Ubiquity from the bottom up: Grassroots initiated networked communities

Book Section

AoIR 5.0 Ubiquity?

Title: Grassroots initiated networked communities: a viable method of overcoming multiple digital inequalities within communities of locality?

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Abstract

Achieving ubiquity is more than achieving access: multiple social and technological insufficiencies must be overcome and continually readdressed. It is unlikely that these will be overcome through government funded interventions focussing primarily on achieving physical access to the internet. A possible solution may be found in the emerging phenomenon of grassroots initiated networked communities; communities of locality that have developed their own internet and/or intranet infrastructure with minimal external support.

This paper analyses examples of networked communities, and considers their effects on the associated physical neighbourhood. Preliminary survey results will be presented, identifying types of networked communities and highlighting their approaches to achieving sustainable ICT usage. A common feature of the communities is their desire to enhance community interaction, and we discuss the role social software may play in achieving this goal.

Introduction

How ubiquitous is the internet? Simply speaking, it could refer to whether or not people can theoretically access the internet. However, we would argue that defining ‘ubiquity' requires further critical analysis, and merely attaining access is too low a benchmark. This paper will consider a more complex interpretation of what it means to be connected. We extend the definition from a simple dichotomous divide to multiple dimensions of sufficiencies that need to be attained in order for an individual to become meaningfully and sustainably 'connected'. To achieve these measures, we argue that a community based approach may be an effective method bringing benefits to both individuals and their host communities. We focus on one possible solution – grassroots initiated networked communities: the phenomenon of communities of locality building their own computer network infrastructure and tools. This paper will report on research examining five such communities presenting initial findings, and suggests they may offer lessons that can be applied in a wider social context as the discourse promoting ubiquitous access to the internet expands. We offer a taxonomy of such communities, and report on our initial work considering the role that social software can play in such communities.

Achieving ubiquity: from simple divide to multiple insufficiencies

Achieving universal usage of the internet has become a call for many policymakers: ensuring nobody will be “left behind in the new knowledge economy” (Brown quoted in Shearman1999 p.3). The UK government seeks to achieve “universal access” to the Internet for its citizens by 2005 (Cabinet Office 2004), and in Spring 2005 an influential thinktank will be publishing the "Manifesto for a Digital Britain" (IPPR 2004).

Our concern is that the focus of much current discourse seems to be overly influenced by historic concerns to assure universal telecommunications access for all (McConnaughey and Lader 1998): focussing on achieving theoretical access to the detriment of other equally significant issues. Even defining access may be problematic. 'Nearby' internet facilities may not be accessible to elderly citizens or the physically impaired, and the social context of the building hosting the facilities may affect usage (Devins 2003).

Access is only one of multiple barriers to meaningful Internet usage. DiMaggio and Hargittai (2001) argue that as Internet penetration continues, researchers should shift their focus from analysing a dichotomous divide, to a study of multiple inequalities between those who are potentially connected:

- Equipment: the quality of computer hardware, software, and Internet access
- Autonomy: the control an individual has over how they can use their connection
- Skill: the knowledge to make best use of the equipment and access
- Social support: to be able to draw on others to develop skills and overcome obstacles
- Purpose: to have meaningful reasons to be connected

DiMaggio and Hargittai consider that each of these inequalities – which we believe should be more correctly referred to as insufficiencies - must be overcome if an individual is to move online. Barriers may change over time, and must be continually readdressed (van Dijk 2003); hence we argue that *sustainability* is a further critical factor. The existence of ex-users as well as non-users supports the argument that maintaining, as well as achieving initial connectivity, is a significant issue (Lenhart et al. 2003). Furthermore, we extend DiMaggio and Hargittai's work to place it within a community discourse: as Wellman et al. note (1996) a computer network is a social network, hence we should consider actions based around groups, not individuals. Solutions may be found by utilising existing social interactions within an existing community; the 'social capital' of a group (Putnam 2000).

Community approaches to achieving connectivity

Community based approaches to achieving ubiquitous connectivity can overcome several difficulties faced by individuals moving online. Moving online as part of a

geographical community brings shared purposes, reasons to communicate and the opportunity for members to share skills and informal support. Lave and Wenger note that social context supports learning, and in turn can strengthen a community (Lave and Wenger 1991).

Much research has been carried out studying connectivity initiatives within the workplace in the field of CSCW, and communities of practice. However, we believe that as more internet penetration increases, it will be valuable for academic researchers to focus upon geographically defined social communities. Defining geographical community is highly problematic (Hillery 1955). Willmott defined community as being of one of three types: geographical locality, interest, or emotional attachment and noted that the mythical ideal of 'community' is often invoked when place and attachment are combined (Willmott 1986). We use the term community of locality to describe a geographical community where some level of social interaction and emotional attachment exists, Putnam's 'social capital'.

Communities of locality have utilised the internet to support community interaction for many years and may be described as having a 'community network' (Schuler 1996). This term can refer to a broad range of initiatives, but in some cases it may prove problematic to identify how representative of the community the 'community network' actually is (Skerratt and Warren 2004), and how many residents have access to these services. We are interested in projects where an explicit aim is to develop a computer network infrastructure in order to ensure connectivity to all members of their community, as well as providing shared tools. Such initiatives are more likely to offer greater levels of connectivity than projects that rely on individuals within the community to arrange their own internet connectivity. To distinguish such projects from the more broadly used 'community networks', we use the term 'networked communities'.

Networked communities have been developed by a variety of agencies, for example universities (Blacksburg Electronic Village: Cohill and Kavanaugh 1997), commercial partnerships (Netville: Hampton 2000, The Range: Arnold 2003), or government bodies (Wired Up Communities: Devins 2003). Our concern however, is that such 'top-down' interventions may not address all the insufficiencies and ensure meaningful and sustained connectivity, nor be sustainable in the long term. Project agencies may have differing goals from their users, terminating projects when their objectives have been achieved (Hampton 2003). Members of the community may suffer lack of support (Devins 2003), feel disenfranchised , or find that the project may displace their preferred social practices (Warschauer 2003).

Grassroots initiated networked communities

We follow Day (2001) and Fisher (2002) and argue that a more participatory approach to design, implementation and development is required. Our interest is in one particular phenomenon: the grassroots initiated networked community; communities of locality that have developed their own network infrastructure with minimal external support (Gaved 2003). We argue:

- Grassroots initiated networked community projects are more likely to succeed as they are developed from within the community and respond to the specific social context in which they are situated

- Networked community projects developed from elective rather than selected neighbourhoods can draw on existing social capital to achieve their goals

- Grassroots initiated networked community projects are likely to be more sustainable as they can set their own goals and may not be so dependent on external resources

These communities may offer a meaningful and sustainable method for achieving ubiquity of access and usage to the internet for a large number of people that are currently inadequately served by existing solutions.

Such connectivity projects are often developed by 'early adopters' (Rogers, 1962) within communities in response to a perceived gap in provision by external bodies. Project initiators may be prompted by economic reasons (the cost of getting connected) lack of provision (commercial service providers not covering area) or philosophical stance (a belief in cooperative development or self ownership of resources). Project initiators may initially focus on achieving shared access to the Internet, but often aspire to the development of further services to support the exchange and storage of information for internal and external consumption. The development of such services is seen as enhancing the potential for social interaction and community development.

Case studies

Five example communities were studied beginning in Summer 2003. The communities were identified in a snowball gathering method beginning from the authors' contact with the first group. An inductive approach was employed, aiming at developing terms and definitions to describe the phenomenon, and provide a grounding for later research. Interviews were carried out with project initiators as it was felt that they could offer the best overall view of how each project worked, but we were also interested to speak to end-users of the projects to see if their views and goals were similar to those of the initiators. The interview questionnaires were developed following a study of interviews of Internet usage both in the USA (Pinkett 2000) and the UK (Devins 2003, Oxford Internet Institute 2003)

Project initiators from five hybrid community projects were asked 21 questions divided into six categories:

1. Community knowledge: e.g. “What is the boundary of the community?”
2. Network project: e.g. “Why should people get involved with your project rather than connect to the Internet through the national telecom provider?”
3. Knowledge and skills: e.g. “What kinds of people are involved in the project?”
4. Collaboration and information sharing: e.g. “Are you aware of other people carrying out similar projects?”
5. Sustainability and lifespan: e.g. “How does the funding operate?”

6. Training: e.g. “What training process do you have for new members?”

Questions were open ended and the interviews lasted between one and three hours.

In one community, fourteen end users were interviewed. It is intended that end users in further communities will be interviews but only a single community has been interviewed so far as a pilot study. These interviews were based on a more structured set of questions. Eighteen questions were asked seeking quantifiable data with the opportunity for further comments by the participants (e.g. “How often do you use the computer for the following tasks”), followed by ten more open ended questions (e.g. “ How do you think the community network helps you?”).

For both sets of interviews, both quantative and qualitative data was captured: as well as identifying the scope of the projects the authors were interested in understanding the intentions of the participants. What the participants *believe* are the benefits of a hybrid community are of interest as well as the actual effect.

Analysis

By analysing the data collected in the interviews, the authors sought to gain an understanding of the key characteristics of the networked community projects, and how well they achieve meaningful and sustainable internet usage within their host communities. The next subsections present the results from the interviews with project initiators and end users. The projects studied have been given pseudonyms for the purposes of this paper.

Summary of project initiator interviews

In order to understand how well the projects offer a potential route to achieving ubiquitous access, we mapped responses given by project initiators to the five dimensions of inequality identified by DiMaggio and Hargittai, in order to identify what resources were available within the project and whether these would be sufficient to achieve a sustainable solution. In addition to these dimensions, we sought to understand the how the projects were structured and their ambitions: who is responsible for provision of **technology**, the organisational **structure** of the projects, and their **scope**. Furthermore, we were interested to identify to what current online services the projects offer: how much social interaction is supported within the community as well as the provision of connectivity to the Internet.

	Southern Wired	Northern Coop	Digital Estate	Scottish Wireless	Southern Wireless
Scope	Housing association 28 / 29 houses connected Wired network Shared link to Internet	Housing cooperative 50 / 70 houses connected Wired network Shared link to Internet	Housing association 150 / 250 houses connected Wired network Shared link to Internet	Citywide subculture 20 users connected Wireless network Multiple links to Internet	Citywide subculture 80 users connected Composite wireless and wired network Multiple links to Internet
Technology	Users provide own computers Network infrastructure provided by project	Users provide own computers Network infrastructure provided by project Computer recycling scheme	Users provide own computers Network infrastructure provided by project	Users provide own personal computing and network equipment	
Autonomy	Unlimited access and usage	Unlimited access, usage moderated by traffic shaping software			
Skill	Range of computer literacies amongst users			Early networking technology adopters	Mixture of early technology adaptors and domain experts
Support	Informal access to experts	Informal access to experts Workshops Posters	Informal access to experts Workshops Drop-in centre	Informal access to experts	Informal access to experts Workshops Drop-in centre
Purpose	Affordable connectivity Community information resource			Affordable connectivity Umbrella support of wireless initiatives	Affordable connectivity Content sharing Umbrella support of wireless initiatives
Current online services	None	Mailing lists	Public website Mailing lists	Public website Wiki	Public website Mailing lists Wiki
Structure	Subscription based service Core of volunteers and wider group of end users			Peer network of users with core of super users	

Table 1 Key characteristics of grassroots initiated networked communities

In the section below, we note key aspects of interest.

Size: Each of the projects surveyed is of relatively small size, with user populations of between approximately 20 and 200. The communities closely identified with a specific locality were more concerned about the geographical limits of their project, and were less inclined to consider expanding beyond these clear boundaries, suggesting that the clear sense of purpose and identity would be diminished by expanding beyond locally understood limits. The 'wireless' projects perceived their boundaries in more a diffused manner, defining their boundaries by a mixture of geography, community of interest, and technological limitations.

Penetration: Projects can be divided broadly between the 'wired' and the 'wireless' projects – 'wired' projects have achieved very high levels of penetration within their defined areas, between 60 and 95% of the residents connecting. The 'wireless' projects (Scottish Wireless and Southern Wireless) are more distributed in nature, covering sections of two large urban areas, and reach only a small percentage of the population in those areas. The wireless projects can potentially offer access to their services to passers-by and non-residents and both projects encouraged their members to allow this.

Autonomy: All projects emphasise provision of access in users own homes, with central facilities seen as a secondary priority. Only one project offers a central facility (which is also the drop-in support centre and technical centre). A great deal of the projects energies have therefore focussed on achieving comprehensive network coverage. For the 'wired' projects this has meant aiming at running cable to every house: in one case responding to users' requests for access, and in two projects seeking to connect houses, rather than residents. For the wireless projects this has focussed on seeking access points with as wide a coverage as possible: members living in high buildings are particularly valued. All projects offered very open access policy to their users, in four cases seeking to moderate fair use by software traffic management.

Skill and support: The projects vary in the skill level they expect from their users, which reflect the nature of the community and the networking project. For example 'Scottish Wireless' is an experimental wireless network and is dominated by expert users seeking to share their knowledge and support local initiatives. 'Digital Estate' aims to provide a robust, network to all residents of a housing estate and supports more basic levels of computer literacy. Skill sharing is generally carried out in all projects in an informal manner, echoing Lave and Wenger's concept of 'apprenticeship' within a community of practice. Informal social networks (friends, neighbours, network peers) play an important role in sustaining each individual's computer and online activity. In all cases, the projects are explicit about their 'community' rather than 'commercial' nature and assumption that the burden of support is to be shared amongst the community, that a 'commercial contract' is not being offered.

Purpose: Projects vary in their intended purpose. The 'wired' projects aim to provide ubiquitous access within their communities of locality, seeing the network as a method of supporting community functions. The 'wireless' projects appear more like communities of interest, either supporting a subcultural community within a broader

area, or as an expert community supporting a broader population within their locality. In all cases the projects perceived themselves as a 'community' service to a defined and limited group of users, that they felt themselves to be part of. Project initiators viewed the projects as long term ventures that added value to their locality, rather than being a method for generating income.

Summary of end user interviews

Fourteen 'end users' were interviewed from one project, 'Southern Wired' in Summer 2003. This was carried out to test a more quantative 'end user survey' and also to find out how similar end users and project initiators' perceived the goals and ambitions of the network within the host community. We defined these 'end users' as being users of the network that had no specific responsibilities within the project beyond maintaining basic membership status (e.g. payment of subscription fees).

One of the criticisms of 'top down' networked community projects is that there is infrequently any design input from the users themselves, sometimes leading to a gulf between the external initiating body and the actual users. We are keen to establish whether a grassroots initiated network project can offer a better model with project initiators and end users belonging to the same community.

The questions we posed the end users therefore varied from the project initiators. We asked more specifically about type of usage and skill levels and what they perceived as the bounds and ambitions of the networking project. We were interested to find out how closely their views matched those of the project initiators, and if indeed there was a greater shared vision. The following subsections highlight the key points of interest gleaned from this set of interviews.

Usage: 13 out of 14 users noted they used the Internet daily, suggesting the importance of access. The two most popular usages of the computer were 'Email' (12 out of 14 on 'most days') and 'Looking for information on the web' (7 out of 14 on 'most days'). The network was seen as supplementary to existing community functions. It offers additional affordances “I’ll use it when it’s useful, like for sending photos to my friends”, but is used in conjunction with existing social conventions “If I want a chat I'll just pop round for a cup of tea”.

Autonomy: Users valued the ability to access the Internet from their own home: all users noted that their preferred point of access was their own home. Public access points such as the local library were noted as being useful “but you have to queue”. Other problems of public access machines noted were the limit of opening hours, limited software, and strict usage conditions.

Skill: Users generally rated their 'Internet skills' as higher than their 'computer skills'. One user commented that “if the computer is offline it's only 10% of the machine it is when it's online”. 11 out of 14 had received some form of computer training prior to joining the network, and 13 out of 14 noted an interest in further training, though preferring shorter informal courses.

Support: Informal social support was seen as important to the majority of users. 10 out of 14 noted that they would ask a neighbouring friend for help if they had a problem with their computer, and 13 out of 14 would turn to the project initiators if they had a problem with their Internet connection. High value was placed on being able to resolve problems face to face rather than via phone or online.

Purpose: The community network was seen as supporting existing social transactions through offering additional affordances and an integral part of the community infrastructure. Users wanted more than just connectivity: "this could be more than just cheap Internet access". Document repositories, discussion boards, and a shared music server were popular suggestions for services. A comparison of the interviews with end users and project initiators suggest a close correlation between the aims and objectives of both parties.

Interpretation of interviews

Grassroots initiated networked communities are an interesting phenomenon that can contribute to the wider discourse surrounding 'ubiquitous connectivity' within the social environment. More networked localities will be developed in the near future (e.g. Oakgrove: English Partnerships 2004, Rugby Radio Station: BT Group 2003) and grassroots initiated networked networked communities may offer valuable lessons to help ensure sustained and meaningful connectivity within these communities, and enhance existing critical analyses such as Arnold et al.'s work (2003) . We have drawn the following initial findings from our research:

a. There are at least three differing models of grassroots initiated networked communities. Even as a subcategory of wired community initiatives it can be seen that the case studies covered in this paper can be divided into further subtypes:

- **Cooperatives:** closely associated with a formally defined geographical locality. Ubiquity is seen as achieving connectivity for all residents, and the purposes of the network closely match those of the locality. In Lazar and Preece's terms (1998), the users of the networked community can be seen as highly bounded to the geographical community: interactions online match closely to the physical locality. We would describe Southern Wired, Northern Coop, and Digital Estate as examples of Cooperatives.

- **Subcultures:** developing a networked infrastructure to support a community of interest within a defined locality. Ubiquity is seen as achieving connectivity for all members of the community of interest within the geographical locality. The network is driven by the community of interest (e.g. 'artists within London') but the membership may spread to others connected to this social network. We would describe Southern Wireless as an example of a Subculture.

- **Pioneers:** pushing technological limits to connect areas. Innovators connecting both localised networks based on existing social networks, and linking to widely dispersed similar innovating groups. The project initiators

are often driven by the goal of experimenting with new methods of connectivity, and are involved as part of a wider pioneering community, while practically applying the technology by connecting local hubs of less expert users. End users within these networks are much less 'bounded' in their interactions, with the network community only providing one aspect of their social network. We would describe Scottish Wireless as an example of a Pioneer.

b. Grassroots initiated network communities offer a broad response to DiMaggio and Hargittai's five measures of digital inequality. The community based approach to achieving and sustaining connectivity appears to bring benefits and ensure multiple insufficiencies are overcome. Community members, as a group, have access to support (their neighbours and friends), skills (local experts), and a purpose (the social functions of the geographical community).

c. Grassroots initiated networked communities may provide a more sustainable approach to the digital divide. The studied projects are funded and supported from within the communities and are identified as located within the community. Project initiator and end users perceptions and goals are similar. These factors may suggest that the projects are in the long term more sustainable than externally initiated attempts to create hybrid communities; where the funding/initiating body may have its own agenda and cease operations when its goals have been achieved. One project commented that they were unlikely to run out of external funding as there was none to begin with!

d. Developing community is as important as developing communication. While all projects see development of an ICT infrastructure and shared connectivity as an initial goal, all projects emphasised the intention to develop further services. The importance of supporting community functions is seen as of high importance. There is a belief in achieving symmetrical communication between peers, encouraging user input, rather than a centralised publishing model, with end users passively receiving content.

e. Grassroots initiated network communities may offer possible models of near ubiquitous computing. A key aspect of all the projects is to offer services to each user's home. End users express a preference for home access, and the always on and liberal usage policies have generated interesting scenarios: it was noted that in at least two cases the computer has taken the place of the living room hi-fi, playing streamed music from neighbourhood file sharing archives. These projects could be viewed as trailblazing early adopters that may offer insight into how ubiquitous internet access may be domesticated into the home environment.

Continuing work: social software

An important aspect of these five projects is how they embed the computer network within their existing social network. The computer network is not seen as a not an instrument for escaping from the community but rather for increasing interaction within the community. In order to achieve this integration, software enabling social interaction is used, or sought. While the majority of projects are using little software

at the moment this may simply be a reflection of their stage in their lifecycle. Kavanaugh has reported that little development of software tools was undertaken in the first years of the Blacksburg Electronic Village; only when the infrastructure had been developed sufficiently did people consider how to exploit this resource (Kavanaugh 2002).

Tools used for social interaction can be grouped together as 'social software': defined by Brady et al. as "software that supports the sociality of people in a beneficial way both online and offline" (2003). We are interested to examine what software exists and how it can be used to support community functions. Schmid, considering software to support digital marketplace transactions, suggests a layered model to connect community with software (Stanoevska-Slabeva and Schmid 2001). Based on this, we have begun to develop a representation of networked community functions.

Community purposes
Community functions
Software tools
ICT Infrastructure

Table 2: Networked community functional model

This model allows us to consider what activities are carried out at each layer of the model, and how software tools may support community functions. Research has previously been carried out into how virtual communities function (Preeece 2000) and what software may support these functions (Stanoevska-Slabeva and Schmid 2001). Networked communities, however, are of a different nature to their purely virtual counterparts. The physical aspect of their geographies and interactions mean that many functions of virtual communities such as trust, identity, and reputation mechanisms do not have to be developed as they can be adequately supported through existing methods of social interaction. Social software is rather employed to support community functions poorly served by existing media.

Surman and Reilly (2003) have mapped the strategic uses of social software within the internet for NGO's and this provides a useful starting point for identifying major groupings of social software that may be employed. Of particular interest is Davies' work (2004) considering what social software may benefit local neighbourhoods, approaching the concept of networked community by asking what particular aspects of neighbourhood life may benefit from being more like an online community. Davies' conclusions, that social software may be most effective when supporting interactions which benefit from a codified exchange of knowledge (e.g. trading, sharing childcare, and arranging school runs) match well with the initial feedback from our projects.

The interviews carried out within the communities have identified needs or desires that the initiators and end users have voiced for specific functions, and we will be using this as a basis for our research. We will seek to use the requests from the users as the basis and work through a participatory approach to choosing certain software

that may support particular functions. One of the criticisms of network projects that have been implemented in a 'top down' approach by external bodies is that they can alienate those people they seek to support. We seek to follow Day and Fishers' advice and look to undertake a more participatory design approach to design, implement and manage software tools within the communities.

We will follow the implementation of the software by logging their usage, and with follow up interviews, and seek to identify to what degree social software can support networked community interactions.

Conclusion

In this paper we have discussed the complexity of the expression 'ubiquity', showing that more than simply arranging access is required, and a variety of dimensions of insufficiencies need to be overcome to ensure meaningful and sustained usage. We have described our study of grassroots networked communities as a possible solution, and described the results of interviews with users. We have found that there is a desire to achieve more than just connectivity to the internet but the broader desire to enhance community interaction. Our current work is focussed on investigating social software and developing a theoretical basis from which to consider developing participatory solutions for communities. We are seeking to continue our work in the following manner:

1. Further investigate types of community: continuing to explore examples of grassroots initiated networked communities, seeking both specific information about each community and also working towards developing a taxonomy. The development of such a taxonomy will support the refinement of design guidelines to support specific categories of community.

2. Developing a theoretical basis to understand how social software may support community interaction, and undertaking a participatory design process to implement software tools within selected communities. We seek to report to what degree such tools can enable social interaction and help develop a framework that can be used in wider discussion.

Credits

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