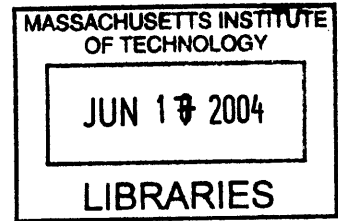**Speakeasy:**
Mobile Telephony for Community Networking and Civic Engagement
in an Immigrant Community

by

Edward A. Hirsch

BA, Philosophy
Vassar College
Poughkeepsie, NY
1992

MDes, Interaction Design
Carnegie Mellon University
Pittsburgh, PA
2000

Submitted to the Program in Media Arts and Sciences, School of Architecture and Planning,
in partial fulfillment of the requirements for the degree of Master of Science in Media Arts
and Sciences at the Massachusetts Institute of Technology
June, 2004

Signature of Author _____
Program in Media Arts and Sciences
May 14, 2004

Certified by _____
Christopher P. Csikszentmihalyi
Assistant Professor of Media Arts and Sciences
Thesis Supervisor

Accepted by _____
Andrew B. Lippman
Chair, Departmental Committee on Graduate Students

Speakeasy:
Mobile Telephony for Community Networking and Civic Engagement
in an Immigrant Community

by

Edward A. Hirsch

Submitted to the Program in Media Arts and Sciences, School of
Architecture and Planning, on May 14, 2004 in partial fulfillment of the
requirements for the degree of Master of Science in Media Arts and Sciences
at the Massachusetts Institute of Technology

Abstract

Immigrants face a variety of barriers limiting their access to social services.
These include inability to speak English, unfamiliarity with available services,
and distrust of government agencies. To overcome these obstacles,
many immigrants rely on informal social networks for information, advice,
and language interpretation. This is an imperfect solution that provides
inadequate access for the immigrant and unduly burdens friends and family
members. More importantly, it does little to address the social isolation that
characterizes much of the immigrant experience and contributes to the
disenfranchisement of immigrant communities.

Speakeasy is a community-based service that provides telephone-
based access to a network of volunteers who provide real-time language
interpretation and help navigate complex social service networks. Relying
on the constant connectivity afforded by cell phones and wireless devices,
Speakeasy overcomes barriers to traditional forms of volunteerism with a
"just in time" model of community service. The system also encourages
community development efforts by engaging new immigrants and volunteers
in community activity, and by fostering a sense of collective identity.

A study with members of Boston's Chinatown community showed that
Speakeasy is an effective, convenient, and easy to use service that
engenders trust among non-English speakers.

Thesis Supervisor: Christopher P. Csikszentmihalyi
Title: Assistant Professor of Media Arts and Sciences

Speakeasy:
Mobile Telephony for Community Networking and Civic Engagement
in an Immigrant Community

Thesis Committee

Thesis Reader _____

William J. Mitchell
Head
Program in Media Arts and Sciences

Thesis Reader _____

Ceasar McDowell
Director
Center for Reflective Community Practice

Table of Contents

Acknowledgments

Introduction

A True Story

While riding the "Chinatown Express," a low-cost bus service that runs from Boston's Chinatown to Chinatown in New York City, a friend observed a woman sitting in the front seat of the bus, with cell phones pressed against either ear. Into one, she spoke Cantonese[1] Into the other, English.

After a few minutes of eavesdropping, it became clear that the woman was engaged in a single conversation between someone speaking English and someone speaking Cantonese. When the bus stopped for gasoline in Connecticut, my friend approached the woman, and asked her about the call. The woman, named Shirley,[2] told my friend that she had been interpreting[3] for a friend of hers whose car was in the shop. Her friend only spoke Cantonese, while the auto mechanic only spoke English.

Shirley was born in China, and moved to the United States when she was very young. She now lives in a suburb of Boston and speaks English, Cantonese, and Toisanese. Shirley often assists her non-English speaking friends with errands and telephone calls, although as a full-time student, she doesn't have as much time to help others as she'd like.

Language and Access

There are over 300 languages spoken in the United

[1] Cantonese is the most common Chinese dialect spoken in the Boston area.

[2] Not really.

[3] "Interpretation" generally refers to spoken language, while "translation" refers to written documents.

States, and 20% of people older than 5 speak a language other than English in the home. (USCB 2003). Approximately 11.9 million people in the United States live in linguistically isolated homes, meaning no one in the household older than 13 speaks English proficiently–a 54 percent increase from 1990 (USCIS 2002).

Multilingual access to social services has been a national and municipal priority. In the year 2000, President Clinton signed executive order 13166, which mandates improved access to services for persons with limited English proficiency (LEP). Similarly, Oakland and San Francisco have passed Equal Access to Services Ordinances, and legislation is pending in New York City. Here in Boston, Mayor Thomas Menino has made bilingual services for new Bostonians a priority. These legislative initiatives have been matched by increased hiring of bilingual employees in government and nonprofit agencies, new contracts with commercial document translation and voice interpretation companies, and growing interest in interpretation technologies for emergency-response services.

However, demand for non-English services far outstrips the capabilities of many communities (Chan and Zhan 2002), and limited information is available in languages other than English (AAPIP 1992). A range of services including public advocacy, community development, and legal assistance are often only available in English.

It is important to note that language is just one obstacle that immigrants face in accessing social services. Most immigrants are working class, ethnic minorities (USCB 2002), who are marginalized by a variety of socioeconomic factors (Vali 2002). These include lack of awareness of eligibility and availability of services (Schlosberg 1998); difficulty navigating complex bureaucracies; and frustration with inadequate facilities, confusing policies, and poorly trained and/or racist staff (HFGC 2002). In addition, cultural factors and wariness of government influence decisions about contacting service agencies. Many immigrants mistrust government or fear that accessing the social service system could jeopardize their immigration status or lead to deportation (Maloy, Darnell et al. 2000). Further, in many communities, cultural norms preclude members from asking for help from "outsiders" (Ho 1990).

Inability to access social services or participate in community development and advocacy programs is detrimental to individual immigrants lives and unduly burdens the neighborhoods where they live. It also poses risks for the community at large, which depend on community involvement for effective public health and safety programs (WALPHO 2003). Disenfranchisement isolates ethnic communities, excluded from flows of information and capital. The resulting "black holes of poverty and ignorance" (Castells 1999) become entrenched ghettos rather

than ethnic neighborhoods (Castles and Miller, 2003), increasingly dependent on social services that are not forthcoming. As governments fail to meet their growing needs for food, shelter, education, and health care – the "nuts and bolts" of governance (Castells, 2004) – there is a growing crisis of legitimacy that undermines the democratic process.

Current Practice

In the absence of effective outreach programs, most immigrants either go without social services, or rely on informal social networks for assistance (Avery, 2001)[4]. Friends and family members are routinely enlisted to help navigate complex bureaucracies and to provide language interpretation and translation. While this can be an effective solution, it is often not available to recent immigrants who have limited social networks and limited local knowledge (Castles and Miller 2003). This social isolation also makes new immigrants particularly vulnerable to exploitation and fraud (Brady 2000).

Where social networks are available, individuals who are called upon to provide assistance may have limited English-language proficiency themselves, and may not be well informed about available services and eligibility. In addition, there are often a relatively small number of well-connected people in immigrant communities who are relied upon by many others. These individuals may feel overburdened by the amount of assistance they are asked to provide, and may not be available as often as their skills are

[4] This claim is supported by ample anecdotal evidence. According to one Chinatown community organizer, "almost every bilingual board member [of our organization] has had a quick trip to the post office become a 45-minute, impromptu interpretation session for a Chinese person trying to communicate with a non-Chinese speaking postal worker... Our resident leaders are supportive of this project because they recognize its potential to reduce their interpretation burdens as well as the regret they feel when they are unable to help."

required.

Perhaps most importantly, the practice of relying on informal social networks does little to change the status quo. Non-English speakers and their assistants experience exclusion on an individual basis – their successes and failures in overcoming barriers are personal ones and are not shared by the community. As a result, current practice does not affect the structural causes of disenfranchisement, including poverty, ignorance, and racism, which can only be addressed through collective identity, organization, and action.

Speakeasy

As an alternate solution, I have worked with the Asian Community Development Corporation (ACDC)[5] to develop Speakeasy, an integrated web and telephone service that allows immigrants to contact multilingual volunteers who are familiar with community concerns and social service options. We refer to these volunteers as "Guides" to indicate the range of services they offer. Guides can offer suggestions and answer questions, and also provide real-time language interpretation for calls to social service agencies, government institutions, and local businesses. This system is intended to supplant reliance on informal social networks with a new communications infrastructure that is conceptually simple, technically sophisticated, and has community empowerment at the heart of its design.

[5] See Appendix A for information about the Asian Community Development Corporation.

This system harnesses the collective power of the community to improve access to social services by its most vulnerable members, and transforms the immigrant experience into a collective activity.

There are several benefits to this solution. For the non-English speaker, Speakeasy offers convenient access to a network of well-informed interpreters. For the community, the system fosters the development of social capital and a sense of collective identity through the creation of productive relationships between new immigrants, established members of the community, and community development organizations. This, in turn, provides a basis for collective action and community empowerment.

Research Question

Adoption of this system requires a significant leap of faith by its users. The current practice of relying on informal social networks is founded on trust and social obligation. Speakeasy requires that immigrants transfer their trust from friends and family to a network of strangers; a challenge for a group whose vulnerability often causes its members to distrust institutions and be hesitant to approach outsiders.

This paper examines the feasibility of the Speakeasy project. It explores questions of whether non-English speaking immigrants would be willing to call on strangers – whom they may never meet – to provide assistance they currently receive from friends and family members; and if so, why would they be willing

to do so?

Methodology

To answer these questions, I have worked closely with colleagues at the Asian Community Development Corporation to design and build two iterations of the Speakeasy system. We recruited over two-dozen bilingual volunteers to staff the service, which was then offered to approximately 200 immigrants enrolled in English-proficiency classes at the Boston Chinatown Neighborhood Center. For two weeks, volunteers fielded calls, answered questions, and provided language interpretation services for telephone conversations between social service agencies and non-English speakers. Through a variety of qualitative research techniques including surveys, interviews, and self-documentation exercises, I analyzed users' experience with Speakeasy. Based on these activities, I claim that non-English speakers are willing to use a community service in place of their networks of trusted friends and family members provided that the service in question is appropriately designed to meet their needs, and that it is offered by an organization that has previously established a trusted presence in the community.

Background

To understand how Speakeasy can improve
immigrant access to social services and contribute
to strategic community development goals, we must
consider the context in which it operates. Specifically,
this means exploring the history and sociology of
immigration and community development, and the
opportunities for socially meaningful technological
interventions.

Immigration and Globalization

The rise of globalization has been accompanied
by mass movements of people across international
boundaries. This is a worldwide phenomenon.
Between 1965 and 2002, the number of migrants
in the world doubled from 75 million to 150 million
(IOM 2000), with nearly 2% of the world's population
(185 million people) living outside their country of
birth (Crossette 2002).

The United States saw a dramatic increase in both
legal and illegal immigration through the 1990's.
In 2000, 10% of the total U.S. population – 28.4
million people – were foreign born; in 1970, the
figure was 4.7%. In addition, analysis of US census
data suggest a total of 9 million illegal aliens living in
the US, and an annual increase between 200,000
and 300,000 (Castles and Miller 2003). This trend
is expected to increase for the foreseeable future
due to a host of factors including employer demand,
demographic imbalances between the developed

and undeveloped nations, and the increasing porousness of international borders (Sassen 1999; Castles and Miller 2003).

The United States has certainly undergone periods of mass migration before; indeed, current immigration levels fall far short of the peak periods in the late 19th and early 20th centuries. However, globalization and the rise of the "network society" cast current migration in a very different light. Current migration patterns occur at a time when economic conditions in the developing world are largely shaped through interaction with multinational corporations, developed states, and transnational institutions. Nation states' autonomy is restricted by transnational agreements like NAFTA and the EU, and by the influence of multinational corporations, which favor the free flow of goods, labor, and capital. In addition, international human rights programs promoted by the United Nations and other organizations strengthen the rights of migrants around the world, often at the expense of local authorities (Sassen 1999; Castles and Miller 2003).

Market segmentation makes upward mobility much more difficult for immigrants than in the past (Castles and Miller 2003). In previous eras, it was possible for immigrant steelworkers to advance to positions of greater responsibility and pay, or to apply skills like welding and carpentry in other sectors of the industrial economy. The entry level jobs available to immigrants today - in fast food

service and agriculture, for example - generally offer little opportunity for advancement, and minimal opportunities to acquire skills that can be applied in other industries.

In this context, one might wonder whether it is appropriate that the "burdens of immigration" (including poverty, marginalization, and social isolation) be shouldered by individual immigrants. This is precisely the question being asked by a growing number of analysts and policy makers, among whom there is "considerable agreement" (Sassen 1999) that host countries need to focus their efforts on supporting and integrating immigrant communities in their general culture, or run the risk of long-term marginalization of immigrant communities.

In The Age of Migration, their comprehensive overview of global migration, Stephen Castles and Mark Miller draw a distinction between "ethnic communities" and "ethnic minorities" (Castles and Miller 2003). The former – exemplified by Italian immigrants in the United States – are described as retaining their cultural identity while enjoying full participation in the host country, including citizenship, political representation, and social mobility. Ethnic minorities, on the other hand, remain marginalized and vulnerable to poverty, social isolation, racism, and other socioeconomic problems.

The question of whether a particular immigrant

group forms an ethnic community or ethnic minority depends on how they are received in their host country, and is largely a matter of policy. In democratic societies, policy is not driven solely by careful consideration and rational debate, but is the expression of political will and is dependant on public perception.

Perception of immigrants can be a fickle thing, and is largely driven by the social, political, and economic climate in the host country. Saskia Sassen, a sociologist who has written extensively on migration, labor, and urban issues uses the notion of "guests and aliens" to describe how immigrants are received in settlement nations (1999). Guests are welcomed with something like open arms, and are provided with social services, access to jobs, and political inclusion. Aliens, on the other hand, are viewed suspiciously, regarded as a threat to economic and physical well-being, and tend to be marginalized within their host communities.

Unfortunately, "immigration often takes place at the same time as economic restructuring and far-reaching social change," (Castles and Miller 2003) when citizens of host countries are particularly vulnerable and more likely to be threatened by newcomers. This has been particularly true in the United States, where the influx of migrants in the 1990's was accompanied by a rise in grassroots anti-immigrations initiatives, such as the "English-Only" movement, and by state and federal legislative efforts

to curb illegal immigration.

In 1994, California passed Proposition 187, which banned access to social services by illegal immigrants and their children. In 1996, the federal government passed an immigration reform bill that similarly cut welfare benefits to immigrants, and also lead to widespread arrest and deportation of legal and illegal aliens. Both of these efforts were widely criticized by human rights advocates, and in fact, much of Prop 187 was struck down in successive court challenges. After a decade of economic growth, the country appeared ready to reconsider its stand on immigration, and newly-elected President George W. Bush, citing the strong personal friendship Mexican President Vicente Fox that developed while Bush was Governor of Texas, indicated that immigration reform would be one of his administration's priorities.

Momentum for reform was lost in the terrorist attacks of September 11, 2001. After 9/11, immigration came to be seen as first and foremost a security issue. Coupled with a downturn in the domestic economy, 9/11 signaled the end of any hope for easing the immigration process. President Bush dissolved the Immigration and Naturalization Service, and transferred its operations to the newly-formed Department of Homeland Security. When the President unveiled his immigration program in January 2004, there was little notion of enfranchising immigrant communities; the Bush proposal was

instead a "temporary worker" program that was roundly criticized as making immigrants even more vulnerable to abuse by employers.

Both Prop 187 and the 1996 law attempted to reduce levels of illegal immigration by removing what were perceived as economic incentives to migrate to the United States. While neither legislation had a measurable impact on immigration, they are illustrative of a tendency among developed nations to adapt a neoclassical view of migration as the aggregation of "individual response to market forces" (Castles and Miller 2003), in which immigrants choose to leave struggling economies in search of jobs and opportunity in the developed world. This widely-held perception does not reflect the realities of immigration, which is a complex process shaped in large part by international forces well outside the control of individual immigrants (Sassen 1999). Castles and Miller (2003) are adamant in their critique of such initiatives:

"Policies that deny realities of immigration lead to social marginalization, minority formation and racism... ethnic groups arising from immigration need their own associations and social networks, as well as their own languages and cultures. Policies which deny legitimacy to these needs lead to isolation and separatism."

The United States maintains an ambivalent attitude towards immigration, on the one hand celebrating

diversity in conceiving itself as "the great melting pot" and "a nation of immigrants," while at the same time viewing immigrants with a mixture of fear, suspicion, and racism. The result of these divergent attitudes is that US immigration policy – particularly at the federal level – is unique in the world, offering equal opportunity, affirmative action, and anti-discrimination protections to (legal) immigrants, but little or no support for language acquisition, education, or training (Castles and Miller 2003). In other words, we support the rights of immigrants, but not their needs.

The upshot is that immigrants in American are largely left to their own devices. Efforts to increase their lot are generally undertaken at the local level, with few resources and little support. Doug Schuler, founder of the Seattle Community Network and former chair of Computer Professionals for Social Responsibility puts a positive spin on the lack of government support for local initiatives: "The best reason not to expect (or want) a government 'bailout,' however, is that real solutions to community problems need strong community participation, and the government (at least in the US) has rarely shown itself capable of being an equal participant with citizens in community projects" (Schuler 2000).

In the short term, immigrants will continue to fend for themselves, largely through informal social arrangements. Longer term, immigrant communities must advocate for new policy initiatives by

challenging public perception and applying political pressure. This political clout needed to achieve these goals will only come through ongoing community organization efforts.

Community as the site of political consciousness and action

Globalization's privileging of unfettered competition for markets and resources promotes a culture of individualism, in which discrete entities (people, institutions) are largely expected to fend for themselves (Castells 2000). However, there is a simultaneous trend towards new forms of shared identity and collective action as means of constructing resistances to the marginalizing effects of the network society (Castells 2000; Castles and Miller 2003). Primarily grounded in geography and history, this form of identity politics builds on the tradition of "community" as the locus for political empowerment and shared resistance, but reflects recent developments in technology and social practice.

There is a well-worn saying – attributed to Massachusetts Congressman and former House Speaker Tip O'Neil – that, in America, "all politics is local." O'Neil's observation was that citizens tend to care about and vote on issues that directly touch their lives, and the lives of their communities. If this was true during his tenure in the US Congress, it's even more accurate now. Indeed, one of the great ironies of the network society is that the globalization

of labor and capital has in many cases tended to localize political consciousness. As the sociologist Manuel Castells observes, "the growing inability of the state to control capital flows and ensure social security diminished its relevance for the average citizen" (Castells 2004). The dismantling of the social safety net – the "nuts and bolts" of legitimate government for the common people – has had the additional effect of distancing federal government from the lives of its citizens, and creating a crisis of legitimacy for nation-states. Citizens are increasingly looking to local governments and institutions to fill the void.

If local communities are the site of political consciousness, they are also the incubators of political movements and political issues. American government has traditionally lead from behind, particularly on pressing social issues. As the philosopher Jürgen Habermas (1996) notes, the most vital issues of the day – including women's rights, the environment, and sexual identity – have been brought to the fore through grassroots efforts of citizens acting primarily on the local level. This observation echoes Alex de Tocqueville's (2000) analysis nearly 150 years prior, which presented the New England town meeting as the key instantiation of democratic practice and championed Americans' capacity for forming civic associations to address problems.

Local communities are the primary site of political

consciousness and political action. But, "community" must be understood as a social construction that is subject to change as social relations are reorganized. As such, our understanding of what it means to be a member of a community is bound up with (but not determined by) technology. A brief look at how the concept of community has evolved should make the point clearly.

The conception of community has undergone dramatic change with each major technological transformation. Industrialization moved work out of the home and into the factory, and gave rise to the modern city with its collection of disparate neighborhoods. The advent of communications technologies in the postwar era, coupled with widespread adoption of automobiles as the primary form of transportation, situated work in the modern office and gave rise to suburban living, further separating work from domestic life and presenting the image of community as primarily a site for domestic and leisure concerns.

Rapid adoption of networked computing in the 1990's again promised to reshape social relations and corresponding notions of community. A number of theorists extolled the virtues of a new kind of community, freed from the constraints of time and space. Perhaps the most well-known of these was Howard Rheingold (1994), who offered the conception of a "virtual community," in which like-minded individuals utilized the Internet to participate

in communities founded not on geography, but on mutual interest.

This new community captured the imagination of numerous techno-utopian writers, who envisioned work, culture, and ultimately, most social relations being uploaded to the global "medianet" (Kroker and Weinstein 1994). For others, however, 'virtual communities' sounded more like fan clubs, and seemed rather thin in comparison to traditional ideals of shared values, shared resources, and shared lives. In The Wired Neighborhood, Stephen Doheny-Farina (1996) draws a comparison between "virtual communities" and "lifestyle enclaves" (such as ski resorts), which "flourish where individuals need not depend on each other for much beyond their companionship in their leisure lives... the need for complex, integrated communities – collectives of interdependent public and private lives – is replaced by the need for isolated individuals to bond through lifestyle enclaves, which provide only the sense of community." For Farina, the notable thing about virtual communities is not that they replace traditional communities, but rather that our desire for them to do so speaks of another kind of alienation that runs rampant in the culture.

While the advent of "virtual community" may not (yet) constitute a structural social change, it did serve to bring the defining feature of community into sharp focus. If the old community was founded on interdependence, the "new community" is based in

self-awareness. When people lived and worked in more or less the same place, and lead lives that were overtly dependant on their neighbors, participation in one's local community was a necessary fact of life, and as such, was rarely confronted directly. Now, with individual webs of social relations no longer tied to geography, and interdependencies mediated by technology and bureaucracy, individuals engage each other both consciously and unconsciously in a multitude of configurations. Membership in a community becomes, at least in part, a state of mind. As Doug Schuler (2000) writes, "[The] new community is marked by several features that distinguish it from the old community. The most important one is that it is conscious. In other words, more than ever before, a community will need a high degree of awareness – both of itself (notably its capacities and needs) and of the milieu in which it exists (including the physical, political, economic, social, intellectual and other environmental factors)."

In other words, the defining fact of "community" now seems to be "collective identity" – an awareness of belonging in a shared association whose primary function is to provide its members with "a sense of meaning and experience" (Castells 2004). This reconception of the traditional site of political consciousness has, perhaps unsurprisingly, been accompanied by a change in our notions of civic engagement and political action. Just as communities have transformed into collective-identities, so has politics become identity-politics.

Correspondingly, traditional geographically-based institutions like governments are no longer viewed as primary sites for political change, but have now been supplanted by "faith-based" and "race-based" organizing – political movements centered on constructing collective identities in opposition to dominant forms of power. As Robert Wood describes, "Indeed the most crucial dynamics for long-term political change arguably do not lie within government at all, but in the formation of political will and aggregation of interests among both the general citizenry and leaders of nongovernmental institutions" (Wood 2002).

The key point here is that contemporary political and cultural resistance is focused fundamentally on the construction of collective identities. Examples abound, including "indigenous rights" campaigns, radical Islamist movements, and the construction of the "hip hop nation." According to Castells, collective identities are the most viable mechanism for political empowerment in the age of globalization because, by their very nature, collectives undermine the individualization of labor (Castells 2004), the primary mechanism of working class disenfranchisement.

The challenge to community development organizations – that is, nongovernmental organizations whose primary mission is the political and economic empowerment of minority interests, many of which are directly related to the physical environment in which they are situated – is therefore

the construction of a collective identity that includes, but is not necessarily bound by, geographic territory. That is, community development involves cultivating a sense of shared identity among residents of a given area that is primarily formed in relation to their neighborhood.

Technology, Cooperation, and Collective Identity

If collective identity is the goal of community development work, then what is the mechanism through which it is created? And, is there a role that technology can play in this process? These are the questions to which we now turn.

The conception of collective identity is generally associated with the study of social movements. It is not surprising, then, that in addition to the cognitive dimension described above (the sense of "we-ness" shared by a collective's members), collective identities are also defined by their capacity to facilitate and motivation action:

"Embedded within the shared sense of 'we' is a corresponding sense of 'collective agency.' This latter sense, which is the action component of collective identity, not only suggests the possibility of collective action in pursuit of common interests, but even invites such action" (Snow 2001).

While it is true that collective identities often arise from a shared set of social characteristics (such as race, class, or nationality), these characteristics are

not in and of themselves enough to generate the requisite sense of participation in a collective (Snow 2001; Castells 2004). Instead, collective identities are constructed through the shared activities of their members (Fantasia 1989; Melucci 1989; Calhoun 1991).

David Snow, a sociologist who studies social movements, identifies "identity work" and "identity talk" as two mechanisms for the generation and maintenance of collective identity (2001). Identity talk expresses a collective identity through the creation and invocation of symbolic resources that bind participants. Examples of identity talk include storytelling (for example, sharing war stories), sharing songs and styles of music, and repeating keywords or slogans. Identity work more generally involves engaging in collective action, through which participants' personal identities are transformed or extended to give more salience to their participation in the group. Identity work encompasses identity talk, but can take a variety of other forms, including participating in group activities, like sporting events and political protests, or confronting a shared threat, like a zoning ordinance or natural disaster.

The question at hand, then, is what role can technology play in constructing collective identity, either through supporting existing practice or constituting new forms of identity work.

Technology shapes the way we understand the

world and our place in it – it is central to the
construction of human identity (Heidegger 1977).
But the form of this relationship is dependant on
the particular technologies in question – just as
mechanization had a profound influence over daily
life and social relations (Giedion 1948), so does
networked communications technology – and, now,
wireless technology – shape the way we understand
ourselves.

As Bill Mitchell, Head of MIT's Media Arts and
Sciences program, observes, the advent of
networked communications has produced a
reconceptualization of identity away from thinking of
ourselves as "discrete, unified intelligences," but as
essentially interconnected entities (2003). Mitchell
sees the advent of wireless, mobile communications
situating identity in a physical location even as it is
extended to encompass relationships with people
and information situated far away.

Howard Rheingold (2002) shares the view that
human identity is increasingly understood in terms
of connectedness. He is primarily interested in
ways that people cooperate, and looks at wireless
communications in relation to several other recent
technologies, particularly distributed computing
and peer-to-peer networking. Based on reviews of
relevant literature and interviews with technologists
and social scientists, Rheingold suggests that indeed
widespread use of wireless technology gives rise
to "smart mobs" – an emerging form of collective

identity that is fundamentally about cooperation for collective action. Mitchell (2003) presents a similar notion when he describes the role of cell phones in coordinating action during political demonstrations.

It's always dangerous to make claims about the nature of social transformations as they are unfolding. However, wireless communications technologies appear to offer the capacity for binding individuals together for collective action, and to extend individual consciousness to include the collective – in other words, to create a sense of collective identity. What's needed are applications that support collective action and foster conscious interdependence.

Opportunities for Community Telephony

This project occurs at a unique moment in telecommunications history. To date, telephone infrastructure has largely been deployed and controlled by telecommunications companies. As a result, there have been relatively few projects that exploit the potential for telephone communications for non-commercial uses. Although hackers have been playing with telephone systems for a very long time, for example, there has until recently been little exploration of telephones by artists & designers (Wilson 2001).

Previous disinterest in telephone technology among creative professional stems from both a perception of telephones as mundane and the inaccessibility

of underlying technology. Neither of these is true anymore. "Wireless" technology is sexy, and by extension, so are (mobile) phones – wireless' most common extension. It is unsurprising that in the past several years there have been dozens of new artworks involving mobile phones by such artists as Golan Levin, Usman Haque, Jonah Brucker-Cohen, the Bureau of Inverse Technology, and others.

Due to their ubiquity, telephones are becoming even more a part of everyday life. Formerly exotic features, like call waiting, caller ID, and 3-way calling that were once available only to businesses are now part of every teenager's lexicon. Conference calling is poised to join this list, with new services being launched by established service providers and new startup companies alike. For example, Orange's TalkNow service allows subscribers to establish conference calls with people listed in their address books, while Integrated Data Concepts now offers a service (www.freeconference.com) that provides low-cost teleconferencing on a "pay as you go" basis.

Renewed interest in voice communications has coincided with new technologies that put control of call switching and voice communications infrastructure in the hands of individuals and grassroots organizations. Voice over IP (VoIP) technology that uses the internet to route telephone calls has come a long way, with steady improvements in sound quality, a growing number of service providers, and dozens of clients including several

VoIP handsets. For developers, the hardware needed to interface a computer directly to telephone systems, which formerly cost many thousands of dollars, now can be had for few hundred. Concurrently, a proliferation of open-source software projects and well-designed commercial products for personal computers means anyone can be their own private-branch exchange (PBX), routing telephone calls within their own private networks, or to anyone in the world.

Related Work

Language interpretation

There are a number of commercial agencies that provide language-interpretation and document translation services by telephone. Most, like Language Learning Enterprises' LLE-LINK service[6] are targeted at corporate clients who conduct international business, but some, including Language Line Services[7] have secured contracts with municipal governments to provide multilingual access to social services.

Commercial services are prohibitively expensive for most working-class communities. Service providers therefore tend to contract their services to businesses and government agencies. As a result, they provide spotty coverage to social services – in a given city, for example, a large hospital may provide language interpretation for callers while a neighborhood health clinic may not.

Additionally, professional interpreters employed by commercial services are limited in their ability to interpret some conversations. For example, effectively conveying meaning between immigrants and health care providers requires more than language proficiency, it requires intimate understanding of cultural connotations of words, phrases, and ideas. Because culture shapes the meaning of language, effective interpretation requires interpreters who are "embedded in [their] cultural-

[6] http://www.lle-inc.com/link.html

[7] www.languageline.com

33

linguistic community" (Avery 2001).

The lesson here is that non-English speakers are best served when interpreters are drawn from their own communities. In other words, the most effective approach is the one that facilitates immigrant communities helping themselves to overcome access barriers. This approach draws on an older tradition of self-reliance and cooperation among working class and immigrant populations. Many communities in 19th and early 20th century America established "mutual aid societies" that pooled resources and expertise to collectively address community-wide concerns, and to provide financial support to individual community members (Beito 2000). Chinese communities in America have a particularly strong tradition of self-sufficiency.

Of particular relevance is "China-5." This organization provided telephone service to San Francisco's Chinatown community during the 1930s, and was staffed by a remarkable collection of women who knew every Chinatown resident. Callers to China-5 need only tell the operator the name of the person they wanted to reach; telephone numbers were not generally used. Taken as a group, the China-5 operators were fluent in every Chinese dialect spoken in the community (Lowe 1997).

Mutual aid societies largely died out with the rise of the modern welfare state. However, the dismantling of the social safety net – an international

phenomenon, generally attributed to the effects of globalization (Castells 2004) – makes this a good time to reevaluate community-based efforts.

Indeed, the mutual aid model is at the heart of initiatives by nonprofit agencies around the country to create "language banks" – pools of interpreters who work directly with immigrants and are drawn from their own communities. Program specifics vary greatly, as some agencies provide interpreters only for emergencies, while others have volunteers available for a wide range of calls. For example, the Tulsa Volunteer Center provides language interpreters for disasters and emergencies[8]; the Seattle Red Cross offers 24/7 language interpretation but doesn't help with legal, medical, or business calls[9]; and the Volunteer Center of Montgomery County, Maryland offers volunteer interpreters for County government agencies and non-profit organizations[10].

These services have their own limitations. They tend to be inefficient, labor intensive undertakings, with human operators providing interpreters' phone numbers to incoming callers or requiring volunteers to sit by the phone during their shifts, awaiting calls. More importantly, by focusing solely on language, they miss the larger problem of access. As previously discussed, language is but one of many socioeconomic barriers that immigrants face. Providing access to non-English speakers requires approaches that address broader socioeconomic issues (Comico and Harris 2002).

[8] http://www.tulsavolunteercenter.org/TVC_corps/CC_home%20page.htm

[9] http://www.seattleredcross.org/international/language/

[10] https://www.montgomerycountymd.gov/apps/lang/index.asp

35

Community technology

Speakeasy addresses access issues by employing information and communication technology (ICT) as a tool to support resource-sharing and collaborative problem solving among members of immigrant communities. In addition, Speakeasy lays the groundwork for community empowerment by fostering networks of interdependence within the community of need, and by helping to build a sense of collective identity and efficacy among its participants. This approach is informed by substantial prior work in community-based technology initiatives.

The idea of using networked computer technology to connect and empower residents of a particular geographic area dates back at least to the 1970's Berkeley "Community Memory Project" (Farrington and Pine 1997). These initiatives have often been framed in terms of the "digital divide," and generally involve the development of community networks (free or low-cost electronic communication networks for community residents) and/or community technology centers (CTCs: public facilities providing free or low-cost access to computers, software, and technical instruction) (Turner and Pinkett 2000). Probably the most well-known of these have been the Blacksburg Electronic Village (Carroll and Rosson 1996) and the Cleveland Free-Net (Beamish 1995). A more recent study revealed approximately 500 community network projects worldwide (Carroll 2001).

Conservative analysts and policy makers point to indications that, as with televisions and telephones, falling prices and growing interest (including the perception that computers are a key to education and economic success) are fueling rapid adoption of computers and the Internet by all economic sectors of society (EPF 2001). They conclude that free market forces will bridge the digital divide more quickly, and more efficiently than the government subsidies that support many CTC and community network initiatives (Powell 1999).

A deeper critique of CTCs and community networking accuses their proponents of a sort of technological determinism that implies increased access to technology necessarily leads to economic and political empowerment. These analysts argue that digital divide theorists conflate access to ICT with access to jobs, services, and information (Servon 2002; Warshcauer 2002; Gurstein 2003). Simply put, making technology accessible is not equivalent with economic or political empowerment (Marx 1999). Overcoming the problems of underserved communities – many of which are indeed exacerbated by the growth of the 'network society' (Castells 2000) – requires addressing a host of social, cultural, and political issues with which technology is inextricably linked, but which cannot be solved by technology alone.

These critiques stem from consideration of the "sociotechnical" nuances of computer use – namely

that users and computers taken together as a unit of analysis constitutes a complex system, the meaning of which is derived through the use of technology as situated in specific social practice. Sociotechnical theory postulates a reciprocal relationship between technology and culture – the way a technology is used depends on the social environment in which it operates, while at the same time, the use of technology structures social relations and shapes culture (Bijker 1995; Kretchmer and Carveth 2001).

This reciprocity suggests that efforts to redress social inequalities through ICT must consider both the design of technology and the social context in which it will be used. The availability of technology by marginalized communities does not in and of itself guarantee access to jobs, services, and power. Community empowerment through ICT requires technologies and applications that are meaningful within the social experience of those constituencies, as well as the formation of social environments that are conducive to ICT's effective use.

Design and Implementation

Community Setting: Boston's Chinatown[11]

Chinatown is a 42 acre inner city neighborhood in the heart of downtown Boston. Built on a landfill created from tidal flats in the early 1800's to provide additional housing for Boston's expanding middle class population, it has become Boston's most densely populated neighborhood, with approximately 6000 residents[12], 91% of whom are Asian. Chinatown residents are primarily first generation immigrants, 40% of whom have lived in Boston for five years or less. The per capita income is $6,539, the median household income is $9,059, and the poverty rate in the neighborhood of 28%. This compares with a poverty rate of 18% for the general population, and a median household income of $12,350 for all Boston households.

The median age of Chinatown residents is 37, compared with a median age of 30.4 for the City. The majority of Chinatown residents are men, with low levels of education – just 8 percent of Chinatown's Asian adult population are college graduates. According to the 1990 Census, 35.2% of Chinatown adults spoke English "not well" or "not at all." The dominant Chinese dialects spoken in Boston are Cantonese, Toisanese, and Mandarin.

Boston's Asian population is increasing at an annual rate greater than 10%. The last two Censuses each recorded an Asian population that had doubled in

[11] demographic data based on interpolation of US Census Data by ACDC and Boston Redevelopment Authority.
[12] ACDC analysis indicates that past Censuses have undercounted the Chinatown population by as much as 10%.

39

size. In addition to the Chinatown neighborhood, small enclaves of Chinese are found throughout Boston's suburbs, with concentrations in Lowell to the North, and Quincy to the South. The dispersion of the Chinese community throughout the greater Boston region poses a significant community organizing challenge, as many of the community's wealthier, more educated members' involvement with the neighborhood is limited to shopping and dining excursions.

Concept Development

I first met Jeremy Liu at a forum on technology and community development held at the Media Lab by the Center for Reflective Community Practice and the Media Lab's Lifelong Kindergarten Group. Jeremy is the Director of Community Programs at the Asian Community Development Corporation (ACDC), a nonprofit development organization that serves Boston's Chinatown neighborhood. He has a keen interest in technology and the arts, and has been involved with several community-based new media art projects. Towards the end of the meeting, which had been spent discussing a variety of ongoing community technology projects, Jeremy made a comment about the lack of technology innovation in the community development sector. Jeremy discussed feeling disappointed as a community developer visiting the famed Media Lab, walking past a number of provocative technologies on display in the building's corridors on his way to the meeting, and then finding that, when it came to community

development, there didn't seem to be anything new going on.

Jeremy's comments struck a chord with me, as they reflected my growing frustration with the community technology field. In the year or so I had spent researching information technology and community development, it often seemed that community technology initiatives – particularly those focusing on the needs of inner city neighborhoods – are limited to a handful of fairly similar projects, largely concerned with providing access to computers and internet technology.

To be sure, these are worthwhile efforts. Many underserved communities still lack basic infrastructure, so providing access to information networking technology remains an important goal. However, as a designer – a field that perhaps fetishizes innovation – I have been disappointed not to find more "breakthrough" projects addressing the needs of the inner city; particularly at a time when so much research and development is focused on bringing technology to the developing world. It appears that these efforts are largely driven by interest in the developing world as an emerging market for electronic products, a view that doesn't extend to urban centers in the United States (Sherry 2003).

Nonetheless, there is the perception among some inner city residents and community organizers

that at the same time that students, faculty, and corporate researchers are combing the rural villages of south America and southeast Asia for technology opportunities, communities like Roxbury and the South Bronx garner little attention from technologists and designers.[13]

After the forum, I approached Jeremy and suggested we get together for a chat. Over the next several weeks, we held a number of informal meetings – often in neighborhood bars and restaurants – during which we talked about art, technology, and community development. We discovered several common areas of interest, including public safety, grassroots media, and environmental monitoring, and quickly came up with several project ideas.

Based on feasibility, available resources, and community need, we decided to focus on public safety. Several recent deaths in the neighborhood had heightened local concern with crime, and had motivated the ACDC to host a series of community-wide discussions about public safety. One of the outcomes of these sessions was the recognition that language presented an insurmountable barrier to many Chinatown residents' access to vital government services, including police and 911.

Recognizing that distributed throughout the community are individuals who have language skills and expertise needed to overcome many obstacles that immigrants face (Rogers and Ellis 1994), and

[13] My experience working in Springfield, Roxbury, and Chinatown - communities that have strong MIT partnerships - has shown that when residents hear of academic projects in the developing world, a common response is "why don't they do that here?"

that access to telephone technology by residents is nearly ubiquitous, we developed the concept of a telephone-based service that would connect non-English speakers with volunteer translators, and support three-way calling to police and emergency-response services.

We also thought that the widespread use of mobile telephones could provide a means for overcoming barriers to traditional forms of volunteerism, the most significant of which are time constraints (Putnam 2000). Rather than requiring volunteers to come to Chinatown for long periods of service, mobile phones could allow translators to be "on call" to the community whenever they had a few minutes to spare, wherever they might happen to be.

In addition, we considered the opportunities and challenges afforded by immigrants' current practice of relying on friends and family members for assistance with language and other needs. By extending this activity, we hoped to leverage socially meaningful practice to facilitate adoption of the service (Warschauer 2002); but attempting to replace established social relations with a network of well-intentioned strangers would require that the service provide benefits that could not be achieved through current practice.

Jeremy presented the concept to colleagues in Chinatown, while I spoke with community organizing and technology developers at MIT's Media Lab

and the Center for Reflective Community Practice.
These sessions helped to identify a wider range
of situations in which residents might benefit
from translation and interpretation services, and
highlighted some of the sociolinguistic factors
that mitigate immigrant access to social services,
including awareness of available services, mistrust
of government, and feelings of helplessness and
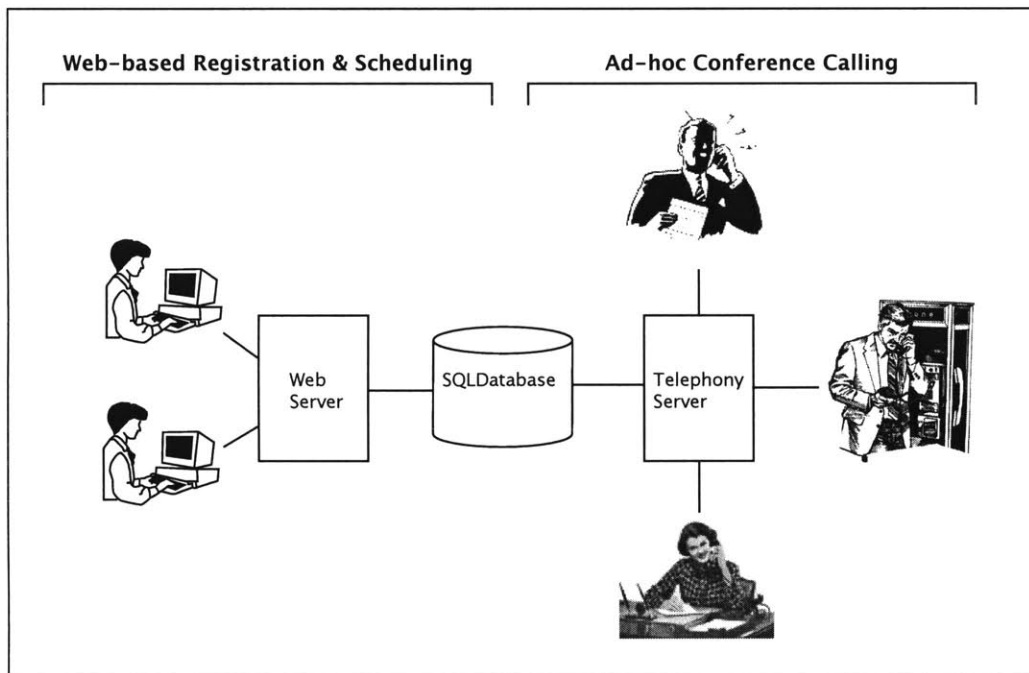
system diagram

isolation. A conversation with Chris Schmandt,
director of the Media Lab's Speech Interfaces
Group, confirmed the project's feasibility, and
clarified several technical issues.

Based on these conversations, we developed several
scenarios that guided the system design (Carroll

1994). Scenarios included both telephone calls (e.g. reporting noise complaints, requesting service from utility companies) and face-to-face encounters such as automobile registration and parent-teacher conferences. Through these scenarios, we developed the concept of "community guides" – multilingual community residents who, as current and former consumers of social services, are familiar with social service options and with neighborhood and cultural issues. These "guides" would provide real-time language interpretation over the phone, and would also help neighborhood residents navigate the social service system. Where appropriate, they might also suggest non-institutional solutions to problems, including, for example, references to neighborhood service providers such as handymen and baby sitters. We also decided to focus on "quality of life" issues rather than emergency-response services. This decision was motivated both by concern about legal liability and by the expectation that users of the system were far more likely to need to report noise complaints or ask questions of the housing department than to require emergency fire or police response.

The "Guides" concept helped clarify the value that our approach offered over other solutions to language barriers. Because Guides would be "embedded in [their] cultural-linguistic community," (Avery 2001) they would not only provide language interpretation assistance, but could also provide guidance on navigating social service networks and

help accommodate cultural specifications. We came to envision Guides as bridging the gap between immigrants and the various government, nonprofit, and private sector organizations that are available to them.

Implementation

It was clear from the outset that this project involved the design of both technical and social systems. In the technical domain, we needed to design and implement web and telephone services. On the social side, we needed to develop a means of recruiting and training Guides, and publicizing the service within the Chinatown community.

Technically, Speakeasy consists of three components – a web service for Guide registration and scheduling, a telephony server for call routing and conferencing, and a database that stores Guide phone numbers and schedules.

Design of the database was begun in September, 2003, and took several weeks. By October, a MySQL implementation of the database was running under Linux on a Pentium III that I salvaged from the Media Lab's informal equipment recycling network (i.e. I found it sitting in a closet). Approximately a month later, a web-based application supporting Guide registration and scheduling had been implemented in HTML, with PHP scripts handling form processing.

While the database and web application

development went relatively smoothly, the telephony server presented a challenge. Based on input from the Speech Interfaces Group (SIG) at the Media Lab, my initial specification was designed around an Intel Dialogic D/120JCT-LS voice data combined media board, which Intel Research had graciously donated to the project. The rationale for choosing this hardware was that Dialogic boards are considered "industry standard" for telephony server applications, and that SIG had extensive experience with this technology and had already developed software libraries for this board that could be extended to support the functionality I needed.

After several frustrating months, it became clear that the challenge of adapting the Speech Interfaces Group's libraries was more difficult than initially anticipated. It also turned out that the Dialogic board didn't support call conferencing, a crucial feature. I began investigating alternative technologies and discovered two promising open-source PC-telephony software packages, Asterisk and Bayonne. After weighing the advantages and disadvantages of each, I decided to proceed with Asterisk, even though this would require new PC-telephony hardware. While it might have been possible to develop Dialogic drivers for Asterisk, this seemed like an unnecessarily arduous task considering that the Digium cards that Asterisk supports are only about $100 each. In the end, Digium donated several cards to the project, which minimized cost considerations.

With the new software and hardware, development picked up considerably. By the end of December, I had a prototype that answered the telephone and allowed users to place outgoing calls. By the end of January, users could also initiate conference calls to 3rd parties. By the end of February, this was integrated with the database I'd written, so that a user who called the system would be connected with another user who had registered their phone number and schedule with the web service.

In early March, I conducted an informal test of the system with 10 MIT students to assess usability and identify technical problems. During a single two-hour period, participants played both the role of users and Guides, and used the system to call the Kendall Square Cinema to ask about movie schedules. Participants were then asked to evaluate each component of the interaction (registering and scheduling, making and receiving calls).

The results of this evaluation were encouraging. Participants were able to complete the assigned task, and all reported little or no difficulty with either the web or telephone interface. This test also identified several software bugs (including an error that occurred with certain on-campus telephone prefixes), highlighted areas for improving the interface (particularly the volume of several of the recorded messages), and identified additional features to be implemented.

Over the next two weeks, I fixed the bugs and made the interface improvements suggested by the first test. I also redesigned the website to provide a cleaner, simpler look. By late March, the improved prototype was ready to be deployed in Chinatown for its first "real-world" evaluation.

Participant recruitment and training

Concurrent with developing the Speakeasy prototype, we began recruiting participants from ACDC's networks of community residents who are currently involved in other ACDC projects, including its Youth Leadership Network. Jeremy was also eager to use the Speakeasy project as an opportunity to form new relationships with other civic organizations, and with Chinese and Chinese-Americans living outside of Chinatown. From a community development standpoint, increasing the involvement of these individuals and institutions – many of whom are wealthier and better-educated than their inner-city counterparts – is vital to the political and economic empowerment of the neighborhood. Toward this end, Jeremy approached several suburban churches and civic organizations, and also contacted several individuals he knew socially, but had previously had little opportunity to involve in ACDC activities. E-mail was also sent to several community action mailing lists.

Recruiting users presented a different challenge. Immigrants with limited or no English proficiency

are less likely to be involved with community development groups and tend to have limited social networks, making them difficult to reach. At the same time, we were hesitant to publicize the project too widely in the community for fear of adversely affecting future adoption by unrealistically raising expectations for an experimental service.

We formed a strategic partnership with the Boston Chinatown Neighborhood Center (BCNC)[14], a nonprofit agency that offers "English as a Second Language" (ESL) classes to Chinese-speaking adults. Working with new students in the ESL program provided access to immigrants with limited English proficiency in a controlled setting. The BCNC also administers a "mentors" program, through which graduates of their ESL program help new students with homework and answer language questions. Given the similarities between this program and the "Guides" concept we had developed for Speakeasy, the BCNC partnership was a natural one.

To ensure that all participants understood the nature of the project and to address any concerns they might have, we conducted training sessions for both users and Guides. These sessions were held at ACDC and BCNC offices over the course of about a week.

The user training sessions were conducted in Chinese and were led by Edward Wei, a student at Harvard Law School that Jeremy had recruited

[14] See Appendix A for information on the BCNC.

to help with the Speakeasy project. Ed introduced Speakeasy and gave the students an opportunity to familiarize themselves with the telephone interface. He explained that Speakeasy was an experimental system it's early stages of development, and asked that the students set their expectations accordingly. He also stressed that Speakeasy should not be used for emergencies. Finally, Ed handed out a sheet with several examples of how Speakeasy might be used. He asked the students to try the system using an example from the sheet, or to invent their own uses for it.

The guide training sessions were held at the ACDC offices, and were moderated by Jeremy, Ed, and me. We introduced the system to the volunteers, and gave them an opportunity to practice using both the telephone and web interfaces. As with the users, we discussed the experimental nature of the system, and described the types of uses we envisioned. Again, we stressed that Speakeasy should not be used for emergencies. If a user did call with an emergency, we asked the Guides to instruct the caller to contact 911, and to say the word "Chinese" in English, which would alert the 911 operator that Chinese language assistance was needed.[15]

We also gave the volunteers small booklets that I designed which included instructions on using Speakeasy, and lists of various Boston government and social service agency phone numbers that might be of use. The booklets also included several "Call

[15] Strange as it may sound, this was the protocol that the Boston Police Department suggested to the ACDC.

Diary" pages, which were to be used to document calls they received. We requested that the volunteers carry the booklets with them during the evaluation period.

Finally, we discussed privacy issues, and cautioned the volunteers not to divulge details about calls they received. We further instructed them not to include callers' names or telephone numbers in their Call Diary entries.

Evaluation

This evaluation is based on a two-week pilot of the Speakeasy system in Boston's Chinatown neighborhood from March 25 through April 8 2004. In total, 26 Guides registered with the system, of which 20 were actually on-call during the test period (the other six dropped out of the evaluation after attending training). Speakeasy was made available to current BCNC students, which represented a user base of approximately 200 people.

Several data collection methods were employed. Surveys were administered to Guides and users to collect demographic data, and to assess attitudes and usage patterns. Guides were also asked to maintain diaries throughout the evaluation period, which were used to record details about each call. Finally, informal interviews were conducted with several Guides and users, both in person and via e-mail.

30 users and 8 Guides completed surveys. Questions for users were translated into Chinese by Douglas Ling, Executive Director of ACDC; the responses were translated into English by Ed Wei. 5 guides also completed and returned call diaries. Informal interviews were conducted with approximately twelve Guides by e-mail and in person.

During the trial period, Speakeasy answered 54 calls. It should be noted that this number is probably not a good indicator of the community's degree of interest

in this project. Users tended to call in the evening although Speakeasy's service hours ended at 8 PM, and each session tended to last a minimum of 15 minutes. As a result, only a relatively small number of calls could be answered on any given day. Also, the prototype only allowed one session at a time, which resulted in many callers reporting difficulty in accessing the service. This may have discouraged users who heard that others were unable to get through. Finally, some members of the user group were advanced ESL students who tended to be relatively established members of the community, with some level of English language proficiency and familiarity with social service options. These individuals are probably better suited to being Guides than users. Based on feedback from Chinatown residents, we expect higher usage rates when more developed version of the system is deployed.

This pilot was intended to asses three things: the usability of the system (with particular emphasis on the phone interface), the actual uses that the system was put to, and likelihood of adoption – in other words, does the system fill a real need and will people use it, even individuals who currently rely on family and social networks for guidance and language help.

User Experience

Usability was assessed both through surveys and informal interviews. Users reported little difficulty using both the web and phone interfaces, and were

generally able to complete tasks. Minor language changes were suggested for some of the audio prompts, and several users reported difficulty hearing some of the messages, particularly when they accessed the system via mobile phone from busy or crowded locations. Also, at least one Guide experienced confusion around dialing "1" before entering an area code for outgoing calls. Speakeasy doesn't require this prefix, but the Guide was so used to including it that doing so had become an unconscious part of placing calls. The next version of the Speakeasy prototype will allow long distance dialing both with and without the prefix.

Several users stated that it took too long to be connected to a Guide, while others reported busy signals when they tried to access the system. Several factors contributed to this problem. Because the prototype utilized three analog phone lines (one for incoming calls, one for calling Guides, and one to call 3rd parties), calls could only be made sequentially. If a session was underway, subsequent callers were unable to connect. Also, the system could only call one Guide at a time, and would have to wait until the first available Guide refused the call or until a time-out threshold (15 seconds) was reached before trying the next one.

The Asterisk software also has a difficult time identifying busy signals on analog lines, which again meant it took approximately 15 seconds before an outgoing call was considered "unanswered." Finally,

the speed of the system was determined in part by the capabilities of the server, which, as been previously noted, was an outdated machine with limited memory and processing power.

The next iteration of Speakeasy will address this issue by upgrading from analog lines to a dedicated T-1 phone line, supporting up to 24 channels of voice data. This solution will support multiple simultaneous sessions, and will also improve the PBX's ability to detect busy signals, hang-ups, and the like. In addition, the next version will be developed on a newer, faster machine, which should improve performance.

For the first several days of the evaluation, there was a software problem that caused Speakeasy to occasionally crash at the end of a session. This resulted in the system being down for several hours at a time. The problem was fixed shortly after it was detected. However, it is unknown what effect if any this had on users' perception – for example, people who were unable to connect during the first few days may have become discouraged and not tried again.

Due to the limited number of Guides participating in the project, the service was restricted to the hours between noon and 8 PM daily. Unfortunately, this was not suitable for some users, particularly those who worked very long hours. We received several requests to extend the hours, which will certainly be taken into consideration in the next deployment.

But this also points to a user need that was not addressed in the system design. Because many immigrants work long hours with very little flexibility, they tended to use the system at night and on weekends, when many social service offices are closed. As a stop-gap measure, we instructed Guides to refer calls to 24-hour telephone services, such as the Mayor's 24 Hour Helpline and the United Way's "First Call for Help" service. Longer-term, it might be worthwhile to integrate an asynchronous messaging system to overcome scheduling issues.

All in all, the results were positive. Users had little difficulty with the telephone and web interfaces, and found the service to be useful. The negative feedback that was recorded reflected the need for longer service hours and more Guides - indications of strong user desire for the service.

Applications

Call diaries completed by five Guides provided analysis of 20 calls, which revealed a range of uses. Four calls pertained to citizenship and immigration issues, two with transportation and telephone service, and one each with answering education, entertainment, housing, and medical questions. Two callers requested social service agency referrals, and four were unclassifiable (for example, a Guide reported a caller's need as simply "interpretation" without further detail).

While most calls were informational (requiring

responses to specific questions), two were transactional in nature. One involved changing a user's address with a utilities provider, while the other was from a maintenance worker employed by a Chinatown building who needed to order supplies from Home Depot.

The degree of assistance required by users varied from simple information requests like "how late is the Museum of Fine Arts open?" to more complicated inquiries, like whether or not a caller's medical insurance would cover the costs of her lung x-rays. In addition to providing language interpretation, Guides answered questions, performed internet searches, and acted as proxies – for example, in the case of the user who needed to order supplies from Home Depot, the Guide wrote down the user's information and placed the order for them.[16]

[16] This raises an interesting problem. While a some service providers will provide information to proxies, many public institutions and government agencies will only speak directly with individuals who make requests. According to informal interviews we conducted, current practice is that bilingual friends impersonate their non-English speaking colleagues in order to access information or request services.

Calls were often time consuming – one Guide reported that "each call lasted about 15 minutes minimum, in order to properly respond to callers concerns. Most calls required further research and calling third parties, such as public agencies, friends, or going on the internet to get proper info." Several sessions required making multiple outgoing calls; for instance, a first call to find the name and phone number of the agency best suited to handle a request, followed by a call to that agency.

The variety and complexity of calls shows the need for Guides who are dedicated to public service,

and are capable of creatively addressing callers' needs. In other words, the success of the Speakeasy system is predicated on providing more than just language interpretation. It must address a host of interrelated issues including familiarity with available information and social service resources, and awareness of local concerns. It also shows the need for an interpretation service that works directly with immigrants, rather than being employed by certain organizations or agencies. Information retrieval and accessing services often requires contacting a chain of organizations and agencies before a problem is addressed; if any one of these is unable to understand a caller's need, the chain is broken and the problem goes unresolved.

Guides also suggested several new uses for the Speakeasy system. One guide, a former legal aid worker from Los Angeles, felt that there is not enough legal assistance in Boston, despite keen interest in immigration law among Chinese and Asian communities (this observation was corroborated in the Speakeasy trial: more calls were related to immigration and citizenship issues than any other topic, including one call requesting information about pending changes to US immigration policy scheduled to take effect in 2005). This Guide was convinced that, if Speakeasy were up and running, she could organize 20-25 volunteer lawyers to support a legal aid hot line.

Another interesting finding was the desire expressed

by Guides to meet callers face to face. For example, several calls pertained to billing issues. In these cases, it was suggested that resolution would be easier through a face-to-face meeting, where the guide and user could look at the bill together. This suggest a potential benefit of incorporating location-awareness in future development, so that users could be connected with Guides who are physically close by.

Adoption

Speakeasy was well received by both users and Guides. Even before we began testing the system, there was substantial interest by the community, and several non-English speaking residents expressed deep skepticism that we didn't intend to charge them to use the service.

50% users who were surveyed said that they would use Speakeasy again, compared with 17.65% who said they would not. Only one indicated that he would not recommend the service to his friends or family. Those who indicated that they would not use the system generally cited the long wait times and inability to connect with Guides, problems that will be improved in the next version of the project. Only two users indicated that they did not see a use for Speakeasy in their lives. Fewer than 15% of respondents were unable to recall a time in the previous 30 days when language proficiency didn't pose a problem to them personally.

73.53% of users report relying on bilingual friends, family, and other associates to help them with English. The fact that so many of them wish to use Speakeasy and recommend it to others indicates that current practice is not meeting all of their language needs. This is confirmed by most respondents citing utilitarian reasons for using or recommending Speakeasy. Several also referred to convenience as a motivating factor, indicating the need for a service that provides "just in time" assistance more effectively than current practice. Respondents also expressed a desire for greater independence and the ability to do things like travel and post packages by themselves – further indication that Speakeasy will improve immigrants' quality of life if it fosters a sense of autonomy and efficacy.

Guides were similarly receptive to the Speakeasy project. Overwhelmingly, they cited altruistic reasons for participating, such as wanting to "give back" to their community, or to "help others." This is not surprising as the volunteers were largely recruited from existing community service networks, and many reported involvement with other community service projects. However, this poses an interesting challenge for designing incentive programs to retain Guides, as it indicates a need to reward participation in ways that reinforce this spirit of civic responsibility, rather than replacing it.

In considering the Speakeasy model of just-in-time community service, it is informative to note that

several Guides cited time constraints as a primary barrier to community involvement – hardly surprising as our volunteers generally reported working between 40 and 70 hours per week. For these people, the ability to remain "on call" while attending to work, family, and other obligations is an attractive means of fulfilling their wishes to "give back" to the community. According to one Guide, "[My husband] tells me that the doctors at the hospital are so desperate for Cantonese interpreters. I never sign up for it because I was told that I had to go to the hospital in the middle of the night. If I could do it over the phone, then I won't mind so much."

It should be noted that for some Guides, interest in the project wasn't entirely selfless. Several volunteers who live in Chinatown report helping family members, friends, neighbors, and others with language and other needs on a regular basis. At least one of these told us she hopes the Speakeasy project is a success so that "maybe they can call someone else for a change!"

Conclusions and Future Work

Speakeasy increases immigrants' support networks, offering access to a network of volunteers through a single, easy to use interface. This project demonstrates the feasibility of improving immigrant access to social services through a community networking system that integrates web and telephone technologies. The work completed thus far shows the need for a community-based solution that is not tied to one or several agencies, and the efficacy of volunteers who are sufficiently motivated and familiar with local need and culture to address the complex obstacles – linguistic and otherwise – that immigrants face. Qualitative analysis of a two-week trial of Speakeasy has demonstrated the desire for such a system among the residents of Boston' Chinese community. This indicates that such a system would likely supplant the current practice of relying on established social and familial networks by providing convenient access to language interpretation and other assistance. The system could also enhance immigrants' quality of life by promoting feelings of self-reliance and independence.

This research discovered Speakeasy's potential to relieve the burden of a few well-connected community members who currently provide informal assistance to many friends and family members. It has also demonstrated the role that mobile telephony can play in boosting civic engagement and volunteerism by offering a means of remaining "on-call" to one's community even while managing a host

of competing responsibilities.

Nonetheless, significant work remains to be done for Speakeasy to reach its full potential. The short-term goal is to institute several technical upgrades that will prepare the system for an expanded pilot that services all of Boston's Chinese community. Longer term, the goal is a national rollout of the Speakeasy system, and extending the service to other language groups. This plan is contingent upon additional work in several areas.

Hardware upgrades

Technically, the obvious next steps are upgrading the Speakeasy server to a faster machine, and implementing an all-digital solution that replaces the three analog telephone lines with a T-1 voice line. This will improve performance and reliability, and with 24 voice channels, will reduce wait times and increase access to the service by supporting multiple, simultaneous sessions. This solution will also allow more than three people to participate in a session, which will provide new opportunities of collaboration among immigrants, volunteers, and service providers.

Improved access to knowledgeable Guides

Perhaps the greatest challenge facing adoption is ensuring that callers are able to reach Guides who have the appropriate skills, knowledge, and experience to provide meaningful assistance. This is a resource management issue, requiring solutions

that make the most efficient use of Guides skills and availability.

With the current implementation, Guides set their schedules based solely on availability, with no awareness of other Guides' schedules or of the system's usage patterns. Because the trial deployment was carefully managed, there was reasonably good coverage throughout the test period. In practice, however, it is easy to imagine Guides' availability clustering according to work and commuting schedules, which may not correspond to users' needs and leaving times with little or no coverage.

Coverage could be easily improved with a collaborative scheduling application that visualizes an aggregated Guide schedule, and also highlights system demand based on usage patterns. Guides would be able to see where coverage is light and demand heavy, and schedule their availability accordingly.

Collaboration and Knowlege-Sharing among Guides

The evaluation revealed that users, many of whom work very long hours, were generally available to make calls at night and during the weekend, when most agencies are closed. Adding an asynchronous messaging system to Speakeasy could address this discrepancy. For example, if a user called after hours to request information about registering her daughter for school, a Guide could forward the request to

another volunteer who was scheduled to be "on-call" during the day. The second volunteer could call the user back with an answer to the query, or might simply leave a message with a voice mail message for the user to pick up at their convenience.

Additional messaging capabilities would also allow greater collaboration among Guides, and could provide a means of sharing tacit knowledge. For example, Guides might ask each other for advice or assistance in solving problems or addressing particularly complex queries. This could be done through expanded conferencing features while the caller is on the phone, or asynchronously utilizing voice mail or a call-back feature.

Sophisticated Matching

The evaluation demonstrated that immigrants often have questions that require specialized knowledge. This finding is borne out by research showing that medical translators and interpreters need to be well versed in medical and cultural issues as well as language (Avery 2001). Speakeasy would benefit from a more sophisticated matching system. Currently, Guides are selected by language and availability; future versions could also select according to skills or areas of expertise. For example, a caller might indicate that they speak Cantonese, and need to speak with someone about auto repair. If Speakeasy maintained a database of Guides' areas of expertise, it would be a simple matter to connect the caller with an appropriate volunteer. This would also

facilitate adding specialized services to Speakeasy, like the legal assistance hot line described previously.

Integrating emerging technologies

The Federal Communications Commission has mandated that all mobile telephones include location-awareness capabilities by 2005. Location data could be used to match callers with nearby Guides, which would facilitate face-to-face meetings for document translation and other applications – a need that was revealed by the evaluation.

VoIP technologies have matured dramatically in the past few years, and are gaining market share. As a nationwide rollout of Speakeasy is contemplated, VoIP would enable connecting local Speakeasy networks to create a nationwide service, which could dramatically increase Guide availability. For example, a user who calls the Boston service at midnight could be connected to San Diego, which might have more available Guides because local time would only be 9 PM.

Finally, wider adoption of mobile web and text messaging could enhance Guides' effectiveness. As the evaluation demonstrated, Guides often resolved calls by retrieving information from the world wide web. For most guides, this currently requires access to a PC or laptop. If guides were equipped with appropriate devices and service, they would be able to access information and answer callers' questions wherever they are. Similarly, sending brief text

messages to each other while they answered calls would provide a fast and convenient way for Guides to collaborate to address users' needs.

Volunteer Recruitment

At the heart of the Speakeasy system is a network of skilled, dedicated volunteers. The success of the project is dependant on the ability to attract and retain Guides. The evaluation provided valuable insight into the types of people who are likely to participate in the program. This information can inform future recruitment activities.

Guides were recruited from variety of neighborhoods and socioeconomic backgrounds. While they tended to be young women in their late 20's and early 30's, there was enough variation in the sample to indicate that men and women of varying ages and educational backgrounds could be enlisted as volunteers. Indeed, the most significant similarities among the Guides were a desire to serve and involvement in an active social network, rather than gender, age, or socioeconomic factors.

The point here is that recruitment is most effective when it leverages existing social networks, of the type that are maintained by community organizations. This insight has implications for the design of an organizational structure to carry the project forward. It is not enough that Speakeasy is a concept that resonates with immigrant communities. As the project is extended to additional communities, it will

be developed in partnership with local organizations that can provide local legitimacy and networks of potential volunteers. Once a Speakeasy site is up and running, it is expected that it will create its own social network as Guides publicize the service and recruit their friends and family. A long-term goal for this project is to develop rich networks of civic engagement that support the system, and which can also be leveraged for other community development efforts.

Training

In addition to speaking several languages, successful Guides are familiar with social service alternatives, and are creative problem solvers. These capabilities are a form of "tacit knowledge" that many new Guides do not realize they possess (Polanyi 1974). Awareness of these abilities and the value they can provide to others can be developed through education and training.

Developing an appropriate training curriculum will build confidence and enhance Guides' efficacy. Guides also need to understand the importance of confidentiality, which requires developing an well-considered privacy policy and methods for communicating this policy to Guides and users. Because privacy concerns are largely context-dependent, policy should be developed in collaboration with local communities.

Incentives and Accountability

If recruiting Guides is a one challenge, maintaining their interest and involvement over time is another. This will depend on developing appropriate incentive models to reward ongoing participation.

Incentives present an interesting design challenge. The most obvious approach, to pay Guides for services rendered, may not in fact lead to quality service. For example, it has been well documented that paid donors tend to produce a lower quality of blood than volunteers (Titmuss 1971) – which is why the American Red Cross does not pay for donations.

Knowing that Guides are likely to be motivated by altruism, incentives should reward those tendencies. Distributing regular newsletters that highlight Speakeasy's efficacy might be one way to reinforce the sense the Guides' contributions are valuable; holding annual dinners or distributing T-shirts might be a way to provide social recognition for involvement. Obviously, particular reward and incentive programs will have to be socially meaningful and in accordance with such local concerns as privacy and anonymity. Therefore, they should be developed in close consultation with the local community.

Incentives will be accompanied by accountability. Measures must be put in place to ensure that Guides do their job effectively, and to the users' satisfaction. One means of achieving this accountability would

be developing a rating system, wherein users evaluate Guides' performance. For example, at the end of each session, a user might rate the Guide's performance according to criteria like effectiveness and politeness. Guides with high ratings will be given preference in receiving additional calls, and might be publicly honored with a "guide of the month" award on the Speakeasy web site.

Sustainability

Installing and maintaining a Speakeasy network, recruiting and training guides, providing incentive programs – these things all cost money. While it may be expected that government and foundation support might be secured to cover initial expenses, it is clear that Speakeasy will have to be self-supporting. This requires developing organizational models and business plans.

I envision a distributed organizational structure consisting of several independent but related Speakeasy networks, each associated with a particular geographic area. For example, Speakeasy networks might be established in Boston, New York, Chicago, San Francisco, and San Diego – US cities with significant Chinese populations. At the center of each network would be an organization that hosts the Speakeasy service, and is responsible for technical administration, publicity, and managing Guides. The various independent networks could be connected through a nationwide VoIP service, allowing the various sites to pool Guides.

This organization would also facilitate connecting disparate ethnic communities, which could provide a variety of language translation options (for example, Chinese / Spanish) and promote solidarity and advocacy work that transcends ethnic boundaries.

A separate organization would assume responsibility for developing and maintaining Speakeasy technology, as well as developing training materials to be shared throughout the Speakeasy network. This organization would host software and document repositories, and would also conduct regular assessment of usage patters and user feedback at each site. This assessment would be used to identify emerging needs and trends, and make improvements and develop new features accordingly. Best practices could be identified at local sites, and distributed across the network.

Several revenue streams can be tapped to fund this activity. Given the community of intended users, it is neither desirable nor feasible to generate operating funds solely by charging end users for the service. However, it is conceivable that the organizations that benefit from Speakeasy use would be willing to underwrite its costs. For example, city governments and private businesses might contribute to a Speakeasy fund that would defray the cost of the service. The challenge would be structuring the fund in such a way that users are not limited to contacting only agencies and institutions that contribute to the fund. This is sort of a public radio model, where the

service is underwritten by donations, with the implicit understanding that not everyone who accesses the service contributes to its operating costs. This might be feasible if it can be demonstrated that funding a citywide service offers a greater cost benefit to sponsoring organizations than the current practice of hiring private contractors on an agency-by-agency basis – even if it is understood that some beneficiaries of the service would not be contributing to its upkeep. As an added incentive, it might also be possible to arrange branding or public relations opportunities for sponsoring organizations.

Another potential source of revenue comes from analyzing usage patterns of the Speakeasy system. Assuming the service is widely adopted, monitoring the frequency and types of calls that are made will provide on-the-ground data about changing community needs. Aggregating this data will enable community development organizations and social service agencies to identify emerging trends, monitor public health and safety issues, and evaluate program effectiveness at the community level. Because this data will enable institutions to more effectively monitor needs and allocate resources, it has value that can be leveraged to underwrite the cost of operation. For example, Speakeasy sites could offer monthly reports to subscribers, or provide on-demand access to aggregated usage analysis for a fee.

Fostering Trust and Social Relationships

The long-term goal for this project is developing social capital and collective identity among participants, in order to organize and empower immigrant communities. This effort proceeds by building trust within the community. Speakeasy requires a significant level of trust among its participants (Bannon and Bødker 1997). Users must have faith that the Guides will offer sound advice and not betray confidence; Guides must trust that personal information they share with the service will not be misused. And, it goes without saying, all participants must trust that the system will work as advertised.

At the center of this relationship is the sponsoring organization – in this case the Asian Community Development Corporation and the Boston Chinatown Neighborhood Center. Guides and users agreed to participate in this project because they had ongoing relationships with these organizations, which have spent many years establishing a presence and building their reputation within the community. Speakeasy provides an opportunity for neighborhood associations to strengthen community relationships, and expand their networks through the recruitment of new Guides and new users. At the same time, sponsoring organizations will need to be vigilant to ensure that communication remains open, that expectations are fulfilled, and that all parties benefit from their involvement.

Speakeasy can also help to foster a sense of personal involvement in the lives of immigrants among Guides. This sense can be nurtured by using Speakeasy's matching mechanism to create ongoing relationships between individual users and Guides. If a caller and a Guide have positive experiences with each other, then Speakeasy might attempt to match the caller with the same Guide in subsequent sessions. Provisions might be made to encourage other kinds of interactions as well; for example, users might be able to record "thank you" messages or birthday greetings for well-liked Guides.

The goal here is not simply to relieve overburdened family members, or just to provide a more convenient means for non-English speakers to access social services. By supplanting informal networks of dependency with formal structures that are mediated by technology and brokered by trusted community development organizations, Speakeasy hopes to extend both immigrants' and Guides' sense of themselves to include the whole community – to see themselves as important members of a vibrant, powerful group of people. This sense of collective identity and collective efficacy is at the heart of successful community empowerment efforts, and should be an integral component of community technology initiatives.

References

[AAPIP] Asian Americans/Pacific Islanders in Philanthropy (1992) "Invisible and in Need: Philanthropic Giving to Asian American and Pacific Islanders," AAPIP, New York.

Avery, M. P. (April 2001) 'The Role of the Health Care Interpreter: an Evolving Dialogue,' The National Council on Interpreting in Health Care, Santa Rosa, CA.

Bannon, L. and Bødker, S. (1997) 'Constructing Common Information Spaces,' Proceedings of the European Conference on Computer Supported Cooperative Work (ECSCW'97), Kluwer Academic Publishers, Netherlands.

Beamish, A. (1995) 'Communities On-Line: Community Based Computer Networks,' Master in City Planning Thesis, Department of Urban Studies and Planning, Massachusetts Institute of Technology, Cambridge, MA

Beito, D. T. (2000) From Mutual Aid to the Welfare State: Fraternal Societies and Social Services 1890-1967, University of North Carolina Press, Chapel Hill, NC.

Bijker, W. E. (1995) Of Bicycles, Bakelites and Bulbs: Toward a Theory of Sociotechnical Change. MIT Press, Cambridge, MA.

Brady, K (2000) 'Immigration Consultant Fraud: Laws and Resources,' Immigrant Legal Resource Center, March.

Calhoun, C. (1991) 'The Problem of Identity in Collective Action,' in Macro-Micro Linkages in Sociology, ed. J. Huber, Sage Publications, Newbury Park, CA.

Carroll, J. M. (1994) 'Making Use: A Design Representation,' Communications of the ACM 37(12).

Carroll, J. M. (2001) 'Better Home Shopping of New Democracy?', SIGCHI Conference on Human Factors in Computer Systems, ACM Press, New York.

Carroll, J. M. and M. B. Rosson (1996) 'Developing the Blacksburg

Electronic Village,' <u>Communications of the ACM</u>. 39.

Castells, M. (1999). 'The Information City is a Dual City: Can It Be Reversed?' in <u>High Technology and Low-Income Communities: Prospects for the Positive Use of Advanced Information Technology</u>, ed. D. A. Schön, B. Sanyal, and W. J. Mitchell. MIT Press, Cambridge, MA.

Castells, M. (2000) <u>The Rise of the Network Society</u>, Blackwell Publishers, Malden, MA.

Castells, M. (2004) <u>The Power of Identity</u>. Blackwell Publishing, Malden, MA

Castles, S. and M. J. Miller (2003) <u>The Age of Migration: International Population Movements in the Modern World</u> The Guilford Press, New York

Chan, C. S. and L. Zhan (2002) 'A Survey of Health Services and Identification of Needs for Asian American Elderly Women in the Greater Boston Area,' <u>Institute of Asian American Studies</u>, University of Massachusetts Boston.

Comico, E. and B. Harris (2002) 'Maternal and Infant Services: an Examination of Access in a Culturally Diverse Community,' <u>Journal of Paediatry and Child Health</u> 39(95-99).

Crossette, B. (2002) 'UN Coaxes out the Wheres and Whys of Global Immigration,' <u>New York Times</u>, New York, July 7.

Doheny-Farina, S. (1996) <u>The Wired Neighborhood</u>, Yale University Press, New Haven, CT.

[EPF] Employment Policy Foundation (2001) 'Computer Ownership and Internet Access: Opportunities for Workforce Development and Job Flexibility,' <u>Technology Forecast</u>, Jan 11.

Fantasia, R. (1989) <u>Cultures of Solidarity: Consciousness, Action, and Contemporary American Workers</u>, University of California Press, Berkeley, CA.

Farrington, C. and E. Pine (1997) 'Community Memory: A Case Study in Community Communication,' in <u>Reinventing Technology, Rediscovering</u>

Community, ed. P. Agre and D. Schuler, Ablex Publishing, Norwood, NJ.

Giedion, S. (1948) Mechanization Takes Command: A Contribution to Anonymous History, University of Oxford Press, Oxford UK.

Gurstein, M. (2003) 'Effective Use: A Community Informatics Strategy Beyond the Digital Divide,' First Monday, 8(12).

Habermas, J. (1996), Between Facts and Norms: Contributions to a Discourse Theory of Law and Democracy, MIT Press, Cambridge MA.

Heidegger, M. (1977). 'The Question Concerning Technology,' in The Question Concerning Technology and Other Essays, trans. W. Lovitt, Harper & Row, New York.

[HFGC] The Health Foundation of Greater Cincinnati (2002) 'Access to Care for the Uninsured and Underserved,' The Health Foundation of Greater Cincinnati.

Ho, C. K. (1990) 'An Analysis of Domestic Violence in Asian American Communities: A Multicultural Approach to Counseling,' Women and Therapy 9(1-2).

[IOM] International Organization for Migration (2000) 'World Migration Report 2000,' International Organization for Migration, Geneva.

Kretchmer, S. B. and R. Carveth (2001) 'The Color of the Net: African Americans, Race, and Cyberspace,' Computers and Society, Sep 2001.

Kroker, A. and M. A. Weinstein (1994) Data Trash, St. Martin's Press, New York.

Lowe, F. (1997) Chinatown: A Portrait of a World-Renowned Neighborhood (videocassette), KQED, San Francisco.

Maloy, K. A., J. Darnell, et al (2000) 'Effects of the 1996 Welfare and Immigration Reform Laws on the Ability and Willingness of Immigrants to Access Medicaid and Health Care Services,' George Washington University

Center for Health Services Research and Policy, Washington DC.

Marx, L. (1999) 'Information Technology in Historical Perspective,' in High Technology and Low-Income Communities ed. D. A. Schon, B. Sanyal and W. J. Mitchell, MIT Press, Cambridge MA.

Melucci, A. (1989) Nomads of the Present: Social Movement and Identity Needs in Contemporary Society, Temple University Press, Philadelphia, PA.

Mitchell, W. J. (2003) Me++, MIT Press, Cambridge MA.

Polanyi, M. (1974) Personal Knowledge: Towards a Post- Critical Philosophy, Chicago, University of Chicago Press.

Powell III, A. C. (1999) 'Falling for the Gap: Whatever Happened to the 'Digital Divide'?,' Reason, November.

Putnam, R. (2000) Bowling Alone: The Collapse and Revival of American Community. Simon and Schuster, New York.

Rheingold, H. (1994) The Virtual Community: Homesteading on the Electronic Frontier, HarperPerennial, New York.

Rheingold, H. (2002) Smart Mobs: The Next Social Revolution, Perseus Publishing, Cambridge MA.

Rogers, Y. and Ellis, J. (1994) 'Distributed Cognition: an Alternative Framework for Analysing and Explaining Collaborative Working', Journal of Information Technology, 9:2.

Sassen, S. (1999), Guests and Aliens, The New Press, New York.

Schlosberg, C. (1998) 'Not-qualified: Immigrants' Access to Public Health and Emergency Services After the Welfare Law,' National Health Law Program (NHeLP), January 12.

Schuler, D. (2000). 'New Communities and New Community Networks,' in Community Informatics: Enabling Communities and Communications

Technologies ed. M. Gurstein, Idea Group Publishing, Hershey PA.

Servon, L. J. (2002) Bridging the Digital Divide: Technology, Community, and Public Policy, Blackwell Publishers, Malden MA.

Sherry, J., Intel Research (2003), personal communication, Oct.

Snow, D. 'Collective Identity and Expressive Forms,' Center for the Study of Democracy, Paper 01-07, October 1, 2001, available at http://repositories. ccdlib.org/01-07.

Titmuss, R. (1971) The Gift Relationship: From Human Blood to Social Policy, Vantage Press, New York.

de Tocqueville, A. (2000) Democracy in America, University of Chicago Press, Chicago.

Turner, N. E. and R. D. Pinkett (2000) 'Closing the Digital Divide: An Asset-Based Approach to Community Building and Community Technology,' Agenda for the New Millennium: Association of Collegiate Schools of Planning (ACSP 2000) 42nd Annual Conference, Atlanta, GA.

[USCB] United States Census Bureau (2002) 'Coming to America: A Profile of the Nation's Foreign-Born,' Census Brief: Current Population Survey.

[USCB] United States Census Bureau (2003) 'Language Use and English-Speaking Ability: 2000 Census Brief,' USCB, Oct.

[USCIS] United States Citizenship and Immigration Services (2002) '2002 Yearbook of Immigration Statistics,' US Citizenship and Immigration Services.

Vali, F. V. (2002) 'Barriers to Access Primary Care Services in New Jersey: A Qualitative Study,' American Public Health Association 130th Annual Meeting.

Warshcauer, M. (2002) 'Reconceptualizing the Digital Divide,' First Monday 7(7). Available from http://firstmonday.org/issues/issue7_7/warschauer/index. html

[WALPHO] Washington Association of Local Public Health Officials (2003)

'Testimony Offered to the House Health Care Committee,' March 11. Available from: http://www.naccho.org/advocacy/doc724.cfm.

Wilson, S. (2001) Information Arts: Intersections of Art, Science, and Technology, MIT Press, Cambridge, MA.

Wood, R. (2002). Faith in Action: Religion, Race, and Democratic Organizing in America, University of Chicago, Chicago.

Appendix A: Community Partners

This project was completed with the cooperation of two community-based organizations serving the Chinatown neighborhood.

The Asian Community Development Corporation develops affordable housing in Chinatown, provides technical assistance to neighborhood small businesses, and is a leader in numerous community advocacy efforts. It's three program areas are physical development of the neighborhood, leadership development particularly among neighborhood youth, and community programs including arts, culture, and advocacy.

The Boston Chinatown Neighborhood Center (BCNC) is dedicated to improving quality of life for Boston's Asian-American community. The BCNC provides bilingual education, childcare, counseling services, to neighborhood residents. They also offer a host of cultural, social and recreational programs.