locative media technologies offer NGOs and NFP agencies the capacity to representationally combine the services and resources that they collectively provide; and to consolidate their presence by mapping their geographical relationships with each other, along with a holistic representation of services, sources of information and support within a community. From a user perspective, when effectively designed, locative media presents an opportunity for

individuals to find and relate what they are looking for through a lucid process of engagement. As a means to visualising spatial information then, locative media applications can help people to conceptually and representationally map and visualise spaces and localities, as well as their own experiences and potential journeys through them. In this way, it not only facilitates improved access to local, appropriate information and services, it can encourage participation in them.

Mobile technologies, in the form of Internet-enabled devices, also offer an important opportunity to improve access to information. There are two emerging approaches to mobile web design. They include the creation of smartphone apps (applications), which can be either native (developed using the platform coding languages with access to a device hardware), or web apps (websites that have been optimised for smartphone) (Stark 2010, 1). The latter involves optimising web sites for viewing on a range of mobile devices. This can be achieved by ‘responsive web design’, which involves producing one website that is optimised (through the use of Cascading Style Sheet (CSS) themes) for viewing across devices of different screen sizes (Lawson 2012). When thoughtfully designed and implemented, mobile apps and themes can increase the reach of information, as well as provide the capacity to upload information while on the move, because it bypasses the need for desktop computer access.

The latent potential of new data aggregation, locative, and mobile Internet technologies then lies in their ability to effectively aggregate, synthesis and filter information; to display it in a contextually meaningful way; and to increase access through the deployment of a both static and mobile platforms.

Complementing these new ways to display information and increase access are advances in social web technologies, which offer the potential to extend the information and support provided by agencies. Community participation has long been understood to be an important factor in developing effective online applications. Indeed, it is well-recognised that contemporary interaction design reflects a shift in design practice from a “traditional practice” (which primarily employs graphic, product and technology design to improve access to information) towards “emerging practices”, which takes account of experience, service and social design as it relates to social networks and online communities (Sanders and Stappers 2008). Now, new technologies provide the opportunity to develop applications that

encourage and support community members to actively contribute contextually specific information, to annotate information, to provide advice on services, to build resources of their own and to connect with others to build online and offline relationships.

Participation in the social web provides the opportunity to collaborate in resource provision. This enables capturing the tacit knowledge of individuals to improve the quantity and quality of information that is provided to people in need. Undoubtedly, the greater the number of (accurate) contributions made to an information resource, the greater chance there is, in turn, of individuals finding information that is relevant to them. By facilitating community-generated contributions to information and resources in this way, new social web applications can help build social capital.

HARNESSING COMMUNITY PARTICIPATION

Community has long played an important role in supporting people in need by providing information, recommending services, volunteering, and offering material and financial support. Community might therefore be envisaged as a resource that can be harnessed to collectively and cooperatively help prevent individuals from slipping through the net; to decrease social isolation by enabling connectivity; and to enable individual and community resilience. In these regards, community has the potential to build and extend social capital, which is perhaps best defined by Bourdieu (1986, 248), in his text *Forms of capital* as, “the aggregate of the actual or potential resources [linked to] a durable network of more or less institutionalised relationships of mutual acquaintance and recognition—or, in other words, to membership of a group.” That is, it is the group's contributions to the network of resources and supportive relationships that grow social capital. Attempts to facilitate participation in such activities can improve the ability for people to engage in society and their local community, and this is considered a way of enhancing social capital. This point is argued by Blokland and Savage (nd, 13) who state that:

[...] wide ranging attempts to stimulate participation in all sorts of voluntary associations, community action and organisation and other forms of civil society, as such participation is held to create cohesion in a geographical unit

as well as to enhance individual's engagement in 'society' and thus by definition their social capital.

These networks of trusted connections can generate social capital through aggregating community information.

Bourdieu's definition of social capital has the "advantage of defining the term in a clear and focused, if not reductive way", as it is increasingly losing its clear specificity in literature (Blokland and Savage nd, 2). However a broader definition is provided by Putnam which hints importantly towards an understanding that social ties produce co-operation and trust (Blokland and Savage nd, 2). Putnam (1993, 4) defines social capital as self-reinforcing and cumulative trusts, norms and networks in which successful collaboration facilitates future collaboration in unrelated tasks by building connections and trust.

Social web applications not only function as hubs of valuable community information, they can also promote involvement in activities. Members can encourage each other to participate in local community initiatives and networks, and services provided by them. Moreover, facilitating social connections can thereby help to engender the provision of direct and indirect support to people in need. The approaches and principles of 'persuasive media' can be harnessed to encourage and facilitate such community contribution. Persuasive media, which has recently emerged in response to the capabilities of mobile and social technologies, involves designing purposefully to enable "planned persuasive effects" within technology applications. It involves what BJ Fogg calls captology or "built-in persuasive intent" (Fogg 2003, 16-17), such as increasing the motivation of users to contribute. In this case, this involves participation in building community information, resources and activity that purposefully contribute to social benefit.

A range of new technology capacities can therefore be drawn upon to improve access to information that is local, timely, relevant and meaningful to individuals; and to encourage participation in local initiatives and networks. However, doing so effectively involves more than simply incorporating web, mobile and locative technologies. It requires new interaction and information design principles, models and frameworks, which promote accessible interfaces and engage communities in using technologies effectively and efficiently to build social capital and community connections.

RESEARCH PROBLEM

Situated within the field of information design and, more broadly, the field of interaction design, this research project has set out to investigate how emergent locative, mobile, and social web technologies might be effectively combined in ways that improve access to information in ways that are contextually relevant to individuals and communities in times of need and to facilitate the collaborative production and sharing of information and resources by agencies and individuals. This, at its heart, is a design problem: enabling community generated social capital building, and promoting participation in community events and support services, requiring the establishment of principles, models and practices for enabling access to information, promoting participation in community events and services, facilitating interactions between people and products, and building social capital building, through the integration of locative, mobile and social web technologies. It is a problem that focuses on effective and persuasive design for social benefit.

RESEARCH QUESTIONS

This research problem gives rise to a principal research question, which underpins this investigation, namely: How can web applications be purposefully designed to harness new locative media, mobile and social web technologies for social benefit in ways that effectively enable service organisation to display, and people in need to access, resources with greater ease; facilitate community connectivity; and encourage community participation in building social capital?

Within this overarching research question sits a number of sub-questions, which have guided the investigation. Firstly, do exemplars exist that are aligned with this intent, and what insights into their effectiveness can be drawn from them? Secondly, what interaction design and persuasive media theories can be drawn upon to enable the effective use of new technologies to address the research problem? Thirdly, how can community agencies contribute to a better understanding of the research problem, help to establish contextually specific needs, and ensure quality of the outcomes? From this contextual review of existing exemplars; analysis of theory; and establishment of a contextually specific needs analysis and contextual

framework, what design principles might underpin a purposeful approach to resolving the research problem? And, finally how might these principles be realised in practice to produce exemplary solutions and the creation of demonstrational prototype web applications?

PROJECT AIMS AND OBJECTIVES

In line with these overarching research questions, this research project has set out to investigate how emergent mobile, locative and social web technologies might be incorporated into a designed application or tool for social benefit—in ways that support community service organisations to more effectively achieve their aims of information and service provision; enable people to more readily find and access relevant and appropriate information and community services; encourage online and offline community connectivity; and help build social capital by facilitating cooperative approaches to producing and sharing information and support. It has done so through a scholarly investigation of the fields of emergent technologies in addition to applications designed to improve social benefit in some way, and a participatory research methodology involving an agile design process. This process of interaction design has enabled principles for engagement in online communities to be created alongside exemplar demonstrational applications.

These prototype applications are both situated in the field of locative media by taking data on local community services that are available and visualising them through a geographical context. By visualising the extent and range of local support available to those in need, these applications form exemplars of how locative technologies can be utilised to improve access to local information. This in turn, can improve the ability for individuals to source help in times of need.

It is important to note that the primary focus of this research project is not designing for social benefit per se, but rather establishing design principles for web applications that can help to facilitate participation in community initiatives for social benefit. Furthermore the focus of this research project is on designing solutions for specific local community contexts, rather than fulfilling broader social benefit agendas. Therefore, the functional aim of this research project is to develop design principles and to test these principles through the design of prototype

applications then apply them in practice for the purposes of supporting individuals and communities in time of need.

It should also be noted that since the research was undertaken over 2011 to 2013 that by the time of publication there may have been shifts in the fields of locative, social, mobile and persuasive technologies. However, the design principles established throughout the research process and provided as outcomes are pragmatic in that they are focused on leveraging established technologies and therefore can be applied to other web applications developed for social benefit.

To achieve this aim of establishing design principles that optimise the potential of new technologies to aggregate, expand and collate information on community services; facilitate participation in online communities and activities; and encourage and enable user-submitted contributions, the following research objectives have been pursued. First the project has involved investigating existing models and exemplars of mobile, locative and social web applications from which exemplary principles, strategies and technological approaches have been drawn. Second, the research has involved establishing a clear understanding of needs through a participatory approach in which NFP agencies were involved in various aspects of the design process to inform and shape the web applications developed. Thirdly, the investigation has involved an evaluation of how the fields of interaction design and persuasive media might inform the design of applications for social benefit.

By triangulating the findings of these three approaches, the overarching objective of the research has involved establishing a set of design principles for aggregating and displaying information in ways that are contextually (geographically, temporally and individually) meaningful and designing with mobile approaches to increase access to information sources and services. It has also involved developing design principles and persuasive approaches to encourage and enable contributing to online communities in the immediate and long-term. These design principles are therefore derived from a combination of my previous research project; secondary sources (literature, current and past web applications, and community support initiatives); and primary sources (such as contributions from staff at community agencies).

The primary and culminating objective of the project has been to apply these principles in a design framework and develop exemplar prototype applications

through an iterative application design approach involving two NFP support agencies. The principles developed are the primary contribution to design research and the practice has been a way to test their implementation in form and in practice and to refine and resolve them. The demonstrational applications produced not only provide contextual specificity, they also help to clarify user needs, and provide a context for evaluating the efficacy of the applications, and hence the principles that are proposed. Therefore the applications are artefacts developed as a social-change trigger and this forms the centre of this project, not the act of designing itself.

PROJECT APPROACH

In concrete terms, this research project has involved establishing a set of design principles for increasing access to information, services and support for people in need. These principles are then applied in practice through a contextual framework approach and the development of exemplar online, locative and mobile applications. The research process has therefore involved a practice-led research approach employing an ‘effective’ design methodology. This approach generated tangible outcomes in the form of new social and locative media applications developed as instantiations of the research findings. As design research, this project can best be described as ‘effective’ research, which involves solving a design problem to make a product, practice or process more efficient or effective.³

As Smith and Dean (2009, 8) point out, practice-led research is “often carried out collaboratively”, but here collaboration is not simply the approach to developing a project outcome; it provides the context for its purpose as well as its implementation. In line with the goals of community involvement and collaboration, a participatory design approach has been pursued, which is described in detail in the Methodology chapter. This has involved collaborating with community agencies in various aspects of this research project as stakeholders, including contributing insights on issues, opportunities and risks to the design process as well as evaluation.

³ ‘Effective’ research sits in contrast to ‘evocative’ research, which uses an artistic approach “to produce affect and resonance through evocation” (Hamilton and Jaaniste 2009, 5).

From a pragmatic perspective the two demonstrational applications have provided a contextual framework for the development of applications for local community benefit. From a research perspective, they provide a means to employ and test ways in which current technologies⁴ can be designed to harness social capital for social benefit in local contexts. The case studies partners include Green Cross Australia and Community Queensland, both NGO and NFP agencies situated in a local context (Brisbane, Australia). Their contributions have been essential to the research process and the project outcomes.

The aim of these applications has been to formulate instantiations of the research findings and the design principles that have been developed, in concrete form, through an iterative design process. The tangible project outcomes are therefore tailored solutions for these community organisations, but they involve the implementation of the design principles, which are generalisable.

They have enabled an iterative design approach, which means that lessons learnt have been taken forward to improve the design of subsequent applications. In this regard, this PhD project builds upon an initial locative media community benefit application that I developed in my Honours research project entitled PetSearch. (See Chapter 1 for a summary.) The design principles established through it are extended and refined in the first application (Share Our Sunshine) and the second application (Upraxia).

More specifically, Share Our Sunshine involved an investigation into the research question: How can web applications be designed to provide ease of access to locally relevant information and encourage end-users to advise and help each other, and to provide information on support services after natural disasters?

The second application, which is entitled Upraxia, was shaped by reflections upon the first, as is appropriate to an iterative design approach. It sets out to address the problem of synthesising dispersed and diverse information sources provided by community organisations into an effective aggregation portal that enables the meaningful categorisation and geographic visualisation of information, resources and support. It extends the approach of the first application by applying principles of

⁴ Current at the time of the research investigation

persuasive media and, through a participatory approach involved collaboration with a local community organisation.

PROJECT OUTCOMES

This research approach has resulted in two substantive project outcomes. The first is a set of design principles for other web applications developed to improve social benefit. They are presented in Chapter 6 of this exegesis.

The second project outcome involves applied research through creative practice—and takes the form of concrete exemplars or instantiations of the principles in the form of two demonstrational prototypes, which are functional web applications. The project is called ‘practice-based’ because this is a CIF requirement (when an assessable artefact has been developed as part of the PhD submission). For the purposes of this particular project, the search for design solutions and the elaboration of principles resulting from this search forms the major contribution. This is in contrast to some other creative projects in which reflective journals form the major contribution.

The first demonstrational prototype, Share Our Sunshine, which can be viewed at share.social-goodness.com, was produced in response to the 2011 Queensland floods. It is an example of a web application that enables individuals to locate available resources when they need to rebuild their lives after a natural disaster. A locative media application that takes the form of a website developed using the Drupal content management system (CMS), this prototype demonstrates how the design principles established through this research can be applied to effectively aggregate and visually display local community information, facilitate social collaboration and contributions of support, and display the support and services offered by community members (such as voluntary work, goods and services) to enable ease of access to them. The application provides an example how social capital in the form of the visualisation of aggregated information on local disaster relief support can be facilitated, which can benefit those affected by natural disasters in the future.

The second prototype outcome, Upraxia, which can be viewed at <social-goodness.com/upraxia>, demonstrates how information, services, support and events provided by a range of community NFP and NGO agencies can be aggregated and displayed effectively. A locative media application developed out of the Ushahidi open source platform, this prototype application facilitates a socially collaborative approach through strategies of persuasive media. It serves to encourage communications between agencies and individuals and facilitates the verification of information posted by end-users. This application demonstrates, as an extension of the previous application, how social capital through the visual aggregation of information on local community support services can be produced to the benefit of those facing personal crises.

As instantiations of design principles that were developed from the research base, the web design explorations have provided the opportunity to both apply and test them. The design principles have been generalised and, as a project outcome in their own right, might, along with recommendations that have been made here, inform the design and development of online community applications for social benefit more widely.

The creative practice outcomes Share our Sunshine and Upraxia are presented for examination with this exegesis, and are complemented by a website that presents design documentation for the web applications. See <social-goodness.com/desdoc>. The creative practice outcomes (weighted at 40%) and this exegesis (weighted at 60%) represent a symbiotic relationship and both are integral to the research findings. The creative practice is weighted heavily as innovation is produced through the demonstrational applications.

THE EXEGESIS

This exegesis is therefore an attendant and integral part of the research outcomes. It presents the rationale for the project; provides research background in the form of a literature and contextual review; outlines the project's methodology, processes, and outcomes; and provides a discussion on feedback and testing and an analysis of the demonstrational application development and outcomes.

The Introduction has first established a program of research and investigation. This includes the rationale for the study, the research problem, aims and objectives and the significance of the research.

Chapter 1 then develops a research base, drawn from a discussion on previous research and the design principles brought forward from it; a literature review of concepts such as locative media, mobile design, social web and online communities, plus persuasive media; and a contextual analysis of current social benefit applications.

A set of design principles is established in Chapter 2 for the effective design of interactive applications for social benefit. These design principles are drawn from the triangulation of the preliminary research findings.

The project's methodology is outlined in Chapter 3. It first includes an explanation of agile research as an established methodology. Participatory methods have helped to guide the design of these applications and these are discussed here, along with the details of the collaboration with community organisations and stakeholders. The chapter discusses interaction design and agile software development as it has underpinned the creative practice and iterative design approach of the project.

Chapter 4 then discusses the unfolding of the research, which has involved an iterative application of the methodologies and project design described in Chapter 3. This discussion includes the recruitment of, relationship with, and advice provided by, the community organisations involved in the application design process. It explains how incremental evaluations and reflections have served to progress design outcomes including both the design principles and the resulting applications. It also takes up the discussion on the design principles that have been developed and extracted from the introductory investigation, including the research background and contextual review. It explains the value drawn from these principles and how they are applied to the context of the applications that form the outcomes.

The first project outcome (the two applications, Share Our Sunshine and Upraxia) is discussed in Chapter 5. This includes a description of the prototype applications in context and in use. The evaluation and analysis of these applications are also discussed in this chapter.

In Chapter 6, the design principles drawn upon throughout this research project are consolidated and discussed in relation to how they can be applied to better the design of other community-driven applications developed for social benefit.

This exegesis is then concluded, emphasising the research significance of this project, and future research directions. In addition to the exegesis, web applications and resulting principles, a number of publications form the outcomes of this project. Currently, one conference paper has been published, as has one book chapter. Two papers have also been prepared for submission to appropriate journals. These are included in the appendices as Appendix A: Papers prepared for publication.

Chapter 1: Literature and contextual review: Local communities and online information delivery

INTRODUCTION

This chapter presents a literature review of key theories drawn from relevant academic and professional literature, along with a contextual review of the technologies that the project has applied (including locative media, mobile applications and social web technologies). It also provides a review of early digital applications that have been developed through the same technologies to improve information delivery for local communities and/or to foster local community participation for social benefit.

In this way, the literature and contextual review situates the research project within the fields of interaction design, persuasive media and online community building, and positions it in relation to recent technological advances and early initiatives that have taken advantage of their capabilities. Contextualising the research project against the backdrop of recent theoretical and practical advances in the fields serves to provide a scholarly foundation to the project and its creative practice. Moreover, the aim of this literature and contextual review is to establish a foundation for deducing a preliminary set of working principles to guide the design of creative practice prototypes, which sit at the heart of the research investigation.

INTERFACE DESIGN AND INFORMATION DESIGN

As noted in the Introduction, this project is situated in the field interaction design and, more specifically, the fields of interface design and information design. Interaction design involves facilitating effective interactions between people and products with a focus on product behaviour and functionality (Saffer 2004, par 3). Interaction design is an umbrella term for different aspects of the design process including user interface design, software design, user-centred design, product design,

web design, experience design, and interactive system design (Sharp, Rogers and Preece 2007, 9). It is therefore a broad field that encompasses many varying techniques and ways of thinking about reaching design solutions. More specifically, it involves designing user experiences through a combination of theoretical research, establishing contextual factors and user needs to establish requirements for a design solution, then conducting practical experimentation and prototyping potential design solutions, with an evaluation strategy to test their use in context (Sharp, Rogers and Preece 2007, 10-14). This reflects the methodological process used in this research project.

The fields of interface design and information design are two of the core interaction design approaches harnessed in this research project. Information design is best defined by Horn (quoted in Cairo 2013, 18) as “the art and science of preparing information so that it can be used by human beings with efficiency and effectiveness.” Information design provides practices and principles for the design of organisation, categorisation, aggregation and visualisation of information. And interface design is best defined by Saffer (2010, 17) as “the experienced representation of the interaction design, not the interaction design itself. The interface is what people see, hear or feel.” Combining the fields of interface and information design provides a strengthened design practice that involves thoughtful consideration of both the experience of application interaction and the organisation of content. This is important in this research project as it involves providing an optimal visual and interactive experience for aggregating information contributed through a collaborative community.

Contemporary interaction design reflects a shift in design practice from a “traditional practice” (which primarily employs graphic, product and technology design to improve access to information) towards “emerging practices”, which take into account experience, service and social design as it relates to social networks and online communities (Sanders and Stappers 2008). This shift has involved a reconceptualisation of the core principles of interaction design to encompass a theoretical, research-based and practical focus on the collaborative, social interactions of individuals online to generate an improved user experience. New technologies offer the opportunity for enacting this shift.

EMERGENT TECHNOLOGIES: DATA AGGREGATION, LOCATIVE MEDIA, MOBILE WEB DESIGN AND OPEN SOURCE SOFTWARE

As I have also outlined in the Introduction, the emergence of technical advances in the form of data aggregation tools, locative media technologies, mobile web applications, and social web structures presents an unprecedented opportunity to extend and enhance established interaction and information design principles and to produce new tools for social benefit. There at least five of these opportunities relevant to this study, which include:

1. Enabling the meaningful aggregation and contextual display of information
2. Increasing access to information through the provision of multiple platforms and data displays
3. Enabling individuals to collate and relate the information and support services they are looking for through a process of lucid engagement and interaction
4. Facilitating the increase of social capital through the opportunities they provide for developing contributory applications
5. Enhanced and extended support relationships through collaborative online communities.

These five possibilities are furthered through the use of open source software, which enables the design and implementation of web applications in ways that are unprecedented in their ease of production and require minimal cost. All of these capacities are particularly useful to social benefit organisations and the aims of this project.

This discussion therefore turns to the nature and capacity of these technologies, and their potential use in the design of web applications for social benefit through effective information delivery, social capital building and community collaboration in supporting people in need.

Data aggregation

Data aggregation tools draw together content forms within a collective database and categorise it into meaningful groups or clusters. Tagging content with ‘metadata’, or content type naming conventions, which describe content types and categories, means that database searches can group and present collated information. Metadata tags can be augmented with automated ‘background data’ such as time-stamps and location co-ordinates and can be integrated into a database from other sources, such as Twitter feeds and other social media applications. Annotation tools can add another layer of meaning to data and the implementation of tagging tools in web applications can enable user contributions to the groupings. And web analytics can log and store statistical data, such as frequency of use, along with user types and their locations.

This combination and categorisation of data ‘types’ means that a taxonomy, or classification of content into meaningful categories within the database, can be produced. In this way, data aggregation can pull together vast arrays of data from a range of sources and enable its collation into meaningful groupings or category types, and interlink it through a taxonomy structure (Bojārs, Breslin, Finn and Decker 2008, 12).

Complementing the classification of data within a database are web applications that provide search, retrieval and presentation tools. Such tools go beyond simply displaying data as an ‘output’ of a search process. They enable a rich representation of the aggregated data, which can be recombined and reconfigured through in-built interaction processes and interfaces.

This is of benefit to applications to support people in need because a ‘sea’ of information can be filtered into meaningful summaries related to a specific subject matter, date of upload, or location for example. This information can be utilised to locate support services and resources, which in turn can improve the welfare of someone in need. While the vast amount of community support information available is indeed valuable to those in need, improving access to such information through meaningful aggregation provides further social benefit by making it efficient and effective to find.

Locative media

Locative media involves a particular approach to data aggregation and visualisation techniques based on geographic locality. 'Locative media' relies upon "location-aware technology" such as Google Maps and other GPS software, and involves both the capture of geographical information (for example the coordinates of the user) as well as the display of aggregated data by plotting content on a map. The principal strength of locative media is its ability to enable the visualisation of place-orientated information through its visualisation techniques.

This means that locative media can enhance the presentation of information in meaningful ways related to geography, through aggregating and clustering site contributions. Perhaps not surprisingly then, locative media applications now exist in great numbers, with numerous sites employing novel approaches to visualising the distribution and density of incidents, businesses, and services. It is used for locating nearby businesses that provide specific goods for example. For the same reason it is also a potentially powerful and valuable tool for community services as it enables visualisation of geographically relevant information, which is often dispersed across a range of locations and agencies. It therefore can improve access to locally contextualised information, support services and agencies within the local area.

In this research project a specific type of locative media, known as social annotative locative media, is of particular interest. Social annotative locative media enables individuals to "geotag" specific physical sites with their own content (Collis and Nitins 2009, 10). In this way, maps can be augmented through community-contributed information (O'Rourke 2004, 11). This means that users can potentially comment on and contribute to the resources that are shown, and so participate in social capital building.

Because of its capacity to not only capture geographical data, and to call up and display locative content in relation to geographical localities, the capacity to enable the annotation of content by users, means that locative media is both a powerful communication and collaboration tool through which meaning can be associated with place and social capital building can be encouraged by a collaborative mapping approach.

Platforms and mobile web

Supporting those in need may also potentially be improved by harnessing new and emergent mobile Internet technologies, which use Android and iOS platforms, as well as feature phones that are used to access the Internet. It is well established that designing with mobile users in mind (that is, people who might access the Internet through smartphones or other mobile devices such as laptops, iPads and tablets) undoubtedly serves to increase the reach of information as access is not predicated upon being physically located with a desktop computer. It also facilitates access to information on the move and instantaneously. Mobile applications now form an important part of how people interact with the world and find new opportunities (Eckles 2007, 147) and the increasing uptake of wireless Internet-enabled devices has served to facilitate increased connection with others online.

In mobile design, device access is an important consideration, particularly when designing applications for those in need. As Adamson (2012, 22) argues “the existence of a technology doesn't imply its availability.” There has been a long-term discussion on the digital divide in Australia. For example, in 2006 the Australian Bureau of Statistics indicated that income was the “single largest determinant of Internet access” (Notley and Foth 2008, 3); in 2010, Bruns and Humpreys (2010, 19) argued that “the lack of opportunities to participate in online environments and to tap into the advantages that such engagements can produce ... may contribute to an increasing digital divide that builds on existing gaps between the haves and have nots”; and a recent government report has continued this theme stating that, “disadvantaged, disabled and vulnerable Australians are often unaware or unable to take advantage of the opportunities digital technologies provide” (Commonwealth of Australia 2011, 23).

This discussion now extends to access to mobile devices with Internet capabilities (specifically access through smartphones). In 2013 the Australian Communications Media Authority (ACMA 2013, 22-24) noted that because 85% of smartphones are bought through post-paid plans, with significant upfront costs, the majority of people experiencing socio-economic disadvantage do not have access. And Anglicare Victoria's paper, *Trying to connect: telecommunications access and affordability among people experiencing financial hardship*, suggests that 57.4% of

respondents (N=325 clients across 25 emergency relief and counselling services) do not have a smartphone. Significantly, the study found that almost one third of surveyed clients who access the Internet do so from free Internet facilities at community services or libraries (Wise 2013, 1-15).

On the other hand, others have argued that the shift to mobile Internet appears to have increased access by a larger and broader cross-section of society (Notley and Foth 2008), and this has increasingly been borne out in statistical data. Telsyte's *Digital Nation 2012* (2011, 23) publication for example shows that Android smartphone usage in Australia has increased substantially,⁵ and a recent CSIRO publication, *Broadband impact and challenges: realising the benefits from the digital economy* claims that while people with a lower standard of living are less likely to have desktop computers, they are as likely to have a smartphone (Campbell et al 2013, 7). This indicates that people who would otherwise be considered part of the digital divide now have Internet access through smartphones. More broadly, research by ACMA (2013, 22) indicates that smartphones and tablets are increasingly used in addition to (not as a substitute for) other hardware such as computers, demonstrating how smartphone usage has driven increased Internet access.

Given that the means of access is varied, the vast range of mobile devices necessitates considerations on how to best design for potential application users and the devices they may possibly use. It has been argued that access to experiences with mobile devices related to learning, for instance, would be improved through less focus on technological affordances (Böck 2010, 30). Similarly, this project proceeds from the assumption that community disadvantage and social need can be improved if people are supported to become more confident with, and informed about, the technologies they are using. In terms of technologies then, mobile web design is investigated in the case studies of this research project, albeit in very different ways, as a means to provide an improved user experience to users on wireless devices.

⁵ Android smartphone purchases increased from 6% in 2010 to 29% in 2011, while iOS devices (Apple smartphones) increased by only 3% in this period (from 39% to 42%) (Telsyte 2011, 23).

The choice of technology and platform should be based on meeting user needs, not technological bias or short term gain (Balkan 2012, 284). So while expanding ownership of mobile phones, along with the proliferation of mobile technologies, provides an opportunity to design worthwhile applications that encourage community collaboration, this research project proceeds from the proposition that technology does indeed matter and that we must balance access to technology with potential social benefits.

However the primary principle that can be derived from this discussion is that many forms of Internet access must be considered and catered for in the design process. If there is a large segment of the target group of users who use smartphone applications, then there is benefit in developing apps which smartphone users access with greater ease than websites. However, a focus on smartphone apps forgets a segment of the population who do not have a smartphone. Therefore it is important to ensure that web applications are designed to cater for audiences on various devices. Web technologies should therefore be designed for viewing on all displays, including those of desktop computers, TVs, mobile phones, tablets and notebooks. This research project therefore focuses on the design of cross-platform mobile and locative applications that can extend online community presence, increase access and distribution of community information, and promote participation in local services.

Both native and web (apps) are mobile design approaches that are currently being used to develop smartphone apps. Native apps are developed using the platform coding languages and have access to hardware whereas web apps are essentially websites that have been optimised for access through a smartphone (Stark 2010, 1). Web apps are not real apps but they feel and look like native applications although native apps run faster (Buidu 2013; Rundle 2011, 75).⁶ In regards to native

⁶ The pros of developing web apps include that you can use current web design and development skills, can fix bugs in real-time and the web app will run on any device with a web browser. Further advantages to web apps include that content is more discoverable on the web than in a native app where the maintenance and development costs in terms of finances and time can be great (Buidu 2013). This approach is not without its cons however, which include the inability to access certain hardware and difficulty implementing sophisticated UI effects such as transitions and other visual feedback that is available in the coding platform of the native app (Stark 2010, 2).

apps, iOS has specific human interface guidelines which developers must adhere to, while Android is heavily customised by manufacturers, carriers and users (Balkan 2012, 260). However, there is a design guide available for Android development.

While Android web application development is currently used for facilitating web access on Android devices,⁷ the needs of users may guide the additional implementation of a mobile website to provide an improved user experience to those mobile devices. Mobile websites can be developed as a secondary theme for the web application. When designing a mobile theme, the website needs to direct to the mobile theme for it to be accessed. For a website powered by a CMS it is often easier to implement a CSS theme in addition to the desktop theme by implementing a “parallel URL structure” so that the mobile theme is mirrored through a URL such as m.website.com (Lawson 2012). In addition, links to and from the desktop and mobile sites should be included to allow users to change the site theme manually.

A responsive design approach can be harnessed to ensure that an application is accessible across devices and platforms. Responsive web design techniques can be used to design a single website across multiple sized devices including mobile phones, tablets and desktop computers (Lawson 2012). Media queries enable designers to apply custom CSS code to content based on the devices' screen size (Lawson 2012). While smartphone apps and mobile themes offer other ways in which websites can be created and optimised for mobile devices, responsive design is a more efficient approach, because it provides a means for web applications to be viewed on various devices. Because of their simplicity, effectiveness and inclusivity, responsive approaches are growing in popularity.

Some designers have argued that responsive design is not necessarily the best approach for mobile design. For example, in 2013, Nielsen and Budio (2012, 16-17) recommended that different experiences need to be designed for each mobile class,

⁷ To provide some context for the design of smartphone apps in this research project, during the course of this PhD-at the time of the first case study in 2012-Android smartphones overtook iOS based iPhones as the most popular smartphone operating system in Australia, according to data from Telsyte (2012). As of December 12 that year, Android users took up 44% of the market while iOS users took up 43%. In the first case study smartphone app development takes the form of a web app for Android devices (specifically the Samsung Galaxy S2 and devices with a screen size of 480 x 854, 265ppi).

with scaled back designs on smaller screens, following Nielsen's (2011) guidelines which suggest designing a separate mobile site and providing a link to the desktop site and vice versa. However, as Swan (2009) has countered, Nielsen has "missed the point", and that we have standards and guidelines to help developers achieve 'one web' and we should not promote separate websites.

Mobile technologies therefore provide numerous opportunities for improving information distribution. However, it is important that, as a researcher and designer, one must investigate whether, and to what extent, potential users of a proposed solution have smartphone access. Through responsive design approaches, cross-platform access can be facilitated. We must also endeavour to improve access by developing applications and interfaces that adapt across a range of platforms and modalities. The type of approach taken for mobile design, whether through smartphone apps, mobile themes or responsive design, depends on the needs and usage patterns of potential application users. By designing mobile applications with a focus on the context of use, additional means are provided for individuals to access information that they need, as they need it.

Open source software

The rise of online open source applications is another development that promises great benefit to community organisations. Open source systems, such as Drupal and Ushahidi, are released under licenses that encourage open access and reuse, as well as further development and adaptation without financial cost. Open source software can be aligned with Creative Commons licenses, which encourage people to alter and use creative works. However, while Creative Commons licenses focus on sharing creative content, software is the focus of the open source movement. The Creative Commons (2007, par 8) core principle, which is illustrated by the statement: "An idea is not diminished when more people use it" is similar to that expressed by Tim O'Reilly (2007, 32-33) who argues in relation to open source that, "the most successful web services are those that have been taken in new directions unimagined by their creators." Like Creative Commons licenses, which encourage others to copy, distribute and make use of the application while giving credit to the creator, open source software is defined by its adherence to principles

outlined by the Open Source Initiative (n.d., accessed March 23, 2011) which include: free distribution of the software without royalty or fees, enabling modifications of derived works while still maintaining integrity of the source code, and ensuring no restrictions to any single operating system or technology platform. To ensure this research project provides maximum potential benefits to the community, the applications developed in the case studies will be offered under an appropriate Creative Commons license to reflect open source software development principles.

In practice, open source software offers the benefit of a low cost approach to developing digital applications, because it provides the core code, along with potential for future extension. As Bruns and Humphreys (2010, 12) argue, “Traditional media models of content production, high cost, 'one-off' productions - are unsustainable, and in many cases unsuitable, for online distribution and participatory environments.” However there is also another benefit to community organisations. That is, open source enables an agile way of producing design solutions, when providing swift support to people in need. A long timeframe is required for a bespoke solution and, if time is of the essence, posters on bulletin boards, for example, are not an efficient means of gathering help. Reskinning (that is, the repurposing and restyling of an existing website) an existing open source software application allows for agility and a timely response.

Open source platforms therefore provide a means for bespoke solutions to be developed using a pre-existing framework that has been thoughtfully and collaboratively developed over time. Examples include the Drupal CMS, which can be repurposed and built upon for complex web applications and Ushahidi, which has been developed for implementation during times of crisis. Open source software licenses are extended by Creative Commons licenses, which encompass the distribution and sharing of creative projects. Both of these are relevant to the design of community service applications as they enable NFP agencies and NGOs to build upon web applications to provide a suitable solution for their community with much less financial cost and time. Open source platforms often facilitate interactions reflective of social networks and online communities.

HARNESSING SOCIAL CAPITAL THROUGH ONLINE COMMUNITY BUILDING

It is important at the outset to differentiate between social networks and online communities. While often used interchangeably, these terms have very different meanings and characteristics. Social networking systems (SNS) and social media applications are predominantly designed to support individuals to construct a public or semi-public profile within a bounded system; generate a list of other users with whom they share a connection; and view and traverse these connections with others within the system (Boyd and Ellison 2007, 2). That is, social networks position the user as a ‘micro-broadcaster’, who is situated at “the centre of the network”, with their identity anchored in “physical proximities, institutions and shared personal relationships in daily life” (Hargittai and Hsieh 2010, 148). The experiences and interactions that social networks provide are therefore unique to each user, according to their social media connections such as ‘friends’ on Facebook and ‘followers’ on Twitter (Howard 2010, 13). However it is important to note that, as Hargittai and Hsieh (2010, 165) points out,

It is important not to assume that all people use social networking sites to the same extent as many people have incorporated usage of these sites into their lives more than others.

Because of the focus on individual expression and interaction in social media, new behaviours may appear but they are expressed in relation to “age-old problems” that relate to individuals in social contexts (Dourish and Satchel 2011, 21-22).

By contrast, online communities are dedicated to a specific topic, theme or practice. Existing before the emergence of what is commonly referred to as “the social web”, and major social networking platforms like Facebook, LinkedIn and Twitter, online communities have long been a popular way for people to connect with each other around in-common concerns. They include communities of practice, communities of interest, problem-solving communities etc. While it is also possible to create them using social networking tools (such as a Facebook page or group), historically, they have typically been employed through forums, newsgroups, and Internet Relay Chat (IRC).

Another key difference is the social models that are employed. Online communities coalesce around a shared issue, and this means that some core value or set of values underpins participation and communication practices (Howard 2010, 15). While this can also be the case in social networks, the topic is not the central focus—the individual is. Collectively developed implicit or explicit rules are more likely to govern behaviour and forms of contribution in online communities. It is therefore a common practice for online communities to have collective terms of use, which outline the common purpose, as well as rules and guidelines for the behaviour and posts of participants. These rules and guidelines often reflect particular offline behaviours such as the desire for ethical and mature communications amongst community members. Online communities therefore tend to be cooperative, offer mutual benefit and are regulated by social codes.

The contributory behaviour engendered by online communities for social benefit can be aligned with long-established attributes of a cooperative society. As Whitworth and Whitworth (2010) point out, in some ways there is little difference between a willingness to “contribute to social synergy” by giving directions to a lost visitor in the street and peer to peer file sharing. Both of these behaviours reflect an altruistic mindset, one that sees the benefit of sharing and helping those in need. Such a mindset and intention can be enabled through online initiatives when they are purposefully and effectively designed for online community building for social benefit.

Taking this a step further, online communities for social benefit can be aligned with the goals of social welfare. Social welfare is founded upon overarching principles of social inclusion and focuses on reducing disadvantage; increasing participation in the community through social, civic, and economic forms; and giving people a greater voice in their community (Australian Institute of Health and Welfare 2009, 4). Importantly, it presumes participation by all community members, not just those considered to be socially or economically in need or disadvantaged. This is predicated on the fact that, at some point or another in any person's life, access to

services, information and resources might be needed.⁸ It presumes contributions by a wide range of community members in reciprocated giving and receipt of support, information, advice, donations and resources.

In the digital age, forms of community support and social capital building have changed. Online communities in particular, have reconfigured the ways in which information provision is captured and shared, along with how networks are formed, recommendations are made, and volunteers are recruited and contribute. The importance of the role that communities have in collaborating and sharing information online is emphasised by Clay Shirky (2010, 27) who writes that,

Our ability to balance consumption with production and sharing, our ability to connect with one another, is transforming the sense of media from a particular sector of the economy to a cheap and globally available tool for organised sharing.

Notley and Foth (2008, 15) argue that this level of community engagement builds social capital, which recognises that community contributions and networks can be harnessed to become “smart assets” in service provision for social innovation in Australian communities. These ‘smart assets’ in this contextual exploration take the form of online applications that improve various areas of local community support. Online services that provide ease of access to useful, timely and accurate information are crucial in providing support; just as important is fostering the capacity of individuals to contribute to the building of social capital by adding their own knowledge and insights.

In this regard, developing online community building applications for social benefit sits within the realm of design activism, through what Markussen (2012, 38) describes as design’s pivotal role in promoting social change. In this sense, social change is promoted by facilitating the participation of community members in local services and in information provision. In policy terms, social capital is a way to more broadly value Internet use at both a community and an individual level-not just for defined disadvantaged groups (Notley and Foth 2008, 13). This project therefore

⁸ According to the literature, factors that limit social inclusion can be related to five defined categories, namely social distress, health, community safety, economic, and education (Vinson quoted in Price-Robertson 2011, 7).

takes an inclusive approach, which provides opportunities for people from various backgrounds and demographics to both benefit from the information and resources that are shared, and also to contribute to them and so provide support for the community.

While designing online services that provide ease of access to useful, timely and accurate information is crucial, just as important then is fostering the capacity of individuals to contribute their own knowledge and experiences for social benefit. Online applications that are designed for social benefit should therefore not only enable people to access resources with greater ease, they should also be designed to help build social capital, and enable community connectivity. The potential value of web applications is improved greatly by enabling and encouraging community participation in information provision.

Given the social benefit of reciprocated giving and receipt of support, information and advice, the overriding purpose of online communities in this research project is in enabling the largest audience possible to access and use information and resources provided by agencies and, at the same time, enabling community participants to contribute by providing and sharing support, information, and resources.

By encouraging contributions to an aggregation of resources, collective knowledge is facilitated. This “collective knowledge” which is created in these applications when data is aggregated and combined can create new knowledge, which can lead to discoveries and other results not found in the submitted contributions (Gruber 2008, 5-6).

In summary, the combination of the above technological approaches can be harnessed for the purpose of designing socially-beneficial applications. Data aggregation tools can pull together similar content forms within a collective database and through its visualisation techniques, locative media can enhance the distribution and access of information. In addition, supporting those in need can be improved by harnessing mobile Internet technologies as designing with mobile users in mind increases the reach of, and facilitates instant access to information. Lastly, designing online open source applications to support community organisations, which largely rely on charity and community support, is important because it provides the potential for future extension and reuse. The social web can also be harnessed as a means to

facilitate communication and sharing of local information amongst individuals in the design of applications for social benefit.

The social web

The social web refers to not only major social networking platforms like Facebook, LinkedIn and Twitter, but also other social networks and applications in which the user is the central focus and the content they receive is based on their network of connections. The rapid growth in social web applications can be attributed to the desire for varied means of social connectivity (Willson 2010, 495). Whilst the social web is a relatively new web field, online communities have long been used by people to connect with one another and discuss common issues. This contributory behaviour is also apparent in social media networks. The focus on both online communities and the social web however, is connectivity, and the social web in particular provides an opportunity to facilitate communications and the sharing of information amongst individuals in need, and those offering support. These are some principles that have been established and extended from a research background of theoretical and practical outcomes.

RESEARCH BACKGROUND

This research project is informed by, and builds upon, a research project I completed for a Bachelor of Creative Industries (Communication Design) Honours degree in 2010. Like this PhD research project, it was a practice-led research project, which involved exploring a research problem, proposing a set of strategies and principles to solve it, then developing a demonstrational online application through effective design and agile, participatory methodologies.

That project's creative outcome is entitled PetSearch. A locative online application that I developed and migrated to a server <petsearch.social-goodness.com>, it is designed to build online communities to supports animal welfare. It enables participants to locate lost, found and injured pets using an online, locative media interface. More broadly, it involves plotting the location of events

over time, encourages and enables collaborative participation in the production of local community or neighbourhood resources, and combines collaborative interfaces and the online visualisation of aggregated data through location and mobile technologies (Gough and Hamilton 2012, 3).⁹ As a research project, it established that elements of locative, social and persuasive media can be utilised to provide an effective design solution that supports people to become involved in a collaborative community. This contextual framework is carried forward into this project, along with relevant background theory, and experience in creative practice research—all of which has contributed to the project design of this PhD.¹⁰ The PetSearch application has also provided the technical foundation for the first web application developed in this project and the strategy of combining online tools, particularly locative media.

The Drupal open source CMS is used in PetSearch and this repurposed application provides the foundation for the first application. In addition, a set of design principles were developed as a research outcome of PetSearch. They can be summarised as:

- Collaborative mapping using locative media can improve the visualisation and display of complex data on events and available resources;
- Utilising graphical visualisations to effectively display statistical data encourages community use of an application;

⁹ Apart from gaining First Class Honours from this project, it won the Best Student Project Award at the Australian Interactive Media Industry Association's 17th Annual AIMIA Awards in 2011 (Australian Interactive Media Industry Association 2011, accessed 14 April 2011).

¹⁰ This project also resulted in a published paper which was written and submitted as a conference paper during the early stages of my PhD research project. It was presented at the 24th Australasian Conference on Computer-Human Interaction (OZCHI 2012) in a conference paper entitled *Designing locative and social media technologies for community collaboration and social benefit: PetSearch (lead author.)* Peer reviewed proceedings appear as Gough, Kathryn & Hamilton, Jillian G. (2012) Designing locative and social media technologies for community collaboration and social benefit : PetSearch. In Farrell, Vivienne, Farrell, Graham, Chua, Caslon, Huang, Weidong, Vasa, Raj, & Woodward, Clinton (Eds.) *Proceedings of Australasian Conference on Computer-Human Interaction (OZCHI 2012) (24th): Integration, Interaction, Innovation, Immersion, Inclusion*, Association for Computing Machinery (ACM), Melbourne, Australia, pp. 158-161 (available for download through QUT ePrints).

- Using elements of social media can build a community approach and encourage communication and collaboration among end-users, increasing contributions to the development of a valuable database and community resource, and through verification, and feedback help to ensure the veracity of information;
- The development of a cross platform extension of the application into a mobile version broadens application use beyond desktop computers;
- Ethical issues associated with end-users (privacy for example) and the needs of animal welfare organisations must be considered. It is important to protect online identities through an understanding of locative media privacy;
- Utilising Creative Commons licensing and open source software can lead to an application that has the potential for future development.

A number of these principles have been carried into this research project, where they have been refined, extended and built upon, through further research into ways in which emergent technologies are being used to improve information delivery for people in need and to harness local insights and community resources and support for social benefit.

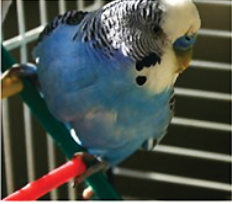


Figure 1.1. PetSearch logo


Blue Budgie / NT

View
Upload Images

▶ **Add another sighting**




Pet ID (Found#): 3
Name: Spooky
Breed: Budgie
Colour: Blue
Age: 2years
Gender: male
Description: found on back fence, seems domesticated
Found on: Tue, 14/09/2010
Location:
 14 Sep 2010
 Alice Springs 0870



POWERED BY Google
 50 mi 100 km Map data ©2010 - Terms of Use

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Submitted by **Charlie** on Tue, 14/09/2010 - 01:45

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 There are currently no images in this gallery. You may upload images to this gallery.

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[memorial](#) [Newcastle](#)
[park](#) [pug](#) [rehoused](#)
[Rockingham](#) [rottweiler](#)
[more tags](#)

ACT NSW NT
 QLD SA TAS VIC
 WA

[Add new comment](#)

[Give points to author](#)

Bookmark this post




Figure 1.2. PetSearch found pet post

THE USE OF NEW TECHNOLOGIES FOR INFORMATION DISTRIBUTION IN RESPONSE TO NATURAL DISASTERS

Because of the concentrated information and support needs they generate, natural disasters provide a useful case study for considering how technological advances have enabled shifts in both information distribution and community participation in social capital building. An example is the Queensland floods, which occurred in December 2010 to January 2011 and again in 2013. During this natural disaster, diverse new technologies were embraced to instigate new and innovative ways of capturing and sharing information. Digital applications were developed to provide alerts, improve community awareness, offer post-flood information, direct people to services, and to harness support and resources from within the community. They involved new models of information delivery, which employed data

aggregation and locative media, as well as new ways to facilitate community participation in information provision, disaster management and relief.

Alongside traditional media broadcasts on flood levels, road closures and other hazards provided by the Queensland Police Service (QPS), a range of locative media and new web technologies were utilised to provide ‘official’ updates to Queenslanders during the 2011 and 2013 floods. For example, the Brisbane City Council developed a locative media site called the BCC Brisbane Storm and Flood Map <bnestorm.crowdmap.com> (see Figure 1.3). It was designed to map local incidents such as road closures, flooded areas and hazards. Utilising the Crowdmap platform (an adaptation of the content management system (CMS) Ushahidi, which is discussed in detail later in this chapter), it provides an example of a crisis management website that enlists the capacity of online mapping to present official emergency information.

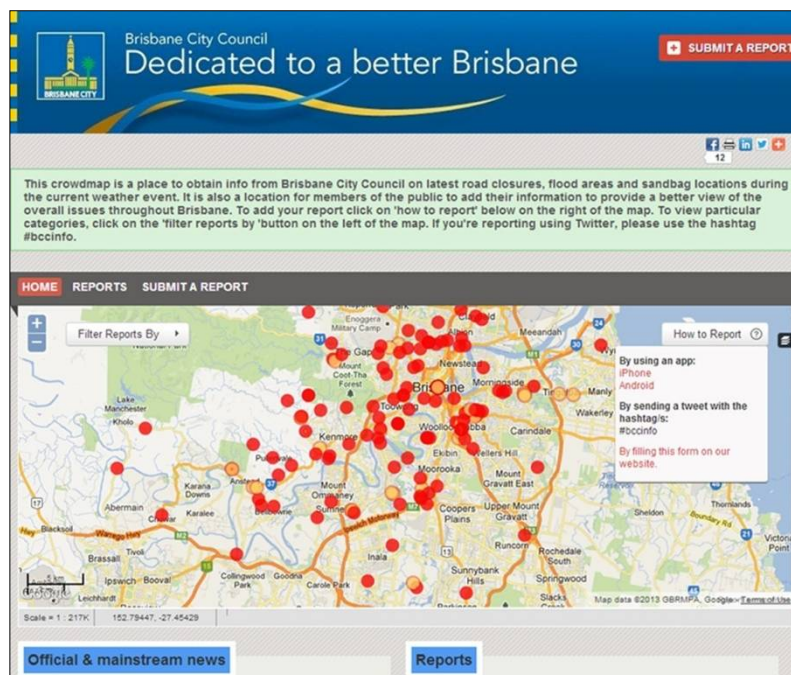


Figure 1.3. Brisbane City Council Storm and Flood Map

Another online emergency information service that was also developed in response to the Brisbane floods is entitled QLDAlert <qldalert.com> (see Figure 1.4). A website that is updated in real-time, it aggregates streams of official emergency information. It was designed to include feeds from the Queensland Police

Service (QPS) and State Emergency Service (SES) Twitter accounts alongside meteorology warnings, updates from Qld Health, QldFire, Rural Fire Service, 131940 road closures, QLD Rail and Translink. In this way, it provides an ever-current centralised resource of officially distributed information through a web-based data aggregation application.

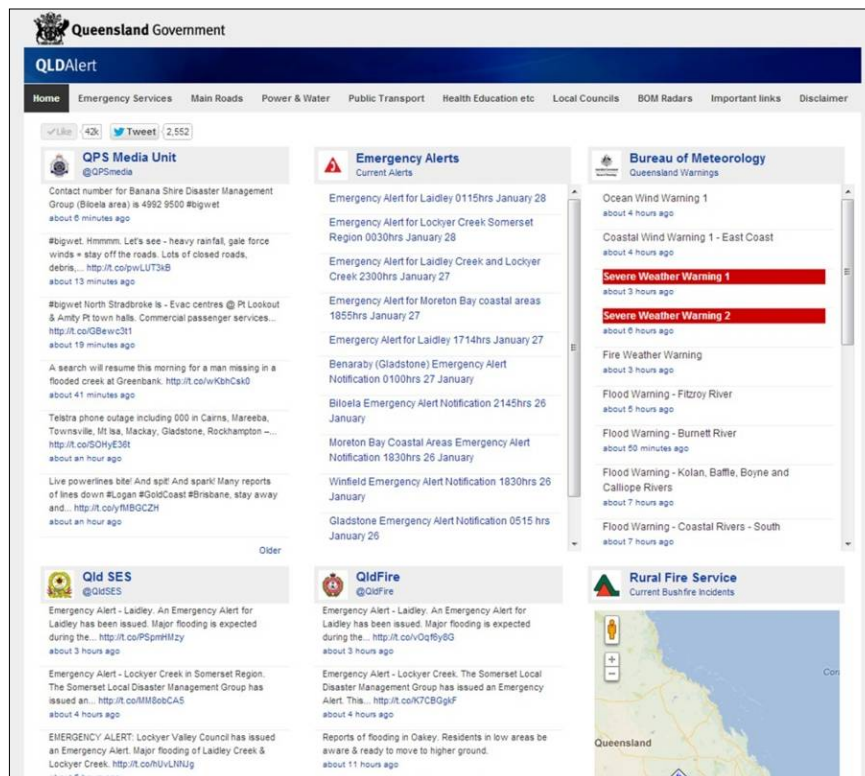


Figure 1.4. QLDAlert website

An international example is Google Crisis Response <<http://www.google.org/crisisresponse>>, which also aggregates information from official sources, as well as community sources, about global natural disasters into a page that the Crisis Response team at Google curates. It has been in use since Hurricane Katrina in 2005 when it was first used to publish information on storm paths, shelter locations, emergency numbers, missing people and donations. It was employed in Queensland in response to Cyclone Yasi to provide alerts and updates.

The aggregation of information from multiple sites and data sets in these applications is a powerful addition to community information delivery. By automatically combining 'official' information feeds, or through the process of

curation, these applications illustrate the principle of data aggregation of sources of official information into a single interface for ease of access to information. Drawing upon official government and emergency agency sources, the information they provide combines the most verifiable, accurate and up to date that is available. In this way, aggregation helps to provide a solution to the frustration of trawling through numerous sites, of varying reliability, to find appropriate information. Moreover, locative features visualise affected localities, along with the range and density of hazards, making them easier to relate to a user's current location.

Official agencies have also developed smartphone apps to improve access to information during natural disasters. The features of smartphones enable apps to harness in-built hardware and the operating system to provide geographically specific information based on the user's current GPS coordinates, and the 'push' notification features of iOS and Android devices can be harnessed to send message alerts to clients' phones. Perhaps unsurprisingly then, apps have been developed to assist in disaster preparedness and to enable people to access resources and information 'on the go'. An example of an Australian smartphone app that employs such features is Disaster Watch (see Figure 1.5). Developed by the Queensland State Government Emergency Management Sector, this app is complemented by a website, which maps current local disasters using feeds from authorities nationwide. However, while the information emanates from a reputable source, the site warns that these feeds are not to be used as real-time emergency alerts or warnings as the information is only updated 'regularly'. This is perhaps a limitation of official sources of information. They may lack the agility and breadth of wider collections of information.

A smartphone app created to provide real-time alerts on disasters is the Victorian Country Fire Authority's (CFA) FireReady app (see Figure 1.6). It not only displays information, but it sends 'push' notifications to smartphone users about local fire warnings and relevant incidents. This is complemented by a locative website <www.cfa.vic.gov.au/warnings-restrictions/warnings-and-incidents>, which maps fire warnings as they are added to the system by the CFA. It illustrates how locative media can be used to both visualise live updates of disaster incidents and to distribute real-time information to smartphone users. This approach is beneficial because it also harnesses GPS locative technologies to make individuals aware of the

latest local information on weather, hazards and alerts when they are away from a computer, or are not aware of the need to initiate an information search.

Like the other examples discussed in this section, this application limits the information it aggregates and circulates to official sources. This approach provides benefits in terms of trustworthiness. Trust is a crucial consideration for the design of collaborative web applications, especially when such information is focused on providing support to those in urgent need. Information needs to be accurate and the source of information, in the case of the website and contributor, needs to be credible. Credibility can be ensured through a verification process that either approves or rejects content as accurate.

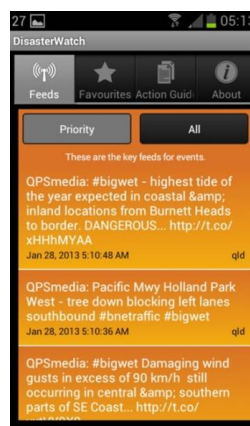


Figure 1.5. Disaster Watch app for Android

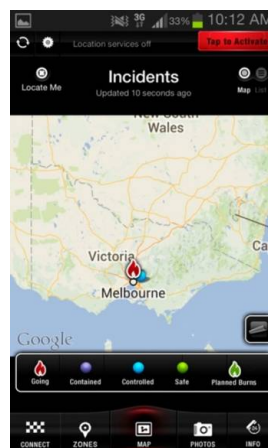


Figure 1.6. CFA's Fire Ready app for Android

A global example is provided by the Fukushima disaster on 11 March 2011, where the social networking platform Twitter was used after an earthquake measuring 8.9 on the Richter scale and a following tsunami hit Japan, killing or displacing tens of thousands of people (Ng and Lean 2012, 307). An analysis of re-tweets (ie. tweets shared by other users) revealed that following the disaster, the public were most concerned about missing and dead people and the devastation caused but fears over the Fukushima power plants soon took over, and although the government produced more reassuring tweets than citizens, they were retweeted less over time, and therefore lost influence (Li, Vishwanath and Rao 2014, 78).¹¹ This illuminates the need to ensure accurate and timely information is provided to the public in times of natural disasters, as response efforts by organisations and individuals can be hampered through misinformation that is not corrected quickly enough. Pierpoint (2011, 57) argues that “misinformation must be crowded out by credible sources in the calmest of times, but the responsibilities of all types of informed experts become especially important during a major catastrophe.”

From this analysis of recent applications that enable effective information distribution in response to natural disasters, it is clear that various technological approaches can be utilised. Both the aggregation and locative display of official, verified information empowers those affected by natural disasters by making trustworthy information conveniently accessible, visible, and related to their current location and context. This access is further extended through smartphone applications, which harness smartphone hardware to provide information based on GPS coordinates as push notifications to provide urgent information from an app straight to a user’s phone. The use of official information through sources such as emergency and government agencies reduces the risks associated with incorrect information being published, and ensures timely information access to those in need. However it also has limitations in that it is less agile and comprehensive than information generated by crowdsourcing local information from people on the ground.

¹¹ There were of course other contingent factors to also consider, including a major issue with trust in government messages (particularly those that provided reassurance when the situation was not under control)

EXEMPLARS IN PRACTICE: THE USE OF DATA AGGREGATION AND LOCATIVE MEDIA AS TOOLS TO INCREASE ACCESS TO INFORMATION DELIVERY ON COMMUNITY SERVICES

Along with applications that provide information and support services for the community as a whole during one-off events like natural disasters, data aggregation and locative techniques can be extended to a broader approach to aggregated, locative visualisations of everyday local community support services and resources for those facing a range of individual hardships. A number of online services aggregate and point to a collection of community support agencies and summarise the support they provide within an index or directory. An example of such a 'curation' is found in Lifeline Service Seeker <lifeline.serviceseeker.com.au> (see Figure 1.7). This website provides an online directory of community support services by state, postcode and type of service. While it provides an online location search field to help people to find local services, it has no mapping functionality, so it is limited to providing an aggregated list of available services.

Another example is the Op Shop Listing map <opshop.org/map/QLD/BRISBANE> (see Figure 1.8). An Australian locative website, it shows the location and distribution of op shops (thrift stores). A state, then a city must be chosen before viewing a specific map for that city. This is an example of a locative website that could be improved by removing the multiple steps needed to access the map. By displaying all the data on a national map, with the ability to zoom in, the amount of steps taken to view information could be lowered. This locative application forms an example of how goods available in the community can be mapped to visualise what is local to the site visitor, however the interface could be improved for ease of access to information. While it does not allow individuals to map their own locations and movements, applications that do encourage this behaviour run the risk of exposing personal information by storing and publishing user movements and locations. (See Appendix B: Comparative application analysis.)



Figure 1.7. Lifeline Service Seeker page for Queensland

Collaborative mapping applications have been used in a community support context globally. Mapping for Change <<http://www.mappingforchange.org.uk>> (see Figure 1.9) is a UK-based collaborative mapping website for different community agencies and councils to map facilities and services. The website allows these agencies to create ‘minisites’, or community maps on the website with their own content. To view these minisites, a subject is first selected and then the map is updated with different layers of information specific to the minisite. Mapping for Change is an example of a website that encourages agencies and councils to extend their online presence by creating locative media sub-sites for visualising facilities and services.

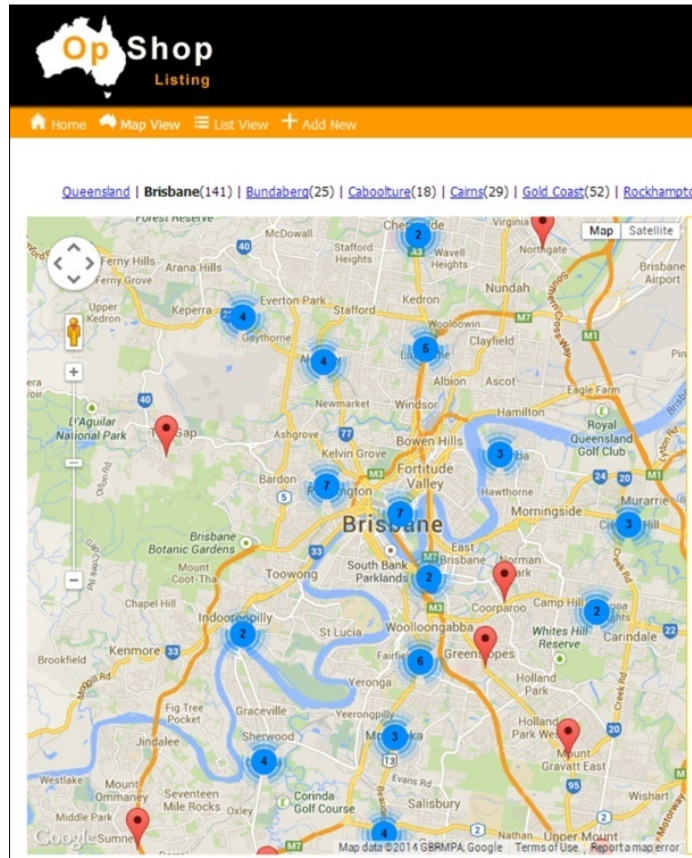


Figure 1.8. Op Shop listing map for Queensland

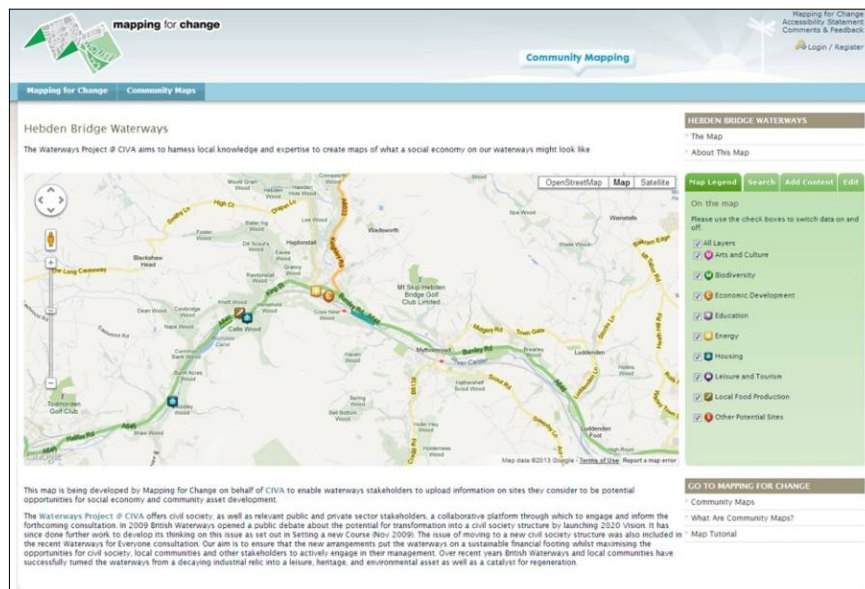


Figure 1.9. One of the UK based Mapping for Change minisites

A more sophisticated approach is provided by the My Community Directory website. Curated by the Australian Community Data Standard (ACDS) team, (a branch and initiative of Community Central), agencies use My Community Directory to add posts and listings, which details the support on offer and where services can be accessed. The application houses 4000 listings of community organisations in Queensland (Community Central 2012b) and combines the contributions made by individual agencies into a curated display, offering a range of information on support options.

To display agencies according to location, My Community Directory uses locative technologies in the form of Google Maps embedded within its interface. However, it is not a true locative media application. Finding an appropriate service requires entering a type of service and a suburb or postcode into a text field so that a list of services and an embedded map can be generated. Then breadcrumb navigation must be used to backtrack (eg. 'Brisbane>>') to a different landing page to reach a list of categories of services that are mapped in the application. A true locative media project would instead coalesce this information and display the service options retrieved from the database around mapping functionality, with categories of services clustered and differentiated as an integral and seamless function. So while My Community Directory offers a very valuable contribution to the aggregation of community services by providing a centralised and standardised catalogue of community agencies, it could benefit from a refined approach to locative media design.

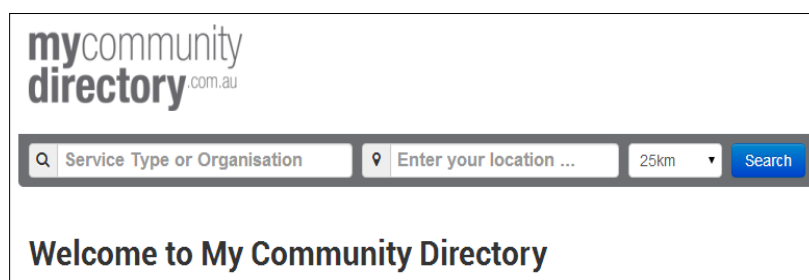


Figure 1.10. The Search functionality on the homepage of My Community Directory

In addition to My Community Directory, the ACDS team is developing an online standard (Australian Community Data Standard) and database of community

data. Entitled the Australian Community Data Warehouse, it is driven by the argument that “a reliable, consistent data source would improve services to the community and reduce costs of delivery” (Community Central 2012a). A data standard determines the format and naming conventions of entries provided by agencies, to ensure consistency in the co-presentation of directory entries. The aim is to provide a one-stop place for information on community agencies (location, eligibility, services offered etc.) through an online interface, which details what each agency offers and where services can be accessed (Community Central 2012b).

My Community Directory and the ACDS Warehouse provide examples of how community agencies are working together to develop cooperative approaches to improving information delivery around their collective services. However, they also highlight potential limitations, which must be taken into account. The manual processes required for searching, along with navigational inconsistencies and the limited use of mapping technologies, exemplify them. That is, we must put the needs of the user at the centre of the organisational logic, rather than the agencies. To do so in this case would mean that instead of requiring users to self-generate a list of their needs as a basis for a search, the aggregated data on services provided by individual agencies might be presented in broad categories of service types for selection. And, rather than detailing aspects of each agency and placing this information at the centre of the organisational logic, it is perhaps more useful to those seeking information to encounter meaningfully clustered events and services on a visual map of their geographic location. When information is presented in a visually organised way, it is easier to understand, which is crucial when providing support to those in need.

Because the Internet is often the first place that help to solve a problem is sought, designing online services that provide ease of access to useful, timely and accurate information is crucial for providing support to people in need. Focusing the organisational logic of information around the needs of users and presenting it in a way that is easy to understand and that relates to a user’s sense of place is therefore a key principle for the design of social benefit applications.

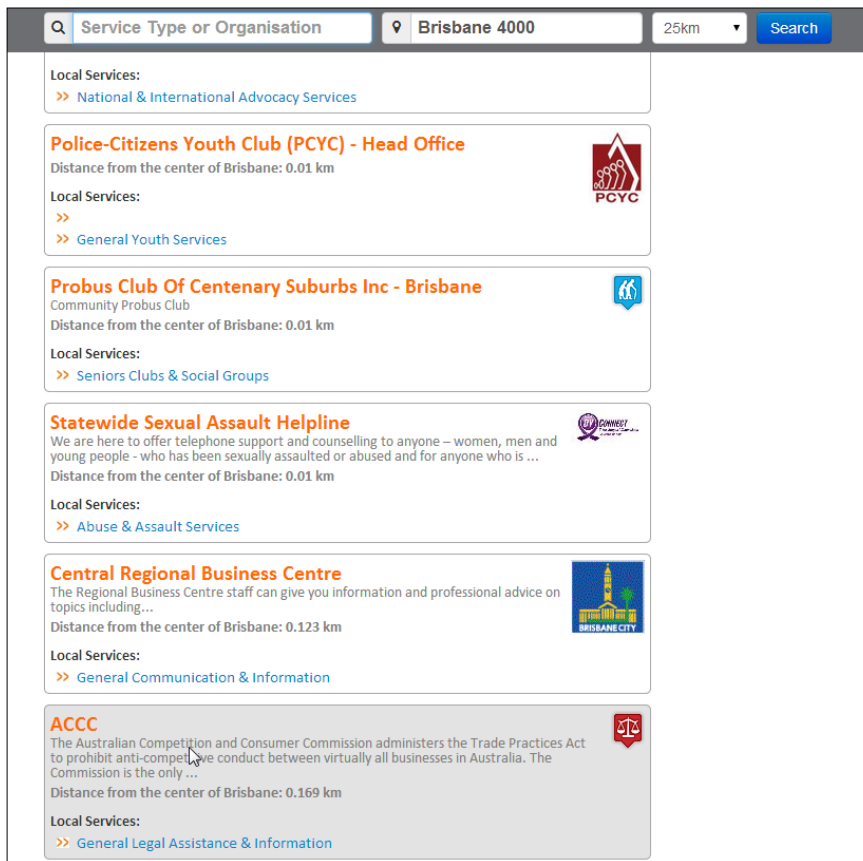


Figure 1.11. Search results for all services listed for Brisbane 4000, with ACCC highlighted

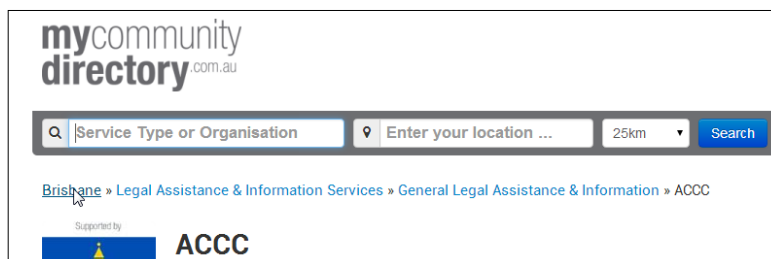


Figure 1.12. ACCC Results page with breadcrumb navigation

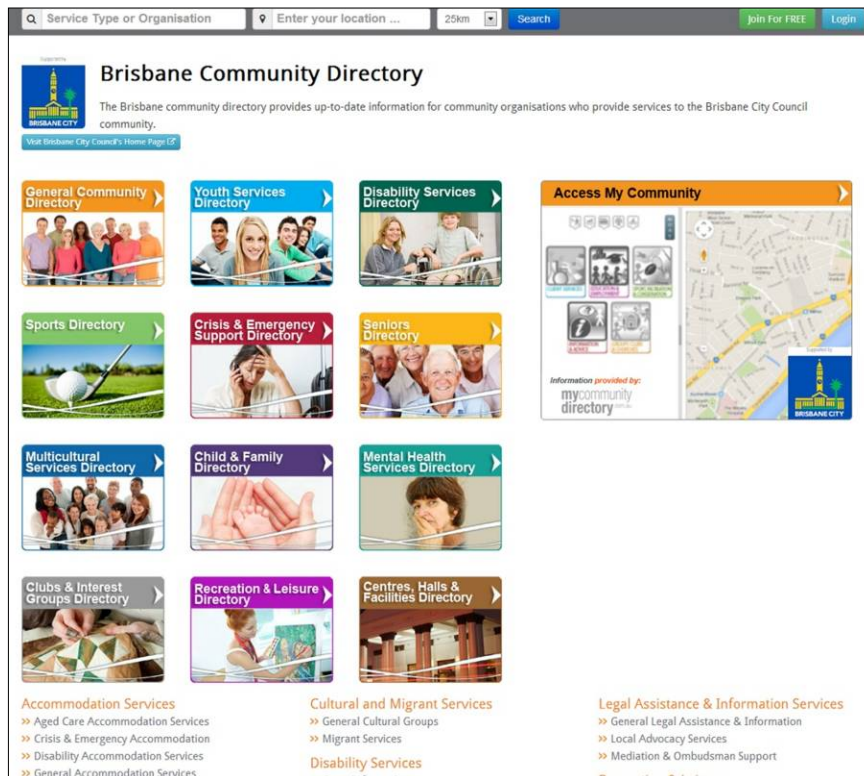


Figure 1.13. My Community Directory page listing all categories that can only be accessed by going backwards through the breadcrumb navigation in Figure 1.12

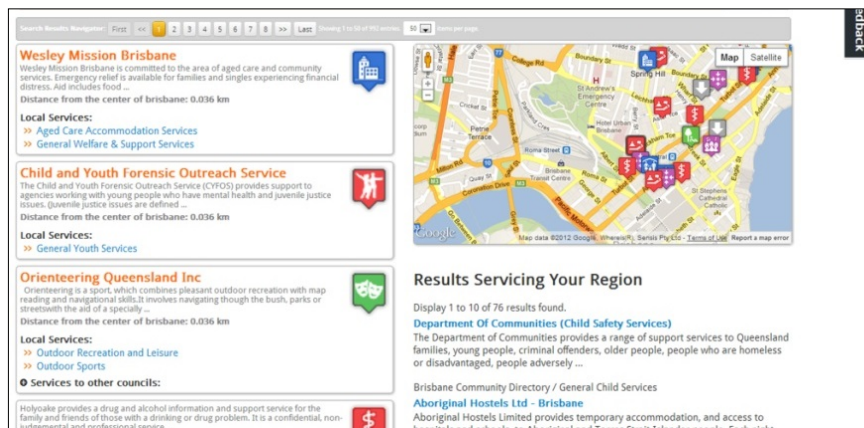


Figure 1.14. The locative functionality visualising the distribution of services returned as search results

EXEMPLARS IN PRACTICE: HARNESSING COMMUNITY INSIGHTS, KNOWHOW, PARTICIPATION AND SUPPORT AND BUILDING SOCIAL CAPITAL THROUGH SOCIAL WEB TECHNOLOGIES

While access to aggregated and accessible online information sources is crucial during times of individual or community wide need, as I have argued above, just as important is fostering the capacity of individuals to contribute to the building of social capital. In the above discussion I have pointed out that limiting aggregated information to official sources provides the benefit of increasing the trustworthiness of sources in catalogues or indexes. However, there is another perspective that must be taken into account. That is, local knowledge, insights and experiences of community members, can be seen as a valuable resource, which can extend the scope, richness and reach of local information provision.

An example of an effective crowdsourcing application is OpenIDEO <www.openideo.com>, a global community which fosters online contributions through calls for responses to challenges that draw on pre-existing social dilemmas. Examples that have been presented include, ‘How might we all maintain wellbeing and thrive as we age?’ and ‘How might we inspire and enable communities to take more initiative in making their local environments better?’ Various stages of the challenge ensue: from *Ideas* (submission) to *Applause* (community feedback) to *Refinement* (changes based on feedback) to *Evaluation* (community evaluation) and, from there, *Winners* are announced. Winning ideas are then made public to enable them to be responded to, developed and implemented.

By fostering input through rewards, such as status for the winner, community collaboration, and peer critique, a range of new pragmatic approaches to solving social dilemmas are realised. In these ways, this web application illustrates ways in which online contributions such as ideas and the rating of such ideas can build social capital. They can enable or enhance the capacity of the individual and collectives to brainstorm, and potentially solve a specific community issue.

However, it should be noted that OpenIDEO is limited in form. While it effectively deploys crowdsourcing ideas from a range of people and employs community ranking and feedback as motivation, the campaigns can only be initiated by the OpenIDEO team—the community cannot create their own dilemmas to solve. It

is worthwhile considering what opportunities for innovation might arise if community members could create their own social campaigns.

For this reason, this research project explores how social capital building—in the form of local information on community service support as well as material resources (such as household items)—can be facilitated through the design of online applications. In this regard, developing community-building applications for social benefit sits within the realm of design activism, and what Markussen (2012, 38) describes as design’s pivotal role in promoting social change. In this sense, social change is promoted by facilitating the participation of community members in local support and information provision for those in need.

This provides the basis for a foundational principle for designing social benefit applications, such as those that will be developed in this project’s conceptual designs. That is, social benefit applications should enable and encourage contributory approaches from the community, in order to harness knowledge, creativity, and innovation in problem solving. This might include crowdsourcing to propose solutions to problems, community evaluation of information posted (through comments and ratings), but also may involve facilitating the capacity to request helpful information and solutions that are not yet available online (through public submissions).

According to Jake Nickell (2013), the founder and CEO of Threadless (a website where illustrators present designs, which are rated by the community for potential use on clothing), the best crowdsourcing applications identify an in-common interest that people tend to pursue regardless of whether a platform already exists or not. They simply provide a new online structure to enable it to happen more easily or more effectively. This suggests another principle that might be adopted for this project, namely, rather than creating new ways for people to participate, online community applications can harness existing social goodwill and make activities that already occur (sharing information, donating, volunteering etc.) easier, more efficient and of greater benefit to those in need.

In addition to the collaborative generation of ideas and design, crowdsourcing can be harnessed for the purposes and goals of this research project—improving information provision, support and resources for those in need in local communities. There are some existing exemplar applications that aggregate local support services

offered through local community service agencies, as well as encourage contributions by individuals. An example is ReadyQLD <www.qld.gov.au/emergency/news/features/ready-qld.html>, which was developed by Volunteering Queensland. It not only offers a list of local emergency contacts (State Emergency Service, Queensland Police Service, Bureau of Meteorology etc.) and information on disaster preparedness but it also assists people to register to be an emergency volunteer and to view current opportunities to help, along with ways to recruit volunteers.

Unofficial, community initiated responses to natural disasters demonstrate the extent to which social media can be utilised to provide support. As Rainer et al (2013, 116) argue, ‘unofficial’ sources, such as social media accounts that do not belong to official agencies, can assist in crisis management through the facilitation of information, communication and collaboration. For example, in response to the 2011 Queensland floods, online communities focused on goods distribution were formed to help those affected by floods by providing them with replacement items. The sourcing and delivery of white-goods, toys and furniture was organised by a Facebook community called Floodswap, which had around 500 members <facebook.com/floodswap> (O’Loan 2011, par 2-5). The Queensland Flood Victims Support website <www.queenslandfloodvictimsupport.com.au> (see Figure 1.15) was similarly set up by individuals to enable people to request assistance, as well as to comment on and respond to requests that were published. Such online communities are examples of community developed initiatives that supported locals through two-way communications such as requests for help and responses. They draw on the collaborative and social functionality of existing web applications. Specifically Floodswap employed a Facebook page and Queensland Flood Victim Support used Wordpress—a CMS (content management system, or web based platform). In this way, the involvement of community members in ad-hoc responses to the Queensland floods extended the support offered by official sources. This response not only indicates the initiative of individuals, it also points to a rich and potentially crucial source of support, which social media can draw upon during times of crisis.

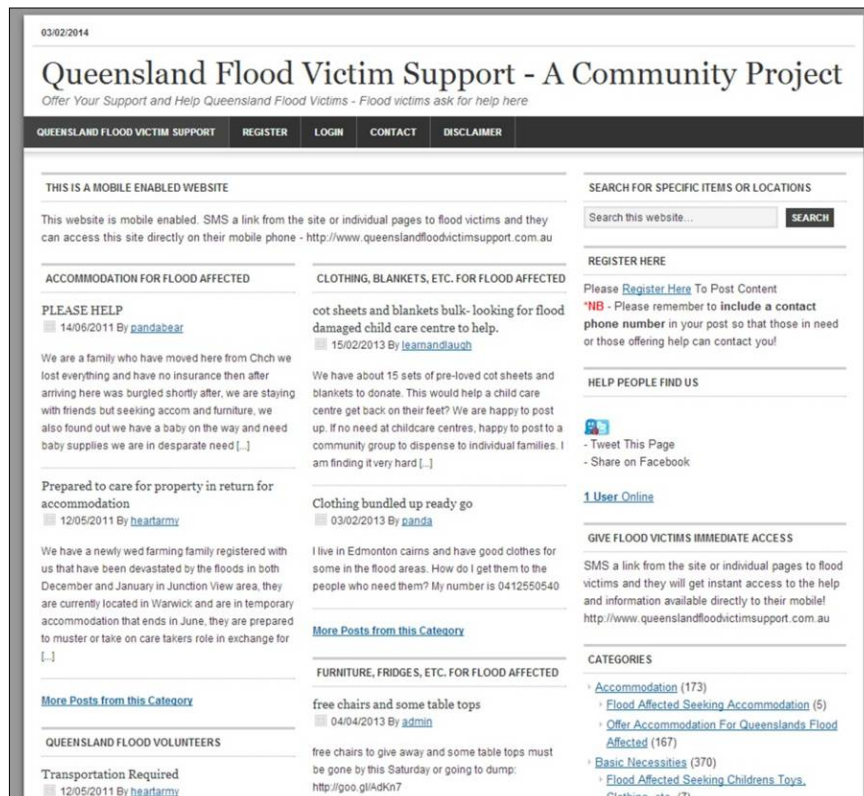


Figure 1.15. Queensland Flood Victim Support website

The benefit of such ad-hoc community online initiatives is facilitating the provision of support to the disaster affected, which takes stress off the agencies involved in disaster responses. By extending the types of support offered in the local community, it benefits those affected by local natural disasters, when road networks, distribution centres, and charity workers are affected, and very local support is needed. In the case of the Brisbane floods for example, many service centres were not only inundated by flood water, charities were physically overwhelmed by donations and had to broadcast appeals to the public to stop donating. Such centres benefit from rapid responses through online communities, when they are stretched by natural disasters. However, to be effective, such initiatives must be coordinated, networked and enabled.

Beyond one-off disaster responses, a number of online communities have been developed for the purpose of goods distribution. Examples include Yoink, which was developed in 2011 as a global community website to map donated household items. This website displays a map with the distribution of needed and available household items such as appliances, furniture, electronics and clothing. Distribution of these

items is then arranged between users. Yoink demonstrates the usefulness of locative media to visualise resource distribution. This web application was therefore an early influence on this project as it inspired the response of providing resources and support in the approach of the first case study.

In 2012 Yoink was converted to use the Facebook API (with access via a Facebook account necessary to view and post), and by mid-2013 it became inactive, possibly due a deterrence from use created by the need to use a Facebook account (see Figure 1.16 and Figure 1.17). This perhaps provides a cautionary lesson around not restricting users to using pre-existing social media profiles, and so requiring them to connect their online identities.

Other online communities have also been developed to harness community participation for goods distribution. For example, Freecycle <www.freecycle.org> is an example that encourages participants to be involved in a donated goods distribution system. It supports people to post unwanted and unused goods on one side of the transaction, and to contact the poster to organise collection on the other. In this way, users can post goods they have available, and others can respond to these requests to organise collection. While it is without locative functionality, Freecycle is a useful example of how online communities can successfully distribute donated goods amongst themselves through the two-way communications of messaging, without the need for a middle service provider such as traditional distribution centres (e.g. Red Cross, Salvation Army or St Vincent De Paul shops).

Perhaps the most viable goods distribution web service that has been developed so far is Givit <www.givit.org.au>. Givit is an Australian online portal that facilitates the donation of goods to people facing hardship. Posting requests on behalf of charities, the Givit community broadcasts what “quality items” are needed by a charity. (It is a prerequisite of donation that goods are not broken, worn, stained, or out of date (for food) and that they conform to national safety standards (for example in the case of child car seats) (Givit 2013a).) Givit, which is made up of 90% volunteers had over 850 charities request items for their clients in 2013, and facilitated the donation of over 74 000 goods (Givit 2013b).

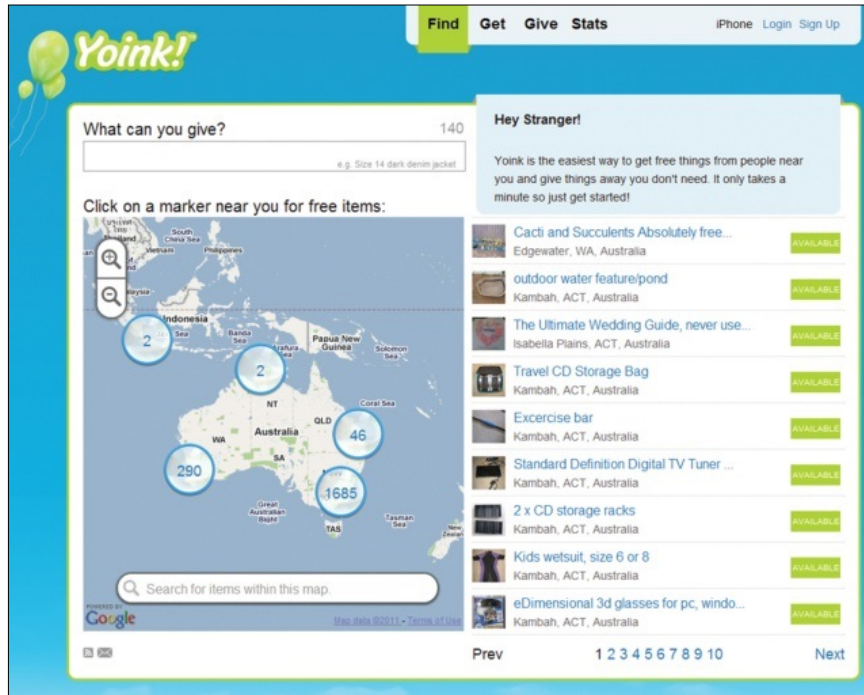


Figure 1.16. Yoink website in 2011

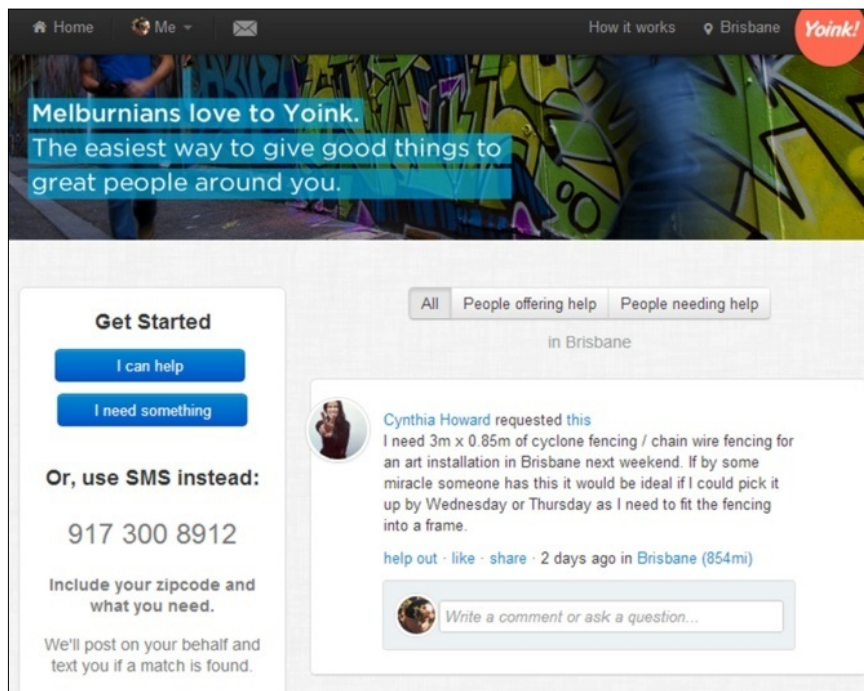


Figure 1.17. Yoink website in 2012

In 2013, the Givit website (see Figure 1.18) was developed further for natural disaster events to meet the extra demands that event produced. Givit created a QLD storms “channel” or page to provide specialised help in collecting donated goods during disasters <channel.givit.org.au> (see Figure 1.19). Currently, a disaster recovery section on the website anticipates future natural disasters.¹² This feature canvasses financial donations to aid future disaster recovery and in this way is preparing for potential future responses to natural disasters.

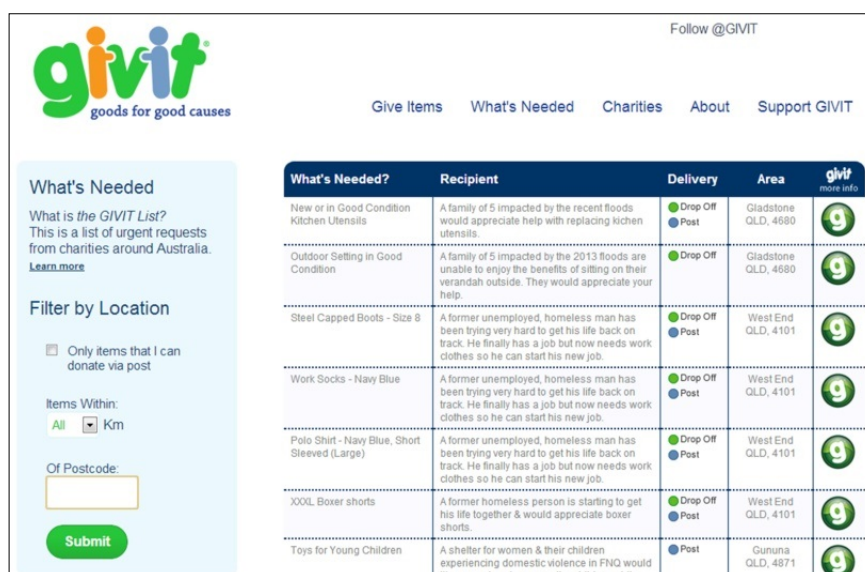


Figure 1.18. Givit website

The Givit website provides an exemplary model for this project. It is an example of an online goods distribution community that considers the needs of agencies and their clients in a number of ways. Coalescence around a shared issue means that some core value underpins participation, and that collectively developed implicit or explicit rules govern participation in these communities. In the case of Givit, the core value that underpins the participation is the donation of useable, quality goods. In addition, what is of value in this application to this research project is the way in which privacy is protected. By acting as an intermediary, the Givit team protects the privacy of the charity clients and limits the potential for scams and fraud. In this way, this goods distribution system enables catered support to clients, post-

¹² <www.givit.org.au/disaster/default.aspx>

disaster without putting further stress on them. Furthermore, the extension of Givit to provide a site specifically for those affected by natural disasters provides an example of ways in which applications can be extended and repurposed for specific community issues that may arise. This adaptability is an important consideration for NFP services where the design of bespoke solutions place pressure on limited financial resources.

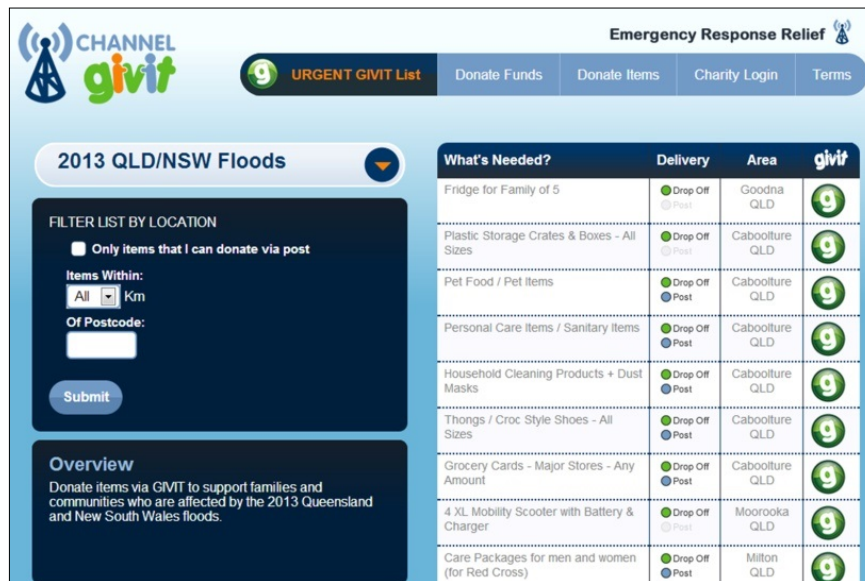


Figure 1.19. Givit 2013 floods channel

The applications that have been discussed so far in this section have all been developed to improve social benefit through community involvement in information provision that enables support and goods distribution. They provide principles that guide this research project for the purposes of improving community participation, including two-way communication and the extension of disaster responses to encourage further community collaboration. Such two-way communications facilitate interactions between community support agencies and individuals, providing an opportunity to respond more effectively to community concerns and needs. The collaborative approach of crowdsourcing can be enabled and encouraged by making a pre-existing task easier, such as locating information in times of personal need, and providing information to those who need help. Issues surrounding fraud and scams can be reduced through the usage of applications as an intermediary. To summarise, social media, when used in a coordinated, networked manner that

enables two-way communications, can be effectively drawn upon during times of crisis.

The Ushahidi platform

An important recent development in the combination of open source, participatory, locative information aggregation applications is Ushahidi. A team of developers formed the NFP agency Ushahidi to create a platform for the purpose of mapping and sharing text messages between aid agencies, governments, journalists and the broader community during local crises. First used in the 2007 Kenyan election and again during the 2013 Kenyan elections, as a site called Uchaguzi <uchaguzi.co.ke>, it included categories of information, including police action, security issues, hate speech, vote counting and results, polling station logistics and a category called positive events (Mitchum 2013, par 3). Ushahidi, as the platform has come to be known, has since been repurposed for various uses by volunteers worldwide including elections, environmental disasters, and natural disaster coverage (Gosier and George 2011).

Ushahidi's core functionality provides an optimised and efficient approach to building online locative systems by and for local communities. Ease of implementation is ensured through Crowdmap, which forms a subsidiary version of Ushahidi, hosted on the Ushahidi team's server (for example yoursite.crowdmap.com). While other CMS implementations can involve a large amount of customisation to get the same locative and communicative functionality, with Crowdmap <www.ushahidi.com/products/crowdmap> the application does not need to be installed on a server. Crowdmap can also be extended and tailored through a customisable interface (although this is currently restricted to editing content, header images, and selection of design templates). If further customisation is necessary, Ushahidi can be installed on a private server and modified extensively in both form and function, although locative and social functionality is built-in (see Figure 1.20). Therefore agencies and individuals can easily take up and adapt the core functionality to share information quickly in times of emergency.

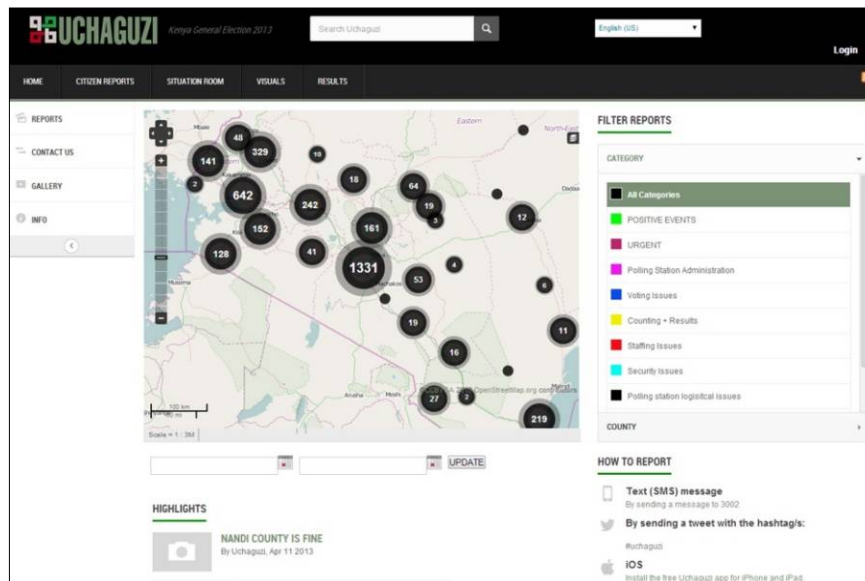


Figure 1.20. Uchaguzi 2013 home page

A number of functional inclusions in the Ushahidi platform enable locative information, SMS and email updates—all of which improve information distribution in situations of urgency. It also facilitates the review and verification of content, which provides a means to ensure the accuracy of uploaded information. The Ushahidi platform also supports the extension of functionality through plug-ins, and a large library of Ushahidi implementations is expanded with each new purpose-built implementation.

The power of the Ushahidi platform lies in its provision of easy to implement core functionality and hosting, combined with the capacity to customise its appearance and extend functionality through plug-ins. This has ensured the popularity of the Ushahidi platform and its extensive uptake for social causes. Examples of Crowdmapper implementations of Ushahidi include the iWitness Pollution Map (2010) <oilspill.labucketbrigade.org>, which was set up to cover the BP oil spill disaster. In the following year it was used in Christchurch to map recovery information following an earthquake (Christchurch Recovery Map <eq.org.nz>). And, in 2013, the Brisbane City Council implemented it as Brisbane Storm and Flood Map <bnestorm.crowdmap.com> to pinpoint sandbag locations, power outages, closed roads and flooded zones.

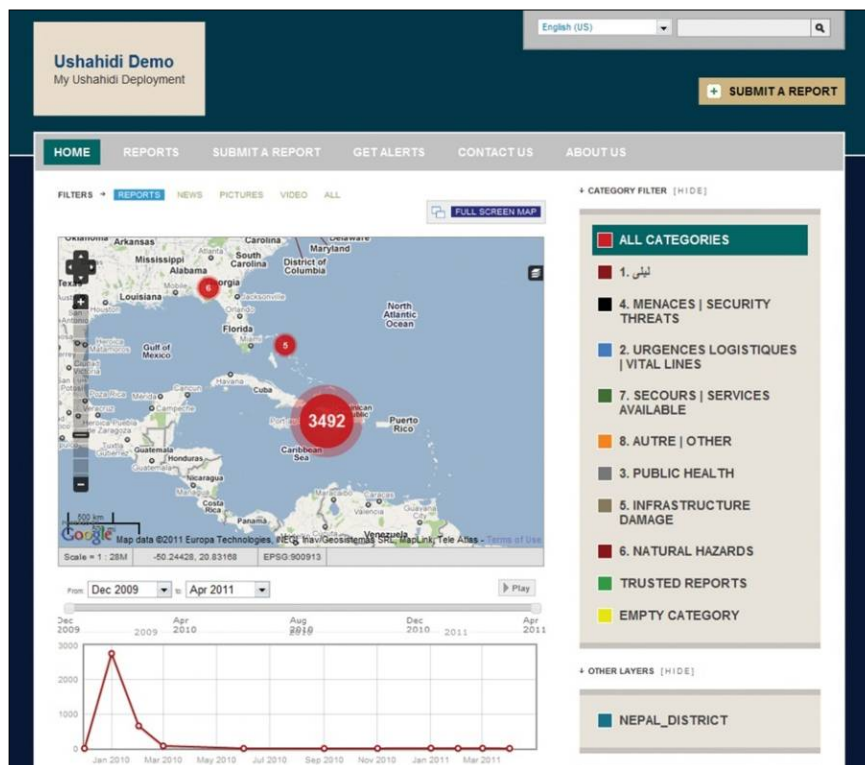


Figure 1.21. Ushahidi home page when first installed is ready to populate content

A current constraint of Ushahidi is that it runs “largely on human power”, as content has to be manually reviewed and approved before it can be seen within Ushahidi applications (Mitchum 2013). However, this process is being improved through the development of a tool that automatically suggests locations and categories so that administrators with the appropriate permissions do not need to manually enter the data (Mitchum 2013).

Other platforms are available that provide an optimised user experience through built-in locative functionality that do not need to be extended through modules and plug-ins. For instance, Local Impact Map <www.localimpactmap.com> is a locative platform, which is offered by Microsoft to create locative websites that map user-contributed ‘stories’. However, it is a pay to use platform and costs \$15 per month. By contrast, the Ushahidi platform is open source and free. It can therefore be utilised to provide inexpensive support, which is important as NFP and NGO agencies may not have the financial means to implement large-scale applications with ongoing costs.

Ushahidi therefore enables customisable, collaborative mapping and communication applications to be produced efficiently, flexibly and inexpensively. It has been repurposed for other local initiatives across the world with many being implemented with Crowdfunder on Ushahidi's servers. Ushahidi's usefulness as a platform for offering community support is further demonstrated by its information review processes which provide ways to limit the circulation of misinformation. All of these elements of Ushahidi make it an attractive technical option for this investigation.

DESIGNING FOR PARTICIPATION AND BEHAVIOUR CHANGE

So far in this literature and contextual review, I have explained how new technologies can contribute to enhancing the information delivery goals of NFP services and enable communities to develop new and agile forms of two-way communication and collaborative and cooperative support for people in need. However, for individuals to commit to using new applications (such as becoming involved in an online community), applications must be purposely designed to motivate them. This can be achieved through strategies identified by the field of captology. Captology, (which literally means Computers as Persuasive Technology, or CAPTology) is a term coined by BJ Fogg that involves designing for behaviour change through persuasive media. The Persuasive Media Framework was developed by Fogg (2003, 173-175) in his book, *Persuasive technology: using computers to change what we think and do*. It focuses on how experiences with technology can be improved through a focus on the “planned persuasive effects” and “built-in persuasive intent” of technology (which is quite different from unintended side-effects of use). Fogg's formulation of captology suggests a “systematic way to think about the factors underlying behaviour change”—from inducing new one-off behaviours, such as signing up to an online mailing list, to increasing a specific behaviour, such as exercising more each day (2009, 1). Fogg argues that such behaviour can be motivated through persuasive media, which might otherwise be described as “interactive computing systems designed to change people's attitudes and behaviours” (Fogg 2003, 1).

More recently, Fogg has developed a model which draws on the three elements of motivation, ability and trigger to encourage behaviour change both online and offline <www.behaviormodel.org>. It suggests that an effective, technologically-mediated experience first depends upon motivating users, making them feel comfortable about making decisions and helping them to act (Fogg 2010, 10). As Fogg (2010, 11) argues in Fogg's Behaviour Model (FBM), new behaviours or what he calls Green behaviours (see Figure 1.22) can potentially be induced by simply increasing awareness of the desired behaviour and providing triggers. This means that seemingly straightforward design decisions, such as the strategic placement of a button on a website, can help to provide a path to a desired action. Long-term behaviours that have not been attempted before are called Green Path behaviours as indicated in the figure. Fogg (2010, 3) argues that “because Green Path behaviours are novel, most people have low ability to perform them.” A focus on Green Path behaviours can encourage site visitors to simply make a commitment by first signing up to the service and then continual maintenance by contributing (Fogg 2010, 10). Therefore, the purposeful design of collaborative web applications should focus on ways to encourage and enable use, inspire hope of positive outcomes, and ensure that applications are developed in ways that remind users of ways to contribute.

However, while the principles of usability, effective content presentation, and enabling action through easy to follow steps are no doubt valuable, in the end this can remain a model of passive information reception and limited interaction. As Rheingold (2000, 49) argues, the most important element of persuasive media is reciprocity, “in which people do things for one another out of a spirit of building something between them.” Reciprocity is foundational to online applications dedicated to improving social benefit. Crowdsourcing, online collaboration, and long-term participation through contributions can be promoted through the FBM, so that applications come to act as a means to share and distribute information and support in a two-way facility.

The Behavior Grid by BJ Fogg					
<small>The Behavior Grid maps 15 types of behavior change. The items in italics are sample behaviors, all related to eco-friendly actions. For more, see www.behaviorgrid.org</small>					
	Green behavior <small>Do <u>new</u> behavior, one that is <u>unfamiliar</u></small>	Blue behavior <small>Do <u>familiar</u> behavior</small>	Purple behavior <small><u>Increase</u> behavior intensity or duration</small>	Gray behavior <small><u>Decrease</u> behavior intensity or duration</small>	Black behavior <small><u>Stop</u> doing a behavior</small>
Dot behavior ... <small>is done <u>one-time</u></small>	GreenDot <small>Do new behavior one time</small> <i>Install solar panels on house</i>	BlueDot <small>Do familiar behavior one time</small> <i>Tell a friend about eco-friendly soap</i>	PurpleDot <small>Increase behavior one time</small> <i>Plant more trees and local plants</i>	GrayDot <small>Decrease behavior one time</small> <i>Buy fewer boxes of bottled water</i>	BlackDot <small>Stop doing a behavior one time</small> <i>Turn off space heater for tonight</i>
Span behavior ... <small>has <u>duration</u>, such as 40 days</small>	GreenSpan <small>Do new behavior for a period of time</small> <i>Carpool to work for three weeks</i>	BlueSpan <small>Do familiar behavior for a period of time</small> <i>Bike to work for two months</i>	PurpleSpan <small>Increase behavior for a period of time</small> <i>Take public bus for one month</i>	GraySpan <small>Decrease behavior for a period of time</small> <i>Take shorter showers this week</i>	BlackSpan <small>Stop a behavior for a period of time</small> <i>Don't water lawn during summer</i>
Path behavior ... <small>is done from now on, a <u>permanent change</u></small>	GreenPath <small>Do new behavior from now on</small> <i>Start growing own vegetables</i>	BluePath <small>Do familiar behavior from now on</small> <i>Turn off lights when leaving room</i>	PurplePath <small>Increase behavior from now on</small> <i>Purchase more local produce</i>	GrayPath <small>Decrease behavior from now on</small> <i>Eat less meat from now on</i>	BlackPath <small>Stop a behavior from now on</small> <i>Never litter again</i>

Figure 1.22. The Behaviour Grid defines the Green Path behaviour as a long-term commitment to a new task such as using a new web application (Fogg 2012)

Triggers can be incorporated into the design of an online application to inform users during the phases of use (known as the initial commitment and maintenance phases), of potential opportunities to participate in the application and in the community more broadly (by say, mapping and distributing information). Triggers can be used in the commitment phase, through elements such as sign up buttons and email invitations to use aspects of a service. In the maintenance phase however, triggers can take the form of cues that are irregular in nature or involve regular cycles (Fogg 2010, 23-24). Triggers can be used in the maintenance phase during regular cycles (every week or month) via notices, emails or SMS alerts, and or through irregular cues (published posts of interest on demand). The FBM provides a simple way to clarify what types of behaviour will lead to improved application outcomes by increasing engagement. These behaviours include commitment and long-term engagement (through maintenance) to an online community, which can be facilitated by varying web design elements and functionality.

Mobile technologies are arguably successful at encouraging and facilitating behaviour change as people can act on triggers (such as sounds, icons and alerts) with wireless technologies immediately. Eckles (2007, 147) explains that technology, “in a persuasive sense,” creates new opportunities, cognitive biases and heuristics by

design. This is evident with the proliferation of mobile app technologies in the past few years. Through a smartphone app, a separate theme or responsive design approaches, the ability to act by people is increased greatly.

By exploring a combination of principles derived from analysing the aforementioned community services and their online presence, alongside applications developed for social benefit, the desired behaviours for locative web applications that improve local information distribution have been identified in this literature and contextual review. A focus on designing with persuasive media principles and Green Path behaviours in mind can further improve the persuasive facility of web applications, by providing purposeful triggers that shift the participant through phases of initial commitment to maintenance in the online community.

RISK MANAGEMENT

Managing risks that can occur through online participation is an important consideration for this research project, as it should be when developing any online community. There are several risks associated with poorly designed online communities and they should be limited where possible. Besides developing online applications that the most people possible can access and, more importantly use by creating an elegantly simple interface, it is essential that users can trust the credibility of a site, and be sure that their personal information is not collected or published.

Investigating how online communities can share information that is verified and trustworthy is an important consideration in this research project. Community based information management is considered to be one of the cornerstones of the social web (Caverlee, Liu and Webb 2008, 1). According to ARC CCI data, “users and non-users” of the Internet are just as likely to think that only “a small proportion” of information on the web is reliable (Ewing and Thomas 2012, 26). And, Bruns argues that, while it is likely to change as the field matures, some social media users and online community users lack the ability to tell good sources from bad (quoted in Atfield 2011, accessed March 10, 2011). As anyone can publish in many online communities, misinformation by accident or intention can be published. For example, social media was said to “circulate misinformation” during the January floods (Australian Associated Press 2011, accessed April 2, 2011).

In addition, because Australians who are disadvantaged, disabled or vulnerable are the “most susceptible to online scams and other cybercrimes” (Commonwealth of Australia 2011, 23),¹³ it is particularly important to create a trustworthy service for information distribution on community services for the public. Social media platforms are increasingly targeted to exploit the social bonds inherent in the communities that form on them (Caverlee, Liu and Webb 2008, 1). These issues highlight the need to limit the circulation of misinformation and provide verification systems for community users to check the validity of posted information.

Accuracy and verification can be provided by moderating and approving contributions before publishing. There are two principal ways of ensuring data quality: expert control and community control. Expert control involves having a site moderator evaluate all information before use (Lee, Kaufmann and Buss 2011, 4). This involves experts verifying information which indicates to site visitors that information is accurate. Whilst this is an effective means of filtering out inaccurate information, it is a manual process that could be time consuming in a large-scale application.

Community control is less time consuming for the site moderators. Community control encompasses corrections made by community members. Whilst unverified reports are still published, there is an extra level of trust associated with verified posts, due to this approval process. This has a surprisingly high potential for ensuring quality information (Lee, Kaufmann and Buss 2011, 4). In online communities such as Ebay, community control takes the form of reputation systems (see Figure 1.23). Reputation-based trust functionality includes the ability to rate others, and so to provide some assurances on the trustworthiness of unknown members of the community (Caverlee, Liu and Webb 2008, 1). In other social media sites, community control enables visitors and members to vote posts up or down and comment. In the field of social media applications, such corrective behaviour is referred to as collective error correction, and it ensures the “resilience of social media communities in the face of (deliberate or accidental) misinformation” (Bruns,

¹³ The Online Scams section of the Australian Competition & Consumer Commission (ACCC) website *SCAMwatch* <www.scamwatch.gov.au/content/index.phtml/tag/OnlineScams> outlines common online scams and ways to protect oneself from them.

Burgess, Crawford and Shaw 2012, 16). This corrective behaviour is evident in communities such as Wikipedia which relies on the community members to check the accuracy of and correct entries.

Finding ways to ensure credibility when developing supportive collaborative applications is vital to developing successful long-term online communities. If applied in the development of online communities for social benefit and social capital building, such verification ensures that information is trustworthy and reliable. Principles of expert and community control can be brought to bear to ensure that content is verified before or soon after publication.

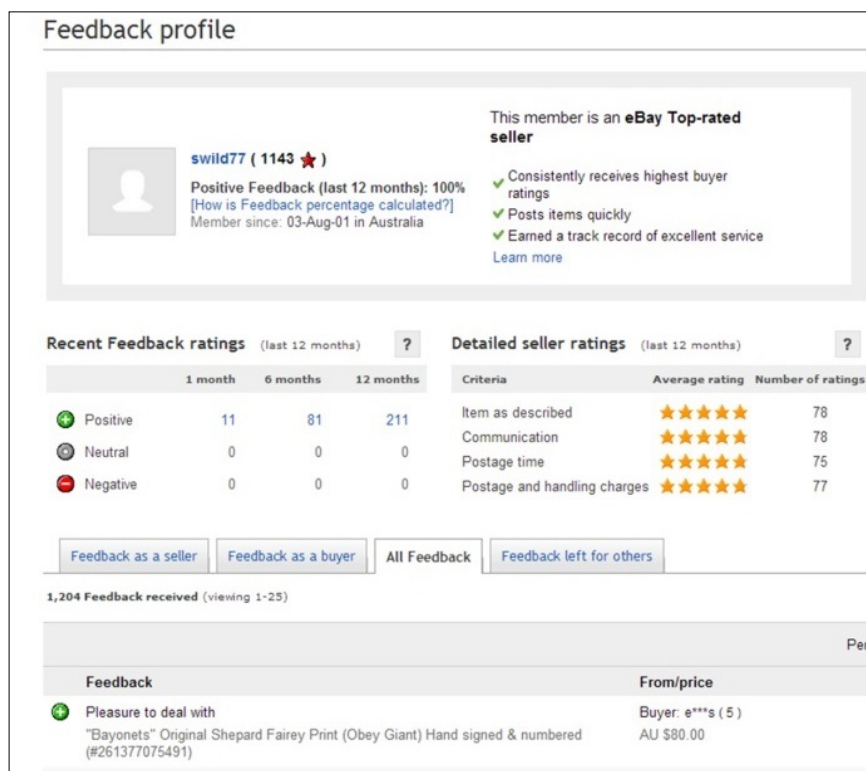


Figure 1.23. An example of Ebay user feedback profiles

In 2013, Fogg provided a useful approach to the problem of providing perceived and actual credibility in his Web Credibility Framework. Forming part of the fundamentals of the 'Persuasive Media Framework', it is just as useful today as when it was published a decade ago, because it focuses on three elements that provide assurance that the site is credible on multiple levels. As outlined in Table 1.1, three design elements are mapped across Fogg's Web Credibility Framework

(Fogg 2003, 173-174). The first important element of this framework is the Operator, that is, the person or organisation offering the site. Not only is the credibility of those maintaining the site important, but so is how quickly queries are responded to. The second element is the Content, which includes information as well as external links, and functionality. These must be accurate and unbiased. Finally, the element of Design, which includes layout, functionality, information design, technical design, aesthetic design and interaction design, influences the perceived credibility of a web application (Fogg 2003, 20).

Table 1.1
Fogg's Web Credibility Framework

Category	Subcategory
OPERATOR	Organisation or person offering site
CONTENT	Information
	Functionality
DESIGN	Information design
	Technical design
	Aesthetic design
	Interaction design

Credibility of information published, and the application in general, are important considerations for the development of any online community focused on information delivery.

Locative privacy and online information disclosure

There are other risks that must also be considered in the design process. In particular they relate to the privacy of users, including the protection of their online identity and not tracking user movements. The inevitable merging of online locative

media applications with social networks and the integration of mapping capabilities and personal information has raised privacy risks. It has been argued, for example, that “the growing importance of online media for Australians may well highlight the privacy and security risks of being online, as well as concerns about content” (Australian Communications Media Authority 2011, 6). And a recent Australian survey (Telsyte 2010, 35) found that “privacy is a big concern” for check-in apps, such as Foursquare <foursquare.com>, which maps individuals’ movements using GPS technologies. 42% of those aware of check-in apps were “very concerned” about privacy, with concerns much higher for those over 35 years of age (61%) and even higher for people over 65 (83%) (Telsyte 2010, 35). By exposing another level of personal information, locative media applications can expose users as “human homing beacon(s)” as explained by the creators of Please Rob Me (Hickman 2010, par 32). Please Rob Me¹⁴ is a website which displayed Twitter user’s locations based on their locative posts and makes evident how locative media can be used to trace people’s movements.

While social annotative applications developed in this research project will not map movements, additional privacy issues such as what amount of information is publicised are important considerations. An example of a locative privacy complication local to the Queensland community surrounds data used in the Online Crime Stats locative website <www.police.qld.gov.au/forms/crimestatsdesktop.asp> (see Figure 1.24), which is offered by the QLD Police to show crime statistics in Queensland. Exact locations are not shown, unlike in CrimeMap <www.crimemap.info> (a privately owned site) which draws on the same data as the Queensland Police map but identifies buildings and areas where offences occurred throughout Queensland. By visualising these exact locations, privacy can be compromised. Terry O’Gorman, the Queensland Council for Civil Liberties Vice President warned in an interview for The Courier Mail that homeowners could be revealed as “soft targets” through the release of crime data and even have house valuations drop (Murray and Chamberlin 2014, par 14). There is a need to consider locative privacy when designing social applications through approaches that don’t map exact locations if not absolutely necessary. A focus on mapping community

¹⁴ <pleaserobme.com>

information (services, support, events, and stores) requires mapping exact physical locations but this should not include individual movements or residences.

Considering online privacy more broadly, according to the Telsyte (2011, 23) survey on Australian digital habits, 49% of respondents stated that they are not comfortable sharing their personal information online, and 32% were unsure. A wide range of implications related to the loss and compromise of online identity include financial loss, emotional distress and reputation damage (Commonwealth of Australia 2011, 10). As long as people continue to use online tools for networking and information, security and privacy risks will need to be considered, especially related to protecting personal details. It is crucial to provide safeguards in case information is compromised, for example, by not storing user details that aren't essential. As Whitworth and Ahmad (2013, 54) argue, "The way to satisfy online privacy is not to store data you do not need." That is, designers should not force registration on users, unless for something that requires registration such as accessing information saved to an account (Nudelman 2013). Developing applications that do not require user registration to explore and post content is a worthwhile consideration when creating collaborative online systems, particularly where content moderation and approval systems are in place.

This has been an important consideration in this research project as it forms one of the largest risks in online participation. Because of such concerns, this research project does not set out to develop check-in applications that plot the current location of users based on GPS coordinates, and if possible require registration. The first application developed as part of this investigation was built using Drupal, and the way it was implemented required user accounts but the ability to contribute without a registered account was explored in the design of the second application. By using the Ushahidi platform, users have the ability to contribute without setting up an account. But it is worthwhile noting the risks as well as the distrust people have for mapping locations online. It is important to consider and resolve when developing locative applications how to protect data from being scraped or copied from the site, such as user locations and details, and how to protect users of mobile devices from being tracked through their applications (Cartwright 2010, 14). This is one of a set of design principles established through the analysis of current theory and implementations in the design fields, which are discussed in the next chapter.

It can be established through this review of exemplar applications that social techniques can provide support in times of crisis. For social media to be effective in its implementation, it must be coordinated, networked and enabled. Two-way communication has particular potential to connect those in need and those who can offer support. Locative media extends the opportunities for support through design with the aforementioned locative applications being effective at visualising the range and density of various information sources. Web applications focused on crisis response have been designed with the Ushahidi platform due to it being open source, and facilitating both social and locative functionality from the outset. Its adaptability is particularly important for NFP services where the design of bespoke solutions places pressure on limited financial resources. Whilst social and locative approaches are beneficial to facilitating participation, they can be further facilitated through persuasive techniques that encourage long-term contributions to online communities.

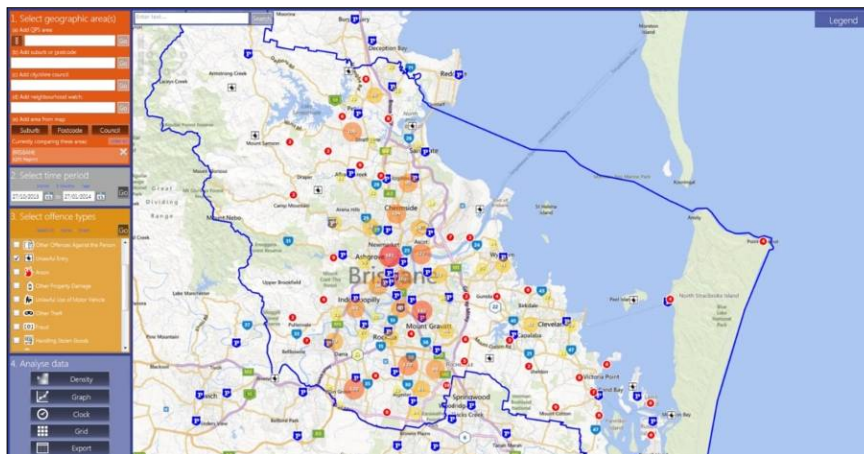


Figure 1.24. Queensland Police Service Crime Map showing distribution of Unlawful Entry offences over a three month period

Chapter 2: A set of preliminary principles for a design solution

From the contextual review, a set of preliminary principles for this research project can be formulated, covering issues such as information delivery and access, locative information delivery, user contributions, platforms and risk management. In summary they are:

IMPROVING INFORMATION DELIVERY FOR LOCAL DISASTER RELIEF AND DAY-TO-DAY SUPPORT

The provision of information to those affected by natural disasters can come from both official and community sources. As far as alerts on local hazards, warnings and official support services are concerned, government and emergency agency information tends to be the most verifiable and accurate that can be provided. This information comes directly from agencies on the frontline, as they have access to the most credible, updated information. Therefore, *real-time information can often be provided by aggregating pre-existing official online resources for new purposes. This can be augmented by information generated by community participants as 'citizen journalists', which extends information sources and provides a wider range of continual and focal community insights. However the risk associated with this community generated information relates to accuracy.*

Information provision can be complemented by official support agencies and community projects that facilitate post-event support to those affected by natural disasters. For example, online communities can successfully organise volunteers and facilitate the distribution of material support by aggregating information on needed and wanted goods. Community support applications such as Givit are successful in facilitating the distribution of goods between agencies and individuals. *Community applications, which harness the generosity of community members and build social capital, can extend the support provided by agencies to provide an effective resource for those affected by natural disasters, and well as those facing a range of personal crises.*

The aggregation of official and community information on local services and community support is beneficial to people in times of community-wide crises, as are effective, holistic resources for those affected by a range of personal crises. However, it is important that clear categories are provided to site visitors so users can easily search for and identify information and services they seek. *To benefit people seeking support and service information that is relevant to them and their current situation, designers should ensure that, instead of focusing on particular agencies and the services, the organisational logic of aggregated data should focus on types of resources and services, and their relative location to the individual as a central organising principle.*

HARNESSING NEW TECHNOLOGIES

The aggregation of a variety of community support information can be improved through the visualisation techniques of locative media. By utilising locative media, the locations of where information is needed most and where it is saturated can be visualised. *The visualisation techniques of locative media are particularly effective in displaying the geographic distribution of services and events in a visually appealing and categorised way, which relates to the user's own locality.*

Mobile technologies can facilitate the increased reach and improved access to information. Smartphone web apps, for example, can be an efficient way of providing an application to smartphone users by using pre-existing web design skills with HTML and CSS to develop themes that look and act like native apps. However, to focus on smartphone apps alone would be to neglect a segment of the population who do not have Android or iOS smartphones. Therefore smartphone technologies should be explored and developed to extend access, but they must be supplemented by a mobile website for non-Android smartphone users. That is, *web applications should be designed to cater for audiences on various devices. This can be achieved through a responsive design approach, which ensures that the application is accessible across all displays including phones, tablets, notebooks and wide-screen displays.*

Social media can also be harnessed to extend information and support provision. While designing online services that provide ease of access to useful,

timely and accurate information is crucial, fostering the capacity of individuals to contribute their own knowledge for social benefit is an important way to build social capital. Facilitating communication between community members and agencies as well as each other is also of benefit to enabling support. *Social web functionality, such as sharing posts and facilitating private and public two-way communications between users, can be harnessed to enable individuals to request information they need but isn't available, to facilitate community participation in information provision, enable one-to-one and one-to-many support, build a community and support collaboration amongst users. All of this extends the range of information and support that is available to be extended.*

INCORPORATING PERSUASIVE TECHNIQUES

The implementation of new technologies cannot in themselves ensure uptake of an application and contribution to social capital building. Designing for behaviour change through persuasive media (Fogg's Behaviour Model) can help to shape people's attitudes and behaviours and so encourage participation in online communities—from inducing new one-off behaviours, such as signing up to an online mailing list, to increasing a specific long-term behaviour, such as contributing insights or donating goods. *Three elements of persuasive media—namely providing motivation to participate, ensuring the ability to do so and providing a trigger within the application to encourage a desired behaviour can help to ensure community participation in an application that is designed for social benefit and help build social capital.*

THE BENEFITS OF ADAPTING OPEN SOURCE APPLICATIONS

Open source platforms can be utilised to provide effective and inexpensive online community building tools for agencies and community groups, which is important as NGOs and NFP agencies often do not have the financial means to implement large-scale bespoke applications to respond to a disaster at hand.

Extending open source licenses are Creative Commons licenses which provide a foundation for other designers and agencies to build upon creative applications developed for their own benefit. *Applications that are developed using open source platforms and Creative Commons licenses can therefore be repurposed with ease for specific community issues that arise.*

The Ushahidi platform is an example of a community information distribution application due to its active redevelopment and its ability to be repurposed easily for various uses. In addition to its in-built locative and social functionality that enables the visualisation of local information and facilitates communications between users, the verification processes of moderation and approval that exist in the platform are valuable in enabling communities to evaluate information as accurate and credible. *Ushahidi is therefore valuable as an open source platform that enables the locative aggregation of local information and communications between users, with risk management considerations through verification processes.*

ENSURING INFORMATION CREDIBILITY AND ONLINE PRIVACY

A number of potential risks need to be considered when designing locative, social applications for harnessing community contributed information of use to those in a crisis. One of the most important is ensuring that information is accurate and can be relied upon by people in need. *Using expert controls such as information approval and moderation, in combination with community controls such as rating systems, can help to ensure a level of credibility when developing applications for information delivery.*

Another risk that must be taken into consideration is online privacy. This is particularly important because people in need are often the most vulnerable in society. The identities of an application's user (including name, location, and contact details) need to be protected in the design of such applications to minimise risks associated with identity exposure. Additionally applications should not require the disclosure of personal information through user registration, as the sign-up process can be a deterrent to use. *Social applications need to be designed with considerations of how to minimise identity exposure, including how to protect these identities by not collecting unnecessary personal information of the users.*

In the design of locative applications, there is a need to consider locative privacy as this technology, through approaches such as check-in apps can be used to plot user locations such as residences and movements over time. *Locative media is useful as a tool for plotting geographically relevant information, however it must be used in a thoughtful way that considers and minimises risks associated with exposing a person's movements or locations.*

To summarise, several initial design principles can be proposed from this literature and contextual review for the development of online applications to enable the effective collation and presentation of local information for those in the community facing natural disasters or personal crises. These principles go beyond a discussion of information delivery, to harnessing the benefits of new technologies such as tools to aggregate official and community contributed sources, as well as locative, mobile and social media capacities to improve the visualisation of information and access to it. Open source platforms can be utilised and adapted to produce a low cost solution, which is important to NFP organisations that may not have the resources to develop a bespoke solution, and it can help to ensure a rapid response to new situations and crises as they arise. Persuasive techniques can help to build community communication and participation, which can be harnessed to extend information and support and so build social capital. Risks associated with identity exposure can be managed through a thoughtful design process that doesn't collect unnecessary personal information from users during registration. The risks that need to be considered are extended by locative privacy which can collect the movements and locations of individuals. These initial principles will be taken forward into the design and development of the case study applications to provide a foundation for other locative, social, community-driven applications designed for social benefit. However they will be first be considered and modified in light of the contributions of case study stakeholders as detailed in the methodology section that follows.

Chapter 3: Methodology and methods

This chapter introduces and explains the methodology and methods that have underpinned the foundation of this creative research project. Positioned in the field of interaction design, the principal methodology that has been employed is practice-led research, which combines both investigative research and design activity (Knight and Jefsioutine 2006, 153).

Such design research might be characterised as contextually grounded, pragmatic, flexible, integrative and iterative (Santos 2010, 1-5). Design practice research first involves investigating inter-dependant variables related to a specific context and environment, the needs of stakeholders, and the purpose of a design solution, then developing a design process that addresses these variables in a specific instance. In this instance it is designing online communities to address the distribution of community information.

To produce a contribution to new knowledge however, the outcomes of a research project must go beyond an instance and a single design solution, to offer deeper understanding of the problem and provide outcomes that are generalisable and more broadly applicable (Hamilton and Jaaniste 2009). This prioritises setting targets that involve broader exploration, over setting bespoke project mandates (Canaan 2003, 239). Therefore, while this project has involved the production of specific creative works (online applications), it has set out to develop a set of generalisable principles for effectively designing online applications for community support. The methods employed in this research project were therefore purposefully selected to derive these generalised principles and then to test them through their implementation within exemplary collaborative, participatory online applications for community benefit, produced out of two demonstrational prototype applications.

The characteristics of the practice-led research methodology and associated methods that form the design framework of this project can be detailed as follows.

RESEARCH METHODOLOGY

Practice-led research

This research project can be aligned with the methodologies of practice-led research. Practice-led research involves a qualitative approach that explores and investigates a research problem through practice, in tandem with relevant theory. It is defined by Carole Gray (quoted in Mafe and Brown 1996, 2) as,

Initiated in practice, where questions, problems and challenges are identified and formed by the needs of practice and practitioners... the research strategy is carried out through practice, using predominantly methodologies and specific methods familiar to us as practitioners in the visual arts [or relevant creative fields].

The outcomes of practice-led research involve both creative outcomes and theoretical insights generated through the research process. Smith and Dean (2009, 7) describe the outcomes as, “referring both to the work of art as a form of research and to the creation of the work as generating research insights which might then be documented, theorised and generalised.” This is the case in this research project as it investigates a research problem in practice and through insights that give rise to generalised principles.

Effective research and interaction design

As design research, this project takes an ‘effective’ research approach, which can be cast in contrast to ‘evocative’ research. Hamilton and Jaaniste (2009, 5) define effective research as research that is conducted to effect change (make a product, process or experience more effective, efficient or useable), in contrast to evocative research, which takes an artistic approach “to produce affect and resonance through evocation”. Research involving a design problem can be identified within a particular community and context, and the aim of the research is to produce an outcome that is an effective solution to the problem. The solution must prove to be “innovative” by providing a “new or improved solution to this problem” (Hamilton and Jaaniste 2009, 5).

In the case of this research project, this involves researching solutions to the problem of empowering community agencies and community members through the design of effective, participatory online applications. More specifically, it involves improving on current locative technologies to provide a new online solution for people wishing to share or locate information, resources, support, or events. That is, within the paradigm of effective design, this research project is positioned as one which focuses on finding a solution to a design problem, as opposed to exploring the aesthetics and artistic nature of the fields of locative media, online communities or mobile design. This impetus is generally the case in interaction design research.

Action research

In terms of process, this design research is achieved through three sequenced approaches. First, it involves looking for patterns and phenomena in a given context, which embodies and exemplifies the design problem. These patterns relate to current user behaviours and processes of engagement with the problem at hand (Saffer 2010, 84). This initial research is often achieved by involving stakeholders in ethnographic methods (observing, interviewing and documenting). However it may involve more active involvement of stakeholders through their direct contribution in workshops, brainstorming and so on.

Second, a detailed iterative design process, which involving stages of brainstorming, sketching, and implementation ensues. An iterative design process is then implemented as feedback received from research participants guides the research project testing, evaluation and direction. Iterative design loops are therefore based on feedback received, as well as changes that become apparent through the design process.

These steps, which form the process of the design research in this project, are commonly used in interactive design research. The stages form within a contextual framework involving instances of the design problem and potential solutions and they result in concrete outcomes in the form of prototype applications. Moreover, they contribute to the refinement of the initial design principles derived from the

literature and contextual review into a generalised form, which represents another key outcome of this project.

Another way of framing this processes of evaluation of a context, developing a proposition, iterative design and testing, is through the methodology of action research. Action research—in particular that which is practice based—inserts practice into research by offering creative works, designs, content and events as core research outputs (Jaaniste and Haseman 2009, 4). It involves a cycle of development which is best explained as a “spiral of self-reflective cycles” involving the fluid overlapping steps of planning, acting and observing, reflecting and revised planning (Kemmis and Wilkinson 1998, 21), which are outlined in Figure 3.1. Action research is a useful component of the methodological framework for this project, as the processes and practices involved as core research methods enable the researcher to “materialise new ideas and forms into being as a form of experimental research” (Jaaniste and Haseman 2009, 1).

Action research requires a “high level of reflexivity and sensitivity” to one's role in mediating the research process (Somekh 2005, 7). It involves qualitative research methods that consider and incorporate perceptions, beliefs and the cultural meaning that people attach to facts, events and experiences (Hennick, Hutter and Bailey 2011, 18). Types of qualitative research include approaches such as stakeholder, expert and customer interviews, user observations, literature reviews and prototyping (Cooper, Reimann and Cronin 2007, 52). This serves to enable the researcher to gain an “insiders” point of view. It acknowledges that the subjective perspective of study participants and the researcher's subjective influences are brought into the research process, and this raises the need for “conscious self-reflection” (Hennick, Hutter and Bailey 2011, 19). Moreover, reflective practice enables both the creation of elements of surprise through outcomes, and considered and purposeful responses to them.

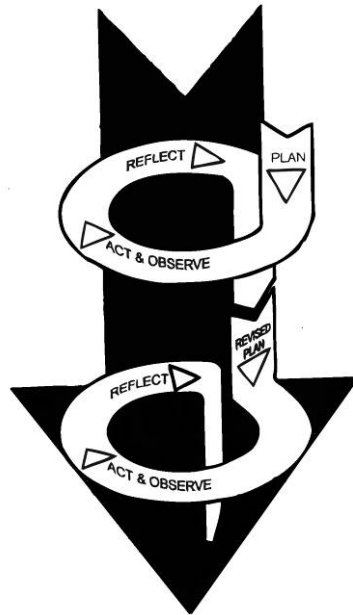


Figure 3.1. The iterative process of action research (Kemmis and Wilkinson 1998, 22)

Because action research involves “integrating social science inquiry with participants’ practical action”, all involved in the research process have a sense of agency (Somekh 2005, 1). This can be amplified through a participatory design process.

Participatory design

As Smith and Dean (2009, 8) argue, practice-led research is often carried out collaboratively. However, as Fuad-Luke argues (2009, 142-147), in design research, participation is essential for enabling “socio-political change” and solving “wicked problems” which focus on complex issues in society. At the core of participatory design is an “ethical motivation to support and enhance how people can engage with others in shaping their world [...] over time” (Robertson and Wagner 2012, 65). Designing with others, as Fuad-Luke (2009, 147-148) explains, provides an opportunity for multiple stakeholders to be involved in design decisions as well as giving feedback. It is a collaborative design process that ensures the agency of stakeholders in ascertaining the goals, priorities and risks for the project at hand.

This research project aims to find a solution to the wicked problem of improving access to and distribution of information on community services, resources, other support and events. In the field of design, many participatory approaches have been developed. They include collaborative brainstorming, surveys and questionnaires that ascertain user needs and online skills, in addition to usability testing. In this research project, participatory design has seen community agencies as key stakeholders, and representatives of these agencies have been invited to guide the development and bring expertise to the project that clients of community agencies cannot.¹⁵

These agency stakeholders have provided industry insights, such as patterns in access and usage of services and current opportunities for design. They have identified priorities and current limitations, in addition to risks that need to be managed in designed applications. Not only have they provided insight into their needs as a stakeholder, but also the needs of other application users such as their clients, or other members of the public.

The International Association for Public Participation (IAP2) (nd, 3) argues that the public (those not usually involved in the decision making process) can contribute to an increasing level of impact in projects, depending on the type of engagement encouraged, as outlined in their diagram, the ‘IAP2 Public Participation Spectrum.’ In this research project, a Consultation role was harnessed for the purpose of gathering feedback from the public on occasion. However the feedback provided in the consultation role of the spectrum can be extended further through working directly with the public (Involving), forming partnerships (Collaborating) and allowing the public to make choices (Empowering), leading to project better outcomes (IAP2 2004).

A participatory approach also encourages reflection by both the designer and stakeholder participants upon the outcomes as they are developed. It is therefore a valuable approach in the field of web design as it grounds the context of the application before and during its development. In this project this has involved interviews with stakeholders to investigate ways to solve the design problem,

¹⁵ Whilst end-users were not able to be involved in this collaborative design process, the stakeholders were able to give valuable insights into their behaviours and needs.

questionnaires about possible design approaches and surveys on Internet skills and usage. All of these participatory approaches have enabled the design of the application to be focused on the needs and desires of the community agency stakeholders with a consideration of their Internet experience and knowledge.

RESEARCH METHODS

The overarching methodology of practice-led research and an effective interaction design approach involving action research and participatory design, has been implemented in practice through a mixed method approach. The methods that have been employed in this research project can be summarised as follows.

Agile Software Development Process

An important approach to iterative design and development process, which is used throughout the field of interaction design, is the Agile Software Development Process. This method's value includes placing "individuals and interactions over processes and tools" and "working software over documentation". This places an emphasis on "customer collaboration" and "responding to change" instead of following a set plan (Sims and Johnson 2011, 34). Through an agile process, research shifts from design to development to testing then implementation in an iterative cycle, as indicated in Figure 3.2 (Groupware Consulting 2007).

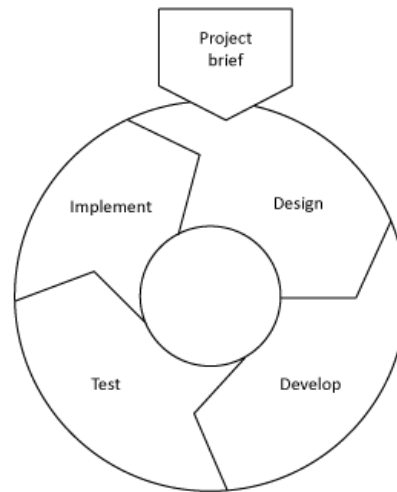


Figure 3.2. The Agile Software Development Process (Groupware Consulting 2007)

Principles from the Agile Manifesto, which outline the nature of Agile Software Development, played a crucial part in adhering to a flexible, yet thoughtful, iterative design process in this research project. The most important of these principles were those outlined by Beck et al (2001). That is: the early and continual delivery of research outcomes, accepting that project requirement changes as often as they occur, and reflecting on how to increase effectiveness in every aspect of the research process of application development.

These principles emphasise the need for an iterative approach where practice outcomes drive application development. These principles have been extended by Subramaniam and Hunt (2006, 31-166), with the following of particular relevance to the methodology of this research project: keeping up with changing technology and unlearning the old; letting designs evolve like a map; choosing technology based on need; and evaluating trade-offs actively. This was achieved (respectively) through new mobile design techniques; using action research; exploring open source systems; and continuously evaluating functionality, systems and approaches. This research project utilised agile approaches to enable feedback from one application to feed into the next application.

A contextual framework

This research project has involved designing and developing two demonstrational prototype applications, which have served to provide specific ‘instances’ of the design problem within a contextual framework. The first instance involved the design of web applications to encourage and enable community members to advise and help each other, and to provide information on support services after a natural disaster (the Queensland floods of 2010-11). The instance set out to address the problem of dispersed and diverse information facing individuals experiencing a personal crisis through the online aggregation, categorisation and geographic visualisation of information, resources and support provided by community organisations in Brisbane Australia.

Contextual frameworks are of benefit to design research because they enable a broad design problem to become focal and specific. They enable the evaluation of a particular context to form an understanding of the design problem, and its environment (including potential users). This serves to bring the initial principles established from a broad contextual and literature review (which at that point are theoretical) into sharp relief and to examine them in context and in use. A propositional design proposal can be developed for the requirements identified within the contextual framework. Then, after the development of a prototype application, it can be tested by users within the context to ascertain its strengths and weaknesses in relation to their needs, and be refined through this consultation within an iterative design process.

In this way, this approach can establish specific contextual requirements, help to determine the approach to the research problem, enable the instantiation of the research findings (the set of preliminary principles identified through the literature and contextual review), and provide a context for testing and refining the design outcomes and, by extension evaluate and enable the refinement of the design principles themselves. The principal benefit of a contextual framework approach then, is that it enables the principles formed from the literature and contextual review to be applied and tested in context of the prototype applications, in situ and in practice.

The design research processes of evaluating a context, developing a proposition, and pursuing iterative design development and testing within the prototypes has involved the following methods.

Ethnographic methods: participant observation, surveys and interviews

Colborne (2011, 19) argues that successful interaction design involves understanding the proposed users' world before figuring out the functionality and purpose of the design as well as the importance of understanding user opinions, desires and needs prior to designing an application (Colborne 2011, 29). When combined with participatory methods (which enable the latter) ethnography offers valuable instruments for establishing the former; that is "making [such] things visible" (Robertson and Wagner 2012, 77). The importance of documenting actions in response to events by users in a specific environment is crucial to understanding how people understand a given process (in this case an interaction process) and its steps. It is also an important part of the evaluation process as it sheds light on how users engage with an application that has been developed, how easily they employ it, and how it can be improved.

Various ethnographic methods have been deployed in this research process, including participant observation. The ethnographic approach of participant observation can be defined as "a field strategy that simultaneously combines document analysis, interviewing of respondents and informants, direct participation and observation, and introspection" (Denzin quoted in Flick 2009, 226). It is of particular use in game studies, interaction design and other fields which are "emergent, incompletely understood and thus unpredictable" (Boellstorff 2006, 32). This makes it appropriate for analysing local community environments, including those in the second design investigation. It involved observing activities within a community centre and sitting in on a computer class to gain an understanding of the computer literacy skills of the potential users of the application I would go on to develop. In addition, it involved a consultation role on a national NFP board to further ascertain how community service support could be improved through information delivery.

The ethnographic methods employed also included surveys and interviews, which were completed by stakeholders in the design of the first prototype to gauge web usage skills, and a three week diary study was undertaken by three staff. In the second instance, stakeholders completed web usage surveys prior to development to gather an understanding of the skill levels of the staff. A research questionnaire about potential site functionality was also completed. It was complemented by a semi-structured interview with one of the staff members, as detailed in Chapter 4.

Approaches taken in the case studies of this project were varied, and were dependent on multiple variables, such as stakeholder and individual availability and the project's time constraints. They included interviews with staff of community agencies, participant observations and user testing of the case studies to provide insights into the benefits, problems and other issues associated with the resulting applications. Surveys on web usage and skills enabled the development of personas. Personas are generalised representations of users that have the same needs or are involved in the same interests, whether in "homogenous audiences or niche markets" (Ireland 2003, 28). Participants were recruited through stakeholders. These stakeholders are known as community "gatekeepers"; those who have a recognised role in the community and are influential in encouraging community members to participate (Hennick, Hutter and Bailey 2011, 92). Designers assume a facilitation role, and introduce a new dimension of creativity into design through developing empathetic, participatory design tools (Bratteteig, Bødker, Dittrich, Holst Mogensen and Simonsen 2012, 9).

In terms of evaluation, feedback that was gathered from user testing, facilitated reflection and iterative design—both within the design of each application and in the way in which the first investigation shaped the subsequent one in an iterative fashion. It also shaped and refined the design principles that were developed as progressive outcomes.

Quantitative and quantitative research

Qualitative research is beneficial as a research method for exploration into the exemplar fields and collaboration with stakeholders through ethnographic, reflexive practices that enable the evaluation of information that is not numeric in form. On the

other hand, quantitative research involves statistical analysis and enables the researcher to gain insights from data that can be ascertained through methods including surveys.

Quantitative research is useful in the beginning of the design process to assess the statistics on needs of the stakeholders and potential users of the application, and to evaluate the importance of design opportunities, and during the design process for objective feature and usability testing (Purpura 2003, 64).

In this research project, qualitative research took the form of interviews, diary studies and questionnaires, which were collated from staff members from community organisations to generate a foundation for the design of web applications and to assess their usability. The insights generated through interviews and questionnaires demonstrated the potential opportunities for application design. And usability testing through diary studies generated insights into the strengths and weaknesses of the application interface and information design, in addition to other interactive elements.

Quantitative approaches were employed for analysis and data collection from surveys, as well as web performance analytics. These were collated from survey data and Google Analytics software respectively. Survey data which was analysed provided insights into the Internet skills and usage patterns of the stakeholders involved. And analytics provides valuable information on the application including devices used to access it, browsers used, times and places of access and page load times.

These varying quantitative approaches of data collection and analysis, alongside web analytics were particularly important to this investigation, in addition to qualitative methods. These quantitative methods enable statistics to be generated based on the skills and understandings of potential users, which are then evaluated to shape the application design towards a better user experience. When combined with qualitative methods that enable an understanding of the design context (including users, environment and opportunities), these quantitative methods strengthen the design research process.

Both quantitative and qualitative research methods were applied in this practice-led research project through data collection, the contextual review, reflection

in action, and reflection on action. Data collection includes ethnographic and participatory activities including observations, stakeholder interviews, questionnaires and user feedback. By drawing on action research and participatory design, an iterative research process involved stakeholders in various aspects of the design process. This collaboration shaped design principles regarding the facilitation role designers can play when working with community agencies to develop online communities. The principles developed for designing web applications discussed in this chapter extend the design principles from the literature review.

The contextual review investigates theory, history, ethnography and critically analyses creative work in the fields of locative media, online communities and mobile design, particularly where these fields intersect. Design principles are extracted from this analysis. Reflection in action takes the form of reflective journals, design exercises including sketches and mock-ups, evolutionary case studies and design principles, in addition to feedback from stakeholders. Reflection on action is the creative component of the two prototype applications developed, alongside the design practices and principles that form this.

A participatory design approach through methods including ethnography, observation, surveys, interviews and diary studies provides a solid foundation for designing applications for social benefit. A contextual framework drawing on action research, is used in this project to guide the development of the application outcomes, design practices and principles.

PROJECT DESIGN AND PROJECT PHASES

As discussed above, the design of this study has involved a practice-led design approach, an interaction design process, and sequenced action research methods. This has involved the processes of *planning*, *observing*, *acting*, and *implementing*, with *reflecting and revised planning* for each design investigation. This phased approach correlates with the agile process, which similarly includes planning, acting and reflection. However, the cycle then revisits the first phase of planning to improve the outcomes in an iterative cycle. The whole cycle is then repeated in an iterative process into the second investigation as detailed in Table 3.1.

Table 3.1

Summary of design processes used in this research project

Research Plan	Tasks
PLANNING	Background research through contextual and literature review, application study identification and design.
OBSERVING	Collaboration (participant observations, interviews, user needs analysis, personas, storyboards).
ACTING	Preliminary design (sketches and graphic design including logos, mood-boards, wireframes, style tiles, mock-ups, information architecture, paper prototypes, thumbnail sketches).
IMPLEMENTING	Application creation (web design).
REFLECTION	User testing of applications, technical design testing, Evaluate outcomes, benefits and problems with practice, Analysis of design principles (from prototype outcomes), Formulate conceptual designs and establish effective design principles.
REVISED PLANNING	Implement changes from testing, publish outcome of iteration , Build upon these principles and conceptual design in the next design iteration (unless application is completed in the sense of design and functionality).

The research methodologies and methods described in this chapter were applied to investigate how web applications for social benefit can be purposefully designed to harness new locative media, mobile and social web technologies, and how they have helped to ensure that the outcomes effectively enable people in need to access resources with greater ease, enable community connectivity, and facilitate and encourage community participation in building social capital. The process of planning, observing, acting and implementing, reflecting and revised planning has provided a means to design applications in a way that has efficiently and effectively improved the concrete project outcomes, as well as the generalised principles through iterations, which are now discussed in detail.

Chapter 4: The unfolding of the research

This chapter details the way in which the research project has unfolded in practice, in line with the stages of planning, observing and acting, implementing, reflecting and revised planning that were outlined in the previous chapter. It relates the activities that were undertaken to the methodologies of effective, practice-led research and the methods of participatory, agile and iterative design described in Chapter 3. Documenting the design process, outcomes, evaluation and reflections that informed the iterative design process were an important part of the research process and so they were documented continuously. This research process is a dual narrative, because it charts both the iterative development of the creative practice as well as the iterative development of a set of generalised principles for designing effective aggregated, locative, and participatory applications for social benefit.

PLANNING

The planning phase of this project focused on establishing a foundation for the research through a contextual and literature review, along with the identification of potential design approaches. First the contextual and literature review involved gaining a scholarly understanding of relevant design fields, current and emerging technologies, and approaches to ensuring participation in online communities (persuasive techniques). It also involved developing an understanding of how various web technologies might be used to enable access to timely, contextually specific information, including the use of data aggregation tools to collate content, locative media to enhance the meaningful display of information, the mobile web for increasing the reach of information, and elements of the social web to improve two-way communication and enable community contribution to building social capital. Further, it involved investigating potential risk and community building. The literature review encompassed both academic and ‘grey’ literature and newspaper articles, through which NGOs and professional bodies informally publish their findings (Thomas, Houghton, Lawrence, White and Weldon 2012, 3) and the contextual review considered a range of exemplary web and mobile applications,

which utilise new technologies to improve information provision and social connectivity during and after natural disasters, or to support people experiencing a personal crisis of a more general kind.

The outcome of this review of theory and exemplars—a foundational literature and contextual review— is presented in Chapter 1. It helped to establish a theorisation of the field and to situate the research project within the field. It also helped to determine gaps in the field—in terms of available web applications for effective information delivery, support and community participation in disaster management and wider social benefit.

An analysis of the findings of the literature and contextual review provided the foundation for establishing a set of preliminary design principles to guide the design of effective social benefit applications. These principles are detailed in Chapter 2: A set of preliminary design principles, and can be summarised as:

Harnessing new technologies can help to improve information delivery for local disaster relief and crisis support.

More specifically:

- Access to information can be improved by aggregating pre-existing ‘official’ online resources for a specific contextual need.
- The visualisation techniques of locative media can be particularly effective in displaying the geographic distribution of services and events in a way that relates to the user’s locality. (This involves a shift in organisational logic from a focus on particular agencies and their services, to a central organising principle of types of categorised resources and services and their relative location to the individual.)
- To increase access and reach, web applications should be developed through a responsive design approach that ensures an application is accessible across various devices including phones, tablets, notebooks and wide-screen displays.
- Accurate and credible information provided by agencies can be augmented by information generated by community participants through contributory web functionality. Social web functionality, such as posting, commenting

and rating, as well as two-way communication, can be employed to enable individuals to request information or support they need, harness the generosity of the community members, facilitate one-to-one and one-to-many support, and support collaboration amongst users. This can extend the support provided by agencies, build a social benefit community, and enable social capital building.

Incorporating persuasive techniques can increase community participation in information provision.

More specifically:

- Three elements of persuasive media—namely providing motivation to participate, ensuring the ability to do so, and providing a trigger to act within an application—can serve to encourage participation in an online system, and prompt and enable desired social benefit behaviours in both the short and long-term.

Adapting open source applications can reduce the cost and time required for development.

More specifically:

- Applications can be developed using open source platforms (such as Ushahidi) and Creative Commons licenses, which makes them relatively inexpensive, faster to implement, and adaptable (compared with bespoke solutions); all of which benefits NFP agencies and communities.

While community participation in information provision provides a wider range of continual and focal information, risk management must be in place to ensure accurate information and limit malicious posts.

More specifically:

- In collaborative online communities dedicated to information delivery, it is important to consider how to limit the circulation of misinformation. This can be achieved through approaches established in the contextual review, namely expert and community control. An example of expert control is the ability for site moderators to approve content and an example of community control is the ability for community members to rate content.

Ensuring content is accurate through an approval process and encouraging individuals to rate content limits the distribution of misinformation, which needs to be avoided particularly for those searching for support information in times of crises.

- Designers must consider how to minimise identity exposure (including personal information and physical location) in social benefit applications. This is particularly the case when working with vulnerable communities and individuals.

These principles were carried over into the next phase of this research project, where they provided the grounds for hypothesising potential solutions.

The literature and contextual review and preliminary design principles also served to establish gaps in the field of research (web applications for social benefit). That is, there is currently a lack of online applications that aggregate available information and community support in a locative visualisation and formulate social capital through doing so. There is also a gap in service provision applications that harness social, mobile and persuasive design approaches to enable and encourage community participation in information and support provision. These gaps established the aims of the research and the approach to development of the web applications, including both conceptual and technological approaches.

Influenced and guided by factors arising from the literature and contextual review, including identified gaps in the field, project aims, and the set of preliminary principles, a contextual framework was decided upon as a means through which principles could be implemented and tested.

Planning therefore also involved the identification and establishment of two relevant web applications through which a user needs analysis could be performed and the principles could be implemented and tested in what might be described as propositional or exploratory applications. Besides establishing contact and building cooperative partnerships with stakeholders, this involved establishing clear and specific aims and suitable information gathering strategies such as ethnographic and participatory design strategies that suited the design contexts, as well as recruiting participants, and gaining ethical clearance. (See *Share Our Sunshine*: background and *Upraxia*: background for details.)

It should be noted that the narrative of this research project involves the design and development of two sequential applications, which both followed the planning, observing, acting, implementing and reflection cycle outlined in the previous chapter. The second application built upon the lessons learnt from the first and extended its outcomes through the inclusion of community building and participatory design principles. In this way it might be considered a further iteration, as well as an extended exploration of the research problem.

Share Our Sunshine: background

The first application designed in this research project focused on an online design solution for populations affected by natural disasters, such as a major flood. During the 2011 Queensland floods, when community services were inundated or overwhelmed by offers of support, it became clear to me that new locative media technologies could improve online means of facilitating the sharing of resources and services to help rebuild the lives of those affected by this and similar natural disasters. Offers and requests for help were scattered across Facebook groups and community-driven websites because there was not, as yet, any centralised online community benefit application that used the strengths of visualising information through locative media to help those affected by natural disasters.

It became apparent that this problem could be addressed by the aggregation and locative techniques that were employed in the PetSearch application I had developed during my Honours year. In that application, locative techniques were effective in visualising the location, density and range of submissions on lost and found pets, and I realised that the same functionality could perhaps be extended to visualise the density and range of requested and available local support after the floods. By repurposing and reskinning PetSearch (see Figure 4.1), a bespoke solution could be developed for aggregating and visualising community-generated information and support for post-flood relief.

The rationale for this approach is the principle that repurposing existing applications, where suitable, enables NFP agencies to implement systems for social benefit while minimising the time and cost that would be involved in developing an

entirely new, bespoke application. This aligns with the principle (explained above) that applications that are developed using open source platforms and Creative Commons licenses can be repurposed with ease for specific community issues that arise. The open source Drupal 6 CMS was harnessed to produce the first case study website, with an application of Creative Commons licensing.

Share Our Sunshine (SOS), as it would come to be called, would be designed in line with the principles I have outlined above. And it would provide an example of how support and resources (such as volunteer help, financial assistance and replacement household items) can be effectively shared through local online communities. It differs from PetSearch in that it uses the interface elements for a different purpose – crowdsourcing help post-disaster and as such, has a different theme.

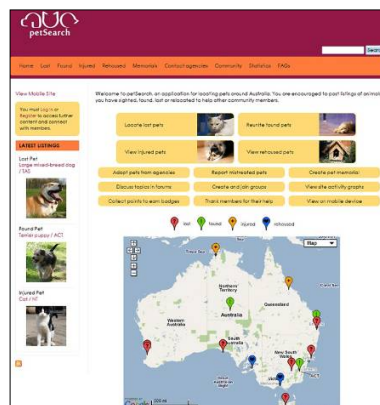


Figure 4.1. PetSearch homepage

CONTEXTUAL RESEARCH (OBSERVING)

Share Our Sunshine was developed in collaboration with Green Cross Australia, an organisation I was familiar with through an internship during my undergraduate degree. Its roles include educating people on disaster preparedness and to provide post-disaster support. Green Cross Australia was therefore in a position to offer valuable insights on community organisations' needs, practices and tasks. A user needs analysis could therefore be derived from what might be considered as invested and experienced stakeholders.

Primary research was conducted with Green Cross Australia to ascertain the contextual factors of the case study and to assess the needs and opinions of stakeholders as well as their practices, culture and needs. It involved collaborative approaches including participant observations, user needs analyses, persona development and storyboards.

Observations had been conducted during my undergraduate internship, so the culture and practices of the agency were known and carried forward. To complement and extend this understanding, I designed surveys to ascertain a clearer understanding of staff user needs, opinions, and actual and assumed skill levels in relation to technology (ie. the computer experience, mobile phone usage and social media use of participants).

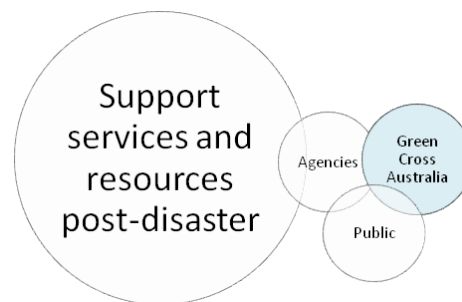


Figure 4.2. Share Our Sunshine participants and potential users

The design of the survey followed the principles of Eszter Hargittai,¹⁶ who held a week-long survey design workshop at The University of Queensland's Institute for Social Science Research (ISSR), entitled *Capturing digital inequality: tools and techniques for empirical social science research in the digital age*. To ensure the robustness of a survey, for example, Eszter Hargittai's (2009, 2) paper *An Update on Survey Measures of Web-Oriented Digital Literacy*, proposes incorporating 'bogus' items (such as proxypod). From the UQ ISSR workshop held by Hargittai the following question was developed, which is used to check the attentiveness the respondent:

¹⁶ Eszter Hargittai is Associate Professor of the Communication Studies Department at Northwestern University, Illinois.

The purpose of this question is to assess your attentiveness to question wording. For this question please mark the “Always” response.

Besides broad and specific questions on web usage and skills, the survey included questions on the topic of passive and active participation in online communities and social media, for example:

At which of these locations do you regularly (at least once a week) use the Internet?

Have you shared any of the following content in the past year? Please indicate if you have shared it (a) on Facebook, (b) on Twitter, (c) on another site, (d) through email, or (e) you did not share such content at all. Check all that apply.

(See Appendix C: Stakeholder web usage survey.)

Three staff members from Green Cross Australia¹⁷ (n=3) completed the detailed survey. This enabled me to gather and analyse information on representative stakeholder web usage and confidence. The survey results indicated that two participants regularly access the Internet at home and work at least once a week, and all access the Internet on their phones and tablets. Although the respondents had quite similar confidence levels regarding completing collaborative tasks online, their usage levels varied slightly. All three respondents stated that they use Facebook, Twitter and LinkedIn often, however usage of Google+ varied. One respondent has used it in the past but doesn't use it anymore. One tried it once but hasn't used it since and one respondent has not ever used Google+. The respondents were positive about the capacity and effects of online participation. However, confidence varied in relation to maintaining computers and using the Internet safely and securely (for example keeping their computer safe from malicious programs).

The results of this survey analysis enabled me to develop personas that reflected the participants' demographics, web skills and usage. The personas also reflect the needs and activities of the stakeholders which included providing local information in disaster responses. Other attributes established in the personas include the need to access and submit information 'on the go' and in environments that provide distractions such as open-plan offices.

A user needs analysis was developed through reference to these personas and storyboards were developed to detail potential situations of application use. These

¹⁷ <www.greencrossaustralia.org>

storyboards described situations in which the stakeholder and potential clients encounter a need for the application and then use it to locate and share post-disaster support information and resources.

In this way, the process of participant observations and surveys served to gain insights into opportunities for design, grounded on the actual needs and desires of stakeholders. It also served to drive the direction of the design process and the types of application developed. This was enabled by establishing the needs of users including stakeholders and potential application end-users.

Reflecting in this phase of observation involved triangulating the set of design principles brought forward from my prior research (the PetSearch project) with the preliminary design principles established through the contextual and literature review, and the preliminary understanding of contextual and user needs. All of the outcomes and observations were documented throughout the design process to formulate a conceptual framework that scoped the application. The understanding gained from this process served to guide the design of the first phase of the application.

THE DESIGN PHASE (ACTING)

The findings of the observation phase were enacted in the next (design) phase of the Share Our Sunshine prototype application, in which the preliminary design principles and contextual considerations were together invested into the development of a prototype.

As explained above, the design phase of Share Our Sunshine, followed the principle that adapting open source applications can reduce the cost and time required for development. In this case it involved repurposing and refining an existing application and transforming its functionality from a focus on visualising lost, found, injured and reunited pets to visualising needed and available local support (including the distribution of goods) for disaster responses. Its development then involved reskinning and repurposing the PetSearch application to meet the needs of stakeholders (flood victims and service organisations that support them).

Repurposing applications and reskinning them provides an opportunity for agencies and individuals to implement systems for social benefit whilst minimising the time spent in structuring the application. The 2011 Queensland floods brought about the opportunity for the repurposing of the previously developed PetSearch application. Especially when the focus is on community-driven web applications, which aim to help people locate information in dire times, there is a necessity for systems that are easily implemented and customisable.

For Share Our Sunshine preliminary site identity designs (in the form of sketches of interfaces and style tiles¹⁸) first defined the colours, fonts and buttons to guide the ‘personality’ of the new application. Wireframes were then produced to draft the information architecture including changed navigation, design, layout, functionality and other elements. These designs involved a process of paper prototyping of interface and interaction design principles, including the grouping of information and categories, colours used for resource categories as they appear on the map and the overall website design, and the layout of elements.

In line with the principle that ‘to increase access and reach, web applications should be developed through a design approach that ensures an application is accessible across various devices’, designs for a desktop web application for Share Our Sunshine were completed first and then a design for an Android web app and mobile theme followed. A web app was designed by evaluating existing Android apps and the current Android interface and interface elements were selected through reference to the Google Android design guide.¹⁹ Based on interface elements decided upon in the previous phase such as colour, fonts, layout, and transitions, a customised CSS theme was created to form the basis of the web app. This online guide has been updated to reflect interface and other design changes in newer versions of the system, but at the time of development it was specific to Android version 4.0 (which is named Icecream Sandwich).²⁰

¹⁸ <styletil.es>-Style tiles provide an alternative to traditional web design wireframes, displaying colour schemes, fonts, and buttons as a template which is particularly useful for mobile and responsive web design.

¹⁹ <developer.android.com/design/index.html>

²⁰ <github.com/enathu/jqmobile-android-holo-light-theme>

This design process served to formulate preliminary visual designs which explore ways to optimise the application's style, interface, and information architecture based on the pre-established user needs.

THE DEVELOPMENT PHASE (IMPLEMENTING)

After designing the desktop theme, mobile theme and web app, development of the application was undertaken based on the design decisions. More specifically, web application development, along with Android web apps, and mobile themes was undertaken. The prototype was then made available for viewing and testing in context (in situ).

In practical terms, this involved modifying modules and code to produce an application that has the same core functionality as its predecessor application but with different aesthetics, content, features and tools. Modification of modules within the Drupal CMS was a crucial aspect to this development phase and modification was also achieved through web languages such as (X)HTML, CSS, JavaScript and PHP. (See Appendix D: Drupal implementation notes.)

Web apps are smartphone applications that are created in a software development kit such as Corona and exported as apps that can run on the platform that it was developed for, such as Android. This approach does not allow for utilisation of push notifications and GPS technologies however, as the web app essentially loads a CSS theme that looks like an Android app and doesn't have the capabilities to talk to the hardware. Loading a website that looks like an app in software such as Corona and exporting it for smartphone is an emerging approach for developing Android applications within a short timeframe, making it a valuable approach to explore how the Share Our Sunshine application can be customised specifically for Android smartphone users. The speedy development process (comparative to developing native smartphone apps) is one of value to NFPs and others implementing online initiatives in times of urgency.

The Android web app was created by developing a CSS theme (which reflects the Android interface) and loading it in an application that then exports the website theme as an app for Android devices. An Android web app was created by

implementing a pre-existing CSS theme that was released to reflect the current Android 4.0 aesthetics (see Figure 4.3 to download the app through the QR code to your Android phone). It was then loaded within an application called Corona and turned into an APK file so that it can be installed and used on Android devices of the same vintage as the Samsung Galaxy S2.²¹

In addition, to provide a design solution for those accessing Share Our Sunshine via non-Android based phones (eg iPhones and feature phones), a mobile theme was implemented by customising a module within Drupal to produce a theme with minimal images and styling. The mirrored mobile address of this theme is m.share.social-goodness.com. These technological approaches of web apps and mobile themes increase the reach of the application by optimising it for a variety of mobile users.



Figure 4.3. Share Our Sunshine QR code for downloading Android app



Figure 4.4. The combination of web design approaches used in Share Our Sunshine

²¹ The Share Our Sunshine web app was created by following the following tutorial: mobile.tutsplus.com/tutorials/corona/corona-sdk-webview/

As established in the contextual review, the visualisation techniques of locative media are particularly effective in displaying the geographic distribution of services and events in a visually appealing and categorised way, which relates to the user's own locality. Whilst initiatives do exist that provide support to those affected by natural disasters, the absence of locative visualisation provided an opportunity to explore the strengths and functionality of Google Maps in Share Our Sunshine. This functionality was implemented by customising Drupal plug-ins, known as modules, for locative functionality (which relies on the Google Maps API) and modifying content types for each category of available and needed support, alongside success stories. Base functionality such as the modules that enable the locative and social elements were utilised from the PetSearch application. This then, is the implementation of the principle that new technology in the form of locative media can improve the aggregation of local information, by making it geographically relevant and easy to access compared to trawling through lists of information.

Other aspects of the redesign process involved much more minor modifications. For example another feature of the Share Our Sunshine application is printable posters, which can be generated by converting online posts on needed or available help into a PDF. Like the other functionality mentioned above, this was implemented using modules for the Drupal CMS. While this is usually achieved by finding the appropriate Drupal module for each type of functionality, implementing it, then customising it, because Share Our Sunshine is a repurpose of the PetSearch application which already included this feature, it simply involved surface level customisation to align with the new purpose of the application. For example, terminology was changed to suit the post-flood support context and the usage of modules was modified to suit the design solution also.

Another example of transferred use of new technology from one application to the next is social functionality, which facilitates community participation in information provision. This is established in Share Our Sunshine through private messaging amongst end-users (one-to-one support) and the facilitation of contributions to discussions on posts, forum topics and groups (one-to-many support). To elaborate, forums are used for public discussions in the application and groups can be set up by users to contribute to conversations on local topics

surrounding disaster relief (in PetSearch this involved topics on animal welfare). Group contributions are only accessible to end-users who have joined the group and logged in. (Without a registered account, an end-user can only view contributions (including comments, blog posts, forum topics, public groups and profiles)).

A range of modules were utilised to enable this functionality in the application. Using module customisation, social media functionality that enhances communications is enabled, as are user accounts. Each end-user has a dedicated profile and can create blog posts that the community can see.

In this way, Share Our Sunshine employs new technology to enable community building and support collaboration, and so provides a wider range of local information. And risk management is in place to minimise identity exposure through considering what personal information of end-users should not be displayed.

REFLECTING

After developing Share Our Sunshine, testing involved a combination of analytics and stakeholder testing to evaluate its capacity to provide community support in post-disaster contexts. Google Analytics was used to gather information on speed, usage and access statistics and technical troubleshooting assessed application functionality and processes for performing tasks and to determine the robustness of the application.

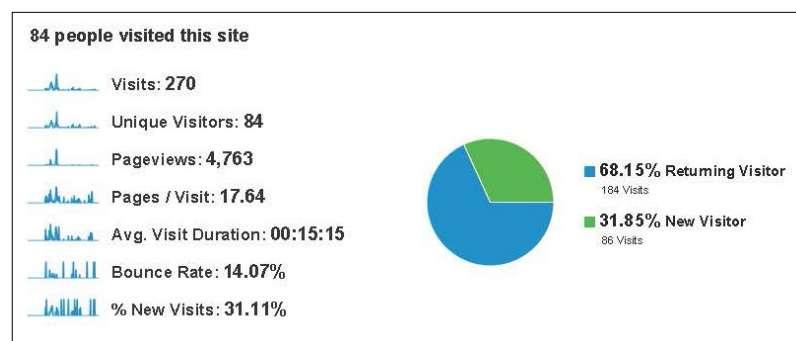


Figure 4.5. Share Our Sunshine Google Analytics audience page

Testing enabled potential application users (both staff and end-users) to interact with and use the system and identify places for improvement. This usability testing

was enacted with staff members from Green Cross Australia. A three-week diary study was undertaken to ascertain the strengths, weaknesses and impressions of Share Our Sunshine.

One principle that diary testing reinforced is that locative media is effective in visualising the distribution of information. One staff member remarked that “the map was a convenient way to find posts.” The strengths of the locative elements of this application are counterbalanced however by site functionality that the staff found unintuitive, including terminology used.

Most importantly, the terminology used in Share Our Sunshine should be stricter. One of the staff understood content and posts as terms used interchangeably, instead of a post being a type of content. They also found that creating a new group was difficult, as the action to do so is in the New Content section of the application, not the Communities section as they expected. Although creating a new group adds new content to the application; it is considered one of the social elements that belong in the communities section. In a similar sense, it was difficult for them to create a Success Story because they did not know to go to the New Content section. Functionality such as a button that directs to a new Success Story submission form perhaps should have been included on the page listing all the Success Story submissions (from newest to oldest). This limits the steps in locating the form to add a new post and provides a clearer, more accessible link to do so. This accumulated feedback on accessing and creating content types makes it evident that the broad term of content makes the application confusing to users. A refined approach to terminology, navigation and other interface design elements can improve this.

Additional interface feedback was provided on the forms for submitting available or needed help. A staff member suggested that the date field on these forms could be improved through a visual calendar. This is a design approach that was considered in the application design but was not implemented due to module restrictions. This feedback still provides evidence of how the submission of information can be improved through visual methods.

Feedback on the interface is extended to also provide insights into how the post subscription functionality can be improved. Site members can choose to check a box on the side of each post with the text “subscribe to this post” that emails them when the post is updated or commented on. The interface of this subscription box can be

improved through clear labelling. As a staff member from Green Cross stated, “subscriptions should be labelled to clarify what the user is signing up for.” This feedback reinforces that the terminology used in Share Our Sunshine needs to be improved for clarity. The insights made by staff into the application also extend from application design to application functionality.



Figure 4.6. The Subscriptions box that appears on all posts in Share Our Sunshine

During the testing phase, staff expressed that there were slow loading times in Share Our Sunshine. This was also found on occasion during the development process. This is partly due to the large number of modules used for functionality and also the choice of web host. Further optimisation of code, modules and the removal of unnecessary functionality could improve this; however it highlights the need to make sure that the server the web application is hosted on can handle the traffic from users. This is particularly important for applications focused on providing support during crises, where high traffic may crash the website, making it unusable for anyone.

All of the above feedback is valuable because of the stakeholders’ understanding and usage of social media. The difficulty of some of the tasks was greater than expected which helped frame what needed improvement. The feedback has guided the second application design to provide a better user experience through a refined application design, in addition to exploring different CMS and approaches for mapping information for social benefit. Specifically, it has guided the use of Ushahidi, a CMS designed purposely for mapping and distributing information during local crises. In addition to the usability testing that took place through the diary studies, analytical tools were utilised to gather statistics on site visitors and usage.

As a means of testing the efficiency and exploring the usage of Share Our Sunshine, Google Analytics were run on the website over the period of development

and testing (1 July 2012 to 21 December 2012). The resulting analytics indicate the most common devices the web application was accessed from and what browsers were most commonly used.

In this period there were 84 unique site visitors, based on the type of device used to access the application. Many of these ‘visitors’ would have been me testing from various devices however. In the sense of each visit including those considered returning, there were 270 visits with 227 from desktop devices and 43 from mobile. 38 of these mobile visits were through a Samsung Galaxy S2 (which is the smartphone I developed the app for and tested it on), 2 were not specified and 5 were from the Opera Mini browser for feature phones and smartphones. These statistics show that the majority of access was related to feature testing. There is more variance in the browser usage statistics however.

The Google Chrome browser was used for nearly half (46.67%) of all desktop visits, followed by Firefox with 27.04%. The majority of site development and testing was undertaken in the Chrome platform, so access by other site visitors explains the 27% Firefox access. The next most used browsers were the Android browser (14.07%), Opera Mini (5.93%), and Safari (2.59%). The usage statistics of Android browser and Opera Mini in particular are related to the testing of the application. The Safari browser indicates usage from Apple devices, which is reflective of the operating system used in the Green Cross Australia office.

Usability testing was conducted through a collaborative process involving stakeholders from Green Cross Australia. It took the form of a diary study to provide further insights into problems and opportunities for further improvement of the Share Our Sunshine application. The staff that completed the earlier surveys were again involved, and the earlier questionnaire informed the design of the diary study.

A meeting first outlined what was needed in the diary studies and a start date was agreed upon. The diary study continued for three weeks with four to five tasks a week with a new diary entry form being completed for each task. (See Appendix E: Diary pack.) Each task was designed to take no more than five minutes of the participant's time, making the weekly contribution to this study no more than forty minutes, including survey completion time. Example diary tasks related to:

Subscribing to a pre-existing post;

Creating an account; and

Sending a thank you postcard to another end-user.

In response to each of these tasks, an online form was completed outlining how the participants approached the tasks and any difficulties they may have had. Example questions included:

On a scale of 1 to 9, how confident did you feel approaching this task?

Did you experience any problems? Please describe.

Did you manage to complete your task successfully? If not, why?

Qualitative feedback gained from stakeholders provided insights into the application's usability and fit for purpose and valuable insights into how the application could be improved. Important feedback gained from stakeholders included the benefits of an online application that maps the local community resources available. The outcomes are discussed in detail in Chapter 5: Project outcome 1: Applications and their evaluation.

The diary studies and Google Analytics strengthen the project outcomes by establishing what can be improved and what is effective. The staff from Green Cross Australia clarified that the terminology in Share Our Sunshine can be improved through consistency, but found value in the mapping of local resources as a way to visualise information. This feedback has informed the modification and extension of design principles which are used to guide the second application, Upraxia.

Reflection occurred after the usability and interoperability testing. It involved reflecting upon the technical robustness, design and usability of the prototypes. Furthermore, it involved reflecting on the principles that were embodied in the prototypes by evaluating the efficacy of them as creative practice outcomes. The process of reflection served to elucidate insights into what improvements could be made to the applications and implementing changes to the applications, such as optimising web content for speed and access. These insights are all documented in a

conceptual design template, which was developed by BJ Fogg.²² (See Appendix F: Share Our Sunshine conceptual design.)

Through this iterative design process the prototype was incrementally improved and refined. Besides improvements to the application in question, reflection led to various refinements to the principles and this, in turn influenced the design of the subsequent application. This included decisions on interface and information design as well as utilising persuasive media to encourage long-term online community engagement. Due to time restraints the feedback gathered at the end of this design investigation could not be implemented into Share Our Sunshine, and instead informed the next prototype, Upraxia.

Upraxia: background

The literature and contextual review, which is detailed in Chapter 1 not only identified gaps in applications to enable access to local information and support by communities during natural disasters, it also identified gaps in the research around community applications which aggregate and visualise local community support services. It is worth noting that often people do not know the difference between government and non-government agencies however for the purposes of scope only NGO are covered (although the same approach could be applied to government services also). This review established that information and resources are currently dispersed and difficult to navigate, and that aggregating and visualising scattered information through locative displays can improve access, and so better serve those in need. That is, it identified the need for an application that efficiently plots local support services, events and resources on a map for individuals in need due to day-to-day hardship or personal crises, and which effectively facilitates community participation in services and information provision.

²² See Fogg, BJ. 2003. "Conceptual designs: the fastest way to capture and share your idea." In *Design research: methods and perspectives*, edited by Brenda Laurel. Massachusetts: MIT Press

The second application design therefore focused on improving access to support, information and resources. Entitled Upraxia (derived from the Greek mythological personification of wellbeing: eupraxia), it investigated how community support and service information might be effectively aggregated and represented through an organisational logic that instead of placing agencies at the centre, focuses on types or categories of resources and services, in tandem with their relative location to the individual. The proposed approach involved combining locative media and elements of social media (or social networking services (SNS)), responsive mobile design, and persuasive techniques for behaviour change.

The partner for this second design investigation was The Exchange, a community service centre of the Queensland-based NGO, Community. Located in the Kelvin Grove Urban Village, The Exchange focuses on welfare issues including health and well-being. Its goal is to foster inclusive community groups and provide opportunities for people to overcome social isolation and increase participation in community activities (Community Queensland 2011, 7). (See Appendix G: ‘Discover The Exchange August 2012’ brochure.) On average, 736 people access their services each month.

The following quote from the Community Queensland Annual report 2010-2011 (2011, 7) describes the impact of The Exchange on the community:

From this small shop front centre, people have made friends and social connections (for the first time in the lives of some), learnt new skills, maintained tenancies, learnt to budget and manage finances, participated in parenting workshops, joined self-help groups and developed cross-cultural relationships through language exchange The Exchange has become a vibrant community hub integral to this community.



Figure 4.7. The Exchange at Kelvin Grove Urban Village

The goal of the second part of the contextual frameworks to design an online application for The Exchange and other community organisations in the Inner North and Inner West Brisbane area, to present information on local services and events and to engage community members in participating in services for social benefit. Individuals can support each other through sharing their tacit knowledge on available local services, and support services they can't find and need.

REVISED PLANNING

The second application involved two key planning aspects. First, reflection on the outcomes of the first (Share Our Sunshine) application and identification of new priorities and a refinement of the design principles were to be carried into the new design. Second, the planning phase for Upraxia involved a contextual review of the needs and contexts of a new group of stakeholders.

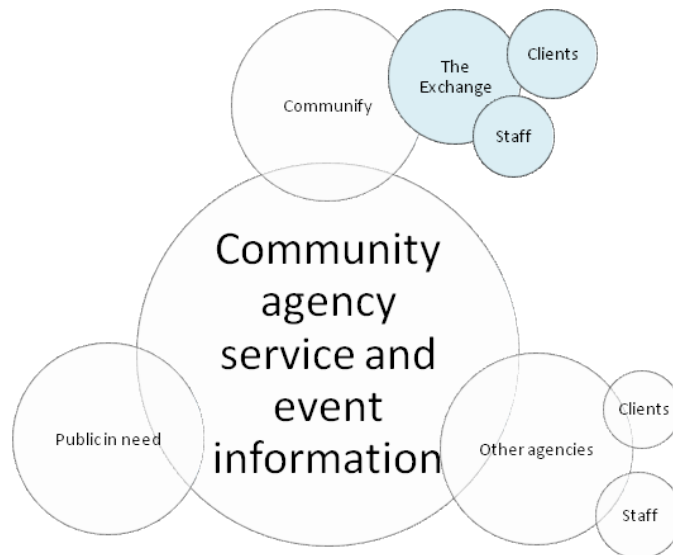


Figure 4.8. Upraxia participants and possible users

Modified and extended principles

Testing, analysis and reflection upon the implementation of the preliminary design principles led to refining them to provide the foundation for the design the new application. That is, by exploring how community participants used the system and evaluating their feedback on the design and function, Share Our Sunshine produced an outcome in the form of revised principles, which guided the development of the Upraxia and the finalised principles for design of other social benefit applications. This revision can be summarised as follows.

Harnessing new technologies

It was established in the design of Share Our Sunshine that there are benefits to aggregating data related to community services that are available. Because end-users are then put at the centre of organisational logic, rather than agencies, this approach removes the need for them to self-generate a list of local support that suits their needs.

In regards to locative media, Share Our Sunshine provided an example of how new mapping technology can be harnessed to visually plot the distribution of locally

relevant information and user contributions (requests for support and offers to help) and so to improve access to pertinent information. However, in an application that may aggregate thousands of contributions, the mapping visualisation can become cluttered and it may be difficult to see what is local without zooming in. This can be improved through a new principle of providing clustered and coded visual signifiers on the map. That is, when multiple posts are displayed in one area, the density of posts is rationalised so that viewers can still see surrounding icons and map elements. In addition, colour coding can differentiate between service categories to enable ease of selection. In short, clustering and colour coding contributions can combat the risk of visual information overload and this principle would be carried forward into the design of Upraxia.

Effective data aggregation is enabled in Upraxia through locative functionality that maps types of local community services including events and services for seniors, health and wellbeing and domestic support. Community organisations can offer services in their local area and individuals, whether clients of these organisations or others in need, can request services in their local area. To compensate for areas on the map with large numbers of visual signifiers (or map markers) they have been clustered for clarity. This establishes a principle for the development of other collaborative web applications for social benefit, that the clustering of plotted elements can improve the pre-existing visualisation capabilities of locative media.

There needs to be an extension beyond the one-way communication that exists in community directories to encourage engagement with community members through private messages or comments. Social web elements were used in Share Our Sunshine for commenting, groups and forums for example, and this can be expected to facilitated communications between members of the online community and social capital building. This can be improved further through a refined approach to communications amongst online community members. Adequate communications can be facilitated between individuals and agencies through commenting (to openly discuss content). These public communications are all that are necessary in an application that encourages communications related to accessing public support and this approach was carried forward into Upraxia. The social functionality (that is commenting) in Upraxia is enabled through the Ushahidi platform with minimal

customisation. This in turn builds social capital through the aggregation of contributions. This social capital takes the form of the resource that are the sum of contributions to the application, and the ability to aggregate and summarise content based on user needs. This means that end-users are able to select a service type of relevance to them and all local instances of such services are aggregated. These services are contributed through a crowdsourcing approach where individuals are encouraged to ask for support that isn't already offered in the application by community agencies and other community members. The contributions to Upraxia can be verified by other users, which encourages and supports building social capital. Upraxia extends beyond the request and offers of support to encourage comments which encourage deeper "peer-to-peer" discussion focused on community support issues and concerns surrounding the service offer or request in question. While social rating websites support gathering and sharing of information, there is not a conscious effort to listen to citizen opinions on policy or promote discussions (Cindio and Peraboni 2011, 98-99). By utilising commenting, agencies and individuals can form discussions on the support services offered in the local community.

The first application design followed the proposition that repurposing an application provides an opportunity to create low cost, rapidly produced bespoke solutions to local communities in crisis. Due to the sense of urgency for many people needing community service support, free local information through real-time updates is beneficial. Share Our Sunshine involved reskinning and repurposing an existing application (PetSearch) and provided an efficient way to redirect its functionality for a different purpose. However, while efficient to implement, this resulted in issues when being deployed via a smartphone application. The utilisation of a purpose-built CMS with a large amount of modules and multiple themes resulted in an application that was slow during user testing, partly due to web host issues of bandwidth with the server hosting the app. The Ushahidi CMS, with its in-built locative and social functionality could improve the efficiency of the application (by not requiring additional locative and social module installation and customisation) and so this was implemented as the system of choice for Upraxia. By using the Ushahidi CMS which has been purposefully designed and optimised for information distribution using locative media, the application loads quicker and responds better to input than the previous application developed in Drupal with dozens of modules. This provides a

refined principle that open source locative and collaborative web applications can be developed with ease to be accessible using the Ushahidi platform.

An additional principle for the development of Upraxia became apparent during the final implementation phase of this project outcome. A better web hosting plan, although more expensive, would better cater for the traffic that such a website could generate. It is important that if Upraxia was offered for public use that it can withstand the large levels of traffic the website will receive, especially in times of local crisis when web applications are known to crash. As a demonstrational prototype however, the web hosting plan available proved adequate.

And finally, the Share Our Sunshine investigation demonstrated that web apps developed for Android devices may not be efficient enough when they are based on a theme of a CMS implementation. When an app is the most appropriate approach to take in developing for smartphones, then a native app is best. This modifies the design principle of complementing web applications with smartphone web apps and mobile themes to become a unified approach of responsive design. Upraxia therefore implements a responsive mobile theme to cater for access via various types of devices including computers, smartphones and tablets. While less complicated and modularised, a responsive approach also increases reach by optimising usability across devices.

Incorporating persuasive techniques

In addition to refining the principles relating to new technologies, it became clear that simply providing a tool to facilitate participation in a collaborative social system does not ensure uptake, and that a strategic approach is required to build audiences and promote contributory behaviour. Therefore, additional background research was conducted into the field of persuasive media and its approaches, which can be utilised to improve participation in online communities in the short and long-term. Persuasive techniques involve providing the user with an immediate opportunity to act and contribute content, which builds towards a collective resource of social capital.

For example, email updates on content changes can be utilised as persuasive techniques to incite actions. In retrospect, and upon reflection, the basic email updates in Share Our Sunshine could be extended and improved upon by implementing a clearer subscription email process, while SMS subscription capabilities can enable personalised mobile SMS updates can prompt an individual as ‘calls to action’. The principles of persuasive media (providing the motivation, trigger and ability to act) were therefore implemented in Upraxia. The ability to provide SMS and email updates act as a trigger for Upraxia members to learn about appropriate services (location, cost, details, date) and improves the ability to find this sort of information and participate in the services offered.

Ensuring online privacy

Other preliminary design principles that emerged out of the contextual and literature review relate to risk minimisation. In particular, it is necessary to consider the privacy safeguards of applications so that online identities are not compromised. Locative media is useful as a tool for plotting geographically relevant information, however it must be used in a thoughtful way that considers and minimises risks associated with exposing a person’s movements or locations. In both Share Our Sunshine and Upraxia, check-in applications were discounted so that users do not give away their residence or indicate their movements through their posts. Locative privacy covering the location and movements of the users is not a necessary consideration due to it only mapping services and events. However a refined principle still became apparent. The privacy issues that arise through implementation of locative media still need to be considered in the development of other locative applications, alongside issues with exposure of online identities.

While contributions in Share Our Sunshine are restricted to those with registered profiles, a decision was made that user registration processes should not gather any unnecessary information on the user and not link to pre-existing social media profiles (on websites such as Facebook). This was implemented in Share Our Sunshine through basic profiles in which the real name of end-users and information other than their nickname and email is not gathered, and email addresses are not publicised. However, this principle of collecting minimal user information and

focusing on the contributions that end-users bring, not their online identities, can be refined further. The optimal approach to protecting user data is not to store unnecessary personal information. For this reason, a registered account may deter end-users from contributing, as some of the requests on the website may be of a personal nature. In Upraxia, if one does choose to register an account, only their email address is necessary to do so and this will not appear on their profile. This profile functionality is thoughtfully implemented to ensure that the online identities of members are not compromised. This is implemented in Upraxia by providing only absolutely basic profile information such as username, profile image or avatar, the ability to send a private message, and a list of their contributions.

Information credibility

The accuracy and credibility of information is an important principle for the design of any collaborative web application focused on local information delivery. Indeed every collaborative web community should consider how to ensure information published is accurate, credible, and appropriate as a part of the design process. Using expert controls such as information approval and moderation in combination with community controls such as rating systems can help to ensure a level of credibility when developing applications for information delivery. In Upraxia, both community and expert control are facilitated. Community control is provided through the ability for end-users to rate up and down content and comment. Expert control is provided by ensuring that community agencies approve all posts before they become public and also verify content as accurate to improve the credibility of the information presented.

Taking into consideration the issues surrounding inappropriate activity online, content should be moderated before publish, unlike in social networks such as Facebook. Whilst this is a tedious manual process, it provides a solution to undesired content being published while still enabling discussion between agency and community members. These controls, in combination with Fogg's Web Credibility Framework aim to improve the credibility of content in the Upraxia application. It is to ensure the information they are offering is accurate, and that the source is credible. In Upraxia, expert control is implemented through approval of content before

publication. Community control is implemented through rating systems to vote content up or down based on its usefulness and accuracy. These techniques are particularly important in the development of applications such as Upraxia which enable end-users to request or offer service information without a registered account (which is often considered a deterrent to use, especially on mobile devices). A streamlined registration process was investigated to make registration only necessary for the management of contributions and contacting other members.

Extending the first case study

In summary, Upraxia is built upon Share Our Sunshine by looking at how to design locative online communities by focusing on mapping local services and resources offered by community agencies, utilising persuasive techniques to encourage long-term use, in addition to approaches to ensure information accuracy and credibility. As Nielsen (2013) argues, “paradoxically, by offering fewer features, you might find that people use more of them.” Therefore, in Upraxia the functionality of groups, forums and unnecessary modules were removed. Upraxia combines locative media and elements of social media (or social networking services (SNS)), responsive mobile design, and techniques for behaviour change to provide a functional prototype application for The Exchange. This involved a range of engagement methods with a staff member from the agency and a similar design process as that for the previous application.

CONTEXTUAL RESEARCH (OBSERVING)

Staff from Communify and their service, The Exchange participated in the primary contextual research for the second application design by providing feedback and guidance, through interviews, surveys and questionnaires. In addition, a consultation role with the Australian Community Data Standard committee provided insights into the data standard for a national database of community agency information, which helped shape the purpose of Upraxia to be focused on the specific services and events offered by agencies. Upraxia also functions as an example

application to supplement to the Data Warehouse created by the ACDS. The Data Warehouse, which covers community agencies in detail, is less accessible for someone stressed and in need of immediate access to local support than an application dedicated to mapping local services, resources and events offered by agencies.

A framework for including clients in community ICT projects, which was developed by Felstead and Stockdale (2012, 136), helped to guide my collaborative approach with stakeholders in the design of Upraxia. The first step of this three-step framework involves identifying the service recipients and stakeholders. The second involves gaining an understanding of the environment they are working in, the affiliations of the community organisation, and important interactions and identities. And the third step involves assessing the potential impact of the project on resources (physical, digital, social and human).

Interviews provide a means to gain an understanding of the stakeholder environment, their needs and the potential impact of a design. Individual interviews are ideal for learning how a person feels or thinks about an issue or design without concern of influence (besides the unavoidable influence of the interview moderator) (Ireland 2003, 25), making this a useful method for understanding the context the agency exists in and assessing the project's impact.

This interview was undertaken at The Exchange with a staff member using open-ended questions including the following:

What do you consider to be the most successful aspects of your organisation?

If given the opportunity, what areas of community support would your organisation like to improve upon to better aid clients and community members?

This interview provided evidence that a key priority of the agency is to be proactive in information sharing. They stated that, "If certain information stays secret with certain people within certain organisations then it's not empowering people." This interview established the stakeholder and community need of a centralised resource that lists, and maps available local support resources. The staff member stated that often when people need to access local resources, they are under a lot of pressure and spend time ringing around looking for appropriate services. They see the benefit of providing locative information, commenting that, "because clients can be restricted

to access[ing] services where they live, mapping capabilities would be beneficial.” This mapping, they suggested, should include their own services as well as those of others in their local area because, as yet, there is no centralised information resource on local community events and resources. [Interview, 16 May 2012].

The community worker who participated in the interview also suggested that while mapping information on services and events is important, facilitating two-way communication, information sharing, and collaboration with the community can enable support agencies to reach further and be more effective [Interview, 16 May 2012]. That is, they are keen to support the community to contribute to this information.

In addition to this interview, the stakeholder completed a brief questionnaire discussing potential approaches for application design. Questions included:

Which (if any) of the following services and events do you think should be included in an online application being developed for the Exchange?

Which of the following functions do you think would be of benefit if included in the application?

(See Appendix H: Stakeholder application design questionnaire.)

The stakeholder emphasised the importance of making sure the application provides timely, accurate and verified information, so primary advice and links to resources should be contributed by the agency. Another concern involved privacy risks, as their clients are often unaware of online security. These issues have therefore been addressed in the development and implementation of Upraxia.

This second application (Upraxia) does not facilitate the distribution of household items as it became clear during the interview with stakeholders from Communify that "the distribution of stuff is a nightmare" [Interview, 16 May 2012]. Therefore such services should be left to organisations such as Givit who connect with charity organisations that have clients in need of a range of household goods.

A survey to establish web skills of workers which was identical to that used in the first case study was given to a staff member from The Exchange. The results indicated that they use the Internet (with a notebook or mobile) mainly at work and use it no more than one hour a day on a weekday or weekend. They currently use Facebook and have used Twitter in the past. They have also tried Google+ and

LinkedIn once but haven't tried it since, showing that they have an awareness of social media platforms and a solid understanding on how to use them, but have low usage of them. They are active and positive about the effects of online participation, showing that they realise the potential benefits of Internet communication technologies.

Alongside this web usage survey, a mobile Internet usage survey was developed for clients of the Exchange to complete. The purpose of this survey was to gain insight into the best mobile application development approaches to take. (See Appendix I: Individual mobile usage survey.) Questions in the survey included:

Is your mobile a smartphone? A smartphone is a mobile phone with built-in applications or 'apps' and Internet access. e.g. iPhone, Android, Blackberry, Nokia E or N series

How often, if ever, do you use your mobile to access the Internet?

Do you use credit (pre-paid) on your mobile or are you on a plan (post-paid)?

Participants were recruited by a flyer in the reception area of the Exchange with 2 respondents. Both indicated they had feature phones, not smartphones and used credit instead of being on a plan, which bears out the research cited in the literature review that those who often seek support from community services and are considered disadvantaged are less likely than others to have smartphones and post-paid plans.

Complementing these interviews, surveys and questionnaires was the method of participant observation. This involved observing clients of The Exchange using the 'Internet cafe' which is open Monday to Thursday from 9am to 4:30pm to allow community members to access computers, the Internet and telephones for free. This is one of the most used services of The Exchange, with 505 clients over three months (from 1 October 2012 to 31 December 2012) according to their *Neighbourhood Centres Initiative - Quarterly Summary Report* (Communify 2012). By observing clients of The Exchange using this service, it became apparent that there is a need for people to find local community services, including free computer and Internet access.

Ethnographic research methods were applied in the early stages in the design process. Collaboration with the ACDS ascertained the need for a centralised resource of community services. Interviews and application questionnaires completed by service stakeholders ascertained the needs of their organisations and clients,

alongside how the application design can best support the agency in its goals. And participatory observation provided evidence of the importance of accessible community services such as Internet access. These aforementioned stages can also be referred to as “generative design” as it occurs early on in the design process as a means to discover user requirements (Sanders 2002, 4). The outcomes of these stages were documented in a conceptual framework to scope the application design. These insights and user requirements then guided the actions of the design phase.

THE DESIGN PHASE (ACTING)

The findings of the previous phase along with the principles (which were refined in the previous application) were enacted through the design and development of Upraxia. Alongside the use of responsive design as a unified mobile design approach, Upraxia had an extended focus on interface design, navigation and layout. This was achieved by designing a locative application for information delivery of community services using a system purpose-built for information distribution. This involved similar preliminary design approaches to Share Our Sunshine including sketches and mock ups, in addition to information architecture such as site information categorisation and navigation. This was complemented by a consideration of information accuracy and credibility techniques.



Figure 4.9. Upraxia mood board which was created to explore themes and ideas

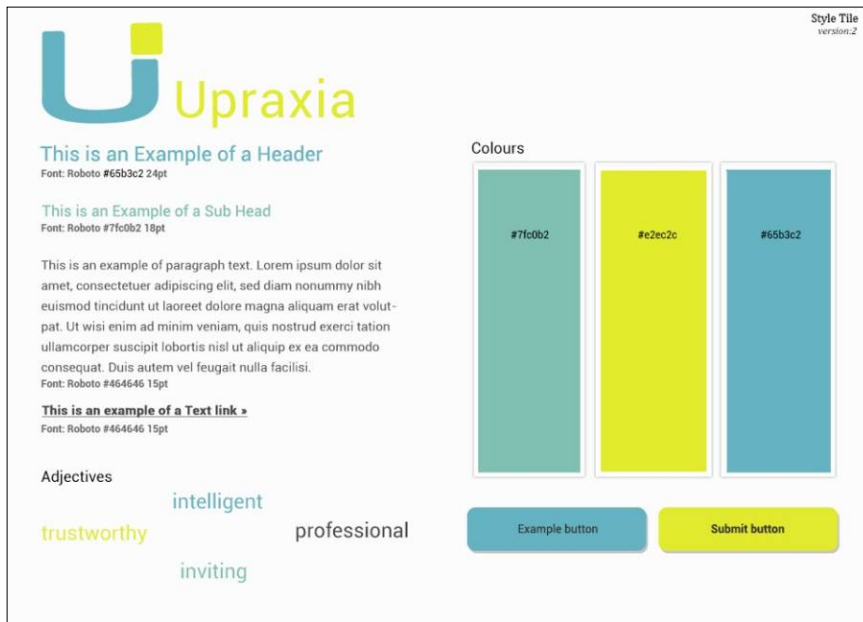


Figure 4.10. Upraxia style tile

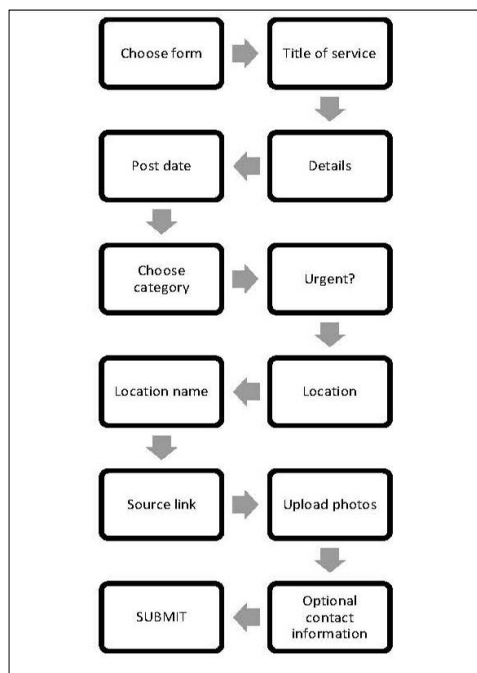


Figure 4.11. Upraxia task flow for submitting an offer or request (Location being the map coordinates and location name being the suburb)

The three elements of persuasive media (motivation, ability and trigger) can help to ensure community participation in an application that is designed for social benefit and help build social capital. Fogg's established persuasive techniques,

particularly his behaviour model (FBM) can be used to determine how users can be drawn to use web applications long-term. The development of Upraxia involved designing triggers to remind and inform users of potential opportunities for them to participate further in the application and local community by mapping and distributing information. These triggers were included in the form of SMS and email updates on new and updated information on services that are selected.

In the design of Upraxia, Fogg's Web Credibility Framework was used to strengthen design elements within the application. This is because Fogg's Web Credibility Framework improves the perceived reliability and trustworthiness of the application overall. These three elements, or important features are 1) application credibility (how credible the application is perceived to be); 2) approval and verification of content (how contributions to the community are moderated and proven accurate); and 3) responsive design (how accessible the application is). These three elements were designed to improve credibility of the application by relating them to the Web Credibility Framework. This framework demonstrates the importance of the Operator, or who is offering the site, the Content of the website, and its Design.

Table 4.1
Fogg's Web Credibility Framework applied to Upraxia

Category	Subcategory	Design elements	Elements that boost credibility
OPERATOR	Organisation or person offering site	1, 2	<ul style="list-style-type: none"> • Not-for-profit agencies can join and maintain content • Has been designed after discussions with stakeholders from a local community support centre
CONTENT	Information	2	<ul style="list-style-type: none"> • Searchable • Categories for service types and organisations offering these services - organisations can add their name to the

Category	Subcategory	Design elements	Elements that boost credibility
			categories
	Functionality	1, 2	<ul style="list-style-type: none"> • Categories can be filtered using boolean operators • Free SMS and email updates (using Clickatell plug-in) • Approval and Verification • Printable posters to extend awareness
DESIGN	Information design	2	<ul style="list-style-type: none"> • Visualisation on map shows extent of and density of community services • Markers show location and range of service for support such as Meals on Wheels • Terminology customised to suit site content and purpose
	Technical design	2, 3	<ul style="list-style-type: none"> • Responsive mobile design • Validates to HTML5 W3C standard • Accessible through Ushahidi smartphone app
	Aesthetic design	3	<ul style="list-style-type: none"> • Accessible across all devices • Calm, inviting design developed with feedback from stakeholders
	Interaction design	2	<ul style="list-style-type: none"> • One page submissions for service requests and offers • Submissions can be made without user account

The credibility of the application (in the sense of who is offering it) is strengthened by considerations of application credibility and the approval and verification of contributed content. To improve the Operator, only agencies can approve and maintain content and the application has been designed with stakeholder needs from feedback.

The Content of the application relates to both the information offered in the website and also the functionality. The credibility of information is strengthened through clear categories that can be searched and filtered. Functionality that is incorporated to improve the credibility of content in the application includes SMS and email updates, in addition to an approval and verification system that increases the quality of information. With staff able to approve and verify content, the credibility of the information presented in Upraxia is increased greatly. Functionality which enables people to print out services also improves the reach of content by extending the dissemination of information offered on the website through multiple mediums.

Design is improved in various ways, by drawing on the design fields of information design, technical design, aesthetic design and interaction design. From visualising the density of information with locative media, and using appropriate terminology, the information presented is strengthened to be more credible. This is improved further by a focus on information architecture in which the navigation, layout and sequences of actions in Upraxia were designed. Technical design considerations include a responsive mobile approach which complements aesthetic design through ease of access and use across all devices. This process involved designing the look and feel of the application through mood boards, sketches, style tiles, paper mock-ups, and wireframes for example. This required reflection on the conceptual framework that has been developed through the preliminary design process.

Ease of access and usage is improved through one-page submissions and the ability to submit content (which needs to be approved) without a user account, reflecting approaches to interaction design which have strengthened the overall credibility of Upraxia.

The design elements from this framework, and others discussed in this section were implemented in the next phase of development or implementing.

THE DEVELOPMENT PHASE (IMPLEMENTING)

The design outcomes from the previous phase were used to guide the development or implementation of Upraxia. It is at this point that technological implementation of the application design is considered. This development involved the creation of the application using the Ushahidi CMS, with built-in locative and social functionality, plus customisation of a range of Ushahidi plug-ins. This customisation involved implementation of design decisions, and modification of code to develop the application outcome.

Locative media was facilitated through in-built functionality in the Ushahidi CMS. Google Maps functionality was harnessed to visualise the extent to which local services, resources and other support is offered and needed in local communities. When using locative technologies to enable individuals to plot events or subjects on a map, clear categories must be provided to site visitors from the outset. This was implemented to enable users to easily search for and identify information.

As discussed in the contextual review, the open source Ushahidi platform was developed as a platform for local communities to distribute information during crises. It is actively developed and can be repurposed easily for various scenarios which necessitate the real-time visualisation of local information. Upraxia was built using the Ushahidi platform with a number of additional add-ons implemented to provide additional functionality needed.

The Ushahidi implementation was deployed by installing the CMS on a personal server. From this, the functionality necessary for Upraxia was implemented, and the content for the application was added. Following this, the aesthetics of the Upraxia application were created using customisation to (X)HTML, JavaScript and CSS, reflecting the design decisions made in the previous phase.

Ushahidi is powerful as a community information distribution medium due to its in-built functionality focused on mapping contributed information and encouraging collaboration between members.

Harnessing contributions through social media has also been facilitated through utilisation of the Ushahidi platform. It can be utilised to provide the ability to comment on services posted. This functionality is also built-in to the Ushahidi

platform and therefore no modification was necessary for the Upraxia implementation.

The Ushahidi system is effective in providing a social and locative web solution for this project outcome as it has the necessary mapping, messaging and content creation functionality built-in, alongside techniques for moderating and verifying content.

Ushahidi's in-built verification process was utilised in the development of Upraxia, which enables information to be rated up and down, and approved with ease. In this way, expert control is ensured in Upraxia with community organisations having the ability to approve services that are submitted to ensure that only appropriate information is published. These approaches are all implemented based on a system of user permissions in Upraxia that provides community organisation account owners and individuals with access to different functionality. The implementation of Upraxia user permissions is displayed in Table 4.2.

The user permissions implemented in Upraxia provide a concrete example of how expert and community control techniques can be implemented to improve the accuracy, credibility and overall quality of information aggregated.

The risks associated with exposure of users' identities and locations can be minimised within the Ushahidi platform. The locative functionality in the Ushahidi system, which draws on the Google Maps API, did not need to be modified for Upraxia. Only local services and events were designed for the Upraxia application and therefore locative functionality that maps user movements and locations was not necessary.

The Ushahidi platform produces public profiles for those who register an account. These basic profiles only include the user's nickname, an avatar of their choice, and a list of their contributions to date. These profiles were implemented using the in-built functionality of Ushahidi. For profile creation, the functionality provided the Ushahidi platform is all that is necessary to create the identity of each user in a way that limits the amount of information on the individual stored in the system.

Registering an account is not necessary within the Ushahidi platform to contribute and access information. To manage contributions, updates and message

other users however, an account is necessary. Because the sign-up process can be a deterrent to use for users in web applications, Upraxia (by drawing on the functionality of the Ushahidi platform), does not require user registration to submit content. This was further improved by functionality in Ushahidi that facilitates the approval of content before publish. This ensures that the information submitted by anonymous end-users is not published without it being approved as appropriate, or verified as accurate. While this adds an extra step to the process (with attendant time implications), on balance, encouraging community collaboration and information sharing speeds up information gathering for those in need, in what is a self-moderating community.

Table 4.2

User permissions applied in Upraxia

	Visitor	Individual member	Community agency member
View services	X	X	X
Create services	X	X	X
Manage own services posted		X	X
Manage all services			X
Manage comments on services			X
Create comments	X	X	X
Send and receive private messages		X	X
Subscribe to email and/or SMS updates	X	X	X
Manage own email/SMS subscriptions		X	X
Manage messages sent to Upraxia through Twitter			X
View stats		X	X
Verify services			X

	Visitor	Individual member	Community agency member
Approve services			X
Access Members interface		X	X
Access Administrators interface			X

One shortcoming of the Ushahidi platform is the need to switch between two forms—one for service offers (what is available locally by community agencies) and one for service requests (what services are needed by people in need). This was the optimal approach in this implementation of Ushahidi based on altering pre-existing code while ensuring stability. As a design improvement, a single form with a checkbox would be sufficient instead of the drop down form selection but this was not able to be implemented in Upraxia due to limits in the Ushahidi platform.

A responsive design approach was taken as it has been established in research as an effective way to cater for individuals using a variety of mobile devices. This involved deep customisation of the Ushahidi platform with plug-ins and alterations to code, in addition to the implementation of responsive web design techniques in Upraxia. The outcome of this is the Upraxia application which can be accessed on any web-enabled device.

Table 4.3

Breakpoints for the media queries used in the responsive design of Upraxia

Breakpoints (device-width)	Device example
min-width: 1024px	widescreen desktop and notebook displays
max-width: 1024px	desktop and notebook displays
max-width: 800px	tablet landscape
max-width: 600px	tablet portrait
max-width: 480px	landscape mobiles
max-width: 479px	portrait mobiles
max-width: 320px	small portrait mobiles

The Ushahidi platform is also beneficial as it utilises persuasive media techniques by providing triggers for end-users to act in the form of SMS and email updates. The SMS updates were included through third-party add-ons in Ushahidi for the Clickatell SMS service and the email updates were included through in-built functionality.

EVALUATION AND FINAL REFLECTION

Testing of Upraxia involved technical design testing through Google Analytics. A diary study was designed but was not completed due to constraints on behalf of the stakeholders. Nonetheless, these analytics provide insights into application speeds and access, which are valuable in reflection alongside outcomes and principles of the conceptual design.

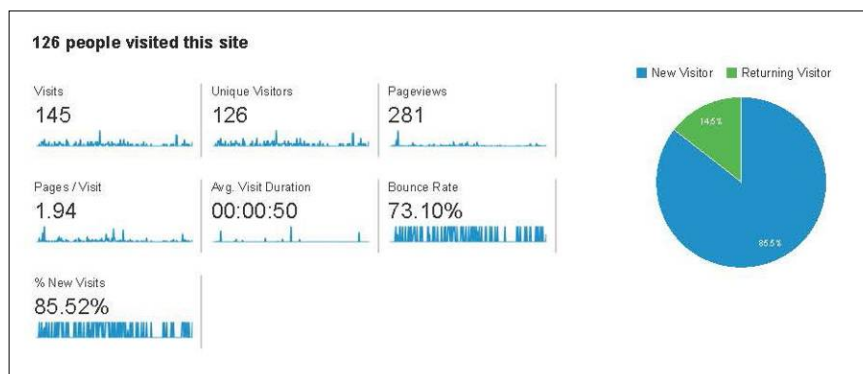


Figure 4.12. Upraxia Google Analytics audience page

The insights that are provided through testing determined how the design principles could be refined further to form project outcomes. Insights from testing also strengthened the evaluation of Upraxia which is documented in Fogg's Conceptual Design template. (See Appendix J: Upraxia conceptual design.)

In the design of this second application, a facilitation role was embraced, allowing the stakeholder to shape the development of Upraxia. These stakeholders were staff from Communify, and although participants were recruited for usability

testing, it fell through due to resource, time and personal constraints on behalf of clients and the stakeholders.

In complex settings, complications can arise from those participants who contribute their time and efforts not being able to be included for their own reasons including time constraints (Robertson and Wagner 2012, 71), as was the case of collaboration in Upraxia. User testing in the form of diary studies were started but were discontinued after the first week due to a problem logging into the system using the set up accounts. Although this was resolved in a matter of hours, there was not an opportunity to re-run these sessions due to the session facilitator being unwell and unable to contribute due to commitments. The opportunity to run a one hour participant observation session was also explored as a means to run quick yet effective usability testing with stakeholders and their clients but could not be arranged within the given timeframe. Sadly, no user testing could be organised due to organisational availability.

As a means of testing the efficiency and exploring the usage of Upraxia, Google Analytics were run on the website over the period of development (1 February 2013 to 1 November 2012). In this period, staff from CommuniFY accessed the site, but were unable to be involved in usability testing. Analytical statistics of their use are somewhat valuable for gaining insight into site access however.

In this period there were 145 visits to Upraxia with 126 unique site visitors (although many of them would be because of testing during the development phase). 126 of the total visits were from desktop devices, 16 were from mobile devices such as smartphones and 3 were from tablet devices. These statistics indicate that even with staff access to Upraxia that desktop computers can be considered a primary means of accessing online information. It also reflects the importance of a responsive design approach to cater for site visitors on wireless devices such as mobiles and tablets.

The browsers used to access Upraxia were also logged using Google Analytics. The Google Chrome browser was used for 44 of the 145 visits, followed by Internet Explorer with 30 visits, then Firefox with 25. Unlike in Share Our Sunshine development, a great deal of website visitors used Internet Explorer. Some of these visits can be accounted for by the development phase but many would have come

from unique site visits, providing evidence that a variety of browsers are used to access websites from non-mobile devices.

The browsers were used mainly via desktop computer operating systems, as opposed to browsers in smartphones, tablets and feature phones. These website visits were completed using the Windows operating system in 106 instances, Macintosh computers in 15 instances, iOS in 10 instances and Android for 9 instances. These iOS and Android devices refer to mobile and tablet devices and once again, the range of devices used validates the approach of responsive design. (See Appendix K: Upraxia responsive design screenshots.)

Although usability testing was not undertaken, testing through the implementation and evaluation of Google Analytics software provides further evidence that responsive design techniques are appropriate to cater for the range of devices used to access websites.

To summarise, by utilising action research in the process of interactive design for the application prototypes, iterations of the applications were improved based on insights and feedback and by doing so, the design principles for the development of web applications for social benefit are strengthened. Planning established the general direction for the research project and the basis of the two design research investigations. This was followed by observing, acting, implementing and reflecting to form the process used in Share Our Sunshine. This is extended by the iterative process of Upraxia in which revised planning, observing acting, and implementing guide the application development. From the design, development, testing and analysis of Share Our Sunshine, modified principles were developed to guide the design and development of Upraxia. These include repurposing existing applications to provide bespoke solutions, complementing community initiatives to provide additional support through information distribution, utilising smartphone app design and social web approaches and a consideration of privacy concerns. Similar fields to Share Our Sunshine were drawn upon, except the mobile focus was one of responsive design, persuasive media was investigated and content accuracy and credibility are considered. These extensions improve the strength of Upraxia as one of the application outcomes, as does the evaluation of Upraxia using analytics. Share Our Sunshine and Upraxia as the first project outcome (being the creative practice) are now discussed.

Chapter 5: Project outcome 1: Applications and their evaluation

This chapter describes the concrete project outcomes of the research—the two applications that were developed in response to a gap in the field of online applications for social benefit, which was established by the literature review and contextual review (Chapter 1). They incorporate the generalised design principles that were also derived from the literature and contextual review (Chapter 2), and the contextual requirements, user needs and circumstances of two specific instances or applications (outlined in Chapter 4). These project outcomes are the result of the practice-led methodology described in Chapter 3, including the agile development process and its application to the design of web applications. They were developed through an iterative interactive design approach, which saw the outcomes refined in response to evaluation, testing and reflection on the needs of the application users, stakeholders and the context of the prototype applications developed.

This chapter describes the form and function of the applications Share Our Sunshine and Upraxia, and explains how they incorporate the new technologies of data aggregation, locative media, and social web design and, as instantiations of the design principles that have been developed through the research, extend and enhance the capacity of community organisations to harness new technologies for social benefit. That is, they are discussed as exemplars that have been produced in response to the research question: How can web applications be purposefully designed to harness new locative media, mobile and social web technologies for social benefit in ways that effectively enable service organisation to display, and people in need to access resources with greater ease; facilitate community connectivity; and encourage community participation in building social capital?

SHARE OUR SUNSHINE

The first application outcome, Share Our Sunshine <share.social-goodness.com>, was created as a conceptual design and demonstrational prototype to

provide support to communities affected by natural disasters. Specifically, current online support can be extended to provide a unified long-term solution to flood management in Queensland. This has been demonstrated through visualising the location and density of available and needed help (such as emergency financial support and replacement household items) which enables people to gather information quickly from a centralised resource.

Technical features

Share Our Sunshine forms a concrete project outcome as a demonstrational web application repurposed from the research background of PetSearch. Its technical foundation is the open source Drupal CMS (version 6). This repurposed application combines pre-established data aggregation and locative functionality that strengthens the visualisation of data, for the purpose of mapping available and needed help for those affected by local natural disasters. To enable further repurposing, a Creative Commons Attribution 4.0 International licence has been applied.²³ Community agencies can therefore build upon it for their own use with no financial cost to them and provide new means of community support.

Mobile approaches were harnessed to extend the reach of information delivery for the web application. They also are useful for increasing the ability of the application to build social capital through contributions from mobile devices. In addition to standard theme development for the Drupal website, Share Our Sunshine was designed with a supplementary web app and mobile theme as a consideration for those who only access the Internet on their mobile devices. The mobile design techniques of developing web apps for Android devices provide a concrete example of how web designs can be repurposed for smartphone users. The elements of this web app are a theme reflecting the design principles of the Android 4.0 operating system, which is packaged as an application for Android devices. The colour scheme for application elements, fonts and hyperlinks is generated to be identical to other Android apps developed at the time of this research investigation. Additionally, the button design and interaction feedback reflects Android application design.

²³ <creativecommons.org/licenses/by/4.0/>

Fundamental to this is the usage of iconography reflecting that of the Android operating system, such as home and menu icons as reflected in the next three figures. Within the Share Our Sunshine app, individuals can easily post information and access their user accounts in an interface that has been refined to suit Android design guidelines.

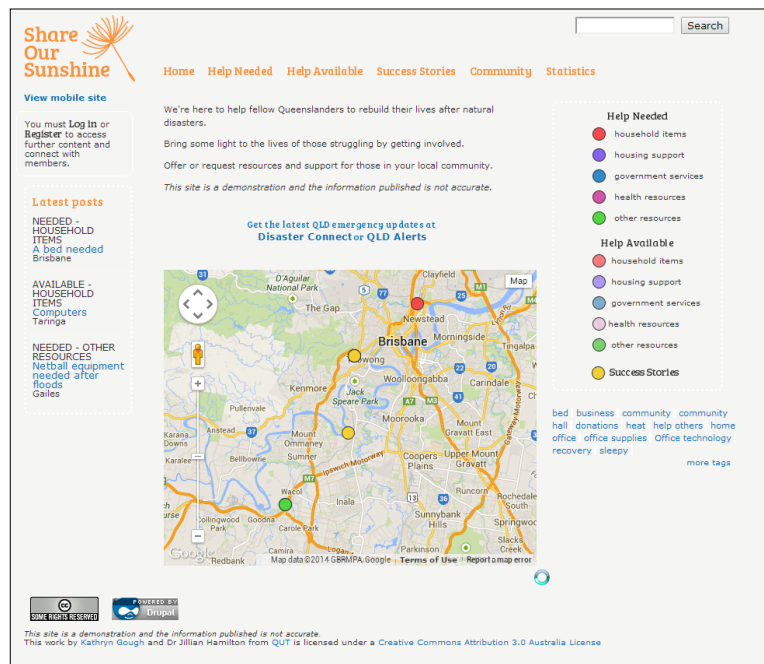


Figure 5.1. Share Our Sunshine home page

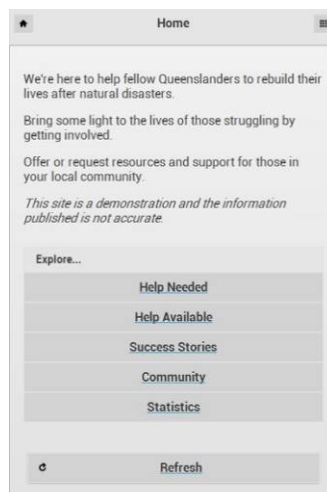


Figure 5.2. Share Our Sunshine Android app view of homepage

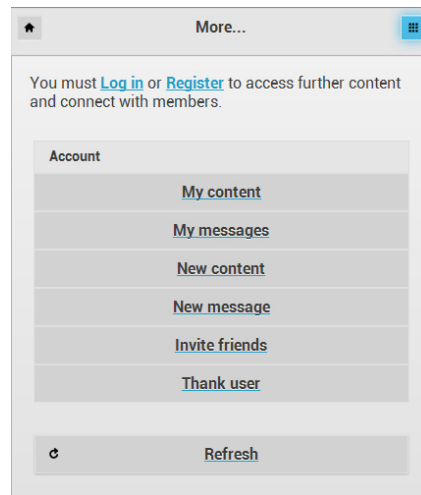


Figure 5.3. Share Our Sunshine Android app view of the 'More' page which can be accessed from the hamburger menu in the top right

The web app is complemented by a mobile theme for access on other mobile devices. This was designed to extend the Android web app by providing a mobile solution to access the Share Our Sunshine application on wireless devices that use other operating systems. The mobile design uses a minimal interface to present information that is easy to read on mobile devices without much screen real estate. The same colours, iconography and typography are used as the desktop theme to provide consistency, but in a much more minimal fashion. Registration and log in details are positioned at the top of the mobile design to facilitate easy access to membership functionality. The navigation is positioned at the bottom of the mobile layout however to allow users to easily move to a new page in the system without scrolling back to the top of the content after reading the page. To increase accessibility within the application and provide choice to the user, a link back to the 'full site' is provided (and a 'mobile site' link is provided on the desktop site).

To combat spam contributions in this application, a registered account is necessary to contribute and collaborate with members. The account details provided below can be used to log in to Share Our Sunshine and explore the functionality offered to registered users.

Demo account

Username: demo

Password: sh4ring!2

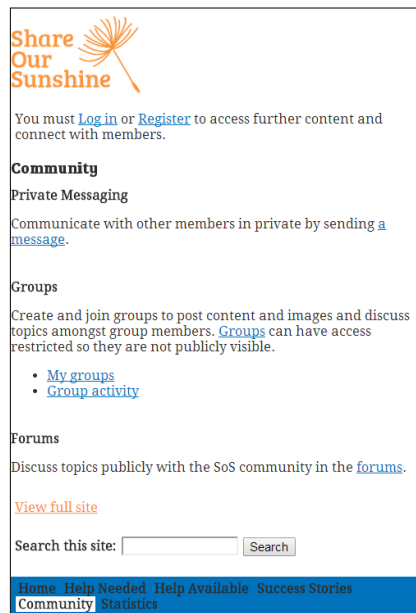


Figure 5.4. Share Our Sunshine mobile theme view of the Community page

Information design features

The primary goal of the design of Share Our Sunshine is to demonstrate how data aggregation and locative media approaches can be utilised to better provide support to people in need in the context of disaster relief. It has been designed to provide an example of how the locative aggregation of data can benefit those who have limited time or means to gather relevant information from various online sources and improve the reach of local support available to those affected by natural disasters, such as the 2011 Queensland floods. By using Google Maps API functionality tied into a Drupal module, the mapping of contributions to the application can be visualised with ease, which complements and improves the visibility of the aggregated information. This in turn makes it easier for those in need to filter through available support that is local to them. By colour coding the markers on the map so a specific colour is allocated to a category of aggregated help, coded signifiers are produced. These signifiers indicate the density and range of varying support services and make it easier for end-users to locate community help relevant to them.

Each submission also has a 'subscription' box which enables users to receive email updates to their registered email account whenever that specific content is

edited or commented upon. These submissions of available or needed help list details, display a map and link to the profile of the user who submitted it. For Needed Help stories the date since it has been needed is generated, which can be edited by the contributor, and Available Help stories generate a date from when the help is available. The location of the ‘help’ is generated on a zoomable map and commenting facilitates the ability for application users to discuss the submission.

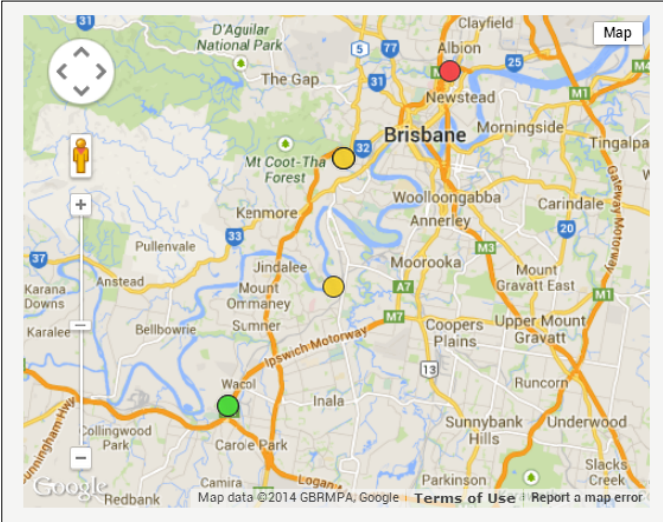


Figure 5.5. Locative functionality on the homepage of Share Our Sunshine



Figure 5.6. Share Our Sunshine site navigation

To visualise the distribution and extent to which this application has benefited community members, in Share Our Sunshine, people can contribute Success Stories for support received. These are mapped using their own unique colour so they can be clearly identified within the application. This has been designed to visualise stories where the application has been helpful to others, providing testimonials of the benefits of contributing.

In addition to the visualisation provided through the mapping of these listings of available and needed help and success stories, visualising quantitative data was designed into Share Our Sunshine to inform users of useful statistics. They were applied in this application through the display of a graph reflecting the frequency of

tag usage in the application. These tags are focused on key words submitted by users, such as ‘recovery’, ‘business’, and ‘donations’.

The information design techniques of harnessing locative media for the aggregation of community-orientated information and the usage of taxonomies form foundational design decisions for improving the access to supportive information in a post-disaster context.



Figure 5.7. Share Our Sunshine categories as they appear in the sidebar of the application

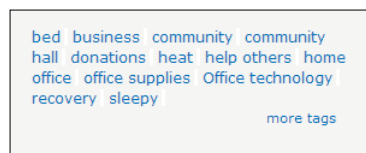


Figure 5.8. Share Our Sunshine tags which are added by end-users

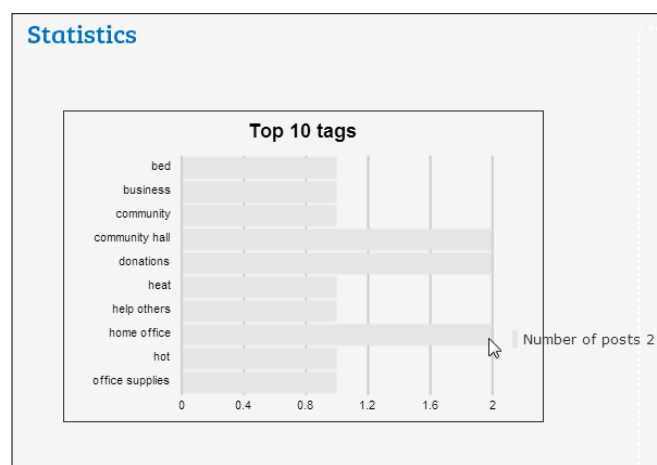


Figure 5.9. Share Our Sunshine graph of tag usage

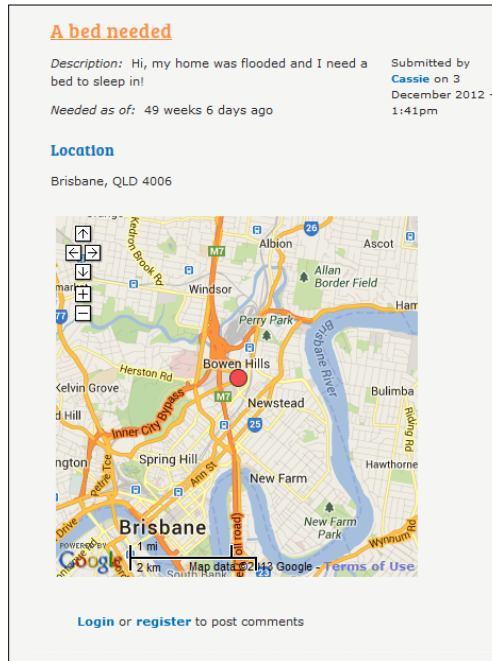


Figure 5.10. Share Our Sunshine help needed post. Please note that this was a prototype application, which was active for a few months during testing with staff.

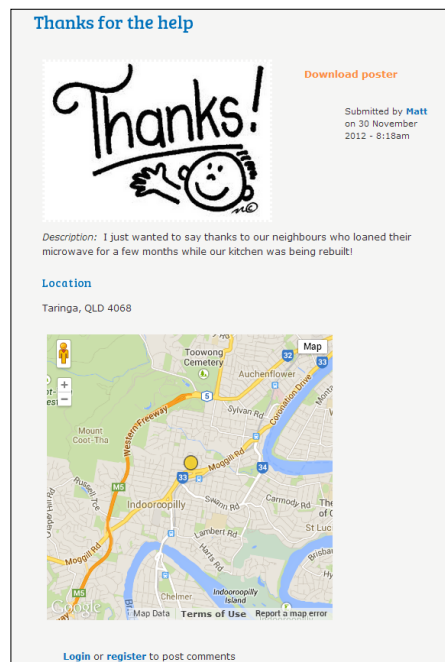


Figure 5.11. Share Our Sunshine success story

Collaborative features

Social capital can be harnessed through crowdsourcing, where opportunities for innovation come through the contributions of community member's pre-existing

knowledge and experience. Crowdsourcing is facilitated in Share Our Sunshine through encouraging contributions in the form of responses to requests for local support in a post-flood context, in addition to contributions of available and needed resources (such as household items and services offered by community agencies). Successful crowdsourcing applications should harness goodwill by making pre-existing activities easier, and in Share Our Sunshine the pre-existing activity of sourcing help when affected by natural disasters is facilitated through a locative online application that encourages collaboration between members. To extend the reach of information in this application and facilitate crowdsourcing, it reflects the common activity of posting physical requests for help and available items on community noticeboards. Posters of the services can also be printed using PDF functionality allowing people to distribute the service information in their local area on public noticeboards, for example. (See Appendix L: Upraxia PDF example.) This printable PDF is generated by text at the top of each Available and Needed Help submission, to provide ease of access to the print functionality. The printable posters present a print-friendly version of the submission which can be copied and distributed with ease.

By encouraging and facilitating contributions to an online community focused on aggregating available and needed local resources after natural disasters, Share Our Sunshine provides an example of how social capital can be built. This social capital takes the form of the sum of supportive resources that are the contributions by users enabled through a crowdsourcing approach. This crowdsourcing approach encourages users to not only request support, but offer it and be involved in conversations in the community. These conversations are facilitated through a collection of social web technologies. By harnessing elements of communication from social media, user contributions can be extended beyond requests, to follow up on information, feedback and private, semi-public and public conversations with community members.

Private messaging facilitates private communications between members (such as those arranging distribution of items) and are complemented by semi-public groups (such as 2011 Queensland Flood support group) which has functionality restricting access to group members only. Public forum topics allow the community to further participate in helping each other and providing support, which increases

the contributions made to the community and its potential as a rich source of social capital. Participating in forums, groups and private messaging is facilitated through a 'Community' link in the primary navigation of the application which generates a page listing these three types of social interactions available. The ability to send private messages is facilitated by an icon in the logged-in member menu and the Community page which produces a message form. In this form any registered member's name can be entered to send them a message about the specifics of a submission, including the logistics of arranging pick-up of goods.

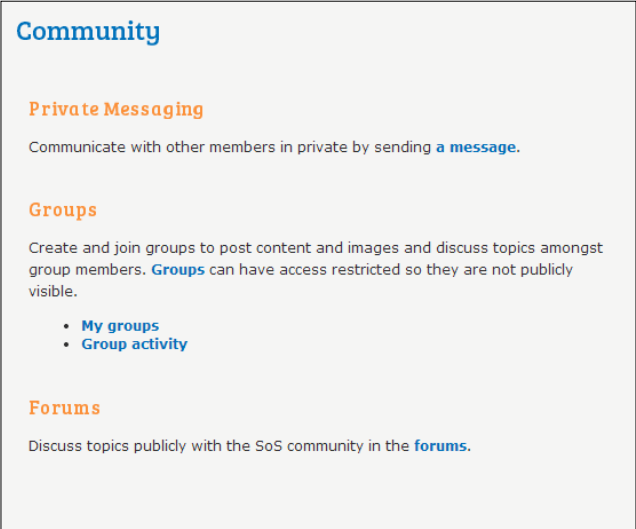


Figure 5.12. Share Our Sunshine Community page

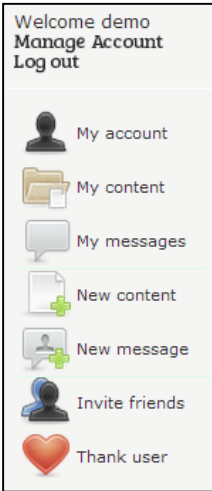


Figure 5.13. Share Our Sunshine member menu

Groups

Groups My groups Group activity

Search for a group by name
 Contains

Group	Description	Manager	Posts	Members	Join Link
Business support group	A group to help businesses get back on their feet after floods	Matt	1	1	Join
Queensland Floods	Group for resources for those affected by floods	heretohelp	1	2	Request membership




Figure 5.14. Share Our Sunshine groups

Write new message

Messages Write new message

To: *

Separate multiple names with commas.

Subject:

Message:

- Web page addresses and e-mail addresses turn into links automatically.
- Lines and paragraphs break automatically.
- Allowed HTML tags: <a> <cite> <code> <dl> <dt> <dd>

- Filtered words will be replaced with the filtered version of the word.

[More information about formatting options](#)

Figure 5.15. Share Our Sunshine private messaging

Forums

[Post new Forum topic](#)

Forum	Topics	Posts	Last post
<input type="checkbox"/> General discussion	2	2	3 years 20 weeks ago by admin
<input type="checkbox"/> Website help	0	0	n/a

Figure 5.16. Share Our Sunshine forums

Extending these communications, commenting on these and other contributions and creating blog posts encourages people to describe their experiences and needs. Comments can be created by responding to any submission when logged in, and blog posts can be created from a registered users profile, or the member menu.



Figure 5.17. Share Our Sunshine comment example

The enacting of social media elements such as messaging, commenting, and blogging functionality in Share Our Sunshine improves community participation by enabling two-way communications and discussions between the members.

Share Our Sunshine provides a concrete example of how current disaster response initiatives can be extended to encourage further community collaboration. It does this by incorporating a locative and social approach to ease in the visualisation of available and needed community support, in addition to facilitating private and public communications amongst members. Through an interface that provides a map of all contributions from the outset, those in need are able to find support that is local and of benefit easier than trawling through lists. However, with the design of web applications that utilise social media elements and locative media comes a necessary consideration of privacy.



Figure 5.18. Share Our Sunshine blog post

Privacy features

In response to the principle that online application (particularly locative and collaborative social applications) must minimise mapping an individual's movements and locations to protect their privacy, Share Our Sunshine does not use check-in functionality to track end-user movements and neither does it require individuals to map their locations, but simply to call up public community services in any given locality as a query. As with the use of Google Maps generally, this is a search feature rather than a tracking feature. In this sense, Share Our Sunshine provides a concrete example of how the design of web applications can consider the privacy needs of the end-users.

Furthermore, considerations of possible risks that became apparent when people use their real details in online applications guided the design of registered user profiles. An individual's location is not collected on their profile, nor is any easily identifiable information and a pre-existing social media profile (from Facebook for example) is not necessary for registration, reducing risks of identity exposure. Attributes of this profile include an avatar, an optional personal description, and a link to their blog posts. Additionally, functionality that indicates their activity in the Share Our Sunshine community is included.

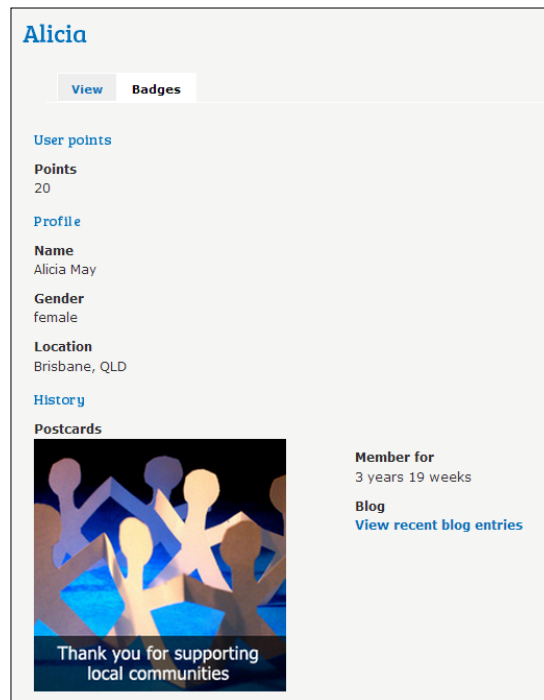


Figure 5.19. Share Our Sunshine profile

The activity of individuals in the community is demonstrated through a numerical value, assigned to them based on the number of ‘points’ another member has given them for contributing. After generating specific numbers of points, users are allocated badges which appear on their profile. These visuals provide evidence of the user’s active contributions to the community, but they do not display any information that can be used to expose the identity and location of the user. Additionally, users can send each other thank you cards to show their appreciation of help by certain members in the community, as demonstrated in Figure 5.19.

UPRAXIA

The second application outcome, Upraxia <social-goodness.com/upraxia> was created as a conceptual design and demonstrational prototype to support locals by visualising community services and events. It extends the Share Our Sunshine project outcome by focusing on the provision of support for those experiencing day-to-day and personal crises, not specifically natural disasters. Such crises include emergency housing, financial support, counselling and support extends to community engagement programs such as social and educational classes run by agencies.

Technical features

As a demonstrational web application that harnesses the functionality of the Ushahidi crisis-mapping platform, Upraxia provides a concrete example of how data aggregation and locative techniques can be utilised to visualise local community support services. As a customised implementation of the Ushahidi CMS, it presents itself as a repurpose of the platform that focuses on the provision of local information for day-to-day support, as opposed to its primary usage for real-time crisis-management. It also has a Creative Commons Attribution 4.0 International license²⁴ applied to it. Community agencies will therefore be able to build upon this locative web application for their own purposes and it presents an exemplar of how the Ushahidi platform can be implemented and modified to suit other altruistic community issues. Although it was not deployed publically, much like Share Our Sunshine, the features were functionally tested, to ensure they worked as intended.

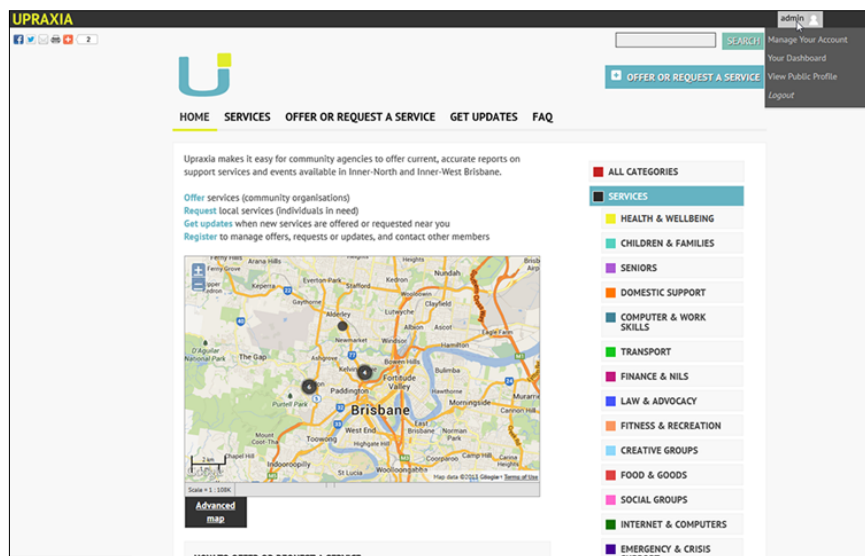


Figure 5.20. Upraxia home page

²⁴ <creativecommons.org/licenses/by/4.0/>

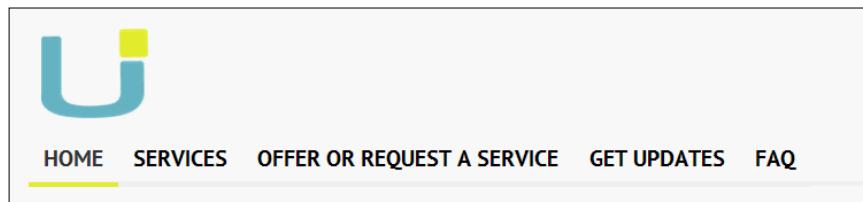


Figure 5.21. Upraxia primary menu

A responsive mobile web design approach was taken with the development of the Upraxia application to cater for the screen sizes of varying mobile devices, from feature phones to tablets, to wide-screen displays. Using media queries as a responsive approach creates an optimised experience for site visitors on varying types of devices and this specifically involves the customisation of fonts to increase readability, and the repositioning of application elements. This was implemented for example in Upraxia by customising the list of services generated for different screen sizes, alongside the maps and all other content. Upraxia therefore forms a concrete example of how responsive techniques can be harnessed and by doing so, increase the reach of the application and improve ease of access to information. Although this project outcome approaches mobile web design in a different way to the previous application, it does draw on the same contextual principle of building social capital.

Ensuring content is accurate through an approval process and encouraging individuals to rate content limits the distribution of misinformation, which needs to be avoided particularly for those searching for support information in times of crises. Limiting the circulation of misinformation can be achieved through expert and community control. This is essential to the Upraxia application, in which end-users can submit service requests and offers without a registered account if they choose to avoid the registration process. An example of expert control is the ability for site moderators to approve content before publish and an example of community control is the ability for community members to rate content after publish.

Upraxia enable users to contribute to web applications without a registration process, because a clear content approval and moderation process is in place to avoid the intentional and unintentional circulation of malicious information. Visitors to Upraxia can register and log in with ease by using the Login/Register link in the top application banner. To register for an account, only a username and valid email

address is necessary, reducing the deterrent that such registration processes produce.



Figure 5.22. Rating submissions in Upraxia

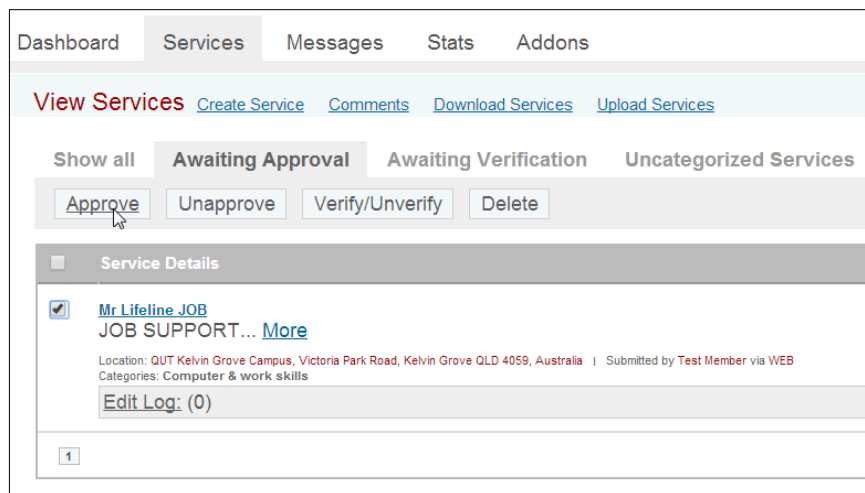


Figure 5.23. Approving submissions in Upraxia

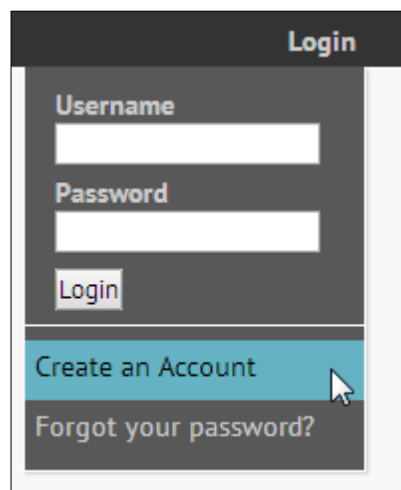


Figure 5.24. Upraxia's drop-down log in box

Individuals do not have the ability to approve posts however they can still manage their posts, updates and message other users. The Ushahidi platform generates a public profile for each account, and every account needs to be approved

by the administrator before they are active. This moderates what type of user is joining (ie. organisational account or individual) and minimises spam accounts. Whilst an account is not necessary for contributing to Upraxia, with a registered account end-users can manage their submitted services, SMS and email updates and be able to contact other members. Anyone who accesses a post has the ability to vote the content up or down, resulting in a number rating for the content based on its perceived credibility, forming an approach to community control.

Whether a member of Upraxia is a community organisation or individual is considered after registration for an account. The site administrator selects whether the registering user is an agency or an individual and based on this, permissions are applied to give them the appropriate level of access to Upraxia. A demonstrational account is provided below to show the full extent of functionality available to community organisations. The details of these permissions are outlined in Table 4.2, in the previous chapter.

Organisation account

Username: ngo

Password: 97QpyXb4

Information design features

Data aggregation and locative social annotative techniques can be harnessed to visualise the distribution of local support services. By aggregating and mapping local community support service for a range of individual hardships, Upraxia extend the directories offered by pre-existing community support agencies with summaries of available and needed services in a local area. The content that is aggregated and mapped using Google Maps functionality in Upraxia relates to varying support services offered in the community, in addition to aggregations of content from varying agencies. This direction for the application is made according to feedback from staff with a local community agency.

Upraxia presents itself as a tool for improving access to local information by aggregating it using locative media. Locative media is used in the sense of coalescing information around mapping and displaying services from the outset using clustering

to meaningfully aggregate these services and events. To improve upon the colour-coded signifiers that are the map markers in the previous application, Upraxia implements clustering as a means to deal with maps that may become swamped with markers and become unreadable. This clustering means that numbers of markers are combined into one, which is then expanded to show the individual markers when zoomed into a level that makes viewing easy. The markers in the application also not only show the specific location of the service but the range of their service delivery on the map.

An advanced map was also included to better visualise the mapped services. The standard map in Upraxia on the homepage does not show the markers as their unique category colour, just the overall category selected. With the advanced map, varying services can be selected using Boolean operations (AND/OR queries) and the relative category colour marker is displayed accordingly. This map can be printed for future reference to aid in the location of the service also.

The various types of support services that are aggregated visually in Upraxia are restricted to a number of categories based on analysis of Communify's services. These are:

- Health and wellbeing
- Children and families
- Seniors
- Domestic support
- Computer and work skills
- Transport
- Finance and NILS (No Interest Loan Scheme – which is offered through Communify)
- Law and advocacy
- Fitness and recreation
- Creative groups
- Food and goods
- Social groups

- Internet and computers
- Emergency and crisis support

NGOs that join Upraxia can add their organisation to the list of those pre-existing so their services are aggregated on the map and can be isolated. Organisations have access to an administrative dashboard, which provides moderation and approval features, unlike the member dashboard individuals have access to. This administrative dashboard allows NFP agencies and NGOs registered to add their name to the list of organisations and allocate a colour that represents their marker on maps throughout Upraxia.

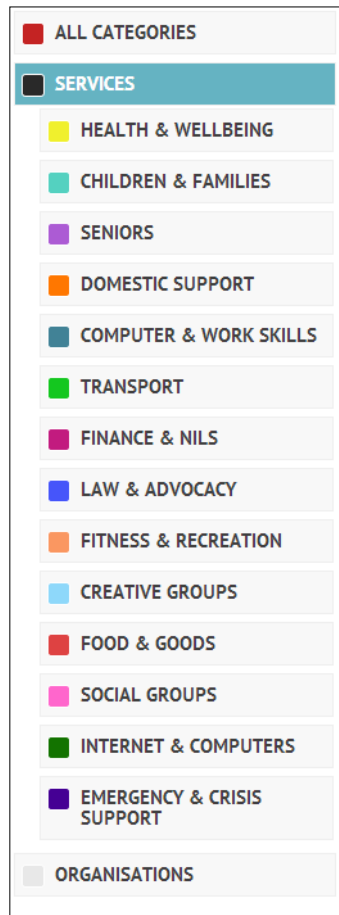


Figure 5.25. The Upraxia categories box expanded

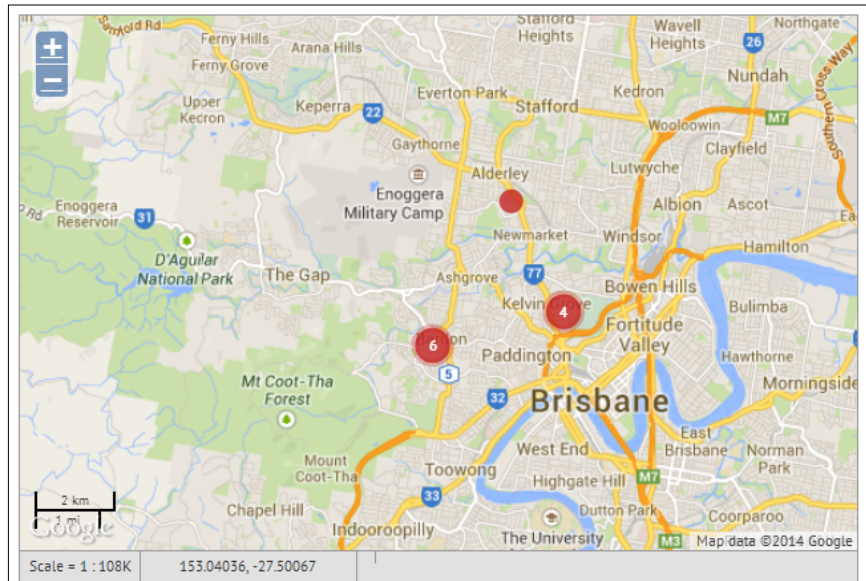


Figure 5.26. Map marker clustering in Upraxia (zoomed out)

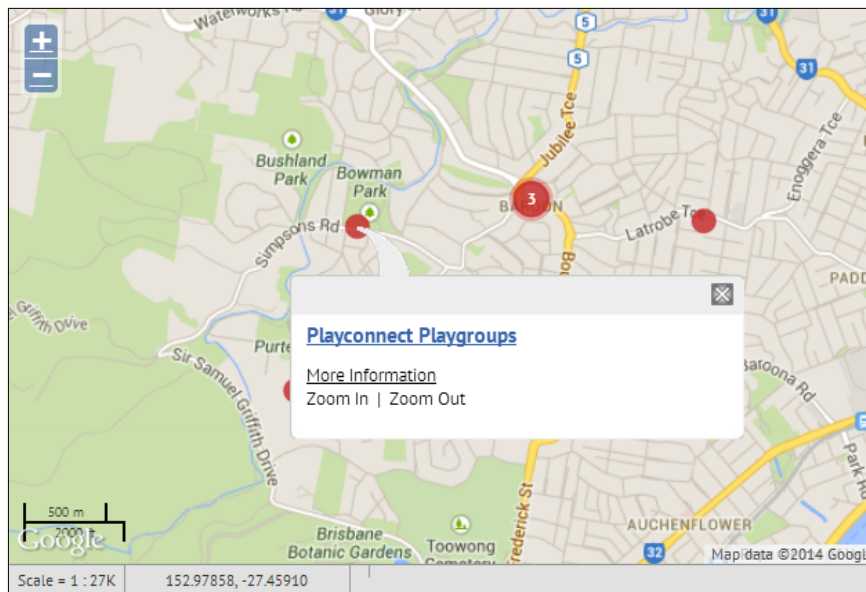


Figure 5.27. Map marker clustering in Upraxia (zoomed in)

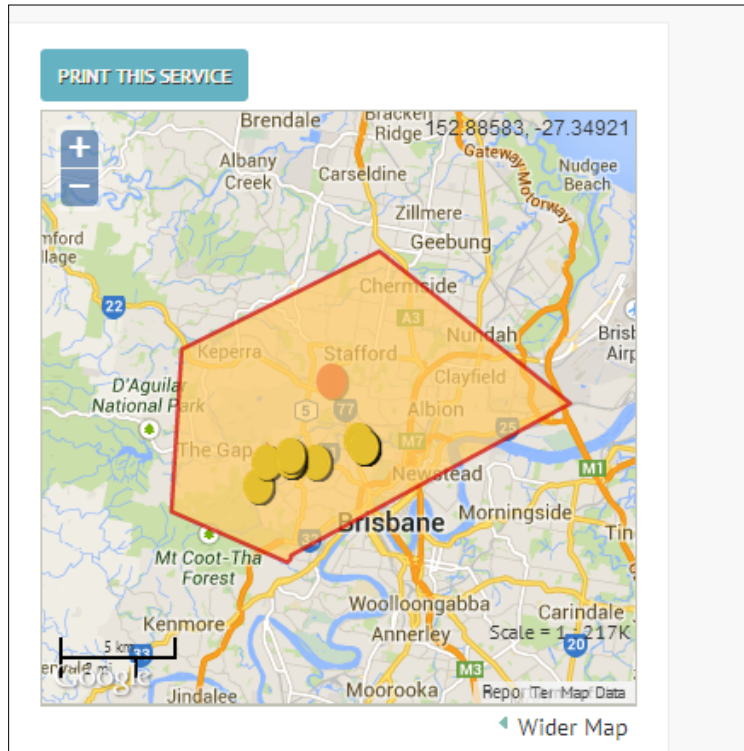


Figure 5.28. Locative functionality that enables an area to be selected, not just specific locations. This is useful for visualising which suburbs a specific service caters for.

The in-built functionality of Ushahidi enables the automatic generation of a page called Services, which lists all the contributions of service offers and requests. The services can be filtered by data including date, service category, organisation or urgency. This improves the ease of access to the contributions and makes the search of appropriate information effective through aggregating services based on multiple conditions (such as what is local, urgent, recently submitted and related to a specific sort of service).

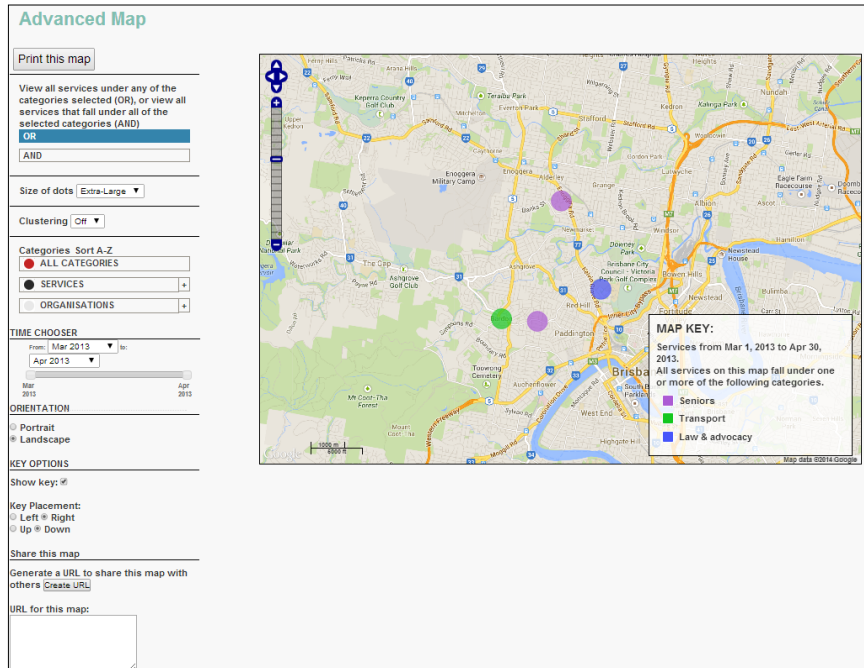


Figure 5.29. Advanced map in Upraxia

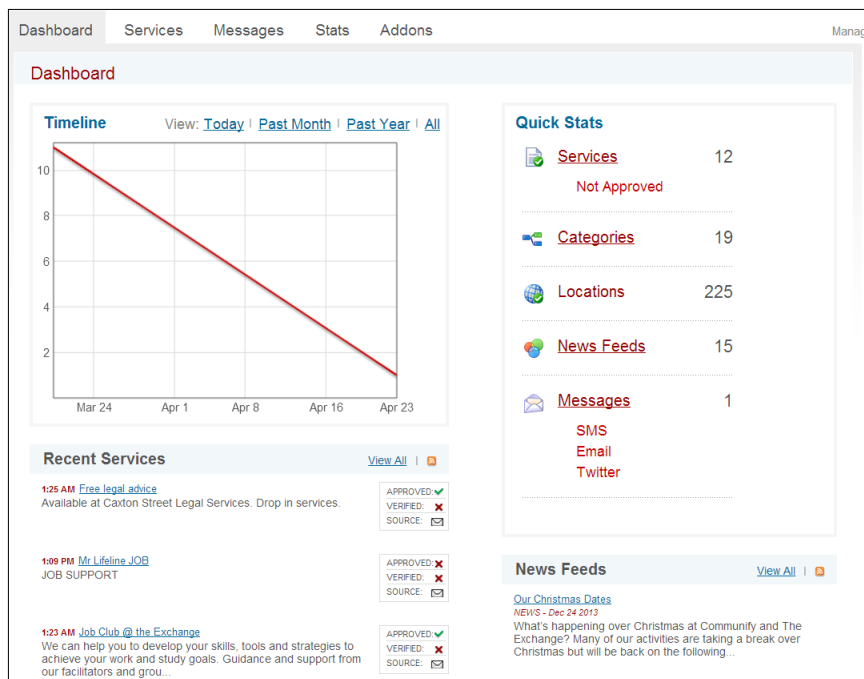


Figure 5.30. Administrative dashboard showing the functionality available. The timeline shows a lack of activity for a month.

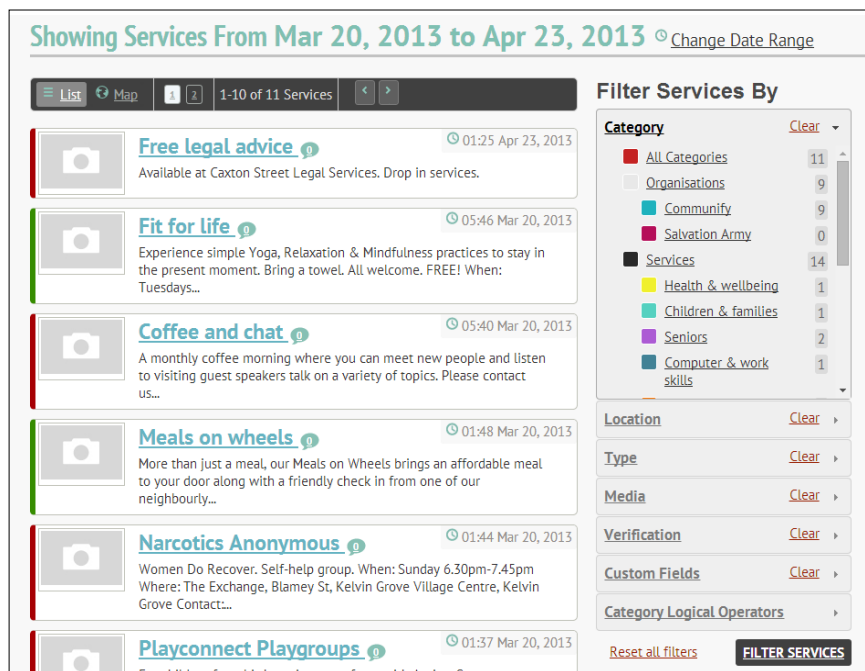


Figure 5.31. Upraxia services page

Collaborative features

By encouraging users to contribute to an application that aggregates local community support services, social capital is built in the form of the summary of support resources that then can be accessed. Furthermore, by harnessing local knowledge it is possible to demonstrate how to extend the reach of community agencies and extend services to those in need. This has been an underlying principle that has guided the outcome, Upraxia.

A substantial collection of resources could potentially be generated over time in Upraxia by drawing on crowdsourcing and harnessing the goodwill of members to make pre-existing activities easier. This is facilitated through contributory design functionality, such as the ability to submit details on an available local service. By aggregating these submissions, the goodwill of contributions can lead to a detailed visualising of available local support. This can be applied also to the request of information or solutions not yet available. In Upraxia, requests of local support can also be submitted as its aggregation can lead to a detailed visualisation of support that is needed in local communities. This information can then provide insights into the range and density of services needed and available, allowing community agencies to offer support where it is needed most.

Social web technologies include the communication and collaboration features of online applications, which when implemented appropriately, can lead to improved means of information distribution to those in need. Such improvements include community participation and two-way communications, and an extension of community support initiatives to encourage further community collaboration, which have been considerations in the development of Upraxia. Social web technologies have been harnessed to improve the design of communications between community agencies and individuals and also how discussions can be formed by considering contributions other than available services. The Upraxia community members can connect with each other through functionality included to facilitate discussion between individuals and agencies. This is only through comments, not additional groups and forums. As the goal of this application was to be focused on increased ease of use, reduced functionality was implemented. This ensures that users are not overwhelmed by unnecessary functionality and that the system functions effectively. With commenting functionality, site visitors are able to respond to any published submissions on the website and also rate the quality of content up or down. By facilitating the ability to contribute further by forming discussions on content, participation in the online community is encouraged. These comments are moderated by administrators or agencies, to ensure that malicious and irrelevant comments are not published. Comments can be added at the bottom of any service offer or request.

Through the utilisation of social web functionality built into Ushahidi, communications between members are facilitated, as are discussions on the service requests and offers posted. This establishes that such functionality can be utilised to provide support to those in need by participating in online communities created to harness community contributions. Contributions are encouraged and enabled further through harnessing techniques focused around designing for behaviour change.

The image shows a web form titled "Offer or Request a Service". At the top left, there is a dropdown menu labeled "I Want To..." with three options: "Request a service" (highlighted in blue), "Offer a Service", and "Request service". Below the dropdown are two text input fields: "TITLE *" and "DESCRIPTION *". To the right of the form is a map of Brisbane, Australia, with a red pin marking a location in the central area near Kelvin Grove.

Figure 5.32. The submission form in Upraxia must be changed for whether a service is being requested or offered because of the limits of the Ushahidi CMS.

Through utilisation of approaches developed in Fogg’s Behaviour Model (FBM), which are discussed in detail in Chapter 1: Literature and contextual review, Upraxia was purposely designed to motivate individuals. For this motivation to be enabled, users must feel comfortable about making decisions and must be encouraged to do so. This encouragement can be offered through the use of persuasive triggers, or ‘calls to action’. A focus on Green Path behaviours from the FBM, in which site visitors are encouraged to make a commitment (by signing up to the service in the Upraxia application) and through continual maintenance (by posting available or needed services in their local area) is effective at encouraging long-term engagement that extends beyond passive information reception. Triggers used in the commitment phase of Upraxia include sign up buttons and the ability to send emails to others inviting them to the service. Triggers take the form of regular cycles (every week or month) and irregular cues (published posts of interest on demand) where users can select services from a list of checkboxes and a locality on a map to receive email and SMS alerts. Through using approaches to online collaboration and crowdsourcing in unison with the FBM and established design patterns, the Upraxia application was designed as a means to share and distribute information on community support in a two-way facility.

Offer or Request a Service

I Want To... **Offer A Service**

TITLE *

DESCRIPTION *

DATE & TIME: TODAY AT 7:46 Pm MODIFY DATE
(AUSTRALIA/BRISBANE)

CATEGORIES *

Services

Organisations

URGENT OFFER? *

Yes No

Optional Information

FIRST NAME

LAST NAME

EMAIL

LOCATION NAME *
Example: Corner Of Musk Ave & Victoria Park Rd, Kelvin Grove

SOURCE LINK

UPLOAD PHOTOS

Browse...

SUBMIT

Figure 5.33. The form for submitting a new offer in Upraxia

Triggers are used to remind and inform users of potential opportunities for them to participate further in the application and local community by mapping and distributing information. A large, bold ‘Offer or Request a Service’ button on every page ensures efficient access to the form for submitting a request or offer for support. In addition to using the FBM, Upraxia’s responsive approach acknowledges the importance that mobile design places as a persuasive facility offered to increase ability and motivation.

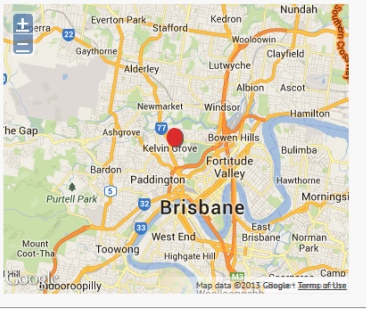


Figure 5.34. The Offer or Request a Service button

Get Updates

Step 1: Select your city or location:

Or place a spot on the map below, and we will update you when a service is submitted within that range.



1 KM 5 KM 10 KM 20 KM 50 KM 100 KM

* If you can't find your location, please click on the map to pinpoint the correct location.

Step 2: Send updates to my:

Mobile phone:
enter mobile number in the following format: +61420123456

Email address:
enter email address

Step 3 (Optional): Select Categories

Services

Organisations

[Confirm A Previous Update Request](#)

Figure 5.35. The Upraxia Get Updates page

Upraxia therefore forms a concrete example of how varying persuasive techniques can be harnessed to encourage and facilitate long-term engagement in online communities focused on information distribution. For complications that arise through long-term engagement, approaches to risk management such as ensuring accuracy and credibility of information and considering locative privacy can be utilised as a way to limit them.

Privacy features

Upraxia reflects how risks such as exposure of personal information can be considered and managed in the design of collaborative web applications. A consideration of how mapping an individual's movements and locations can be minimised resulted in Upraxia not using check-in functionality to track user movements or require individuals to map their locations other than to call up public community services that are available. This provides a level of protection for the online identity of the user that includes their location in addition to personal and contact details.

Additionally, online identities are protected by not linking to pre-existing ones on Facebook for example, and by only collecting absolutely necessary user information upon registration in Upraxia. Only the username and email address is requested upon registration and the public profiles generated from this registration only display a username, an avatar of choice and a list of any contributions to the application. Upraxia therefore provides an example of how information related to the online identity of the application user can be collected in a way that reduces the risks of their identity or location being exposed.

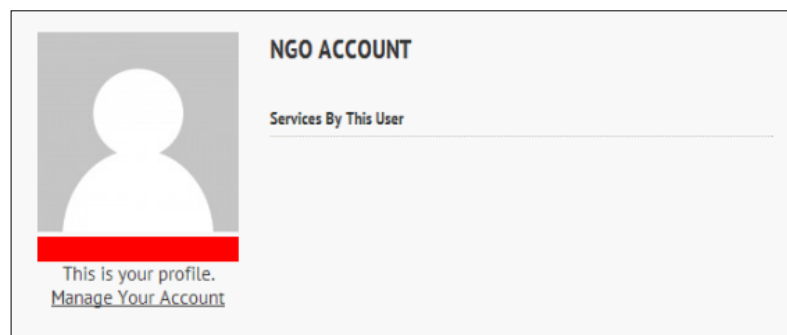


Figure 5.36. Ushahidi profile example that just has the user's contributions, and an avatar of their choice

In summary, this chapter has discussed the concrete project outcomes of the two prototype web applications that are central to this research project, Share Our Sunshine and Upraxia. By drawing on the functionality and potential of locative and social media, Share Our Sunshine highlights opportunities to develop applications which visualise the distribution of support post-disaster and enable community members to collaborate to support each other. Locative visualisation is facilitated through Google Maps API functionality in the Drupal system and the usage of colour-coded markers to simplify the interface. Varying levels of social interactions are facilitated through private messaging and public forums for example. An Android web app was produced to demonstrate how the repurposed PetSearch application could be extended to provide a design solution for those with smartphones. This has been supplemented by a mobile theme for those who use Internet capabilities on other brands of smartphone and feature phones. Considerations of how the privacy of end-users could be managed were approached by not collecting personal information in registration or encouraging the display of it on each registered user's public

profile. Share Our Sunshine forms a solution to how community members can collaborate to help provide each other with resources and other community support after natural disasters. This is extended by Upraxia which uses the crisis-mapping platform Ushahidi to facilitate the sharing of information on local available and needed community services, such as financial and health support. Using the Google Maps API functionality that is in-built, categories of services and the organisations offering them is visualised from the outset on the homepage map. The markers representing the services are clustered to reduce the number of markers on a map, and an advanced map was implemented to allow further filtering of services in a locative context. The submissions that are aggregated visually are moderated before publication by administrators or agencies, and application users can rate the quality of content. In-built social functionality facilitates two-way communications between members of Upraxia, and the reach of the application is increased through responsive design. Persuasive techniques such as SMS and email updates on services provide ‘calls to action’ to use the application long-term. Considerations of risk management in relation to online privacy ensured that Upraxia was developed with only basic profiles in check which do not display any identifiable information or locations of the end-user. These two applications have guided the formulation of a set of refined design principles for socially-beneficial applications, which is discussed as the second project outcome in the next chapter.

Chapter 6: Project outcome 2: A refined set of principles for the design of community-driven social benefit applications

An important outcome of this research project is a set of design principles which have been developed for, through, and out of the concrete project outcomes (Share Our Sunshine and Upraxia). They were developed for these applications through the process of a literature and contextual review, which helped to ensure that they were grounded in research, and existing exemplars from the field. They were refined through the applications designed and developed, as they were applied in concrete instances, which involved actual, specific user needs and a responsive agile and iterative design process. And they were developed out of the applications, as they were modified and extended in response to feedback and reflections on their efficacy.

Prototypes function as a means for the design process to be analysed and reflected on (Robertson and Wagner 2012, 65). In this way, the prototype applications operate in this research project as instantiations of the principles, and as a test case of them. The principles themselves are a contribution to the field in their own right, because, having been derived from existing research, applied, tested and consolidated through the research they can be generalised and applied to other, related design problems and instances (in the field of social benefit applications) with some degree of confidence.

The principles developed throughout this research project have been refined where applicable to form resolved and final design principles. Services (including websites) are both social and complex systems that are often provided by large organisations that have geographically disperse components (Norman 2011, 161, 147), and this applies to the online services (such as directories and service listings) offered by community agencies. Norman (2011, 147) emphasises that “quite often the different parts of the organisation do not understand or communicate well with one another. And many services involve different organisations, and communication

among them is particularly difficult.” Therefore, social benefit in this research project is generated through the increased reach and access to community information on available support services, both in a disaster response capacity and in general times of need. Such social benefit is also generated through the social capital that is built by the contributions of the application users to an aggregation of local support. Technological approaches help establish principles that guide the usage of open source applications, and an ethical approach to designing community-driven applications for information delivery. This responsible design approach considers how to protect the online identities of end-users and their movements, in addition to how information can be accurately presented and verified. Additionally, principles that guide the live implementation of applications are provided. Firstly in this chapter however, principles surrounding emergent technologies are discussed to provide guidance for future applications for social benefit. The refined set of principles for the design of web applications that harness locative, social and mobile technologies for social benefit to increase access to community support resources, encourage communications, and participate in a community that builds social capital, can be summarised as follows.

EMERGENT TECHNOLOGIES: DATA AGGREGATION, LOCATIVE MEDIA, MOBILE WEB DESIGN AND OPEN SOURCE SOFTWARE

The aggregation of official and community information on local services and community support is beneficial to people in times of community-wide crises, as well as effective, holistic resources for those affected by a range of personal crises. While the provision of information to those affected by natural disasters can come from both official and community sources, as far as alerts on local hazards, warnings and official support services are concerned, government and emergency agency information tends to be the most verifiable and accurate. This information comes directly from agencies on the frontline, as they have access to the most credible, updated information. Therefore, *real-time information can often be provided by aggregating pre-existing official online resources for new purposes. This can be augmented by information generated by community participants as ‘citizen*

journalists', which extends information sources and provides a wider range of continual and focal community insights.

However, it is important that clear categories are provided to site visitors so users can easily search for and identify information and services they seek. The vast, disperse and abundant community support information online can be aggregated and visualised to provide better access to local support services. *To benefit people seeking support and service information that is relevant to them and their current situation, designers should ensure that, instead of focusing on particular agencies and the services, the organisational logic of aggregated data should focus on types of resources and services, and their relative location to the individual as a central organising principle. This can be improved by ensuring that services are clearly categorised in ways that make sense to the site visitor.*

Information provision by official support agencies can be complemented by community projects that facilitate post-event support for those affected by natural disasters. For example, online communities can successfully organise volunteers and facilitate the distribution of material support by aggregating information on needed and wanted goods. Community support applications such as Givit are successful in facilitating the distribution of goods between agencies and individuals. It is recommended that providing information on local community services with an emphasis on allowing individuals to request help, ask questions and receive updates on information they require, be embraced by agencies and governments. Through the development of the ACDS and accompanying applications that can be developed through accessing the warehouse of information on community services, there is potential for the state of this situation to be improved. *Community applications, which harness the generosity of the community members and build social capital, can extend the support provided by agencies to provide an effective resource for those affected by natural disasters, as well as those facing a range of personal crises.*

There is a great opportunity to not only provide information on local services, events and resources, but visualise them effectively through techniques including social-annotative locative media. The visualisation techniques of locative media can be utilised to show where information is needed most and where it is saturated locally. When using this technology it should be ensured that categories represented by visual signifiers, or markers on the map are colour-coded for clarity. These visual

signifiers should be arranged in clusters to compensate for when a large number of plotted contributions make the map unreadable. To clarify, when too many posts are displayed on a map, it is difficult to view the map itself, leaving the mass of visual signifiers without a context. There is a risk of visual information overload that comes with having hundreds of items within a small range on a map and clustering can resolve this. In addition to clustering of markers, a map ‘key’ in the form of the list of categories and their respective marker improves usability. This means that categories can be selected, and the map can then be updated to show selected contributions. It also aids in providing from the outset clear categories for the contributions so website visitors can easily search for and identify information they desire. *The visualisation techniques of locative media are particularly effective in displaying the geographic distribution of services and events in a visually appealing and categorised way, which relates to the users own locality. Visualisation techniques that enhance the display of locative elements include the clustering of items on a map, and listing categories for improved usability.*

Mobile technologies can increase reach and improve access to information, however content needs to be accessible by everyone. A focus on smartphone apps alone neglects a segment of the population who do not have Android or iOS smartphones. When a smartphone app is the most appropriate approach to take, then native apps are best due to their ability to harness hardware and provide a better user experience than web apps. Smartphone apps must be supplemented by a mobile website for other mobile phone users. However, a supplementary theme or mobile theme for the website does not provide an optimised user experience for different devices either as the layout, typography and other elements of the mobile design aren’t scaled or repositioned based on the device’s screen size. Therefore, a responsive design approach to development should be used to ensure that the application is accessible across all displays including phones, tablets, notebooks and wide-screen displays without a need to focus on the time costs involved in the development of a smartphone application. Responsive design provides an optimised viewing experience compared to web apps and mobile themes. That is, *social benefit applications should be designed to cater for audiences on various devices. This can be achieved through a responsive design approach, which ensures that the*

application is accessible across all displays including phones, tablets, notebooks and wide-screen displays and is less time-consuming than smartphone app development.

Open source platforms can be utilised to provide effective and inexpensive support to community agencies and individuals in the community, which is important as NFP and NGO agencies often do not have the financial means to implement large-scale applications. Open source principles allow applications to be shared, improved upon and altered, providing the potential for implementation into a live application for local usage. In addition, Creative Commons licenses, which apply open source principles to creative projects, provide a foundation for other designers and agencies to build upon the applications developed for their own benefit. *Applications that are developed using open source platforms and Creative Commons licenses can be repurposed with ease. This makes these platforms beneficial for the design and implementation of bespoke applications for specific community issues that arise.*

While prototype and demonstrational applications can run well on small web hosting plans, with a better, albeit more expensive, hosting plan, a website can withstand larger levels of traffic. This is of particular significance to applications developed to provide support after natural disasters in which entire local communities turn to available web services for information and support. *Being able to handle the increased server load that is unavoidable in times of crisis when people are trying to access information online is absolutely vital to the implementation of community-driven social benefit applications.*

HARNESSING SOCIAL CAPITAL THROUGH ONLINE COMMUNITY BUILDING

Social media can also be harnessed to extend information and support provision. While designing online services that provide ease of access to useful, timely and accurate information is crucial, fostering the capacity of individuals to contribute their own knowledge for social benefit is an important way to build social capital. Facilitating communication between community members and agencies as well as each other is also of benefit to enabling support. As Price-Robertson and Knight (2012, 9) argue,

When a large number of community members actively participate in community life (eg. through employment or education), a number of positive effects tend to follow: important information is shared, community members become aware of their rights and responsibilities, formal and informal networks of reciprocation and trust are developed and strengthened (i.e. social capital is increased), and a shared sense of community ownership is engendered.

This sense of engendered community ownership can improve the facilitation of discussions about what is lacking and what can be improved in the local community support services sector. These contributions to a central resource of support that can benefit others reflect a crowdsourcing approach, which is best used to improve the ability to do pre-existing tasks. Social capital can also be built by making offline behaviours easier. *Social web functionality, such as sharing posts and facilitating private and public two-way communications between users, can be harnessed to enable individuals to request information they need but isn't available, to facilitate community participation in information provision, enable one-to-one and one-to-many support, build a community, and support collaboration amongst users. All of this extends the range of information and support that is available to be extended.*

DESIGNING FOR PARTICIPATION AND BEHAVIOUR CHANGE

The implementation of new technologies cannot in themselves ensure uptake of an application and contribution to social capital building. Designing for behaviour change through persuasive media (Fogg's Behaviour Model) can help to shape people's attitudes and behaviours and so encourage participation in online communities—from inducing new one-off behaviours, such as signing up to an online mailing list, to increasing a specific behaviour, such as contributing insights or donating goods. Triggers can extend participation beyond passive information reception in community-driven applications. Such triggers take the form of regular cycles (every week or month) such as weekly or monthly email subscriptions and irregular cues (published posts of interest on demand) of email and SMS alerts. *Three elements of persuasive media can help to ensure community participation in an application that is designed for social benefit and help build social capital. These*

are namely providing motivation to participate, ensuring the ability to do so and providing a trigger within the application to encourage a desired behaviour. This can be encouraged through triggers such as 'push notifications' and real-time SMS and email alerts on valuable information.

RISK MANAGEMENT

A number of potential risks need to be considered when designing locative, social applications that aggregate information for use by those in a crisis. One of the most important is ensuring that information is accurate and can be relied upon by people in need. Community control can be implemented through reputation-based systems that enable community members to rate content on its quality and value, in addition to rate members based on their contributions. Expert control can be implemented through moderation systems that ensure that information has been read and approved by someone before publication. Moderation can be utilised to ensure no misinformation is published and also can be extended to moderate who else should be given these expert control permissions. Both expert and community control are valuable to ensure information distribution in community-driven applications for social benefit is up to date, accurate, credible and useful. Additionally, designing with a focus on Fogg's Web Credibility Framework can improve the efficacy of applications overall through a consideration of all the application elements and how they change the perceived and actual credibility of application as a whole and the information presented. In times of need, people need to be assured that the information they are accessing is credible. *The risk associated with community generated information relates to accuracy. Using expert controls such as information approval and moderation in combination with community controls such as rating systems can help to ensure a level of credibility when developing applications for information delivery. Fogg's Web Credibility Framework is also beneficial in establishing how applications elements can be best designed with perceived and actual credibility in mind.*

The design of collaborative online communities brings with it risks associated with the exposure of the identities of users. The best way to protect user data is not store it in the first place. By only gathering information considered essential to the

registration process, the risk of a member's personal identity being exposed is reduced. This can be approached with a registration process that only collects a username and email address, and displays minimal personal information on profiles. This can be extended in communities with information moderation and approval techniques in place. Sign up and registration processes can be a deterrent to use for many people, especially if such processes are lengthy, or information is needed to be accessed quickly via mobile devices. By giving users the ability to contribute to online communities without a registered account, the motivation for people to contribute is improved and the number of contributions can be extended. This is an approach that is only suggested for community-driven communities that have a solid information moderation process in place to ensure that unintentional and intentionally malicious information is not published. In the case of social benefit applications this could include incorrectly dated information on events, or directions to a service that doesn't exist. *Social applications need to be designed with considerations of how to minimise identity exposure, including how to protect these identities by not collecting personal information of the users. Registration processes can be a deterrent to users but if registration is not necessary to contribute to the application, then a clear moderation process must be in place to limit the publication of misinformation.*

Online identities can also be exposed through locative media applications. Check-in applications that map a user's location via smartphone GPS technologies should be avoided. In addition, information that is plotted on maps in online applications should not refer to an individual's residence, current location or map their movements over time. The visual aggregation of community support services and resources can be implemented successfully by harnessing locative media without the need to map individual movements. *The location of public events and services is worthwhile mapping and there is value in establishing principles and exemplars for responsible information delivery through collaborative locative platforms. Locative media is useful as a tool for plotting geographically relevant information, however it must be used in a thoughtful way that considers and minimises risks associated with exposing a person's movements or locations.*

The principles discussed in this chapter can be applied to the design of other community-driven collaborative web applications developed for social benefit

through information delivery. These principles can therefore provide guidance on the development of other web applications focused on information distribution for community benefits and the use of locative, mobile, social and persuasive techniques to do so. These final principles are an important contribution of the research project and to the field of design for social benefit.

Chapter 7: Conclusion

In this conclusion I will summarise the research findings and outcomes, and explain the project outcomes in terms of their value to the NFP sector, their significance to the technological fields of focus and how they extend such fields. A set of conclusions that have been reached and a rationale for the new knowledge generated through the production of the research are then discussed. Finally, this conclusion will point to potential for future research in the design of community-driven locative and social applications for social benefit.

This research produces a number of outcomes, each with their own significance and value to the NFP sector, broader community and technological fields applied. First, through a participatory approach to interaction design, two prototype web applications were created through this research project, Share Our Sunshine and Upraxia. They form demonstrational prototypes that illustrate what is possible by combining locative, mobile and persuasive techniques to improve participation in community services and access to resources. They both harness contributions by individuals in need and those offering help as a central resource for community support information. This information, when aggregated and summarised provides a form of social capital that is the sum of contributions to the community. The prototypes created in this research project provide a way to reflect on, and demonstrate the effectiveness of certain technological approaches to solving community issues.

The first web application design forms a preliminary exploration into community-contributed information delivery to improve social benefit and provided insight that better usability, design, and credibility approaches were necessary in the second application. In particular it guided a shift to focus on responsive media as an approach to designing mobile applications, which unlike approaches using app development, require no proprietary software language and work universally across devices, albeit with customisation based on various screen sizes.

These concrete outcomes have particular significance to stakeholders that are involved in the design process. For NFPs and NGOs involved in collaboration in this project, the project outcomes (the new applications) offer the potential to expand their current services through new strategies for supporting both their agency and community members. For the benefit of other agencies in the community sector, the prototypes that have been developed through open source platforms, and produced under a Creative Commons license, means that organisations beyond the applications can repurpose the core technologies for their own use.

The focus on using open source software and Creative Commons guidelines provides applications that can be repurposed, reskinned and implemented for various social causes, as investigated in Share Our Sunshine. While this repurpose may not have been the most refined and appropriate approach for the investigation, it provides an application foundation which agencies and individuals can alter, improve and extent to their own end. The following application Upraxia provides a more aesthetically pleasing, user friendly, and overall better experience and builds upon Share Our Sunshine to provide a central site of access to information on services and events available or needed locally.

In addition, the concrete outcomes of the creative practice aspect of the research provide exemplars of what is possible, and present models that may be emulated. Share Our Sunshine demonstrates how locative visualisation and various mobile approaches can improve information distribution for disaster relief. This is complemented by Upraxia, which demonstrates how locative visualisation, responsive mobile design and extended persuasive techniques can improve access to information on community services, resources and events.

Beyond this, the applications that have been produced in this research project provide technical innovation through web and mobile design approaches to local social problems. The first context involved how to improve access to local support after natural disasters using a repurposed design approach and web app design techniques. The second involved how to improve access to information on local community agency support using responsive design techniques.

Theoretical innovation has been produced in multiple ways. Firstly, it is produced through new understandings of the design fields. The project extends existing interaction design principles in the fields of locative media, mobile web design, and persuasive media by applying them to the contexts of each case study investigation. Secondly, the project demonstrates potential benefits for combining technologies including data aggregation, locative media, social media and persuasive media-surrounding how the goals of the design explorations were realised through interaction design approaches including information design. These benefits are documented as design principles for developing applications for social benefit and include the following.

The potential for locative media to improve data aggregation is valuable to consider when developing online applications focused on the display of local information, and this can be further improved through the communicative and participatory techniques generated by social and persuasive approaches. Information access can be increased further through implementing responsive approaches and it is suggested that this approach be used with similar applications. All of the design practices discussed in this exegesis should be considered in a responsible way to ensure risks are minimised in the development of collaborative open source applications. This theory is not only beneficial to those in the field of design but also to NFP and NGO agencies who provide community support who wish to extend their web presence through similar online strategies.

Importantly, this research project extends beyond concrete outcomes that operate as particular, context specific instances and, and provides a set of design principles for designing online communities for social benefit. Through iterative development, trialling and testing across contexts, these principles have been generalised for use as a reference point underpinning other social benefit applications. This is a significant outcome in its own right and has benefits to the sector because they are based on a scholarly foundation and have been implemented, tested, and refined through a series of iterations. The principles established in this research project have the potential to improve access to local community services and establish a means for individuals to request support.

While the research question “How can web applications be purposefully designed to harness new locative media, mobile and social web technologies for

social benefit in ways that effectively enable service organisation to display, and people in need to access, resources with greater ease; facilitate community connectivity; and encourage community participation in building social capital?” has been answered in part through the scholarly research of this project; through the development and application of a set of principles for design and through the application and testing of them in concrete outcomes, there is, of course, potential for future research into locative and social applications for social benefit, especially those focused on supporting information distribution. For disaster relief this research project illustrates how locative and social techniques can be utilised to provide support to those who need it. This is extended with an exemplar that demonstrates how approaches such as persuasive media and the utilisation of information accuracy and credibility strategies can strengthen the usage of such locative and social techniques. By harnessing the contributions of those in need, the state of information provision by community agencies and in local community initiatives can be improved through an aggregation of resources that form social capital in a sense of gaps in the provision of support to local communities. This has great potential for exploration in other research projects to further test, apply and extend these principles in other web applications for social benefit. This project can be further developed through more extensive participatory design processes and wider testing and evaluation by potential application users.²⁵

²⁵ This has not been possible within the timeframe and scope of the PhD.

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Appendices

Appendix A

Papers prepared for publication

Repurposing the Ushahidi platform for improved access to local community support services

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Abstract— In times of need, people often turn to connections in social networks or Google's search engine for information on available local support. An alternate approach, as informed by Fogg's Web Credibility Framework, allows us to understand an approach to the design of an online application that maps local community support services. Fogg's framework has informed the development of this application through the repurpose of the crisis mapping application Ushahidi. The potential benefits of this approach includes optimizing the credibility of the application, and evaluating the capacity of the Ushahidi platform for use in information delivery of services, events and resources.

INTRODUCTION: Community Information Systems

In 2009 the Knight Commission²⁶ published a report entitled *Informing communities: sustaining democracy in a digital age* [1]. In its discussion on information provision on local community services, it points out there is not currently a problem with the amount of information online per se, but a failure to recognise that the profusion of information must be organised in a meaningful way [2].

In a further publication from the Knight Commission that analyses the Informing Communities report recommendations entitled *Creating local online hubs: Three models of action*, they claim that the three most common approaches that residents use to find information about local community services is through the Google search engine, searching local websites, or tapping into informal networks [3]. Finding the appropriate local community agency that offers the required service is no doubt already a challenge when people are under stress and need, for example, health services or financial advice. Searching site by site, or spending time ringing around looking for the most appropriate service from the vast range of community agencies that provide these services, and identifying those in a restricted to geographical area increases pressure.

This can be minimized by providing a visual display of local services and events that forms a central point of support for residents and agencies. The Knight Commission report went on to recommend that each community should have at least one, well promoted, online aggregation portal, to inform them of resources available [4]. Available technologies, such as online maps and data aggregation applications, can be harnessed to support the correlation of information to a larger context, and so enable residents to see available services and enable agencies to identify service 'gaps'. However, four years after this report, many local governments have not yet implemented such technologies into their community information systems.

The aforementioned Creating Online Local Hubs report helpfully provides three key dimensions of an effective aggregation portal, namely, 1) [the need to] maximize the availability of relevant and credible information; 2) the capacity for individuals to engage with information and, 3) [the promotion of] individual engagement with information and public life in the community [5]. This provides a

²⁶ The Knight Commission was set up by the Aspen Institute, an American education and policy think tank, for the purpose of examining the information needs of communities. <<http://www.knightcomm.org>>

useful set of strategic aims for designers planning to develop online applications to support agencies and individual residents to locate and contribute to community services. That is, we should be mindful to design systems that enable each local community to see what support services and events are available with an emphasis on the location of services (such as financial help and free health advice) offered by agencies.

Some applications have been designed to provide ease of access to the diverse but disparate collections of resources provided by individual agencies. MyCommunityDirectory <www.mycommunitydirectory.com.au> is an example that has been produced for Brisbane residents to provide information on community support agencies and their service provision (such as opening hours, contact details and wheelchair access). While this approach is beneficial in providing a centralised access point, because it does not map services geographically, or list upcoming events, the insights it provided is limited.

In this paper I will discuss the design of an online application for improving the access and distribution of information on local community services and events through repurposing of the Ushahidi platform. This will be achieved through reflecting on the Knight Commission's principles of creating systems for local information delivery and Fogg's persuasive techniques for improving credibility.

Locative Media and the Ushahidi Platform

The expansion of locative media web applications has led to a return to the map, which enables information to be correlated to larger contexts [6]. Through online mapping, residents are able to easily see the density of services in a local area and agencies can see gaps where services are patchy. As argued by the Knight Commission, such information systems could enable citizens to map an effective research journey by letting people know what is available and where [7]. The recommendations of the Knight Commission, and the lack of a centralised locative resource of community support services and events in Brisbane, has led us to explore technology options, that can enable the production of an effective design solution. The aim of this exploration is to present an online application that demonstrates how community agencies can better publicize their services and also demonstrates how individuals could source information in their local area, through using the Ushahidi platform.

The Ushahidi platform <<http://www.ushahidi.com/products/ushahidi-platform>> has been adapted by a number of not-for-profit agencies to providing timely and accurate, locative information to people in time of need. Ushahidi, which is Swahili for witness, is a downloadable web application that geographically and temporally maps posted information and events, while allowing users to capture up-to-date on information via email and SMS. A team of developers formed the not-for-profit agency Ushahidi to create the platform for the purpose of mapping and sharing text messages between aid agencies, government and journalists. It was first used in the 2007 Kenyan election and redeveloped for the 2013 Kenyan elections with categories of information including police action, security issues, hate speech, vote counting and results, polling station logistics and a category called positive events (Uchaguzi <<https://ushaguzi.co.ke>>) [8]. Ushahidi has also been repurposed for various uses by volunteers worldwide including election, environmental disaster, and natural disaster coverage [9]. Crowdmap <<http://www.ushahidi.com/products/crowdmap>>, a subsidiary version of Ushahidi, hosted on the Ushahidi team's server, allows agencies and individuals to share information quickly in times of emergency. Besides ease of implementation it offers the customization of installation (restricted to editing content, header images, and included design templates). An example of a Crowdmap implementation of Ushahidi is the Brisbane City Council Brisbane Storm and Flood Map <<https://bncstorm.crowdmap.com>>, which was set up in 2013 to map sandbag locations, power outages, closed roads and flooded areas. In 2010, the iWitness Pollution Map <<http://oilspill.labucketbrigade.org>> was set up to cover the BP oil spill disaster and, in the following year it was used in Christchurch to map recovery information following an earthquake (Christchurch Recovery Map <<http://eq.org.nz>>). These examples demonstrate the power of Ushahidi in providing information to local communities during emergencies, by sharing and mapping information on community services and events.

The uptake of the Ushahidi platform can be attributed to its combination of locative information, SMS and email update functionality and its refined, easily customizable interface. Its flexible Joomla-based

CMS supports plug-ins and forms a solid foundation for information delivery through locative web applications. Its large library of Ushahidi implementations is expanded with a new purpose-built implementation that seeks to provide information on available community support services.

Ushahidi is a platform that is continually being re-designed and improved to better serve the purpose of delivering information to locals. For example, the review process for content is being improved through a tool that automatically suggests locations and categories so that administrators and those with the adequate permissions are not spending their time manually entering the data [10]. This is extremely beneficial as content submitted by SMS and Twitter has to be added to the map as it is received in basic text format. There is potential for future development of this application based on expansion of the Ushahidi platform and also exploration of another platform developed by the Ushahidi team. SwiftRiver <<http://www.ushahidi.com/products/swiftriver-platform>> facilitates the aggregation and verification of content from other sources online. This platform has the potential to be used for improving information distribution in local communities for real-time news updates, especially in natural disasters and local crises.

Applying Ushahidi to a New Application - Upraxia

Following interviews with staff from a community agency (that provides a range of social events and support services such as language, fitness and art classes for nearby residents) in my local area of Brisbane Australia, I have designed a new application, entitled Upraxia. This has been done to improve information delivery by creating a centralized online resource of available services, while visually showing where services are available through locative media, and what the organization's requirements for participation are. Upraxia was built using the Ushahidi platform. Drawing on the locative functionality of Ushahidi (using the Google Maps API available as a mapping option in the platform) has facilitated the visualization of the extent density of community services and easy categorization of the services posted.

In the design of Upraxia, I created two system category types: services and organization name. This allows users to filter the color-coded signifiers on the map to see what specific services are available within a geographic region, and the organizations that offer them. Based on initial feedback from stakeholders, I customized the markers in the application so that they not only show the specific location of the service but the range of their service delivery on the map.

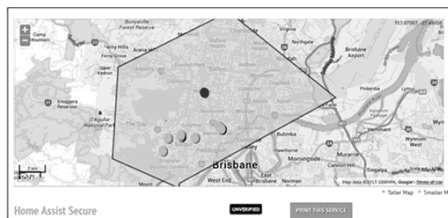


Fig. 1. Upraxia post map showing eligibility area for a service alongside relative distance to other services

Alongside the categories of the platform, the terminology used was altered to suit the purpose and design of Upraxia. What are described as 'Reports' in the Ushahidi system by default were changed to Services and these can be entered as either Offers or Requests. Organisations are encouraged to submit 'Offers' - which are the services that they (or another known agency) provide. Individuals can submit Requests for service information, but they are also encouraged to submit Offers of services they know are available. This is moderated through a multifaceted approach including approval and verification, which is undertaken by the agencies that are active in Upraxia, or myself as the application administrator.

Ushahidi add-ons have been implemented to provide additional functionality in Upraxia. I have included print functionality so that users can print an PDF copy of the service they are interested in, and post it on public noticeboards or share it physically with others. SMS functionality has been included, so that users can receive updates on new services and I achieved this through using the Clickatell plug-in. An enhanced map was also included to better visualise the mapped services. The standard map on the Upraxia homepage does not show the markers in their unique category colour but in the enhanced map the colours for each individual marker reflect their category. Additionally,

through implementing the enhanced map, it is possible to select multiple services using Boolean operations.

I found through discussions with stakeholder organizations, for a user needs analysis that because the users of many community service agencies may not have access to a computer, it is essential that print copies of information from Upraxia are easily accessible in order to extend the distribution of information. Most important in my selection of Ushahidi as a platform for the development of the Upraxia application is the functionality of approval and verification that improves the perceived credibility and accuracy of content.

Upraxia and Fogg's Web Credibility Framework

Many social media applications have emerged which facilitate and encourage discussion and information sharing, from niche online communities that have been developed using Ushahidi to global social networks such as Facebook. Although discussion boards and websites have long existed to serve this purpose, there is a need, as noted by the Knight report, for accurate and credible information. This is especially the case when information proliferates on social networks in times of disaster and more generally, for example in the 2011 Queensland floods when Twitter and Facebook were used by locals to distribute first-hand accounts and information [11].

Fogg's Web Credibility Framework, which forms part of the fundamentals of the 'Persuasive Media' framework²⁷, is just as useful today as when it was published a decade ago, because it focuses on three elements that provide assurance that the site is credible on multiple levels. The first important element of this framework is the *Operator*, that is, the person or organisation offering the site. Not only is credibility of who runs the site important, but how quickly queries are responded to. The second is the *Content*, which includes information as well as external links, and functionality. These must be accurate and unbiased. Lastly, the element of *Design*, which includes layout, functionality, information design, technical design, aesthetic design and interaction design, also influences the credibility of a web application [12]. Along with the recommendations of the Knight Commission report, the Web Credibility Framework has provided key principles for the development of Upraxia in relational to application credibility, approval and verification, and responsive design to ensure that it reflects professionalism, and influences users' perceptions of a successful user experience through an easy to navigate website.

Design element 1 - application credibility

Credibility is established in Upraxia through approaches that take into consideration both the Operator and Content of the application. This application has been designed after discussions with stakeholders from a local community support centre and has a focus on being beneficial to agencies through better distribution of information on their services to those who require it and through the ability for the agency to join and maintain content the credibility of content is increased. Once an agency signs up, the Upraxia site administrator assigns them the role of Community Agency member so they have access to functionality that allows them to verify, edit and delete content. Content can be added to Upraxia without the need for a user account. However, with an account, individuals and agencies can manage submitted services, SMS and email updates and contact other members.

Design element 2 - approval and verification

The approval and verification of content takes into consideration both Operator and Content. The Operators or agencies registered on the site have the ability to approve content before it is published to ensure it is relevant and accurate and verifying content changes the status of the posted service from unverified to verified, making it easy to sort content based on whether it is verified or not. This

²⁷ The Persuasive Media framework was developed by Fogg in his 2003 book, *Persuasive Technology: using computers to change what we think*. He focuses on how experiences with technology can be improved through captology which is a focus on the "planned persuasive effects" and "built-in persuasive intent" of technology, not side-effects of use [13]. Fogg has more recently developed a model which draws on the elements of motivation, ability and trigger to encourage behaviour change both online and offline <<http://www.behaviormodel.org>>

provides a solution to potentially inaccurate posts made by others in the system. Such functionality, which is drawn from the Ushahidi platform increases the perceived and actual credibility of the website to visitors. All accounts have to be approved by the administrator before they are activated, which ensures that the email address submitted correlates with the agency that has registered.

This table reflects the varying permissions that were applied to different types of Upraxia site visitors and members. The flexibility of the Ushahidi platform provided the opportunity to place to control of content approval and verification in the hands of community agencies who use the site, who are better equipped to confirm and amend information than individual site visitors.

A current constraint is that content has to be manually approved before it can be seen within Ushahidi applications [14]. In the Upraxia application, individuals that are not tied to a community agency do not have the ability to approve posts however they can still manage their own content including posts, updates and message other users. Only community agencies and site administrators can approve the content. Future developments of the application could lead to improved timeliness of posts by sending reminders to agencies after set period to check that their posted content is still accurate and ask them to verify it if necessary.

Design element 3 - responsive design

The decision to take a responsive design approach with the Ushahidi application repurposing into Upraxia involves designing a single website that can be viewed across multiple sized devices including mobile phones, tablets and desktop computers [15]. This was determined by the intended audience of the application; those who visit community support services and use them. Responsive design reflects the Content and Design elements of the credibility framework. Research by the Australian Communications Media and Authority (ACMA) (2013) indicates that smartphones and tablets are used as a substitute to other hardware Internet such as computers. Those who do have smartphones and tablets are more likely to have high incomes comparative to those without a smartphone, and live in metropolitan areas of the country. Because these smartphones are often bought through plans (85% of smartphones are post-paid according to ACMA), the majority of people experiencing financial hardship with mobile phones do not have access a smartphone, with them often only being available for an significant upfront cost [16]. According to a study by Anglicare Victoria this year entitled *Trying to connect: Telecommunications access and affordability among people experiencing financial hardship*, 57.4% of respondents (taking the form of 325 clients across 25 emergency relief and counseling services) did not have a smartphone and out of those with any sort of mobile phone (88.9%), almost three quarters used a prepaid account. Significantly, the study found that almost one third of clients surveyed who access the Internet did so from free Internet facilities at community services or libraries [17]. This correlates with findings from discussions with the agency involved who find that many people use their community centre to access the Internet due to a lack of home access. This research is indicative of a divide in access to smartphone plans and devices and the native applications that are developed for their operating systems (such as iOS and Android apps).

By taking a responsive design approach and using CSS media queries to generate different interface layouts, based on screen size, an interface was designed that is accessible across all devices, from desktop computer to mobile phone. This means that no user is denied access to the application and can seek information when needed.

Conclusion

In summary, the need for community information systems that provide a source of local support services and events has been emphasised by the Knight Commission, and although the commission's report is focused on the context of residents of the United States of America, the need is reflected in the current state of community information systems in Australia. By drawing on the strengths of locative media for visualising the density and extent of data mapped temporally and geographically, the implementation of such a system was explored. This was achieved using the Ushahidi platform, which has primarily been used for crisis mapping, but has been repurposed in this study for sharing information on local support services and events. The repurposed application, entitled Upraxia, was developed with feedback from a local community agency in Brisbane and an emphasis on strengthening application credibility through Foggs' Web Credibility Framework. Through focusing on key principles from this framework, application credibility, approval and verification, and responsive design are validated as design elements that strengthen the quality of Upraxia as a potential

tool for improving access to local information. As outlined in Table II, and discussed throughout this paper, the aforementioned three design elements can be mapped across Fogg's Web Credibility framework reflecting approaches to optimizing the credibility of the Upraxia application [18].

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Reskinning for reuse: the repurposing of web applications for social benefit using reflective practice

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Abstract— Within the field of web development, repurposing applications is commonly understood as a means to implement community-based social solutions online. However, the reflective practice of reskinning applications for different purposes through customization of theme, function and form, is a process rarely explored. We might also consider an alternate approach, as informed by Schön's interpretation of reflective practice in design to understand how we might approach the development of web applications for solving social problems in a new way. This paper explores how Schön's protocol of the language of design can inform the practice of reskinning web applications for different pragmatic purposes - from locating pets to locating resources and support post-disaster. This paper discusses the outcomes and potential benefits of this approach, in the context of a web application previously developed to support location of pets repurposed to support residents in post-disaster management.

Introduction to the reflective process of repurposing web applications

With the mass amount of content management systems (CMS) available for website implementation (e.g. Drupal, Joomla, Wordpress) comes the issue of how to best repurpose a pre-existing application created with these systems, avoiding the need to start from scratch. Repurposing applications involves the artistic process of reskinning which can benefit from approaches extracted from Donald Schön's fundamental text, *The reflective practitioner: how professionals think in action*. Through using a reflective and structured approach to reskinning applications, designers are able to improve the efficacy and overall quality of outcomes. As Schön (1991, 103, 56) argues "good designers" shift from "involvement in partial moves to considerations of the whole, and from exploration to commitment" with much of the reflection in this process of action resting on the creation of elements of surprise through outcomes. The reflective practice of reskinning applications for different purposes through customization of theme, function and form, is a process rarely explored. Schön's interpretation of reflective practice in design provides a way to understand how we might approach the development of web applications for solving social problems in a new way. This paper looks now at an example of repurposing and then reskinning a Drupal-based web application for supporting communities after natural disasters.

Repurposing web applications for post-disaster management

The context of the repurposed applications discussed here are community-driven locative web applications that are positioned within the realm of what is considered "design activism". Design activism represents designs pivotal role in promoting social change (Markussen 2012, 38). Community is defined in this paper as those living in a specific local region, Brisbane, Australia. It also reflects Price-Robertson and Knight's (2012, 3) extended definition to describe community as a positive action and connection amongst people. The convergence of locative media and collaborative interfaces has expanded the potential of online information provision (Gough and Hamilton 2012, 1). While the mainstream media is relied on by all for alerts and updates, some of the most valuable information gathering is being done on a local level (Poblet 2013). Online information distribution is no exception and the web applications discussed here approach this through harnessing "social annotative locative media" as a tool for the visualisation of information. Social annotative locative media allows individuals to "geotag" specific physical sites with their own content (Collis and Nitins 2009, 10). This approach was taken when developing a web application that uses elements of social and locative media to locate pets, then repurposing it for a different cause of locating local resources and support post-disaster.

The development of the web application PetSearch provided an opportunity for repurposing based on future needs, which was considered after the 2011 floods in Queensland, Australia. This was considered because the segmentation and geographic dispersal of a wide range of support agencies can lead to frustration—particularly when a crisis affects an entire community—leading people to seek alternate sources of advice and support. The PetSearch web application harnesses aspects of locative and social media to provide an effective design solution to support people to become involved in a

collaborative community, which supports animal welfare by allowing participants to locate lost, found and injured pets. This web application should be considered a demonstrational prototype. The application has a pragmatic benefit to animal welfare as it is designed to decrease the number of animals being handed over to agencies, councils and shelters and to increase the number of animals reunited with their owners without using these organisations' resources. By allowing people to map events the application can draw attention to patterns in where animals have been lost, found, injured or rehoused and increase community pride through participation in rehousing and reuniting pets with owners. Functionality in this application includes mapping lost, found, injured, rehoused pets; posting memorials of pets; data visualisation; a point system for rating members' contributions; contact numbers for agencies; groups and forums; postcards thanking other members for their help; comments and image galleries. A theme for mobile devices was also developed. PetSearch aids in the provision of plotting the locations of events over time, involving collaborative participation in the production of local community or neighbourhood resources, and combining collaborative interfaces and the online visualisation of aggregated data (Gough and Hamilton 2012, 3). This functionality is carried over and altered as necessary in the repurposed application Share Our Sunshine.

Share Our Sunshine was built upon the PetSearch community and like its predecessor, forms a demonstrational prototype. It is a locative media application that allows people to share resources and information, separated into the following categories: household items, housing support, government services, health resources and other resources. In January 2011, as flood waters began to recede after inundating 20,000 homes and businesses in Brisbane, Australia and relief agencies were overwhelmed with donations and volunteers, as well as unprecedented requests for support; small informal community networks began to share locally specific information sources and establish locally organized distribution centers in community halls and private homes. In some cases it was to disperse the overflow of support, and in others it was a necessity. Such was the case for the Bundamba Flood Victims Support Group. Not only was the community cut off by floodwaters, local support agencies such as the Salvation Army, were inundated and, without the profile of the nearby cities or dramatic media coverage and loss of life of other regions, felt forgotten. Share Our Sunshine has been created as an example of how support and resources could have been provided to local communities affected by the floods.

Presently no centralised online community exists that uses locative media to help those affected by natural disasters to rebuild their lives within Australia or Queensland. The current online communities for flood relief take the form of basic forum websites and Facebook pages, or web applications that facilitate the distribution of goods between individuals and charities such as Givit, but these approaches can be extended on to provide a hub of information and a method of communication and collaboration to potential future victims of natural disasters, which is reflected in Share Our Sunshine. The Queensland Police Service gained a large online community of followers on Facebook and Twitter prior to the 2011 floods, which enabled them to engage in "real-time, two-way conversation" with the public when the floods reached crisis level (Price-Robertson and Knight 2012, 7). Alongside the updates provided by the QPS and other official sources, the social sharing sites Facebook, Twitter, Flickr and Youtube, were used by many locals to distribute first-hand information and footage during the floods (Bruns 2012, 145). A number of community-initiated online resources were established during the floods and many of these services were used in the post-flood clean up, although at a lower volume and visibility (Bruns 2012, 149). Further examples can be drawn from the 2011 Brisbane floods, when a so-called 'mud army'—a contingent of volunteers more than 50,000 strong—turned out with gumboots and brooms to clear the streets and homes of strangers of flood debris and sludge. It was a spontaneous form of 'crowd-sourcing', coordinated by the city council, which ferried the volunteers in convoys of buses to affected areas. Local community distribution centers sprang up in churches, community halls and private garages, coordinated through Facebook groups. Such generosity and local knowledge sharing are forms of social capital. A rich and potentially crucial source of support it can be drawn upon during times of crisis, but to be effective it must be coordinated, networked and enabled. It was in response to this that Share Our Sunshine was developed. Its aim is to support formal organizations, as well as spontaneously organized community groups, to visualize and map available resources, and to co-ordinate information sharing, volunteers and resources. Through utilising locative and social media from PetSearch, the extent and locations of needed and available help can be visualised, allowing people to gather information without trawling through pages on Facebook, multiple websites and forums to find replacement goods, financial and health services and other forms of community support. The creation of Share Our Sunshine drew on

Schön's protocol for elements to be considered in design as an important theoretical foundation that ensures reflection and consideration of all aspects necessary to provide a design solution.

Reskinning repurposed applications through reflective practice

The MIT School of Architecture and Planning performed participatory observation across design studies at American universities in the late 1970s (Schön 1991, 360). Drawing on the outcome of this study, Schön created a protocol that specifies the "elements of the language of design" which is separated into 12 clusters as indicated in the following table (Schön 1991, 95). This protocol, although reflective of the field of architecture, has been translated to the field of interaction design, specifically web applications. Architecture being the oldest design field, provides a solid foundation for design fields that follow, including interaction design. Similarities between design fields are argued by Schön who suggests that there is a generic process shared by all design professions in the sense that "designers make things" (Schön 1991, 78).

Table 1: Schön's Protocol of the language of design

Architecture (Schön 1991, 96)	Definitions (Schön 1991, 96)	Interaction Design for Web Applications	Definitions	Repurposed design elements (from PetSearch to Share Our Sunshine)
Use	Uses of building or site	Function	Uses of web application	From locating missing, found, rehoused and injured pets to locating goods, services and resources after natural disasters
Siting	Features and elements of site	Context	Context of use of web application	No change from the Drupal 6 content management system, or the additional modules used
Building elements	Components of building	Application elements	Components and features of web application	Chart of tag usage; fields specific to goods, services and resources; badges for user participation; thank you postcards; colour-coded markers; links to real-time weather updates
Organisation of space	Kinds of spaces and relationship between spaces	Organisation of space	Layout and positioning of information architecture and their relationship	Map key repositioned; Sidebar added; Content types and navigation renamed to focus on available and needed local help
Form	Shape or component; geometry; global geometry; path of movement through space	Form	Shape and form of interface; navigation	Less solid blocks are used to separate content and more whitespace is used to aid in flow of content; flows down left of page as opposed to the center
Structure and Technology	Structures, technologies and processes used	Structure and Technology	Web application structure, platform and mode of delivery	Theme changed
Scale	Relative to one another	Scale	Of elements relative to one another	No changes to scale of elements
Cost	Dollar cost of construction	Cost	Dollar cost, time and resources	Minimal time spent in repurposing application
Building Character	Kind, and style or mode of building	Character	Style and personality of web application	Content-based site still but changed to reflect personality of application: simpler colour palette; Google Font API usage; image usage decreased
Precedent	Reference to other styles of buildings, styles or modes	Precedent	Reference to other designs both in web applications and in general	PetSearch; locative web applications such as Ushahidi
Representation	Languages and notations by which elements of other domains are represented	Representation	Notations and definitions of context of purpose of web application	Clear, concise and minimal text; Iconography where appropriate.
Explanation	Context of interaction between designer and others	Explanation	Context of collaboration between designer and users (including	Designer facilitates the ability for agencies and individuals to request and offer support in

Architecture (Schön 1991, 96)	Definitions (Schön 1991, 96)	Interaction Design for Web Applications	Definitions	Repurposed design elements (from PetSearch to Share Our Sunshine)
			stakeholders)	response to natural disasters (e.g. flood)

Each element of the language of design will now be discussed in further detail.

I - Function

The element of Function describes the uses of the web application being developed. In the case of Share Our Sunshine, the use of the application shifted from locating missing, found, rehoused and injured pets to locating goods, services and resources after natural disasters. This was done to coincide with the main goal of the application: to allow residents post-disaster to offer and request different forms of help.

II - Context

The Context of the web application describes the features and elements of the CMS, in the case of the examples here, the open source Drupal CMS. No changes from the PetSearch Drupal implementation were made and no additional modules were added for the development of Share Our Sunshine. A Creative Commons Attribution license was applied to Share Our Sunshine and PetSearch to allow for future developments to be made. Creative Commons licenses allows others to copy, distribute and make use of the application whilst still giving credit to the creator (Creative Commons 2011, 7).

III - Application elements

The Application Elements are defined as the components of the web application and although only some of the elements have been repurposed, all are worth mentioning as they improve the efficacy of both PetSearch and Share Our Sunshine. The components that make up both Drupal CMS implementations have a focus on providing information and ways of collaborating between individuals and agencies. Rainer et al (2013, 116) argue that social media can assist in crisis management through the facilitation of information, communication and collaboration. Firstly, social media assists through information collection and visualisation through categories for the types of mappable content and statistics of tag usage in chart form. It can assist secondly as an additional communication channel in the form of private messages sent between members Thirdly, it assists through the collaborative information exchange between organisations and citizens by providing comments, groups and forums functionality. Specifically, the elements repurposed for Share Our Sunshine were: tag clouds, which were scoped from a national to a state level; fields specific to goods, services and resources; badges for user participation and thank you cards that reflect the purpose and design of the application; different, more simplistic colour-coded signifiers due to the sheer number of categories available; and links to real-time weather updates in Queensland were also added because updates on current weather events are not provided in the application but would be beneficial to users in future disasters.

IV - Organisation of Space

When approaching the element Organisation of Space, one must consider the layout and positioning of elements and the relationship between these elements. Because this was developed while structuring the PetSearch application, only minor changes needed to be made to reflect the Share Our Sunshine application. The homepage map key was repositioned to an additional sidebar for example, to cater for the larger number of categories and their names.

V - Form

Form, as expected, defines the shape and form of the design elements of the application and how these elements flow. As part of the reskinning process of changing the application design through CSS alteration, less solid blocks of colour were used to separate content and this was instead replaced with the use of whitespace and subtle bordering. The content flows down the left hand side of the browser as opposed to being in the centre of the page also.

VI - Structure and Technology

Structure and Technology is defined by the structure of the application and the technological processes or approaches it uses. In this sense, because the application is a repurpose of a pre-existing CMS, only a change of theme was needed to reflect the style changes made. This theme was designed based on the logo and colour palettes created for Share Our Sunshine.

VII - Scale

The Scale of elements relative to one another is another factor which must be considered when designing web applications, or indeed any other design practice. In the application discussed, no changes to the scale of elements were made.

VIII - Cost

Cost not only covers the financial cost of involvement in the task but also the cost of time involved. One benefit to repurposing and reskinning this application was the minimal time spent with technical aspects such as implementing modules and creating the overall functional experience that is using Share Our Sunshine.

IX - Character

The Character of the web application reflects its style and personality and in the case of both Share Our Sunshine and PetSearch is a content-orientated website that is accessed to gather information quickly in times of need. To coincide with this, a simple colour palette was used but the Google Font API was added for additional styling of some of the headings. The number of images used in the site content was decreased so it doesn't detract from the information presented.

X - Precedent

The Precedent for Share Our Sunshine, or it's reference to other works is of course PetSearch. In addition it includes locative applications such as the Ushahidi platform which is used primarily for crisis mapping.

XI - Representation

Representation defines the languages and notations by which elements are represented and in this application the usage of clear, concise text is carried over from PetSearch as is the use of iconography where appropriate, such as icons for the members panel when logged in.

XII - Explanation

The Explanation covers the context of interaction between the designer, stakeholders and users. The development of Share Our Sunshine saw me as the designer who facilitated the ability for users, both individuals and agencies, to request and offer support in response to natural disasters in Queensland such as bushfires and flooding. Stakeholder involvement took place during the usability testing phase.

Future work and Conclusion

Usability testing with staff members from an Australian non-for-profit agency found that while the locative functionality was considered beneficial with one remark being "the map was a convenient way to find posts", there were slow loading times in Share Our Sunshine (due to the large number of modules used for functionality). This feedback has helped frame what needs improvement and has extended to provide a better user experience through exploring different CMS and approaches for mapping information for social benefit. Specifically, it has guided the use of Ushahidi, a CMS designed purposely for mapping and distributing information for future developments in applications for social benefit.

To summarise, repurposing applications and reskinning them provides an opportunity for agencies and individuals to implement systems for social benefit whilst minimising the time spent in structuring the application. The 2011 Queensland floods brought about the opportunity for the repurposing of the previously developed PetSearch application using Schon's protocol of the language of design. Especially when the focus is on community-driven web applications, which aim to help people locate information in dire times, there is a necessity for systems that are easily implemented and customisable.

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Appendix B

Comparative application analysis

Name	Web address	Keywords	Purpose	Provides for case study an example of...
Case study 1 - information delivery and/or locative media for social benefit and disaster response (SEQ floods 2011)				
Yoink	www.yoink.com	Locative, Facebook app, goods	In 2011 it was a locative website set up for people to find and give goods in their local area It was converted to rely on the Facebook API so people needed to use their Facebook accounts to post Accessed again mid June 2013, but inactive	How a standalone site that people can use without Facebook accounts would not restrict users, or involve their social media identity being used.
Disaster Watch	www.em.gov.au/Resources/Pages/DisasterWatchPhoneApp.aspx	Locative, app, disaster response	Run by QLD government, it is a website and iPhone/Android app that maps natural disasters using feeds from authorities nationally. These feeds are not real-time emergency alerts or warnings.	How disaster response is approached in Australia
OpenIDEO	www.openideo.com	Crowdsourcing, social benefit	Challenges are listed for the OpenIDEO community to solve. Challenges are presented as design questions: <i>How might we all maintain wellbeing and thrive as we age?</i> <i>How might we inspire and enable communities to take more initiative in making their local environments better?</i> The stages of the challenge are: Ideas -> Applause -> Refinement -> Evaluation -> Winners announced	User-generated information valuable to improving social benefit of different communities
VIC Roads road closures	alerts.vicroads.vic.gov.au	Locative	Locative website of road closures and traffic alerts in Victoria Updated by Vicroads. Also offers apps that do real time traffic.	An Australian locative website for information delivery
Neighborgoods	neighborgoods.net	Goods	Share goods with people by lending and borrowing them. Post items that are needed or wanted.	A goods distribution system
Helping Hand	www.couriermail.com.au/news/queen-sland/lending-a-helping-hand-after-disaster/story-e6freoof-1226008396591	Disaster response	Courier Mail and Volunteering QLD 12 month initiative. Community volunteers offer skills to help in 2011 flood cleanup. No longer active, maintained. - 2011	A response to the 2011 South East Queensland (SEQ) floods
Haiti Aid Map	haiti.ngoaidmap.org	Locative, Disaster response	Current aid projects in Haiti mapped using Ushahidi platform	A response to disaster management using locative media.
Freecycle	www.freecycle.org	Goods	Recycling unused/unwanted goods by giving them to those who need them by posting them on the online forum.	A goods distribution system
Bushfire Monitor	www.aus-emaps.com/fires.php	Locative, Disaster response	Locative website of bushfire incidents. No link to agencies, run by aus-emaps.com Also does emergencies, earthquakes and weather	Interface difficult to use and navigate

Earthquake Buddy	www.earthquakebuddy.com	App, Locative, Disaster response	The app sends messages to your friends when an earthquake occurs at your location, to engage in support. Was created to find missing people after an earthquake.	A disaster response app that harnesses GPS technologies
QLD flood victims support	www.queenslandfloodvictimsupport.com.au	Disaster response	Website of posts of assistance after the SEQ 2011 floods	An ad-hoc community website put together post SEQ floods 2011 to assist those affected
Disaster Connect	hardenup.org/weather-hub/qld-hazards.aspx	Disaster response, feeds	Aggregated feeds for three types of disasters: QLD Hazards, TAS Bushfires and NSSW Bushfires. Feeds aggregated from Twitter and RSS and include qldalert.com, Bureau of Meteorology, RSPCA, Red Cross, and traffic and fire and rescue updates.	An aggregation of mostly official sources to refer to for updates during and after a disaster. Constantly updates, so it is ready for use if another disaster strikes.
Google Crisis Response	www.google.org/crisisresponse	Disaster response	This website allows Google to bring information about global natural disasters to the public. Been in use since hurricane Katrina 2005 with information published including storm paths, shelter locations, emergency numbers, donations. Only displays current alerts.	A global disaster response website
ReadyQLD	www.qld.gov.au/emergency/news/features/ready-qld.html	App, disaster response	App to register to be an emergency volunteer through Volunteering Queensland and see their current emergency volunteering opportunities. Also has a list of emergency contacts and information on disaster preparedness.	An app that allows people to access information on volunteering and register on the go, and also access disaster information.
CFA Warnings and Incidents	www.cfa.vic.gov.au/warnings-restrictions/warnings-and-incidents	Locative, disaster response, app	Locative website that maps fire incidents by the Country Fire Authority in Victoria. It also links to social media updates, other fire authorities. An app entitled FireReady is available by the CFA also that allows push notifications to be set up so that smartphone users receive messages about local fire warnings and incidents.	Locative website for disaster response, specifically showing current incidents
Givit	www.givit.org	Goods, persuasive media	Givit, an Australian online portal, also facilitates the donation of goods to people facing hardship. It solves potential privacy concerns by acting as an intermediary, posting requests on behalf of charities. The Givit community then responds, providing what is needed to the charity to distribute.	An example of goods distribution that considers the needs of agencies and their clients.
Local Impact Map	www.localimpactmap.com	Locative	Platform offered by Microsoft to create locative websites that map user-contributed 'stories'	A pay to use locative media website (\$15 per month)
CrisisCommons	crisiscommons.org/about	Disaster response	"CrisisCommons is a global community of volunteers from technology, crisis response organizations, government agencies, and citizens that are working together to build and use technology tools to help respond to disasters and improve resiliency and response before a crisis."	A group of volunteers dedicated to improving disaster response

Flood of ideas	floodofideas.org.au	Disaster response	In response to SLQ floods, this initiative by Healthy Waterways and The Edge, State Library of Queensland to collate user submitted ideas about dealing with future floods.	Website crowdsourcing ideas from the local community about future flood responses
QLD Alert	qldalert.com	Disaster response, feeds	Official aggregation site of Real-time emergency information for QLD. Feeds from QPS and SES twitter accounts and meteorology warnings. Other aggregated information includes emergency alerts , Qld Heath, QldFire, Rural Fire Service, 131940 road closures, QLD Rail, Translink	A government site offering aggregations of information beneficial during disaster response from official sources
Endangered Languages Project	www.endangeredlanguages.com	Locative	Locative website that maps endangered and at risk languages globally based on the data of number of speakers available.	A locative website that visualises the density and number of information
Feral Scan	www.feralscan.org.au	Locative	Locative website that maps feral animal sighting Australia wide. An app is also available.- Aus wide. Map for different types of animals. Also an app	A locative media website and app that has the potential to improve the management of feral animals.
Public Health England maps	longerlives.phe.org.uk	Locative	The Longer Lives map visualises mortality rate for illness across the UK and the socio-demographic levels of these areas	A locative website visualising health and socio-demographic factors for a nation
Case study 2 - information delivery and/or locative media for social benefit in local neighbourhoods and Brisbane, Aus				
Mapping for Change	www.mappingforchange.org.uk	Locative	UK-based mapping website for different communities agencies and councils etc to map facilities and services The website allows these agencies to create 'minisites', or Community Maps on the website with their own content. To view these minisites, you choose School/subject, then the map is updated with different layers of information specific to the minisite.	A website that allows agencies and councils to create locative media sub-sites for visualising facilities and services
Ushahidi	ushahidi.com/products/ushahidi-platform	Locative, disaster response	Swahili for testimony or witness, the Ushahidi platform can be downloaded and installed on a server as a locative tool for mapping categories of community information. It is a tool to easily crowdsource information using multiple channels, including SMS, email, Twitter and the web. Ushahidi was first used during unrest of the 2008 Kenyan elections	A platform to use for the second case study due to its inbuilt locative functionality, unlike the Drupal 6 system used in case study 1
Crowdmap	crowdmap.com	Locative, disaster response	An implementation of the Ushahidi platform on the server ushahidi.com. These crowdmaps take "2 mins to create" but have restricted functionality as you can not install on own web server	Ready to go implementation of Ushahidi for those who need to get a system up immediately for information distribution in an emergency
Crime Stats – ACT Policing	www.police.act.gov.au/crime-and-safety/crime-statistics.aspx	Locative	Locative website that maps crimes in ACT districts including density, number of crimes from 2009 onwards. Just numbers of types of crimes in suburbs, no specifics.	A locative website that maps information valuable to those in the ACT

Givit Channel - QLD storms 2013*	channel.givit.org.au	Disaster response, goods	A page or "channel" on the Givit.org.au website that provides specific support to those affected by a current disaster through donated goods Channel created for 2013 floods in QLD.	How extending the purpose of Givit to provide specialised help during disasters improves their facilitation role between agencies and donors. <i>*also relevant to Case Study 1 as an example of a site that was developed after the QLD floods and implemented during the 2013 floods</i>
BCC Brisbane Storm and Flood Map*	bncstorm.crowdmapping.com	Locative, disaster response, Ushahidi	Developed for 2013 floods in QLD by the Brisbane City Council using the Crowdmapping application to map incidents during and post floods	A Crowdmapping/Ushahidi implementation that focuses on providing information to the local community focused on in the second case study <i>*also relevant to Case Study 1 as an example of a site that was developed after the QLD floods and implemented during the 2013 floods</i>
School of Everything	schoolofeverything.com	Crowdsourcing	School of Everything which allow people to teach or learn a skill from another community member,	A website that allows members to contribute tacit knowledge, information and skills to those seeking it
The Big Blue Book	www.bigbluebook.com.au	Community service information	A community service directory developed by Lifeline and at one time distributed on CD. This website now redirects to MyCommunityDirectory.com.au. This online directory, when in use, was managed by My Community Directory.	A website offering a centralised list of community services available through different services in Australia.
MyCommunity Directory	www.mycommunitydirectory.com.au	Community service information, locative	MyCommunityDirectory is an Australian online application that collates community service information. Agencies can use it to post listings on what they offer and where.	The application combines the contributions to display a range of information on support options. The second case study focuses more on the specific events and services offered currently by the agencies, not overall details of the agency.
Uchaguzi	uchaguzi.co.ke	Locative, Ushahidi	This is a Ushahidi implementation and campaign started in 2010 to monitor Kenyan referendum/political situation	A Ushahidi implementation
Community Data	www.communitydata.com.au	Community service information	Standards and an online Warehouse of community data Australia-wide currently in development. Consultation phase in 2012. This website will form a one-stop place for information on community agencies nationwide and information on	A community approach to create a centralised resource for information on community agencies

			eligibility, services offered, and other information useful to governments, other agencies, and the local community. The standards will inform what sorts of information will appear in the online warehouse of community information.	
Lifeline Service Seeker	<i>lifeline.serviceseeker.com.au</i>	Community service information	Search for local support services by state/postcode and type of service. No locative functionality, one way communication only.	A website showing local support services offered by community agencies.
TaskRabbit	<i>www.taskrabbit.com</i>	Crowdsourcing	TaskRabbit allows people to recruit tradespeople and other workers. Before a tradesperson or worker can appear on the site and recruited, they go through an interview process including resume checks and interviews via video conferencing.	A crowdsourcing platform that attempts to limit possible ill effects from untrained and unsuitable people being involved
Bellstrike	<i>demo.bellstrike.com</i>	Not-for-profit CMS	Instant websites served on the Bellstrike server for not-for-profits to share information. They act like a blog with donate functionality.	A website implementation for not-for-profits that is quite limited but quick to set up.
Steam Greenlight	<i>steamcommunity.com/greenlight</i>	Crowdsourcing	Steam is a popular community, shop and system for playing games on PC. In Greenlight, users rate what games they would like to see put on Steam.	A successful approach of using user ratings in a community to choose what should be offered to the community
Online Crime Stats - QLD Police	<i>www.police.qld.gov.au/forms/crimestatsdesktop.asp</i>	Locative	Locative website showing crime statistics in Queensland	A locative website showing information specific to the community which is the focus of the second case study
Op Shop Listing	<i>opshop.org/map/QLD/BRISBANE</i>	Locative	An Australia-wide locative website showing the location and distribution of ops shop. You must choose your State then City before you can view a map, which is specific to that city.	A locative website that can be improved by removing the multiple steps to selecting a map by just showing all the data on a national map and then zooming in or having the option to choose the location from a list.
Bribr	<i>bribr.org</i>	Locative, Ushahidi	A Ushahidi platform that maps corruption incidents in Russia that are submitted by residents	A Ushahidi implementation
AXS Maps	<i>www.axsmap.com</i>	Locative	A US-based locative website showing locations accessible to those with a disability. A mobile site is available and you are able to search by service.	A locative website that improves access to accessible locations by those who need them

Appendix C

Stakeholder web usage survey

Survey to establish web skills of participants

This brief survey has been developed to help the researcher, Kathryn Gough, to gain a better understanding of your web usage and skills. Completing it will help to ensure that opportunities and benefits are realised.

This questionnaire should take 10 minutes to complete.

Please email this completed form to kathryn.gough@qut.edu.au

OR

Send an email and I can pick up a physical copy of the completed survey from your office.

If you would like to discuss anything about this questionnaire or the case study in general, please advise a time, date and location that suits you.

If you consent to your organisation, Green Cross Australia being named as a case study in my published research (my thesis, conference papers, journal articles), please tick this box

If you cannot use the checkboxes, just indicate your selection with bold or coloured text.

1. Taking all things together, how satisfied are you with your life as a whole these days? Are you:

- Very satisfied
- Satisfied
- Not satisfied
- Not at all satisfied

2. At which of these locations do you regularly (at least once a week) use the Internet?

Check all that apply.

- Home
- Library or computer lab
- School/University (other than library or lab)
- Work
- Friend's house
- Family member's house
- Coffee house/Internet café
- Community center
- Outside (using wireless)
- On the go (using your cell phone, tablet, iPad or roaming wireless)

3. At which of these locations do you have access to the Internet, that is, if you wanted to you could use the Internet at which of these locations? Check all that apply.

- Home
- Library or computer lab
- School/University (other than library or lab)
- Work
- Friend's house
- Family member's house
- Coffee house/Internet café
- Community center
- Outside (using wireless)
- On the go (using your cell phone, tablet, iPad or roaming wireless)

4. At which of these locations do you most often use the Internet?

- Home
- Library or computer lab
- School/University (other than library or lab)
- Work
- Friend's house
- Family member's house
- Coffee house/Internet café
- Community center

- Outside (using wireless)
- On the go (using your cell phone, tablet, iPad or roaming wireless)

5. Do you regularly (at least once a week) access the Internet using the following devices? Check all that apply.

- Desktop computer
- Laptop computer
- Mobile phone
- Tablet
- Gaming device
- eBook reader
- iPod Touch

6. On an average weekday, not counting email, chat and phone use, about how many hours do you spend visiting Web sites?

- More than zero, but less than 1 hour per day
- 1 hour
- 2 hours
- 3 hours
- 4 hours
- 5 hours
- 6 hours or more

7. On an average Saturday or Sunday, not counting email, chat and phone use, about how many hours do you spend visiting Web sites?

- More than zero, but less than 1 hour per day
- 1 hour
- 2 hours
- 3 hours
- 4 hours
- 5 hours
- 6 hours or more

8. How confident do you feel about the following statements? Please choose a number between 1 and 5 where 1 represents "strongly disagree" and 5 represents "strongly agree".

<i>I feel confident...</i>	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
... turning to an online discussion group when I need help with something					
... changing information on a Wikipedia entry					
... uploading a video to a video-sharing site (such as YouTube)					
... posting a comment on a blog					
... submitting a review about a product or service (on sites such as Amazon or UrbanSpoon)					
... voting on the quality of content available on sites where users can rate content (such as YouTube or Reddit)					
... finding reliable information online					
... keeping my computer safe from malicious programs					

9. The purpose of this question is to assess your attentiveness to question wording. For this question please mark the "Always" response.

- Rarely
- Sometimes
- Often
- Always

10. How familiar are you with the following computer and Internet-related items? Please choose a number between 1 and 5 where 1 represents "no understanding" and 5 represents "full understanding" of the item.

	No understanding (1)	Some understanding (2)	Basic understanding (3)	Advanced understanding (4)	Full understanding (5)
Tagging					
Preference setting					
PDF					
Spyware					
Tabbed browsing					
Firewall					
Advanced search					
JPG					
Weblog					
Filtibly					
Podcasting					
Cache					
Malware					
Phishing					
RSS					
Proxy pod					

11. Have you ever heard of the following sites?

	No	Yes
Facebook		
Twitter		
LinkedIn		
Google+		

12. Have you ever used the following sites? For each site, let us know if you have never used it, used it once but have not used it since, used to use it but no longer do, currently use it sometimes or currently use it often.

	No, have never used it	Tried it once, but have not used it since	Yes, have used it in the past, but do not use it nowadays	Yes, currently use it often
Facebook				
Twitter				
LinkedIn				
Google+				

13. We are interested in how often, if ever, you use the Internet for the following purposes. Please indicate how frequently, if ever, you look for, read, watch or use that type of content or service online.

	Never	Few times a year	Weekly	Monthly
Local news				
National news				
International news				
Politics				
Entertainment, celebrity news				
Environmental issues				
Government services				

Government policy, legislation				
Charitable organisations				
Support services				
Local events				
Sports				
Job and career advice				
Health information				
Product information and reviews				
Finance, banking				
Educational content, academic resources				

14. We are interested in how often, if ever, you use the Internet for the following purposes. Please indicate if you ever take part in discussions about the following types of content and service online (for example by posting, commenting on, responding to, or forwarding such material).

	Never	Have done it once or twice	Have done it more than twice	Have done it often
Local news				
National news				
International news				
Politics				
Entertainment, celebrity news				
Environmental issues				
Government services				
Government policy, legislation				
Charitable organisations				
Support services				
Local events				
Sports				
Job and career advice				
Health information				
Product information and reviews				
Finance, banking				
Educational content, academic resources				

Have you shared any of the following content in the past year? For each, please indicate if you have shared it (a) on Facebook, (b) on Twitter, (c) on another site, (d) through email, or whether you did not share such content at all. Check all that apply.

15. Have you shared links to political content?

Check all that apply. Have shared...

- On Facebook as a status update or comment
- On Twitter
- On another site
- Through email
- Have not shared such content

16. Have you shared links to social causes you believe in?

Check all that apply. Have shared...

- On Facebook as a status update or comment
- On Twitter
- On another site
- Through email
- Have not shared such content

17. Have you shared links to entertainment and celebrity news?

Check all that apply. Have shared...

- On Facebook as a status update or comment
- On Twitter
- On another site
- Through email
- Have not shared such content

18. Have you shared links to sports content?

Check all that apply. Have shared...

- On Facebook as a status update or comment
- On Twitter
- On another site
- Through email
- Have not shared such content

19. Have you shared links to jokes, funny content?

Check all that apply. Have shared...

- On Facebook as a status update or comment
- On Twitter
- On another site
- Through email
- Have not shared such content

20. For the activities below, indicate which ones you did during the past year. These questions concern both offline and online activities.

Check all that apply

- Signed a petition
- Donated money to a social cause
- Submitted a "letter to the editor" to a newspaper or magazine
- Worked as a volunteer for a social cause
- Attended a social rally
- None of the above

21. What is a firewall designed to do? If you're not sure, please give your best guess.

- Prevent unauthorised access to a computer
- Automatically update a computer's programs
- Block advertisements on a web browser
- Save the user's search terms and suggest related searches

22. How often, if ever, have you done the following online?

How often have you...

	Never	Have done it once or twice	Have done it more than twice	Have done it often
... turned to an online discussion group when you needed help with something				
... changed/added information to a Wikipedia entry				
... created a new entry on Wikipedia				
... edited/added information to a map				

... submitted a review about a product or service (on sites such as Amazon or UrbanSpoon)				
... voted on the quality of content available on sites where users can rate content (such as YouTube or Reddit)				
... signed up to a mailing list for a website				
... submitted a vote to a reality television show or competition (including using text messaging)				
... looked up something on the internet to help settle an argument or disagreement you were having				
... uploaded a video to a video sharing site (such as YouTube)				

23. Wikipedia is (check all that apply):

- A search engine
- A centrally organized encyclopedia
- A collection of information that is edited and organized by official editors
- A collection of information of Web pages that can be edited by you
- A collection of material maintained by certified experts

For the following items, indicate whether you think each statement is true or false.

24. If you ask a search engine to remove a search result about you, the search engine is required to remove it.

- False
- True

25. When a Web site has a privacy policy, it means the site will not share your information with other sites or companies.

- False
- True

26. To what extent do you agree with the statements below about the dealings you have with others? Where 1 stands for "strongly disagree" and 5 stands for "strongly agree", please select the number that best indicates how you feel about each statement

<i>I feel confident...</i>	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
There are several people offline/online I trust to help solve my problems.					
There is someone online/offline I can turn to for advice about making very important decisions.					
There is no one online/offline that I feel comfortable talking to about intimate personal problems.					
When I feel lonely, there are several people online/offline I can talk to.					
Most people I know online/offline think highly of me.					
If I needed an emergency loan of \$100, I know someone online/offline I can turn to.					
If I needed help fixing an appliance or repairing my car, there is someone online/offline who could help me.					

27. To what extent do you participate online? Where 1 stands for "Not at all true" and 5 stands for "Completely true", please select the number that best indicates how you feel about each statement.

<i>I participate online because...</i>	Not at all true (1)	Slightly true (2)	Moderately true (3)	Very true (4)	Completely true (5)
... it is a good way to improve social skills					
... it helps develop new ways of self expression					
... it helps you connect with people <u>socially</u>					
... it helps you connect with people <u>professionally</u>					
... you believe it will help your <u>career opportunities</u>					
... it helps you show off skills to potential employers					
You do not participate online because you fear of <u>negative consequences</u>					
You do not participate online because you fear <u>unpleasant interaction</u>					

28. Do you believe that your social media use has an impact on your job opportunities?

- No
- Yes

29. What kind of impact do you believe your social media use has on your job opportunities?

- Positive
- Negative
- None

30. What is your current job status?

- Working full time
- Working part time
- Unemployed
- Homemaker
- Student
- Unable to work
- Retired
- Other, please specify:

31. In what year were you born?

Four-digit number:

32. Are you:

- Male
- Female

33. What is the highest level of education you have obtained?

- Year 10
- Year 11
- Year 12
- TAFE (Trade Certificate, Associate Diploma, Diploma, Certificate II/III/IV)
- Undergraduate (Bachelor's degree)
- Postgraduate

34. Were you raised by a person who speaks a language other than English most of the time?

- No
- Yes

Thank you for your time.

Appendix D

Drupal implementation notes

Task list for Share Our Sunshine

Post listing of available support

Post listing of needed support

Types of support:

- Household items
- Housing support
- Government services
- Health resources
- Other resources

Post listing of success story from asking for or giving help on SoS

Comments for listings

Forums

Contact poster of comment

Print poster of needed or available support for local community

Upload images

View tag statistics

Create/edit/delete account and/or profile

Sign up for email reports

Post or content type (blog, needed, available, success stories)

Create/remove/join/leave group

Create/edit/remove own blog post

Comment on blog

Give points to use who provide helpful information

Gain points and status in the community as a trusted contributor

Personas

1 – Person in need during disaster – 20-80 year old, need quick clear information, access to tech may be limited – Beginner to Intermediate skills - aided in application design

2 – Stakeholder – can provide information to those accessing the site, tech savvy, uses social media all the time – Intermediate skills - aided in application testing

Drupal 6 Implementation Plan and Accompanying Notes

Drupal version number: 6.26

Drupal content types

- Forum – organised via taxonomy
- Blog – user submitted blog posts – more useful than implementation of Facebook-style status updates as people can post stories on their encounters related to locating pets
- Page – static content usually linked in main navigation bar
 - Lost, Found, Rehoused, Injured, Mistreated, Adoptable...
- Story – posted by relevance – can create custom types

Drupal taxonomy

Tags – user-submitted terms

Drupal modules

- **@font -your-face** - Google Fonts API plugin
- **Advanced Help** - additional information and readme files for modules
- **Ahah response** - needed for running Flexifield module
- **Backup and migrate** - create quick backup of drupal database
- **Captcha/reCaptcha** - captcha input field for user account creation
 - this limits the ability for spam accounts to be created
- **CCK** - Content Creation Kit (CCK) for creating custom fields on pages
- **Charts and graphs + Views Chart** - used to generate graphs based on site activity
 - uses Bluff charts, other options available but this seems most effective. Google Charts outputted incorrect data.
- **Content permissions** - set permissions for CCK fields
- **Content Profile** - for user profiles
 - functionality to create profiles using custom CCK fields
- **Date/Time** - needed for creating date fields
- **Dompdf** - handler for print pdf module
- **DHTML Menu** - faster navigation, collapsible animated navigation
- **Flexifield** - edit field label display and whether field is displayed in teaser
 - used to customise CCK fields for different content types
- **Formfilter** - hide form elements such as authoring information from users creating content
- **Gmap + Location** - locative functionality using Google Maps API
 - very useful module and most functional for website purpose despite problems with permissions when implemented, this was resolved through other module implementations
- **Guestbook** - user profiles and commenting
- **Imagefield, filefield, ImageAPI** - User profile images
- **Invite** - invite person via email address to set up account
- **Lightbox2** - image and video lightbox
- **Mobile Tools** - used in unison with mobile_garland theme to create mobile website
- **Node gallery** - image galleries for listings
 - most detailed module for this purpose, generates thumbnails and works with Lightbox2
- **Organic groups** - functionality to allow users to create, join and maintain groups
- **Pathauto** - turns node/5436 links into url friendly
- **Poormanscron** - auto runs cron
 - cron updates are run every hour through this module automatically
- **Print/dompdf** - printable posters of nodes, does not support JS, uses static maps instead
- **Privatemsg** - private messaging amongst users
 - opens dialog where user enters message and recipient
- **Security review** - admin module outlining drupal site security
 - informs administrator when important security issues must be addressed
- **Service links** - social networking site links
 - allows users to post articles to social networking websites
- **Subscriptions** - subscribe to alerts for individual post, content type or state

- **Status update** – admin module indicating when newer drupal or module versions are available
- **Tab Tamer** – remove and hide tabs from user view
 - edit tab must be hidden from users so they cannot edit all fields of posts. If permissions are changed to allow them to not add a new location then they do not see this edit tab, but new locations must be possible.
- **Tagadelic** – tag clouds
- **Token** – generates url based on page name, necessary for running Pathauto
- **User badges** – display image badges on user profiles when they accumulate certain numbers of points
- **User deco** – used to create thank you postcards. Relies on images being hosted publically on Flickr.
- **Userpoints** – give users points for site activity
- **Userpoints contrib.** – allow users to give each other points for posting content types
- **Views** – allows pages to list custom story types and to create pages and blocks with specific content
 - locative maps creating this way so they are relevant to the specific node or content type and have their own custom marker
 - Views Attach, Views Bonus, Views Charts, Views Groupby
- **Word filter** – profanity filter
 - must enter words manually, have used to filter out common swearwords
- **Workspace** – link and node for allowing users to edit own content.
 - necessary to allow users to edit own content because edit tabs are removed due to major issues with location module permissions (see section below)
- **Zenophile** - create Zen subtheme quickly

Drupal theming

Mobile plugin plus mobile_garland theme and mobile_android theme

CSS files

layout-fixed.css – make all layout adjustments here

html-reset.css – according to comments in file, this is where you set styling for elements, I

guess the ie.css – IE customisation

mobile_garland/css – mobile theme css

mobile_android - android web app

Appendix E

Diary pack



Diary pack Share Our Sunshine application testing

Thank you for agreeing to participate in this three week diary study. Your input will help with case study development by allowing the researcher to gain insights into application tasks, problems and places for improvement.

The purpose of this study is to document your experiences and interactions with the Share Our Sunshine application (<http://share.social-goodness.com>) over the next three weeks. Participation will involve:

1. Today's **induction meeting** (less than 30 minutes) - Overview of study and tasks. Agree on a start date and receive this diary pack.
2. Completion of five **diary study** forms in a week for three weeks. The list of tasks in this diary pack outline which tasks you are to do, and in which week. These tasks should be done in order and a new diary entry form should be used for each task. Each task should take no more than 5 minutes of your time, making the weekly contribution to this study no more than forty minutes, including survey completion time.
 - i. The diary entry is entered using a Google Docs form which you will need to complete each time you do a task. The link to this form will be emailed to you just before your agreed start date. An example of the form is included in this diary pack. It is recommended to open a new diary entry form in a new browser window before you start each task so you remember to fill it in immediately after each task.
 - ii. Please include as much detail as possible in the diary entry and complete each task if possible. If you are unable to complete a task, don't worry. Just document why you could not complete it in your relevant diary entry. The more information, the better.
 - iii. If you like, you can email any screenshots or content that you wish to document to Kathryn at km.gough@connect.qut.edu.au
3. After the three week diary study, you will be sent a brief **questionnaire** which will allow you to express how you felt the overall study went and also any feedback related to the Share Our Sunshine application.

If you have any questions after the induction meeting or just want to discuss something, please email Kathryn at km.gough@connect.qut.edu.au.

Weekly tasks

PLEASE ENSURE THAT YOU FILL OUT A NEW DIARY STUDY FORM FOR EACH TASK IN EACH WEEK.
COMMENT IN AS MUCH DETAIL AS POSSIBLE.

Share Our Sunshine link: <http://share.social-goodness.com>

Week 1

TASK 1: Create an account

Use the register link from the homepage to create a new account. Please keep a copy of your account details for your future reference.

TASK 2: Create a profile

After you have created an account go to Manage Account and then the Profile tab to edit your basic profile as other site users will see it.

FOR THE REMAINING TASKS FOR WEEKS 1, 2 AND 3, PLEASE MAKE SURE YOU ARE LOGGED IN USING THE ACCOUNT DETAILS YOU JUST CREATED.

TASK 3: Create a Needed or Available post

Once logged in you can create a new post for different types of Needed or Available resources. Please create an example post - it does not need to be factual. Include a picture also if you can.

TASK 4: Subscribe to a pre-existing post

View a pre-existing post and subscribe to it.

This post will then be altered in the next week by the site moderator and you should receive an email of the post update. Please feel free to make any comments on the email sent through in a new form if you wish.

TASK 5: Download a Needed or Available poster

Go to a pre-existing post and download the printable poster.

Week 2

TASK 1: Send a message to another site user

Once logged in, you will be able to send a New Message to another site user. Send a message to the user named *demo*.

TASK 2: Comment on a post

Below the map on each post is a comment link. Use this to make a comment on a post.

TASK 3: Access previous post and edit

Access your content and edit the post you created last week. Add a new tag and change the location of the post.

TASK 4: Add a Success Story

Create a new Success Story post.

TASK 5: Create a blog post

Create a new blog post. Just write a sentence or two.

Week 3

TASK 1: Create a group then add a post

Go to the Community page of the site and then Groups to create a new group. Once you have created this group, you can add posts to it. Add some content to the group by editing the groups section of a pre-existing post of yours.

TASK 2: Send a thank you postcard to another user

Say thank you to another user by sending the user *demo* a postcard which will be displayed on their profile.

TASK 3: Give points to another post author

View a post that someone else has created. At the bottom of the post there is an option to give points to the author, which will allow them to build a reputation (through a number on their profile) as someone who contributes quality posts to the application. Give 5 points to the author of the chosen post.

TASK 4: Access the mobile version and create post

Go to the mobile version of the site by clicking the link on the homepage. Make sure you are logged in and create a new post.


TASK 5: Add a comment in mobile version

While you are still logged into the mobile site, add a comment to a pre-existing post.

Thank you for your time and effort.

Example diary entry form

This is an example of the diary entry form which will be emailed to you before the agreed start date of the study.



Diary entry

Make sure to fill in as much information as possible and to do this for each task.
Thank you for your participation.

Name

Date

Location

Start time

Duration

Activities

What task were you doing?

On a scale of 1 to 9, how confident did you feel approaching this task?
1 2 3 4 5 6 7 8 9
Not confident at all Very confident

Did you do any other activities using Share Our Sunshine during this task?

Were you using any other software or applications during this task that helped you?

Experiences

How would you describe your experience using Share Our Sunshine?

Did you find any aspects of Share Our Sunshine useful and how were they useful?

On a scale of 1 to 9, how difficult did you find this task?

1 2 3 4 5 6 7 8 9

Not difficult at all Very difficult

Did you experience any problems? Please describe.

Did you manage to complete your task successfully? If not, why?

Do you have any recommendations for improvement of Share Our Sunshine?

Any additional notes or comments?

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Appendix F

Share Our Sunshine conceptual design

B.J. Fogg Conceptual Design template. Template from: B.J. Fogg, Conceptual Designs, in B. Laurel (ed. by): Design Research, MIT Press 2003, minor editing by L.Galli. <http://www.slideshare.net/lgalli/bj-fogg-conceptual-design-template>. 1/7



Share Our Sunshine (SoS)

A conceptual design by Kathryn Gough. Design challenge: provide support and resources to local communities affected by the January 2011 floods using locative visualisation.

Sandra the application user

Demographic

Age: 28

Income: 36k p/a

Occupation: Fulltime receptionist

Location: Goodna, Ipswich

Goals

Short term: Find replacement furniture destroyed in flood

Long term: Complete flood cleanup and replace damaged and destroyed items

Technological

Sandra feels overwhelmed using technology and only really uses the internet to access her emails, pay the occasional bill and buy clothing over eBay and also to check Facebook.

She checks her emails and Facebook multiple times a day but other activities are only engaged in every few weeks to monthly. She uses her smartphone, an iPhone 3, to access internet services. She does not feel confident in protecting her identity online and dealing with privacy online.



Web Use

Sandra only has internet access outside of work. She uses the internet on her mobile phone when not at work however using a 3G connection. She estimates that she uses mobile internet between 1 and 3 hours a day.

Environment

Sandra does not use the application at work for personal purposes and is restricted to an intranet operated by the organisation she works for.

Lifestyle

She considers herself to be environmentally-minded. She composts her food scraps, participates in Clean Up Australia annually and also is active in volunteering with her childrens' school.

Roles

Sandra enjoys spending her time outside of work with her young son and husband. To relax, she likes to catch up with friends at the local cafe and is an avid movie fan.

Needs

To successfully use the application, it needs to be quick loading, mobile friendly and use clear, simple language to describe how to engage.

Desires

Sandra wants to connect with people who can help her restore her home to its former state prior to the flood. Particularly, she wants community agencies to inform her of available donations and also source items from individuals in the community.

Knowledge

She is not familiar with terms such as 'tabbed browsing' and 'firewall'. However, Sandra is very proficient at typing and using Office software as she has had over 5 years experience using it in her job and also when she lived at home and attended high school.

Usage Trends

First used the application when she realised it would be beneficial to sourcing community help. A friend mentioned it to her one day at lunch when discussing a recent bushfire. She accesses the site whenever she receives an email update that someone has posted content of interest or responded to her content, and also checks the site every few days for updates while trying to source help.

Tasks

Will need to be able to submit content and create an account easily and with minimal forms. Because of their unfamiliarity with using online applications besides Facebook. It will also need to be mobile friendly and have sharing functionality so that she can distribute her (and other peoples') requests to her network of connections on Facebook.

Matt the stakeholder

Demographic

Age: 34 Occupation: Fulltime ICT officer at NFP
Income: 60k/ pa Location: Annerley, Brisbane



Goals

Short term: Provide information to those flood-affected on available services.
Long term: Reduce resources used by organisation to distribute information. Better service delivery.

Technological

Proficient at computer usage, owns an iPhone 5 and Macbook. Uses an iMac at work 8 hours a day. He feels somewhat confident in online privacy and security, and tries to educate himself on IT matters through tech sites such as Daillytech, Slashdot and Engadget. He uses mailing lists and RSS feeds to keep informed on matters related to the environment, emergency services, policy, and NFPs. Has an applied understanding of applications such as Photoshop which he uses to create print and web graphics for the organisation.

Web Use

Matt accesses the internet mostly at work, and outside of work only uses the internet less than 2 hours a day, usually to check emails and work from home using his home wifi connection. Familiar and proficient at using social networks and sourcing reliable information online.

Environment

The application is used within the work environment which is an open plan office. This means there are distractions including noise and impromptu meetings. The application will need to be quick to use, and it must be easy to continue completing tasks after distractions. Matt will use his phone to access internet applications often, especially when travelling to and from work on the train every weekday.

Lifestyle

Matt is very active in his community in welfare and environmental issues. He often signs online petitions about environmental issues including climate change, attends rallies and volunteers for his organisation when he has the opportunity.

Roles

Spends time when not working riding mountain bikes with friends, reading and playing guitar. He works for a NFP organisation focused on environmental issues including climate change and supporting people through disaster relief and preparation.

Needs

To successfully use the application, it needs to be simple in the sense that there are not many processes to take to complete a task. It will also need to be optimised for various devices including mobile and desktop devices. Furthermore, there should be an aspect of rankings in the system, so stakeholders can be identified as trusted contributors of information.

Desires

Matt wants to connect with other agencies that provide support to people in disasters and help be part of a centralised database of resources that are timely and accurate. Through contribution, he hopes to inform the wider community about the work of his agency and source further support and potential approaches for helping people in the future.

Knowledge

Proficient in designing graphics, distributing them on social networks and communicating with people on social networks for work. He is familiar with common technological terms such as 'firewall' and 'tabbed browsing'.

Usage Trends

First used the application in aftermath of floods. He remembered an email sent from a friend at another NGO about SoS, inviting him to contribute to the community however his inbox was full that morning and he did not follow through with creating an account until the floods. Due to the nature of the site, being reflective of state natural disasters, the signup and contribution rate is only high leading up to and after a disaster such as flood, bushfire or storm.

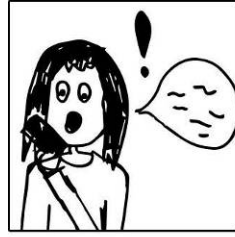
Tasks

Will need to be able to subscribe to content of different types so he can follow updates and contribute as necessary and also rate and comment on posts for verification purposes.

Sandra the application user



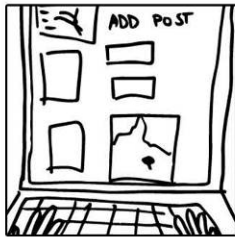
Floods in Brisbane. Furniture in living room destroyed and unable to afford new items.



Sandra remembers that her friend Jessie mentioned SoS as a place to find support in times of bushfires, floods and other disasters.



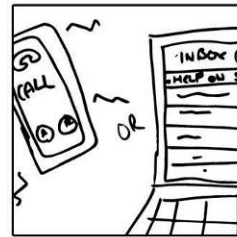
She googles "Share our Sunshine" and then through this search goes to the site and creates an account.



A post is created for needed furniture so she can replace couches and cabinets destroyed.

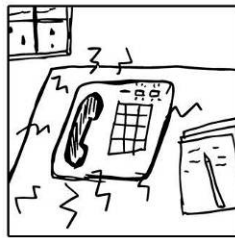


Sandra then subscribes to this post to receive all future updates and also subscribes to help available in her suburb.



She will now receive private messages, email notifications about updates to the posts she has subscribed to and may receive calls from agencies who can help (if she provides a contact number).

Matt the stakeholder



Floods in Brisbane. Influx of calls to agency about places to source help and resources.



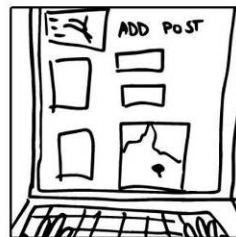
Matt realises that his agency are repeating the same information and have a heap of contacts and details which can help people who are affected by the floods.



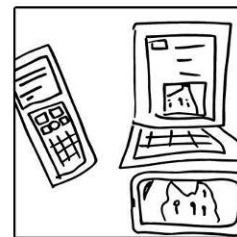
He remembers an email invitation he received from a member of another NGO focused on community support. This invite is to join SoS and contribute.



He follows the link from the invitation email and creates an account on SoS, entering his basic details and what agency he works for.

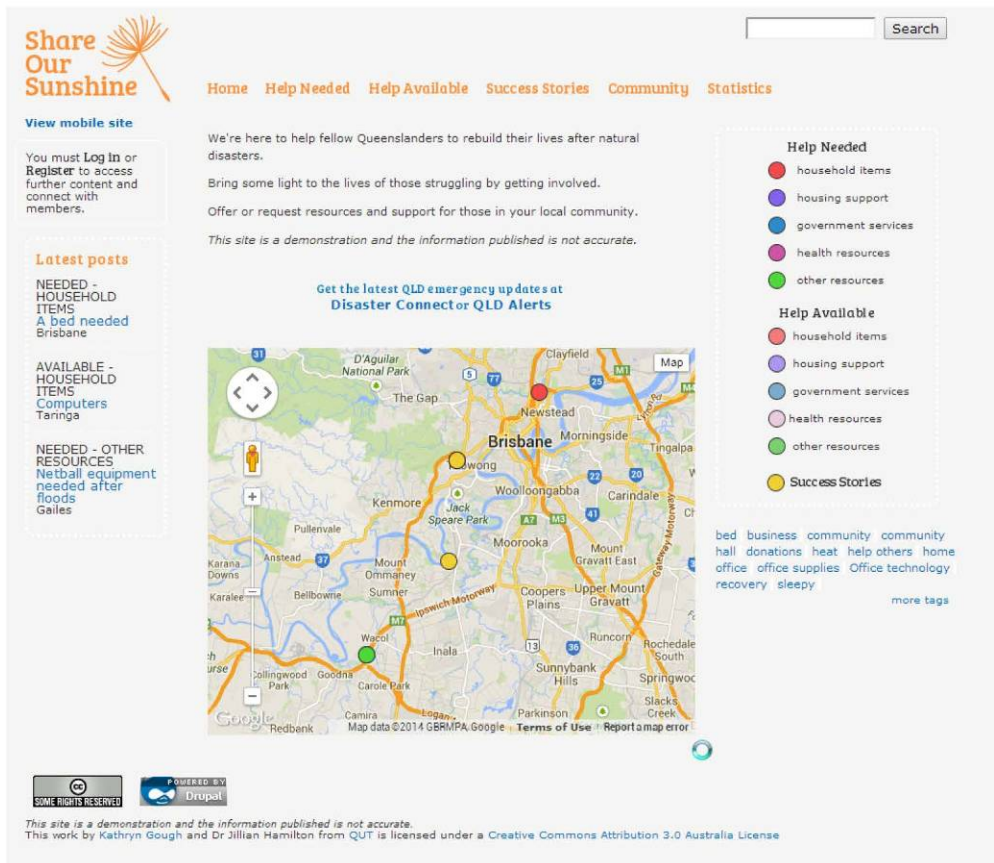
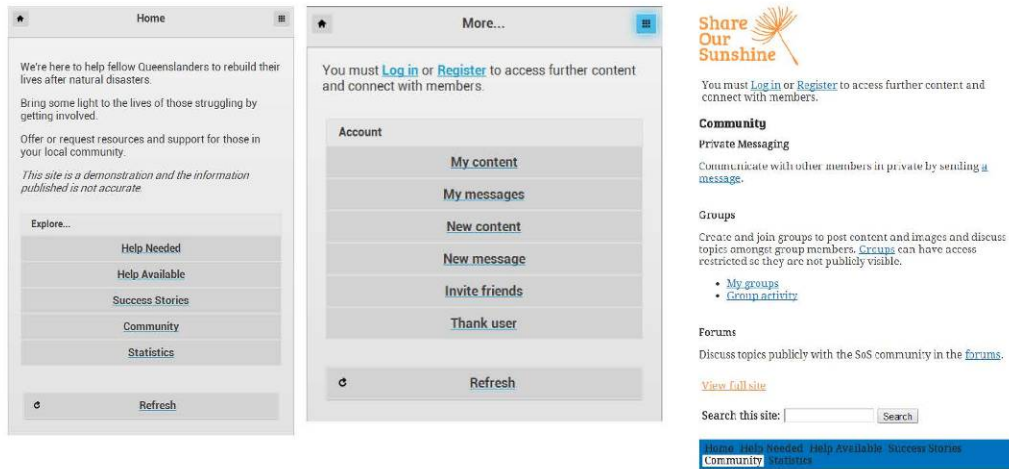


A post is created for food and household items which are available from known charities.



He then subscribes to see what people need in Brisbane as the site is updated, and can receive updates to his mobile devices through.

Prototype of SoS





Download Android app for Galaxy S 2 and equivalent

Features/Functionality

- Post listing of available support
- Post listing of needed support
- Types of support:
 - Household items
 - Housing support
 - Government services
 - Health resources
 - Other resources
- Post listing of success story from asking for or giving help on SoS
- Comments for listings
- Forums
- Contact poster of comment
- Print poster of needed or available support for local community
- Upload images
- View tag statistics
- Create/edit/delete account and/or profile
- Sign up for email reports
- Post or content type (blog, lost, found, rehoused, injured)
- Create/remove/join/leave group
- Create/edit/remove own blog post
- Comment on blog
- Give points to use who provide helpful information
- Gain points and status in the community as a trusted contribution

Theoretical Justifications

This case study will draw on the fields of locative media, social media and persuasive media, focused on where these approaches have been implemented to enhance online communities. Specifically, online communities that use all or some of these approaches have been drawn upon. This case study was based off my Honours project PetSearch, a locative website for people to map where they have lost, found or sighted pets and uses all the design principles and functionality developed for this earlier case study.

Results of user testing (diary studies)

Valuable because of their understanding and usage of social media. The difficulty of some of the tasks was greater than expected.

SUBSCRIPTIONS - Suggestion: "more comfortable knowing what I am signing up for" didn't know what subscriptions were for

GROUPS - Comment: hard to find how to create new group. Went to Communities, not New Content.

CONTENT - Suggestion: generate list of content so that you can choose what to add to group.

WEBSITE VERY SLOW - Comment: was trying to create account.

TAXONOMY - Comment: common terminology for content/posts. Was also unclear where to create posts - because NEW CONTENT.

USER POINTS - Comment: could not give points to user because they did not have enough in testing. Function needs to be improved/changed.

THANK YOU CARDS - Comment: shouldn't redirect out to Twitter when clicked

SUCCESS STORIES - Comment: didn't know how to create content. New Content in sidebar inadequate.

DATE FIELD - Suggestion: hard to use. Use visual calendars and clock.

+ Analytics

270 visits from 1 July 2012 to 21 December 2012. 84 unique visitors (mostly me from various devices I think)

Desktop: 227. Mobile: 43.

Mobile devices: 1) GS2: 38 2) (not set) Opera mini - 5

Location: QLD: 214. NSW: 36

Page load time thrown out by 17.45 seconds for /?=mobile-android. Average of 15.5 seconds due to this. 5.67% exit rate.

/?=user: 4.73 seconds

Page views

home: 1,349 28.32%

mobile-android: 900 18.90%

user: 342 7.18%

needed: 232 4.87%

sos-theme: 187 3.93%

Browser

Chrome 126 46.67%

Firefox 73 27.04%

Android Browser 38 14.07%

Opera Mini 16 5.93%

Safari 7 2.59%

Opera 4 1.48%

Internet Explorer 3 1.11%

Mozilla Compatible Agent 3 1.11%

Shortcoming of Design

- Site too slow (partly due to hosting) and the android application borders on unusable because of the slow feedback and page load times.
- A clear information verification process is needed, alongside moderation.
- Tries to do a lot poorly, instead of a few things well.
- Interface must be improved so it is not cluttered and is easy to assess and contribute information.

Expansion - What else is possible?

- SMS alert capabilities
- Consideration of moderation and information verification processes
- Mapping to show locative restrictions for community services (eligibility requirements) and also clusters.
- Detailed reporting of statistics

Next steps in Design Process

Development of case study 2 - Upraxia. Build upon SoS by looking at how locative online communities can help NGOs and their clients, alongside the local neighbourhood map community services.

Summary

Mapping allows clarity through visualisation of clusters of events. Open source systems provide potential for development of online communities for social benefit (for NGOs). Will be built upon in case study 2.

Appendix G

‘Discover The Exchange August 2012’ brochure

August at the exchange



Free Internet Café, Little Library and Book Exchange

Times can vary daily depending on other activities. Pop in for details

MONDAY

Centrelink

9.30-11am

Centrelink staff are available to talk to you about your Centrelink enquiries

Courage to Heal

Women's support Group

Mon 12pm– 2pm. A safe place where women can learn to heal from childhood trauma. Essential to ring Heidi for more information – 0448441299.

Adult ADHD Support Group

3.30-4.30pm

Free

Table Tennis

7.30-9.30pm

Enjoy a friendly game of table tennis

Where: The Common Room at Campus Living, corner of Blamey St and Victoria Park Road

TUESDAY

Community Garden

Working Bee

Every Tuesday 9am-12pm

Come and join us– across the road from the Exchange

Beginners' English for Women

10-11.30am

A fun and friendly class for all women wanting to improve their English

Fit for Life

12-1pm

Experience yoga, Self-massage & mindfulness practices to stay in the present moment.

Knitting My Way

2-3.30pm

All Welcome!

Bring your knitting, crocheting or just your wish to learn knitting. Patterns optional.

Writers' Group

1.30pm-3.30pm

A group for people wanting to explore their creative writing. Free

Aunties and Uncles

7pm - 9pm third Tuesday of each month (21 August)

Aunties and Uncles support families by mentoring and supporting children. Come along to find out how we can support you or how you can become an Auntie or Uncle too

WEDNESDAY

Individual Sessions

Where the practical meets the psychological.

Anxiety * Depression * social or emotional issues * family and parenting issues * stress * bullying * grief and loss. Free. Appointments essential

Painting Class

9.15-11.15am

A social class for artists and beginners working with still life, portraits and exploring colour through acrylics
Cost \$5

Table Tennis

7.30-9.30pm fortnightly

(8,22 August)

Enjoy a friendly game of table tennis

Where: The Common Room at Campus Living, corner of Blamey St and Victoria Park Road

Mini Muscles (7-12 year olds)

3.45-4.45pm at McCaskie Park playground

Obstacle courses, fitness games, partner activities, body weight exercises, circuits and more . BYO water and snack
Cost \$2 (during school term)

THURSDAY open 10-6

Confidence with Computers

10.15am-12.15pm

Tips and tricks from our whiz. From logging on creating accounts and more

Free Please book your place

Outdoor Adventure Group

An all day group for the adventurous and physically fit

Cost \$5 - \$10

Contact: Vanessa 3510 2735

Knitting English

10am-12pm \$5 for materials

Join our knitting circle. Make blankets to donate and practice English conversation

Brisbane Housing Company

3-4.30pm

Informal meetings between BHC and tenants about tenancy issues

Written and Spoken English

6pm–8pm

Expand your English knowledge at our free and friendly class. All levels welcome.

FRIDAY

Men's Group

1pm-2.30pm

A welcoming space for men to connect with each other

Contact Daniel 35102733

Chess Club

2.30-4.30pm fortnightly (9,23 August)

Chess is such a great game but no fun on your own – come and play!!

Contact Daniel 35102733

Women's Anxiety Support

2.30-4.30 fortnightly (2,16,30 August)

Do you struggle with feelings of anxiety?

Find new and creative ways to deal with anxiety and meet other women as you share experiences, strategies and support others.

SUNDAY

Narcotics Anonymous

6.30pm-7.45pm

Women Do Recover group

Contact Ingrid 0415 269 531

and.....

Dinner Club

6.30pm (monthly)

Enjoy a social dinner out with other Kelvin Grove residents.

Cost: \$20

Community Meeting

Thursday 30 August 4pm

Get involved in our planning and share your ideas for the Exchange and Kelvin Grove at our monthly meeting.

Coming up....

R UOK Day

Friday 14 September 9.30am

Free morning tea as we support this national day dedicated to asking one another—R U OK?



THE
exchange

Appendix H

Stakeholder application design questionnaire

Questionnaire to establish design requirements for the Exchange online application

This brief questionnaire has been developed to help the researcher, Kathryn Gough, to understand and prioritise potential functionality for an online application to map services and events for the Exchange. Completing it will help to ensure that opportunities and benefits are realised.

This questionnaire should take 25 minutes to complete.

Please email this completed form to kathryn.gough@qut.edu.au

OR

Send an email and I can pick up a physical copy of the completed questionnaire from the Exchange.

If you would like to discuss anything about this questionnaire or the case study in general, please advise a time, date and location that suits you.

If you consent to your organisation, Community and/or The Exchange being named as a case study in my published research (my thesis, conference papers, journal articles), please tick this box and state which (either or both) of these agencies can be mentioned: _____

If you cannot use the checkboxes, just indicate your selection with bold or coloured text.

Categories

1. Which (if any) of the following services and events do you think should be included in an online application being developed for the Exchange? Please rate on a scale of 1-10 to indicate priority (with 1 equal to lowest priority and 10 equal to highest).

Referral services for:

Health	1	2	3	4	5	6	7	8	9	10
Accommodation	1	2	3	4	5	6	7	8	9	10
Migrant and refugee services	1	2	3	4	5	6	7	8	9	10
Housing	1	2	3	4	5	6	7	8	9	10
Literacy	1	2	3	4	5	6	7	8	9	10
Art	1	2	3	4	5	6	7	8	9	10
Culture	1	2	3	4	5	6	7	8	9	10
Centrelink	1	2	3	4	5	6	7	8	9	10
Other government support	1	2	3	4	5	6	7	8	9	10

Taxation	1	2	3	4	5	6	7	8	9	10
Language	1	2	3	4	5	6	7	8	9	10
Social skills	1	2	3	4	5	6	7	8	9	10
Free internet access points	1	2	3	4	5	6	7	8	9	10
Law	1	2	3	4	5	6	7	8	9	10
Education	1	2	3	4	5	6	7	8	9	10
Employment training	1	2	3	4	5	6	7	8	9	10
Fundraising and charity campaigns	1	2	3	4	5	6	7	8	9	10
Life skills	1	2	3	4	5	6	7	8	9	10
Social activities and events	1	2	3	4	5	6	7	8	9	10
Crisis support	1	2	3	4	5	6	7	8	9	10
Parental support	1	2	3	4	5	6	7	8	9	10
Physical activity centres	1	2	3	4	5	6	7	8	9	10
Finance	1	2	3	4	5	6	7	8	9	10
Food (Eg. Meals on Wheels)	1	2	3	4	5	6	7	8	9	10
Donation and collection points for needed items	1	2	3	4	5	6	7	8	9	10
Computer skills training	1	2	3	4	5	6	7	8	9	10
Other services. Specify below: _____ _____	1	2	3	4	5	6	7	8	9	10

Any comments:

Referral to events for:

Internal fundraising	1	2	3	4	5	6	7	8	9	10
External fundraising	1	2	3	4	5	6	7	8	9	10
Some internal events Specify below: ----- -----	1	2	3	4	5	6	7	8	9	10
Social events	1	2	3	4	5	6	7	8	9	10
Welfare events Eg. homelessconnect	1	2	3	4	5	6	7	8	9	10
Health information events	1	2	3	4	5	6	7	8	9	10
Finance information events	1	2	3	4	5	6	7	8	9	10
Law information events	1	2	3	4	5	6	7	8	9	10
Accommodation information events	1	2	3	4	5	6	7	8	9	10
Housing information events	1	2	3	4	5	6	7	8	9	10
Government support information events	1	2	3	4	5	6	7	8	9	10
Education information events	1	2	3	4	5	6	7	8	9	10
Employment information events	1	2	3	4	5	6	7	8	9	10
Parenting information events	1	2	3	4	5	6	7	8	9	10
Other information events Specify below: -----	1	2	3	4	5	6	7	8	9	10

Local art events	1	2	3	4	5	6	7	8	9	10
Local cultural events	1	2	3	4	5	6	7	8	9	10
Computer and internet training events	1	2	3	4	5	6	7	8	9	10
Education training events	1	2	3	4	5	6	7	8	9	10
Employment training events	1	2	3	4	5	6	7	8	9	10
Charity campaigns	1	2	3	4	5	6	7	8	9	10
Free and discounted food and/or (please select) household items	1	2	3	4	5	6	7	8	9	10
Life skills events	1	2	3	4	5	6	7	8	9	10
Children's events	1	2	3	4	5	6	7	8	9	10
Parenting events	1	2	3	4	5	6	7	8	9	10
Crisis support events	1	2	3	4	5	6	7	8	9	10
Finance support	1	2	3	4	5	6	7	8	9	10
Literacy events	1	2	3	4	5	6	7	8	9	10
Community sporting events	1	2	3	4	5	6	7	8	9	10
Social skills events	1	2	3	4	5	6	7	8	9	10
Language events	1	2	3	4	5	6	7	8	9	10
Migrant and refugee events	1	2	3	4	5	6	7	8	9	10
Other events Specify below: _____ _____	1	2	3	4	5	6	7	8	9	10

Any comments:

Functionality

2. Which of the following functions do you think would be of benefit if included in the application?
 Posts are messages published on the site by site users, and can be potentially done by both individuals and agencies that use the application. For both external agencies and individuals that use the site, check the functionality you think would be beneficial.

Functionality	Agencies?	Individuals?
Post		
Rate posts		
Comment on posts		
Private messages		
Find services near you (mapping service on computer and mobile)		
Search site		
Forum		
Site statistics Eg. Top categories/posts/locations		
Printable posters of individual site posts for display in local area		
Posts of services needed by users		
Posts of services known by users		
Allow users to save a list of favourite posts Eg. Services and events in their local area		
Link to mobile version of the site		
A tips section – where people can offer advice to others		
Advice and links to resources for people in need		
NILS information alongside events and services		

Functionality	Agencies?	Individuals?
Directions to services and events		
Incentives for users to contribute Eg. Rewards on site or in local community. Specify below: _____		
Subscribe to specific events and services (so they will receive an email on occasion about recent posts or news)		
Other features Specify below _____		

Any comments:

Mobile usage

Research has shown that mobile websites or applications are important to consider when developing online services as some people only have access to the internet on their mobiles, and this may only be through mobile web browsers, not as apps (for iPhone and Android).

However, creating apps for devices called Smartphones (including iPhone and Android) are a popular approach taken when designing for mobile devices. Smartphone applications have the benefit of allowing you to create applications for specific tasks such as quick uploading of a post or finding local services using mapping technologies. Please answer the following questions on your perception of their usefulness for exchange clients

3. If you would like such an application to be developed, what would you like it to do specifically?

Another option for this research project besides an Android app is a mobile website and most websites are being optimised for mobile devices this way. Through this approach the website will be scaled down and optimised for the screen of the mobile device being used.

4. Do you believe this is a worthwhile approach to implement in the context of the Exchange and would it benefit staff and clients?

Any comments:

Moderation techniques

As a way to ensure that information posted on the site is current, accurate and verified, a few techniques could be used. Since we are working on a prototype application at present, I am able to do all moderation on the site during testing. However, sustainability needs to be considered. With this in mind please answer the following

5. Before users can post on the website, should there be a checklist of things for them to check before submission?

6. This list would include a reminder to check the information is current, accurate and relevant to the other site users. Because content needs to be moderated (read and verified before publication) and I will be the person doing this in the pilot phase, do you imagine there will be any issues with this approach or should it be delegated to an Exchange staff member?

7. Do you think clients should be able to rate the posts of others for usefulness? This could be done with stars or a numbered rating system. If so, do you have any suggestions or recommendations for a rating system?

Appendix I

Individual mobile usage survey

Mobile phone access survey for clients of The Exchange

Please circle your responses and place this survey in the box when finished.

1. Do you have a mobile phone?

Yes
No

2. Is your mobile a smartphone? A smartphone is a mobile phone with built-in applications or 'apps' and internet access. eg. iPhone, Android, Blackberry, Nokia E or N series

Yes
No
Unsure

3. What type of mobile phone do you have? Eg. Name, brand or model number. Give as much detail as possible.

4. How often, if ever, do you use your mobile to access the internet?

Daily
Few times a week
Weekly
A few times a month
Every few months
Once or twice a year
Never

5. Do you use credit (pre-paid) on your mobile or are you on a plan (post-paid)?

Credit
Plan

6. If you use mobile credit, how often do you purchase it?

Weekly
Fortnightly
Monthly
Every few months
A couple of times a year
Once a year
Never

Thank you for your time.

Appendix J

Upraxia conceptual design

B.J. Fogg Conceptual Design template. Template from: B.J. Fogg, Conceptual Designs, in B. Laurel (ed. by): Design Research, MIT Press 2003, minor editing by L.Galli. <http://www.slideshare.net/lgalli/bj-fogg-conceptual-design-template>. 1/8



A conceptual design by Kathryn Gough. Design challenge: to design a functional website that allows community agencies and community members in need to map services in Inner-North Brisbane.

User profiles

Persona 1 – JEFF the application user

Demographic

Age: 30 Occupation: Single father
Income: 30k p/a Location: Red Hill, Brisbane



Goals

Short term: Find financial support

Long term: Improve financial situation

Technological

Jeff feels overwhelmed using technology and only really uses the internet to access his emails and check his Medicare and Centrelink details. He does this fortnightly at his Centrelink appointments. He does not use his mobile for activities besides SMS and calls. He does not feel confident in protecting his identity online and dealing with privacy online and sees the internet as more trouble than help.

Web Use

Jeff only has web access when he visits Centrelink (only to check his Centrelink account and for job search), and at The Exchange which he visits once a month or so when he needs to check his emails.

Environment

Because Jeff only accesses the internet in public spaces, there are many distractions including background noise, children and other clients.

Lifestyle

Jeff is an unemployed father of two daughters who lives in a private rental.

Roles

Jeff is a stay at home father who spends his time looking after his 2 and 4 year old daughters. He enjoys cricket and fishing when he is not spending time with them.

Needs

To successfully use the application, it needs to be quick loading, mobile friendly and use clear, simple language to describe how to engage. The application should provide information through minimal steps.

Desires

He wants community agencies to inform him of available support for paying electrical bills and also wants to get involved in a class on how to manage his finances better.

Knowledge

He is not familiar with terms such as 'tabbed browsing' and 'firewall' and has never used social media applications. He is not comfortable using the internet as he feels it is a steep learning curve.

Usage Trends

First used the application when he was recommended it by workers at The Exchange. He continues to check back whenever he is at The Exchange, once a month or so, to see if any newly posted support services are available for him and his children.

Tasks

Will need to be able to submit content and create an account easily and with minimal forms. It should require a basic account creation process - with no more than an email address being used because Jeff does not want his identity (real name) publicised online.

Persona 2 - MARY the stakeholder

Demographic

Age: 34
officer at NFP

Occupation: Fulltime Community Engagement

Income: 60k/ pa

Location: Kelvin Grove, Brisbane



Goals

Short term: Provide information to those in Inner-North Brisbane to help them get on their feet and improve their life

Long term: Reduce resources used by organisation to distribute information. Better service delivery.

Technological

Proficient at computer usage, owns a Galaxy S 2. Uses a Windows computer (7) at work 8 hours a day. She generally uses her computer for word processing, editing spreadsheets and sending emails.

Web Use

Matt accesses the internet mostly at work, and outside of work only uses the internet less than 2 hours a day, usually to check emails and social networks .Familiar and proficient at using social networks.

Environment

The application is used within the work environment which is an open plan office. This means there are distractions including noise and impromptu meetings. The application will need to be quick to use, and it must be easy to continue completing tasks after distractions. She uses her phone to access internet applications often, especially when travelling to and from work on the train every weekday.

Lifestyle

Mary is very active in his community in welfare and social issues. She often signs online petitions about social issues including treatment of refugees and volunteers for her organisation when she has the opportunity.

Roles

Spends time when not working caring for her child and renovating her home with her husband.

Needs

To successfully use the application, it needs to be simple in the sense that there are not many processes to take to complete a task. It will also need to be optimised for various devices including mobile and desktop devices. Indicators for if the information has been verified and a source should be included.

Desires

Mary wants to connect with other agencies that provide support to people in Inner-North Brisbane and help be part of a centralised database of resources that are timely and accurate. Through contribution, she hopes to inform the wider community about the work of her agency and source further support and potential approaches for helping people in the future.

Knowledge

Proficient in using Office to create press releases, distributing them on social networks and communicating with people on social networks for work. She is not familiar with common technological terms such as 'firewall' and 'tabbed browsing'.

Usage Trends

Helped provide insight in design process and is responsible for making the community aware of the application. Due to the busy nature of her role, she and other staff at the Exchange can't verify the information themselves.

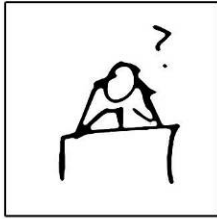
Tasks

Will need to be able to subscribe to content of different types so she can follow updates and contribute as necessary. Crowdsourced information verification will need to be used.

Storyboards

Storyboard (Jeff the Client)

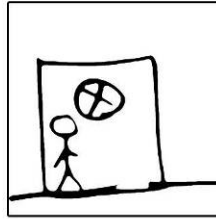
Upraxia



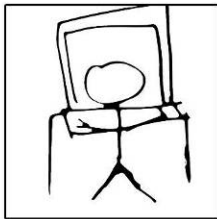
Jeff is stressed and wants to joining a mental health support group for his depression.



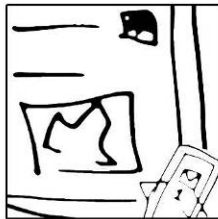
He has called numerous agencies who have given him the names of mental health support groups but none are within travelling distance.



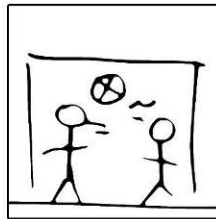
Jeff, feeling disillusioned, walks down the road to visit the Exchange. He has been there to look at available community social events to take his children to.



Staff at the Exchange help Jeff use the computers there to access Upraxia, an online community of information on local community services and events.



He locates a mental health support group at the Exchange on Upraxia and subscribes to receive updates on the sessions via SMS.



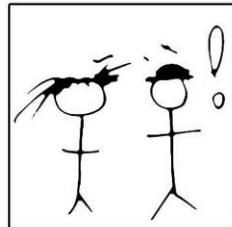
He then receives SMS notifications when details are changed to the sessions and now has a safe, supportive place to go and discuss his issues.

Storyboard (Mary the Stakeholder)

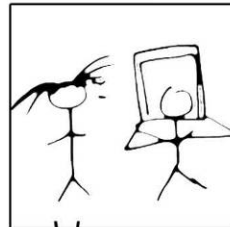
Upraxia



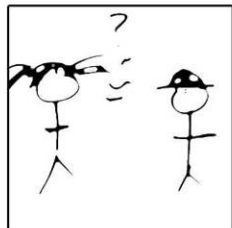
Influx of calls to agency about places to source help and resources. Often the callers will be told about services that are appropriate but not local.



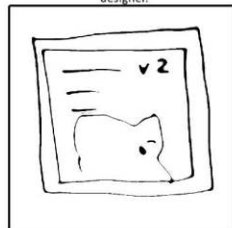
Mary realises that her agency are repeating the same information and have a heap of contacts and details which can help people who are seeking help. She discusses possibilities with a designer.



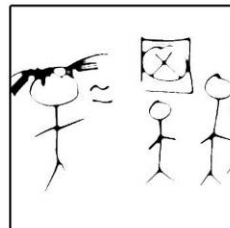
The designer creates a prototype application which Mary tests with agency clients.



She then discusses feedback and outcomes of the prototype testing with the designer.

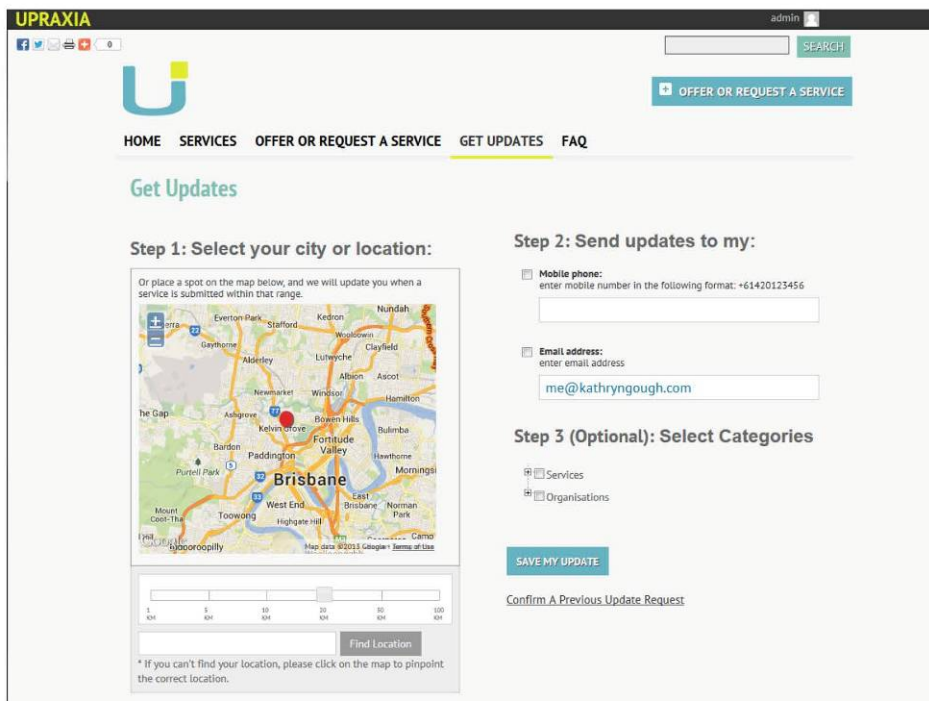
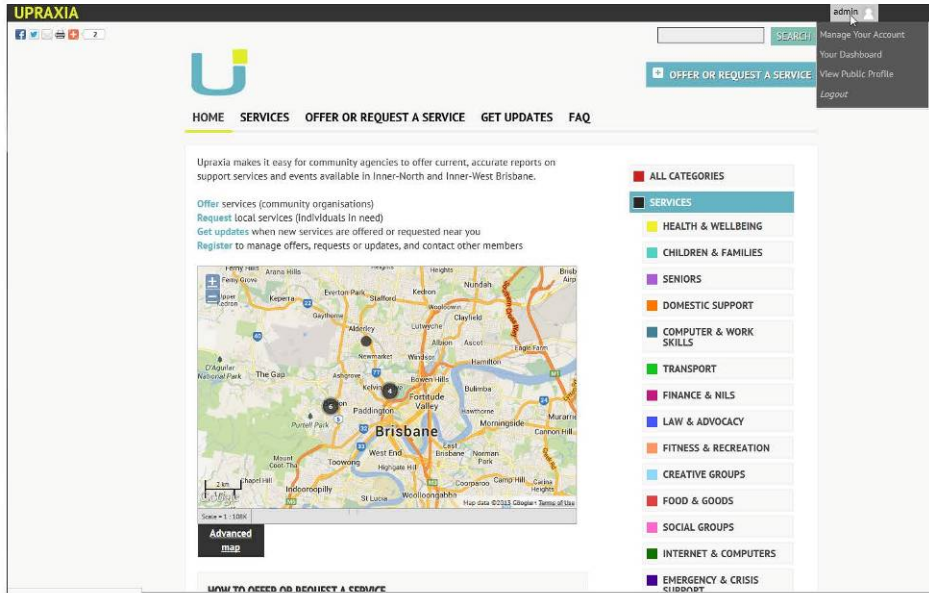


An updated version of the prototype is created, and is available for testing. After a bit more customisation, it is available for release.



Mary then publishes the new application to clients as an option to look for information via computer and mobile and using the agency's computers if necessary. Also talks with other NGOs about use.

Prototype



Features/Functionality

- Post listing of service requested
- Post listing of service offered
- Types of services:
 - Health and wellbeing
 - Children and families
 - Seniors
 - Domestic support
 - Computer and work skills
 - Transport
 - Finance and NILS (No Interest Loan Scheme)
 - Law and advocacy
 - Fitness and recreation
 - Creative groups
 - Food and goods
- Social groups
- Internet and computers
- Emergency and crisis support
- Organisations: Communitify, Salvation Army
- Contact poster
- Print poster of service offers and requests for local community
- Upload images
- Create/edit/delete account and/or profile
- Sign up for email reports
- Sign up for SMS updates
- Comment on posts
- Up or down vote posts to improve accuracy
- Verified posts

Theoretical Justifications

This case study will draw on the fields of locative media, social media and persuasive media, focused on where these approaches have been implemented to improve the distribution of credible accurate information to those in need. This project extends the previous case study by using a purpose-built locative CMS, Ushahidi to improve the design and functionality of a system that improves local information distribution in Brisbane. It draws on responsive design to cater for all devices that the site may be viewed on.

Results of user testing

User testing in the form of diary studies were started but were discontinued after the first week due to a problem logging into the system using the set up accounts. Although this was resolved in a matter of hours, there was not an opportunity to re-run these sessions due to the session facilitator being unwell and unable to contribute due to commitments.

The opportunity to run a one hour participant observation session exists and this will be explored early 2014 as a means to run quick yet effective usability testing with stakeholders and their clients.

+ Analytics

145 visits from 1 February 2013 to 1 November 2013. 126 unique visitors (mostly me from various devices I think)
Desktop: 126. Mobile: 16. Tablet: 3

281 page views

Browser

1. Chrome: 44
2. Internet Explorer: 30
3. Firefox: 25
4. Mozilla Compatible Agent: 17

5. Safari: 17
6. Android Browser: 7
7. Opera: 2
8. Safari (inapp): 2
9. Opera Mini: 1

Shortcoming of Design

- Two forms - one for offer and one for request - was the only approach possible in this Ushahidi implementation. A single form with a checkbox would be sufficient.
- Cannot update to newer Ushahidi implementation without having to modify CSS, PHP and HTML for it to function correctly

Expansion - What else is possible?

- Live implementation
- Extension to include other community agencies
- Potential collaboration with ACDS (Aus Community Data Standards)

Next steps in Design Process

Write up papers based on design outcomes and practices including a paper on repurposing the Ushahidi platform and one on the designer working in a facilitation capacity as a participatory approach to research.

Explore potential opportunities for the third case study investigation including using locative media with virtual environments to map simulations of community centres to increase familiarity and encourage access.

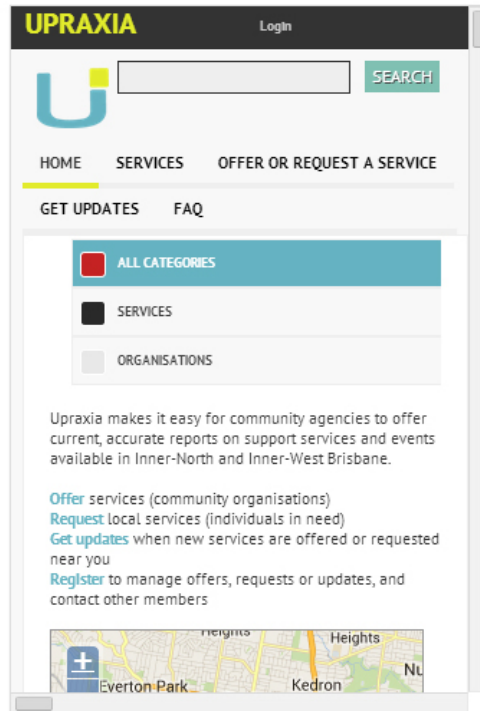
Summary

Extends the first case study through involving stakeholder feedback in the early stages of the design process and by taking on a facilitation role as a design. It improves the first case study by incorporating both SMS and email updates, an information verification process and different roles for agencies and individuals.

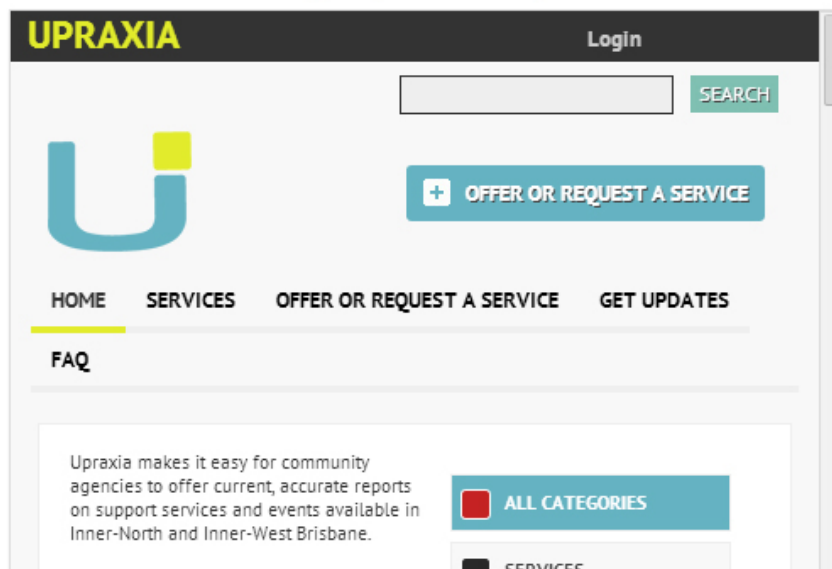
Appendix K

Upraxia responsive design screenshots

▼ Mobile portrait (320x480)




▼ Mobile landscape (480x320)



▼ Small tablet portrait (600x800)

UPRAXIA Login

SEARCH

 + OFFER OR REQUEST A SERVICE

HOME SERVICES OFFER OR REQUEST A SERVICE GET UPDATES FAQ

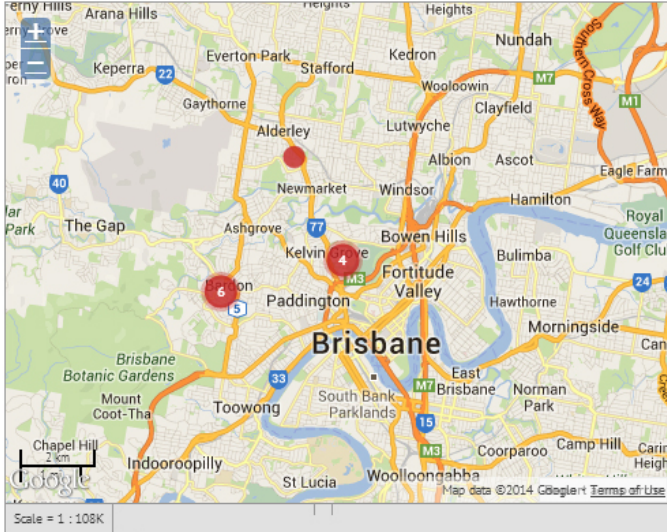
Upraxia makes it easy for community agencies to offer current, accurate reports on support services and events available in Inner-North and Inner-West Brisbane.

Offer services (community organisations)
Request local services (individuals in need)
Get updates when new services are offered or requested near you
Register to manage offers, requests or updates, and contact other members

ALL CATEGORIES

SERVICES

ORGANISATIONS




Scale = 1 : 108K

▼ Tablet portrait (768x1024)

UPRAXIA

LoginSEARCH

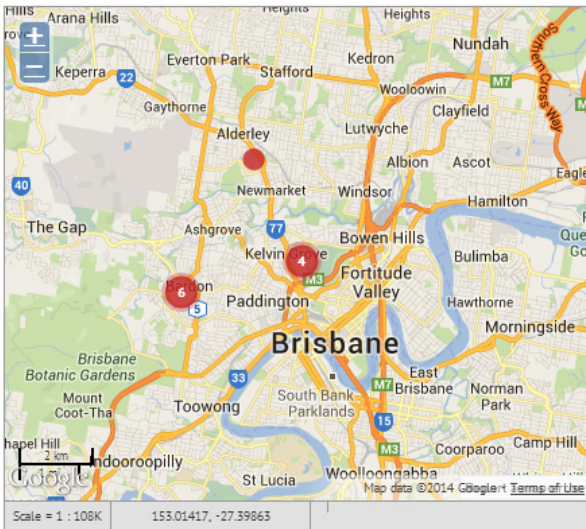
+ OFFER OR REQUEST A SERVICE

[HOME](#) [SERVICES](#) [OFFER OR REQUEST A SERVICE](#) [GET UPDATES](#) [FAQ](#)

Upraxia makes it easy for community agencies to offer current, accurate reports on support services and events available in Inner-North and Inner-West Brisbane.

Offer services (community organisations)
Request local services (individuals in need)
Get updates when new services are offered or requested near you
Register to manage offers, requests or updates, and contact other members

ALL CATEGORIES
 SERVICES
 ORGANISATIONS



Scale = 1 : 108K 153.01417, -27.39863

Advanced map

HOW TO OFFER OR REQUEST A SERVICE

By filling a service form.

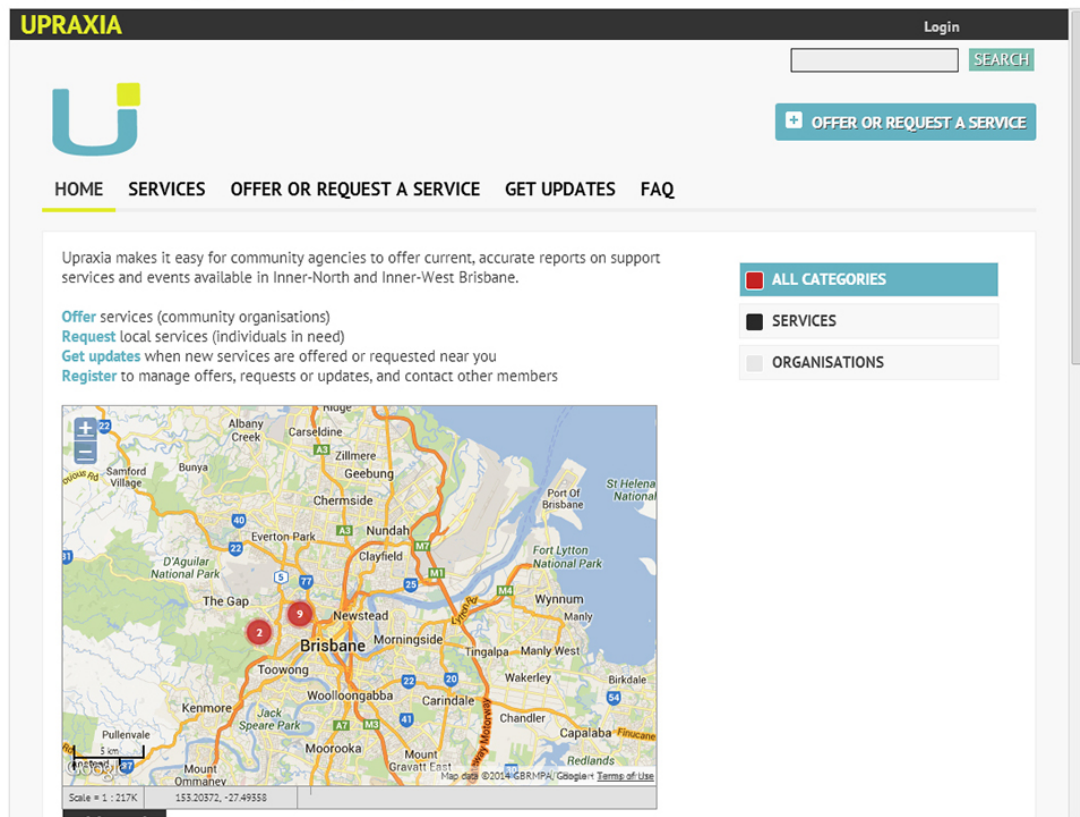
By sending an email:
upraxia@social-goodness.com

By sending a tweet with the hashtag/s:
#upraxia

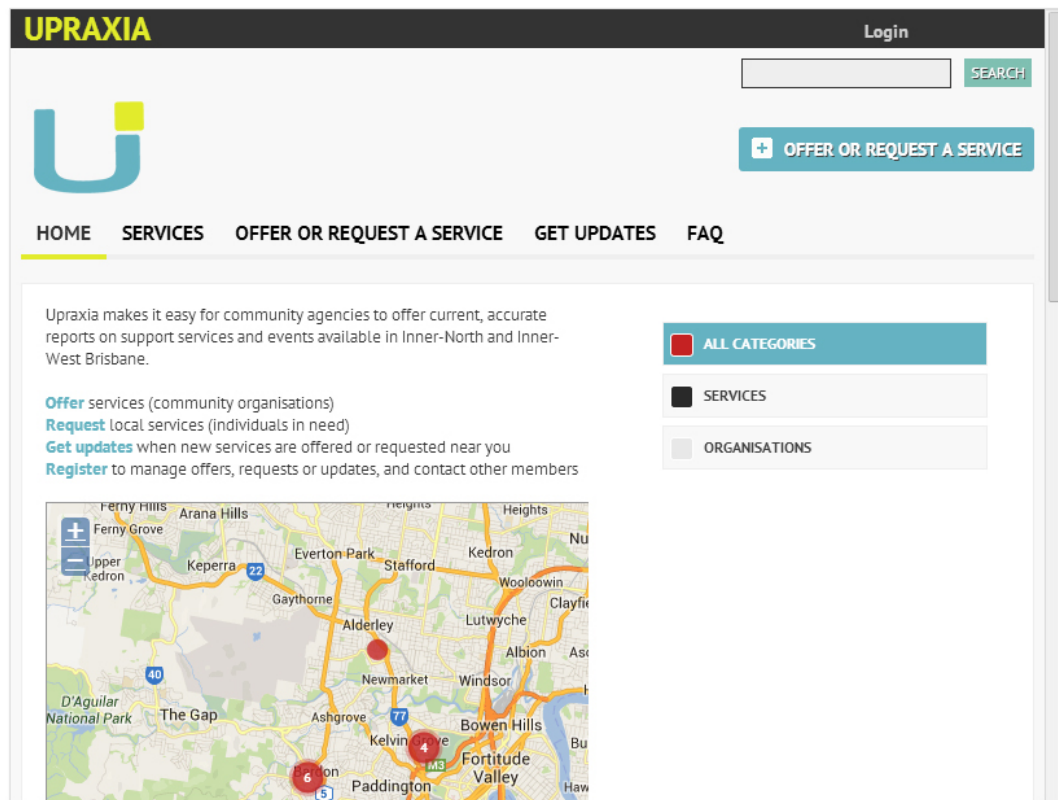
240

Appendices

▼ Tablet landscape (1024x768)



▼ Small tablet landscape (800x600)



Appendix L

Upraxia PDF example

Fit for life | Upraxia

<http://social-goodness.com/upraxia/reports/view/9>



UPRAXIA

Fit for life

VERIFIED

05:46 Mar 20 2013
Blamey Street, Kelvin Grove

[Fitness & recreation](#) [Community](#)

Description

Experience simple Yoga, Relaxation & Mindfulness practices to stay in the present moment. Bring a towel. All welcome. FREE!

When: Tuesdays 11.45am-1pm

Where: The Exchange, Blamey St, Kelvin Grove Village Centre, Kelvin Grove

For more information please contact Angela 3510 2732

Credibility: 1

