

**Title:** Neighborhoods in the Network Society: The e-Neighbors Study

**Abstract:**

This study examines whether the Internet is increasingly a part of everyday neighborhood interactions, and in what specific contexts Internet use affords the formation of local social ties. Studies of Internet and community have found that information and communication technologies provide new opportunities for social interaction, but that they may also increase privatism by isolating people in their homes. This paper argues that while the Internet may encourage communication across great distances, it may also facilitate interactions near the home. Unlike traditional community networking studies, which focus on bridging the digital divide, this study focuses on bridging the divide between the electronic and parochial realms. Detailed, longitudinal social network surveys were completed with the residents of four contrasting neighborhoods over a period of three years. Three of the four neighborhoods were provided with a neighborhood email discussion list and a neighborhood website. Hierarchical linear modeling (HLM) was used to model over time the number of strong and weak ties, emailed, met in-person, and talked to on the telephone. The neighborhood email lists were also analyzed for content. The results suggest that with experience using the Internet, the size of local social networks and email communication with local networks increases. The addition of a neighborhood email list further increases the number of weak neighborhood ties, but does not increase communication multiplexity. However, neighborhood effects reduce the influence of everyday Internet use, as well as the experimental intervention, in communities that lack the context to support local tie formation.

**Keywords:**

Community, social networks, weak ties, computer mediated communication, political communication, Internet, neighborhood effects, social ecology, e-government, local media, community network, informatics.

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# **Neighborhoods in the Network Society**

## **The e-Neighbors Study**

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### **INTRODUCTION**

#### **Space of Flows Meets the Space of Places**

New information and communication technologies (ICTs) provide opportunities for interaction that transcend spatial and temporal boundaries imposed by previous generations of communication technologies. There is clear evidence that new media, such as email and mobile phones, have increased contact and accessibility with almost every domain of our social network: kin, friends, and coworkers (Wellman and Haythornthwaite, 2002, Boase et al., 2006). Yet, as the home has become a bastion for media use, people increasingly link to employment, entertainment, and friends and family, without the mediating environments of public and parochial realms. Interactions with social ties are primarily and increasingly undertaken within the confines of private spaces (Putnam, 2000, Popenoe, 1985, McPherson et al., 2006). Increased home centeredness comes at the expense of acquaintances in public and parochial spaces (Lofland, 1998). While the trend toward privatization did not originate with the Internet – it is part of a historical trend with roots in the rise of capitalism, industrialization, urbanization (Durkheim, 1893, Tönnies, 1887, Wirth, 1938), now mundane technological innovations (Fischer, 1992), and the Disneyfication of public spaces (Zukin, 1995) – the continued decline of the public sphere has significant consequences.

The public sphere serves as sources of social contact to diverse cultural and political information (Habermas, 1989, Sennett, 1977, Kohn, 2004). As opportunities for interaction with those beyond the familiar decline, so do opportunities to share, be exposed, and to influence diverse social networks. The network society

may generate parallel universes, a dominant active space of electronic flows tied to a privatized world of domestic interactions, and an increasingly disconnected and abandoned space of places.

Neighborhoods are at the nexus of what Castells (1996) termed the “space of flows” and the “space of places.” Neighborhoods host the private realm, the home, as well as the public and parochial realms of street and community. As with the public realm, participation with social ties at the neighborhood level became less prevalent in advance of the network society (Guest and Wierzbicki, 1999, Putnam, 2000). Technologies like the telephone and the automobile facilitate the formation and maintenance of ties that were more similar, more compatible, than could often be found at the neighborhood level (Fischer, 1975). As the Internet further reduces the burden of distance, it may further degrade the role of the parochial realm; ties across the street may become increasingly rare as ties at a distance become ever more accessible. However, there is an alternative hypothesis. New ICTs may not create a “space of flows” that is separate from the “space of places.” ICTs may be increasingly embedded into all aspects of everyday life and existing spheres of interaction. In the case of neighborhoods, the integration of ICTs into everyday life could reverse the trend of privatization within the parochial realm.

In the formation of local social ties, homophily is a driving force (McPherson et al., 2001, Lazarsfeld and Merton, 1954), and the ease at which homophilous ties can be maintained at a distance explains in part why less similar neighborhood ties are not abundant in personal networks. However, this explanation ignores the equally important role of institutional forces in the absence and decline of local ties. Unlike ties formed through the foci for work, religion, and many voluntary associations and activities, neighborhoods lack inclusive institutional settings to facilitate local interactions. This is not to say that the urban environment lacks social, religious or commercial places, but that existing institutions serve specialized, dispersed populations and generally do not provide routinized opportunities for interaction within small neighborhood settings.

Accessibility is equally as important as social similarity in tie formation (Feld, 1981). The integration of the Internet into everyday life may work to reverse the lack of individual accessibility within neighborhoods.

Residents of neighborhoods are by definition physically close, but temporal, psychological and territorial barriers often mean that they are not accessible (Hampton, 2002). The Internet affords new methods of interaction at the local level. Like the telegraph and traditional postal mail, email enables asynchronous communication, people do not have to be connected simultaneously in the same space to communicate effectively. Like radio and television, the Internet is also a broadcast technology. However, unlike previous mass broadcast technologies, the Internet is democratizing, users can both send and receive content. Within the parochial realm, the electronic broadcasting of information may mimic the characteristics of more traditional public spaces. Like Speaker's Corner (Hyde Park, London), people can pull up their soap box (email box) and relay the happenings of their community, while all who are near have the opportunity to observe. There is also the occasion to protest, interject, and exchange. Online exchanges may lead to offline contact and vice versa (Hampton and Wellman, 2003).

This study examines in detail the specific contexts where the Internet can afford local interactions at the neighborhood level. Unlike traditional community networking studies (Schuler, 1996), which focus on bridging the digital divide, this study focuses on the divide between the space of flows and the space of places. Detailed, longitudinal social network surveys were completed with the residents of four neighborhoods over a period of three years (two suburbs, an apartment building, and a gated community). Three of the four neighborhoods were provided with a series of simple Internet services including a neighborhood email discussion list and a neighborhood website. This study answers the questions:

- 1) Is the Internet increasingly a part of everyday neighborhood interactions?
- 2) Under what circumstances can the Internet facilitate the formation of neighborhood social networks?

## **Neighborhoods and Technological Change**

Existing research on how information and communication technologies influences neighborhood relationships has been explored in three complimentary, but often disconnected research traditions 1) community informatics, 2) sociology, and 3) communications.

1) Community informatics focuses on how ICTs can be used to empower the residents of neighborhoods and cities (Gurstein, 2000, Keeble and Loader, 2001). Its roots are in the Free-Net movement of the late 1980s. Free-Nets embraced the potential for the Internet to be used locally as a community building tool, and in the period of early Internet adoption they served as providers of low cost Internet access. As commercial Internet service became more affordable, the prevalence of Free-Nets declined and community informatics took on its contemporary form as champion of “community networks” and “community technology centers” (Servon and Pinkett, 2004, Fernback, 2005). Community networks typically providing free or nearly free computer and Internet access to minority and low-income communities. Most community networks are relatively small in scale, focused on the neighborhood level, but there are examples of large-scale community networks like the Blacksburg Electronic Village (Carroll and Rosson, 1996), the Davis Community Network (Lowenberg, 2000), and Prairinet (Contractor and Bishop, 2000). The focus of community informatics on providing access to the Internet, computers, and local information has often limited the extent to which projects focus on facilitating local communication (Beamish, 1999: 362), and building neighborhood social networks. Some notable exceptions have used approaches like “asset mapping” (Kretzmann and McKnight, 1993) to identify skills, expertise, and connections between different individuals and institutions within a community. However, while community networks recognize the potential for ICTs to encourage local interaction and community building, the focus is almost always on providing infrastructure and training, and rarely on empirical evaluations of how interventions or Internet use more generally influence community dynamics.<sup>1</sup>

2) Sociology's interest in the study of neighborhoods has primarily been concerned with explaining the prevalence and structure of neighborhood social ties as a result of macro-level societal change, and in turn how neighborhood structure influences individual and community wellbeing. The earliest work in this area, by the Chicago School of sociology, was a reaction to how "modern methods of urban transportation and communication – the electric railway, the automobile, and the telephone – have silently and rapidly changed... the social and industrial organization of the modern city" (Park, 1915: 593). This early work was mostly pessimistic, they noted that new communication technologies multiplied opportunities for social interaction (Park, 1925: 40), but argued that technologies like the telephone were responsible for the deterioration of local community and social relationships in the urban environment (Burgess, 1925). Ultimately the urban ethnographic tradition provided support for the notion that community had not vanished in the modern urban environment, but that enduring strong ties and institutions continued to exist at the neighborhood level (Whyte, 1943, Gans, 1962, 1967). However, the ethnographic focus ignored the existence of weak social ties, non-clustered ties, and ties to those at a distance, precisely the type of relationships that might be influenced as a result of innovations in transportation and communication technologies, such as public transportation, the automobile, the telephone, and more recently the Internet. Social network analysis emerged in the 1960s and 70s with evidence that most people have more friends outside of their neighborhood than within it (Wellman, 1979), that neighborhood ties have become less prevalent (Guest and Wierzbicki, 1999), and that while most people have a small set of relatively strong ties, that non-clustered, weak social ties are also very valuable (Granovetter, 1973).

While the majority of most people's social support does not come from neighborhood interactions, this does not mean that local ties are unimportant. On the contrary, social network analysis has demonstrated that neighborhood ties are the source of very specific types of support, such as the provision of small and large services, including help with child-care, emergency aid, and home improvements (Wellman and Wortley, 1990:

569-70). In addition, larger local friendship networks are associated with greater community attachment (Sampson, 1988), greater empowerment (Geis and Ross, 1998), lower crime rates (Sampson and Groves, 1989), watchfulness of neighbors (Freudenburg, 1986), reduced fear and mistrust (Ross and Jang, 2000), and lower levels of mental distress (Ross, 2000, Elliott, 2000) and depression (Aneshensel and Sucoff, 1996). However, not all ties are equal, and not all interactions have the same effects in all neighborhoods.

Bellair (1997) suggests that the tendency for neighbors to establish community controls and to work together to solve common problems is related to network size, not rates of neighbor interaction. “Residents of communities where a large proportion of residents know and interact with neighbors appear to be more likely to engage in surveillance, develop movement-governing rules, and intervene in local disturbances regardless of how frequently they interact” (Bellair 1997: 697). Shafer, McCloud, Feldmann, and Moody (2006) have also shown that strong ties do not produce informal neighborhood social controls and may increase perceptions of physical disorder. Indeed, there is considerable evidence to suggest that the presence of densely-knit, strong neighborhood ties may have a negative effect on social controls and community resources, particular in poor or marginalized communities (Wilson, 1987, Fernandez and Harris, 1992). Neighborhood cliques may not have the bridging capabilities of sparsely-knit, weakly bound neighborhood connections that are necessary for successful collective action (Granovetter, 1973). Not only are strong, intimate ties with neighbors the exception, but the presence of many weak ties may be extremely beneficial and an over abundance of strong ties may be limiting.

The study of “neighborhood effects” has found that the formation of social ties and the influence of ties vary by neighborhood characteristics, especially as they relate to socioeconomic status and residential stability (Sampson et al., 2002). An individual in an area of high residential mobility “faces quite different constraints than residents of stable areas” (Sampson, 1988: 768); community-level instability constrains friendship choices and reduces local ties. As an example, residential stability and the presence of social ties in affluent

neighborhoods are protective of mental health, but stability in disadvantaged neighborhoods is associated with low psychological well-being, regardless of the presence of local social ties (Ross et al., 2000). In a related vein of work, social ecologists have focused on how people self-select for different types of neighborhoods based on their perception of what behaviors an environment will support, including levels of community involvement. Those moving to single family homes and the suburbs are more likely to have frequent neighborhood interactions than those downtown or in apartment buildings (Michelson, 1977). Additionally, when the role of life-cycle is considered in residential mobility, the move to suburban housing is primarily the result of considerations related to children (Rossi, 1955: 63, Hampton, 2001). Putnam (2000) and others (Sampson 1988) have found that families with children have higher levels of community participation and local tie formation.

Despite its origins in the study of how transportation and communication technologies changed the structure of community, with few exceptions (i.e., Fischer, 1992, Hampton, 2001), the sociological study of neighborhoods has largely deferred the study of how more recent ICTs have influenced the structure of neighborhood relations.

3) Communications has argued that exposure to local media influences local community integration, and similarly, that community integration influences media use (Westerik, 2001). The concept of “community integration” has been used inconsistently, referring to attachment (McLeod et al., 1996, Rothenbuhler, 1991), satisfaction (Jeffres et al., 1987), political participation (McLeod et al., 1999), civic engagement (Jeffres et al., 1987), cosmopolitanism / localism (Merton, 1949, Neuwirth et al., 1988), and community ties (Stamm, 1985). While recognizing the importance of social networks, few studies of local media have used formal network instruments to generate network measures. Instead, measures of perceived integration and cohesion, such as questions that ask “what percentage of your friends live in your neighborhood” (McLeod et al., 1996), are accepted as valid. Measures of perceived integration may measure something entirely different than more direct network measures (Shafer et al., 2006), like name generators (Laumann, 1966, Burt, 1984, Marin and Hampton,

2006) or neighborhood rosters (Hampton, 2003). The literature on neighborhood effects has also not received significant attention within the study of local media, it has generally been assumed that media have similar effects regardless of neighborhood contextual characteristics (recent exceptions include Shah et al., 2001b, Kang and Kwak, 2003, Paek et al., 2005).

While the study of integration and “community media” (Jankowski and Prehn, 2001) has primarily focused on traditional print media (Stamm, 1985), and radio and television (McLeod et al., 1996), communication scholars more broadly have explored the impact of Internet use on social networks (Zhao, 2006) and on civic engagement (Shah et al., 2001a). In addition, some have begun to explore the role of new ICTs at the neighborhood level. For example, Meyrowitz (1997) argued that the Internet dilutes the importance of place and encourages fragmentation from neighbors, and Matei and Ball-Rokeach (2003) examined the role of Internet use in community belonging. However, there have been few empirical studies of how the Internet influences the structure of neighborhood social networks.<sup>2</sup>

## **Netville**

Netville was one example of a study of networks and the use of ICTs at the neighborhood level (Hampton, 2001, Hampton, 2003, Hampton and Wellman, 2003). Netville was an experiment, an attempt to provide future levels of Internet connectivity and services to a typical middle-class suburban neighborhood, and to evaluate the impact of the technology on neighborhood social networks. Some aspects of the experiment were intentional: high-speed Internet access (10 mbps), online music services, online health services, and a variety of communication tools, such as a videophone, instant messaging, multimedia chat rooms, and a neighborhood email discussion list. Other aspects of the experiment were unintentional, such as the presence of an internal control group of residents who did not receive the technology but lived in the same neighborhood. Systematic, observations of how the technologies were used were incorporated into the design of the experiment. A detailed

network survey was conducted by presenting participants with a roster of adult residents who lived in the community. Participants were asked to identify those they recognized and how often they communicated. The formal network analysis was complimented by two years of ethnographic observations.

When compared to non-wired neighbors, those who received access to Netville's technology were more involved with their neighbors: they recognized three times as many, talked to twice as many, visited with 50% more, and called them on the telephone four times as often. While those with the technology had more ties and more frequent interactions in-person and over the telephone, relatively weak, not strong intimate ties formed as a result of the services. The large number of weak neighborhood based ties was also found to have supported residents' ability to organize collectively when dealing with local issues and concerns. Of all the technology that residents were provided, they most valued the neighborhood email discussion list, and felt that it was most effective in building local ties.

How generalizable are the findings from the Netville study? Other studies of ICTs in neighborhoods of a similar size have found that the technology was not adopted as experienced in Netville (Arnold et al., 2003). Based on what we know about neighborhood effects, would the same results be found in different types of neighborhoods? Were the findings of Netville an artifact of cross-sectional research, or would a longitudinal study produce similar results?

## METHODS

### **Neighborhoods**

Data for the E-neighbors project was collected through a series of three annual surveys. The survey was administered in 2002, 2003 and 2004 to the adult residents of four Boston area neighborhoods. The neighborhoods were selected to be socioeconomically homogeneous (middle-class) but to contrast in terms of

housing type. The expectation was that housing choice would serve as an indicator of stage in the life-cycle and propensity and availability of community involvement.

Two of the four sites were located in the Boston suburb of Lexington. Located in the same U.S. Census tract, both neighborhoods had low-density, single-family, detached homes built from the 1960s-70s. The neighborhoods were selected because of their geographic proximity to each other and because they each had identifiable neighborhood boundaries (boarded by forests, a lake, and major roadways). The first site consisted of 209 homes, the second 226 homes. Neither neighborhood had an existing home owners association. An initial pre-survey investigation using census tract data confirmed suburban, middle to upper-middle class status: median household income \$94,000, high educational attainment (67% with a Bachelor's degree or higher), high home ownership (84%), low mobility (70% had not moved in the past five years), few households with one person living alone (23%), and 51% of family households had related children at home under the age of 18 (U.S. Bureau of the Census, 2000 U.S. Census).

The third site, a 23-story, 174-unit apartment building, was the product of 1960s urban renewal and was located on the site of Boston's former West End (Gans, 1962). The apartment building had no formal or informal tenants group. The median household income for the census tract containing the building was \$52,000, 72% of households had only one resident, 61% had a minimum of a Bachelor's degree, 72% lived alone, and only 11% of families had children under the age of 18. Compared to the suburban sites, this area was also significantly more mobile, only 32% of residents had not moved in the previous five years (U.S. Bureau of the Census, 2000 U.S. Census). One hundred percent of housing units in the area were occupied by renters.

The fourth site was located in the Boston suburb of Quincy; a 101-unit, medium-density, gated, multifamily condominium development built in the early 1980s. This development was one of the few neighborhoods in the Boston area that could be defined as gated. The development did not have barricades, but relied on close circuit television and security guards monitoring the entrance and open areas. As a condominium

development, the neighborhood had a preexisting community association. Prior to contacting residents, a formal request to gain access and a formal presentation were made to the community manager and home owner's association. Based on census tract data the median household income of the gated community was \$59,000, 54% of residents had at least a Bachelor's degree, 40% of residents had not moved in the previous five years, 63% of residents owned their home, 62% of households were occupied by only one person, and only 8% of families had children under the age of 18 living at home.

Following the first survey, three of the four neighborhoods were given access to a series of experimental Internet services designed to facilitate access to local residents and local information. The fourth neighborhood, the second suburban site, served as a control group. Unlike community network studies that specifically set out to provide residential areas with computer equipment or Internet access, the goal here was to intervene as little as possible. To maintain as close as possible to the ideal of a natural research setting, participants were not given a computer, Internet access, or any training.

## **Technology**

Residents of the three experimental neighborhoods that chose to receive the e-Neighbors services were provided with the following:

- A neighborhood email discussion list: Each neighborhood had its own email discussion list. Residents were sent instructions by email and postal mail on how to send messages to the list. Messages sent to the list were automatically redistributed to all subscribed addresses.
- A neighborhood website: As with the email list, each neighborhood had a unique website. Each neighborhood website was dynamically customized for each user (displaying their name and profile information) and neighborhood (displaying the neighborhood name and content provided by other participating members of their neighborhood). The website contained the following features:

- A user profile that included demographics, information on personal interests, and space for personal comments.
- A searchable neighborhood directory that included information from neighbors' profiles.
- A "match maker" that matched participants based on common interests, hobbies, histories, etc.
- An instant messenger that identified which neighbors were connected to the Internet and available to chat.
- A community calendar.
- A forum to provide and comment on recommendations for local business and services.
- A forum to list classified ads and items for sale.
- A "community poll" that allowed participants to create multiple choice survey questions that were presented to other users of the neighborhood website.

With the exception of a reminder email and postcard sent every six months, which included the address for the neighborhood email list and the address/password to the neighborhood website, participants were not given any specialized training or prompting to use their neighborhood website or email list.

## **Hypotheses**

Based on the existing literature of how new media are embedded into social networks, the role of neighborhood effects in tie formation, and the results of the Netville study, the following were hypothesized:

H1) Internet use is increasingly embedded into neighborhood social networks.

H2) Adoption of the experimental intervention will vary by neighborhood with higher rates of adoption within neighborhoods with: residential stability, a large proportion of children, a preexisting heightened sense of community, and a desire for additional contact with neighbors.

H3) When provided with both a neighborhood email list and a series of neighborhood based Web applications, the neighborhood email list will be adopted by more residents than Web based Internet services.

H4) A neighborhood email list will enable residents to exchange information on local services, to organize community events, and to engage in collective action related to local issues and concerns.

H5) Residents who use the experimental intervention will experience an increase in the number of weak, but not strong social ties.

H6) Use of the intervention will increase the frequency of interactions between residents over the Internet, in-person and over the telephone.

## **Survey**

In the spring of 2002 members of the research team visited each household in the four study neighborhoods. Researchers delivered a bag containing a ceramic coffee mug embossed with a university crest, a letter explaining the study, and a stamped return postcard. On the back of the postcard, residents were asked to print the name of each member of their household who was interested in participating in the survey (18 years of age or older). Participants were mailed a letter explaining the study, a consent form, a copy of the project survey, a pen, a stamped return envelope, and a \$20 grocery store gift card (the incentive was sent with the survey pre-completion). If a resident lived in one of the three experimental neighborhoods they were also sent a card explaining the availability of the experimental Internet services. In pre-tests the survey took 40-60 minutes to complete. Participants were mailed up to two reminders to complete the survey. Upon returning the survey, if a participant lived in one of the three experimental neighborhoods they were given the option of enrolling in the e-Neighbors services. Participants were contacted to complete additional surveys in 2003 and 2004, and new participants were recruited annually from each neighborhood. The survey included questions on demographics, organizational involvement, political participation, technology use, neighborhood involvement, time-use, a

network position generator (Lin et al., 2001), a series of name generators and interpreters (Marin and Hampton, 2006), and a neighborhood roster (Hampton, 2003).

The neighborhood roster was compiled annually based on public data sources, including an annual city census (administered each year by local governments in Massachusetts), and a reverse telephone directory. The combined list from the census and telephone directory contained all eligible participants, plus a number of ineligible people who had moved from the neighborhood, were under 18, had been inaccurately listed by the telephone company, or had inappropriately listed themselves on the local census (presumably to gain the right to vote in that area, or to gain access to other local services). It is likely that a small number of potential participants were omitted from the list, those that did not complete the local census and had unlisted telephone numbers. Participants were asked to review the list and to identify those they recognize by name, and if they felt “close,” “moderately close,” or “not close” to each listed neighbor. Participants were also asked to indicate the number of times in the previous 30 days they had met each neighbor in-person, talked on the telephone, or exchanged email (not including the neighborhood email list).

Four hundred and eighty-one participants completed a total of 961 surveys over three years. Sixty percent of participants completed more than one of the annual surveys, and 34% completed all three. Attrition includes refusals, non-response, and loss of eligibility as a result of moving from one of the study neighborhoods. Discrepancies in population estimates make it impossible to calculate a precise response or participation rate.<sup>3</sup> In addition, non-response and attrition as a result of low residential stability were anticipated artifacts of the apartment building. However, based on U.S. Census tract estimates of 1.2 adults per household in the apartment, 1.6 per household in the gated community, and 2.1 adults per household in the two suburban communities, over three years the response rate across all sites is estimated at 26%. However, this calculation underestimates the actual response rate; it does not take into account variations in population distribution within census tracts, overestimates success in identifying all eligible participants, and obscures anticipated variation

across sites. Response was highest in the suburban and gated communities, and as would be expected with a demanding longitudinal survey, response decreased over time (except in the control neighborhood where response actually increased over time).<sup>4</sup> The unusual challenges inherent in trying to recruit participation from all residents of a small geographic area suggest that the involvement of more than one quarter of the eligible population was at least a modest success. The randomness of the sample is unknown. However, concerns about the representativeness of the sample are partially reduced based on the considerable homogeneity that exists within neighborhoods. While there is no available data to compare relevant research characteristics between the sampled and not sampled population, I do not believe that any differences between the characteristics of the sample and characteristics of the population have introduced significant error or bias into this study.

## Analyses

Hierarchical linear modeling (HLM) (Raudenbush and Bryk, 2002) was used to examine change over time in the number of neighbors participants recognized, emailed, met in-person, talked to on the telephone, and referred to as “close” or “moderately close.” The main technical contribution of HLM when employed in the analysis of longitudinal data is that the number of measurement observations can vary across respondents. This contrasts with conventional repeated measures analysis of variance (ANOVA) which requires a balanced model (Singer and Willett, 2003). For this reason, even participants who were only available to complete one or two of the project surveys (because of attrition, or because they were interviewed after the first year of the study) were included in the analyses. Level 1, of the two-level models, computed parameter estimates for the slope and intercept as a function of exposure to the intervention, individual demographic characteristics, and residence in either the control or experimental suburb. The intercept was modeled (at level 2) based on gender, years of education, length of residency (tenancy), marital status (married or living with partner), the presence of children in the household, experience with the Internet (years of use), and for residence in the experimental suburban

neighborhood, the control neighborhood, or residence in the experimental neighborhood but self-selection to not use the provided Internet services (residents of the “experimental neighborhoods” had the option of using the services, 91 of the 185 participants in the experimental suburban neighborhood participated in the survey but did not receive the intervention).<sup>5</sup> The slope was modeled (at level 2) based on individual experience with the Internet (years of use), neighborhood of residence, and extent of use of the e-Neighbors services: received or did not receive the intervention, and did or did not send an email to the neighborhood email list. None of the variables used in these analyses were centered.

In addition to the HLM models, this paper also utilized a series of survey questions related to participant’s demographics, sense of community, and community engagement. These questions were analyzed using cross-tabs. The neighborhood email lists for the three experimental neighborhoods were also analyzed for content.

## FINDINGS

### Community Demographics

This paper argues that neighborhoods have varying potential for local network formation based on neighborhood characteristics. These neighborhood characteristics predict the likelihood of success or failure of a technological intervention aimed at promoting local social contact. To develop profiles of the study neighborhoods, participants were asked a series of questions during their first survey about mobility, family status, sense of community, and desire for community engagement.

[Table 1]

Table 1 summarizes the demographic characteristics of the study sites. Seventy five-percent of apartment tenants moved into the building within the past five years (averaging 5.9 years since last move). The majority of apartment dwellers were not married or cohabitating (45.7% married), and there were few children

at home (14.8%). The two suburban communities were made up almost exclusively of homeowners, they were residentially stable, married or cohabitating, and most had children at home. The two suburban communities were demographically comparable, although the control group was slightly younger and less established. Demographically, the gated community resembled the suburbs; they were a little older (averaging 56.7 years), less likely to be married or cohabitating, and were less likely to have children at home. While all four neighborhoods were primarily Caucasian, the gated community was the only neighborhood with no racial variation. The residents of all four neighborhoods were highly educated (averaging the equivalent of a Bachelor's degree) and had considerable experience with the Internet (averaging 7 years of Internet use; ranging from 0-19 years).

#### [Table 2]

Table 2 summarizes questions on sense of community and community engagement. For each question, participants could indicate that they strongly agreed (SA), agreed (A), disagreed (D), strongly disagreed (SD), or were neutral (N). Suburban residents were almost equally divided between agreeing and disagreeing that they had little to do with people in their neighborhood. Gated residents felt similarly divided, although they tended toward greater extremes, strongly agreeing or disagreeing that they were involved with people in their neighborhood. Residents in the apartment building clearly agreed that they had little to do with their neighbors (Cramer's V = .15,  $p \leq .001$ ). Suburban and gated residents were split between agreeing and disagreeing that their neighborhood had a strong sense of community, with a slight tendency to agree. The apartment building was unambiguous, the majority felt that there was not a strong sense of community (Cramer's V = 0.15,  $p \leq .001$ ). When asked if they wanted more contact with neighbors, most residents in all neighborhoods were neutral or favored more contact. This was particularly true in the apartment building where more than 50% wanted additional contact. While a minority in all neighborhoods did not want more contact, a surprising number of residents in the gated community (17.2%) strongly disagreed that they wished for more contact

(Cramer's V = 0.13, p ≤ .01). When asked if they felt an "obligation to make a contribution" to their neighborhood, residents of the suburban neighborhoods were almost evenly divided between those who agreed and disagreed. Residents of the gated community were slightly less divided, with more residents "strongly agreeing" that they felt an obligation. The apartment building was overwhelmingly ambivalent (41%) or disagreed (47.5%) that they had an obligation to their neighborhood (Cramer's V = 0.18, p ≤ .001).<sup>6</sup>

The results of the demographic and community questions suggest three distinct community contexts corresponding to suburban, apartment and gated life:

- 1) An apartment building of young, single, childless, transient individuals who had little to do with their neighborhood, had little sense of community, felt little obligation to their community, but favored greater local engagement.
- 2) A gated community of older, established, stable, married (or once married), childless (always or recently moved away) individuals who were split in their level of community involvement and desire for involvement.
- 3) Two suburban communities whose residents were middle aged, married, residentially stable, and in the midst of their child raising years. Most wish they had more contact with neighbors, but residents were split in the sense of obligation to their community and in their current extent of involvement.

These results confirm that the study apartment, suburban, and gated residents lived in different neighborhood contexts, with stage in the life-cycle corresponding to different levels of existing and desired community involvement.

### **Use of e-Neighbors**

Participants in the three experimental neighborhoods were provided with a neighborhood email list and website. To use the website participants had to sign in, create a personal profile, and return periodically to add content

and see if other residents had added information. All participants were subscribed to the neighborhood email list and messages were delivered directly to their personal email accounts. I anticipated that the integration of the neighborhood list with an existing means of communication, email, would reduce the cost of participation in comparison to the website. The email list would offer immediate visibility of participation that would overcome high thresholds of participation (Granovetter, 1978) and facilitate the formation of a critical mass of active users (Markus, 1987, Hampton, 2003).

Tables 3 and 4 document the extent to which the e-Neighbors services were used in the experimental neighborhoods. In the apartment building there was almost no use of the neighborhood email list; in the first year one message was sent and no one replied. In the second year, no messages were sent. The gated community demonstrated more use of the neighborhood list, with 8 residents sending a total of 25 messages in the first year, and 2 residents sending one message each in the second year. Comparatively, the suburban neighborhood demonstrated very high use of the neighborhood email list that increased over time; 42 residents sent a total of 115 messages in the first year, and 49 residents sent a total of 271 messages in the second year. The neighborhood websites were used by a very small number of residents in each neighborhood (Table 4). Activity on the website was limited to updating personal profiles and browsing the neighborhood directories. Unlike the neighborhood list, which experienced an increase over time in the suburban neighborhood, the websites experienced decreased use over time in all neighborhoods.

[Table 3]

[Table 4]

The one message sent to the apartment list was a question about construction on a roadway next to the building. Email to the gated list consisted of announcements and discussions of: local services, holiday greetings, local issues and concerns, meetings of the home owners association, and the death of community residents. The two most common topics were the discussion of local services and announcements related to the

death of neighborhood residents. The discussion of local issues included exchanges related to wild animals living near the community (who were occasionally accused of eating pets), mosquito control, and the change in location of a local voting station. The only evidence of collective action on the gated email list was a discussion to negotiate a group purchase of heating oil. Residents of the gated community particularly valued the email list in announcing the passing of neighborhood residents. As one female resident expressed, “*What a shock. Will you pass on the arrangements please? This shows the first real usefulness of this email list. I probably wouldn't have known otherwise.*”

The suburban list was similar in content to the gated community, although there were no announcements related to the death of neighborhood residents (an indication of life-cycle differences between residents of the gated and suburban communities). The far majority of messages to the suburban list were requests and replies related to the recommendation of local services, including: electricians, plumbers, baby sitters, home appliances, cell phone providers, Internet and cable providers, insurance agents, and window washers. The following message was typical:

*“Thanks for your previous home improvement recommendations. I get water in my sun porch, most likely because of poor/non-existent flashing between the roofs. Any recommendations for good roofers who do spot repairs like this?”* (Male Resident).

It was not until the end of the first year of the e-Neighbors experiment that residents of the suburban neighborhood first used the list to discuss local issues. At that time the town government conducted a special ballot for residents to vote on an override to a state law that limited property tax increases.

*“To those of you who are interested in helping get the override passed... Please contact Janice or Linda they are the women in our neighborhood working around the clock to make sure the correct information gets out regarding the override. They really need your help.”* (Female Resident).

While the majority of messages to the suburban neighborhood list were in favor of the “yes” vote, there were exchanges between “yes” and “no” supporters. The exchange was conducted in a manner that could only be construed as polite, there was no flaming and no messages were sent to the list that could have easily been interpreted as uncivil or offensive. A drive through the town prior to the ballot revealed a significantly greater number of position signs on lawns in the experimental neighborhood in comparison to the control neighborhood, both in favor and opposed to the tax override. In addition to the “yes” vs. “no” exchange, an additional group of residents were opposed to the very idea of discussing politics on the neighborhood list:

*“No More Political announcements please on the Neighborhood e-mail list. This great service is supposed to bring the neighborhood together but politics (and religion) often does the opposite.”*

(Signed jointly by a husband and wife).

These messages in turn generated a series of messages in favor of using the list to discuss local political issues.

*“Citizens shape their communities, and communities shape the nation, and so on and so forth. That's the real meaning of “grassroots.” This email list is, to my mind, a forum for local citizens to discover common views and form grassroots groups to support actions or merely to explore common interests. We've all bemoaned how distant government has become from the real world – our world and our daily activities. Perhaps this is precisely the technology that can bring ‘participation’ back into the concept of democracy. How else can we make a difference?*

*National and international issues, as well as local issues, ought to be fair game prior to elections. But not as a soapbox: this list needs to be respected as an ongoing conversation between many parties, not a bully pulpit for a vociferous few. Nor should exploration and connection be limited to politics. For example, speaking for myself, I've been involved professionally, for the last few years, with gender equity. Is there any one else out there who's interested in, or actively involved with gender equity? I'd be interested in knowing who you are;*

*please drop me a line. I don't have Jim's flair with quotes, but I am reminded of the song from 'The King and I': 'getting to know you, getting to know all about you (la da de dah dah, la da de dah...)' Otherwise known as community-building, and it's a very civilized use for technology."*

(Female Resident).

In total 53 messages were exchanged over the 11 days immediately preceding and after the town ballot. No residents asked to be removed from the discussion list as a result of the discussion. In the year following the ballot, the content of email messages on the suburban list diversified to include both service recommendations and discussions of local issues, including a local bus service, local schools, town elections, voter participation, and an additional tax override. Residents also used the service to organize local events, including an annual garage / yard sale and a number of small neighborhood gatherings.

Given the limited use of the intervention in the apartment building and gated community, there is no reason to expect that e-Neighbors had any significant or enduring impact on network size, closeness, or communication between residents. Therefore, the remaining analysis of how neighborhood networks changed over time is limited to a direct comparison of the suburban experimental and control neighborhoods.

## **Network Size**

The number of neighbors participants recognized from the neighborhood roster was used as a measure of neighborhood network size. Hierarchical-linear modeling (HLM), shown in Table 5, verifies that at the start of the study (time 0), there was no significant difference in network size when residents of the control suburb were compared to those who received the e-Neighbors intervention in the experimental suburb (intercept e-Neighbors is not significant). However, there was a statistical difference between the network size of residents in the control neighborhood and those in the experimental neighborhood who did not sign-up to use e-Neighbors (intercept Not participate is significant). On average, residents of the experimental suburb who did not sign-up

for e-Neighbors had 10.35 additional neighborhood ties before introduction of the intervention. There is no indication as to why there was a self-selection for those with larger networks to opt-out of e-Neighbors. It may have been that those residents with more ties were content with their networks and had little desire to use a tool to further increase local connectivity, or their existing success in building local ties suggested to them that a technological intervention was not necessary.

In comparison to the control group, there was no change over time in network size as a result of being enrolled in the e-Neighbors services. However, those who were enrolled and actively participated in e-Neighbors, by sending at least one message to their neighborhood list, experienced an average increase of 4.36 ties in each year of the study.<sup>7</sup> This suggests that use of the neighborhood email list did impact network size, but that lurkers (those who were on the neighborhood email list but did not actively participate) did not experience the same benefits as those who were involved in online discussions.

In addition to the variation between participants based on adoption and use of the e-Neighbors services, a number of personal characteristics influenced neighborhood network size. Male participants had smaller networks, averaging 7.52 fewer ties, those who had lived in the neighborhood longer had almost one additional tie (0.82) for every year of residence, and those with children knew an average of 6.36 additional neighbors. The average Internet user (who had been using the Internet for about seven years), had four fewer neighborhood ties at the start of the study. However, over the duration of the study, in both the control and experimental suburbs, a relationship emerged between network attrition and Internet use. The average Internet user (online for seven years) experienced a slight increase in network size over the duration of the study, regardless of the experimental intervention. Early Internet adopters experienced growth in the size of their local networks, and late adopters experienced a decline in network size. For example, someone who at the start of the study had used the Internet for 12 years gained an average of 1.91 ties in each year of the study. Someone who had only two years of Internet experience lost 1.49 ties per year. While early Internet adopters had smaller neighborhood

networks to start with, they did not experience additional loss over time. Late adopters of the Internet, those who are not online or only started using the Internet in the past few years, had larger neighborhood networks to begin with, but experienced a real loss in the size of their networks over time. This effect was present regardless of the experimental intervention.

### **Closeness**

Closeness is a measure of tie strength (Marsden and Campbell, 1984). It is used here as both a tie characteristic and a network characteristic. In Table 5, “Number Close” refers to the number of network members a participant feels close to, and “Intensity Close”, the percent of a participant’s network that they feel close to; the former measures absolute numbers, the latter controls for network size.<sup>8</sup>

At the beginning of the study, residents of the experimental neighborhood had as many close ties as other suburban participants. Controlling for demographic characteristics, the average person felt close to 11.82 neighbors. However, in comparison to the control neighborhood, residents of the experimental suburb were close to a smaller proportion of their network (pre-intervention); they were close to 6.69% less of their network. Men felt close to a similar number of neighbors as women, but men’s networks were more intensive, they were close to 7.12% more of their network. Those with children and those who had lived in the neighborhood longer were close to both a larger number and larger proportion of their network. Years of education was associated with fewer (-0.58/year) and a lower proportion (-1.54%/year) of close neighborhood ties.

There was no observed change over time in the number or proportion of close ties for those with or without the e-Neighbors services. Not only was there not a general trend toward more closeness with neighbors as a result of the experimental intervention, but prior to seeing the neighborhood roster, when asked how many new “close” ties they had developed as a result of the technology, only 1 participant indicated that they had a

new “close” neighbor (Table 6). Only 3 participants in the first year and 5 in the second reported making at least one new “friend”. The far majority of ties formed as a result of e-Neighbors were weak social ties.

### Contact In-Person

At the start of the study there was no variation between suburban neighborhoods in the number of relationships participants maintained through face-to-face contact (Table 5). The average participant had 11.44 in-person contacts over the preceding 30 day period. However, those who chose to enroll in the e-Neighbors services maintained face-to-face contact with a slightly smaller proportion (7.43% less) of their network (pre-intervention). Over time, both the proportion and number of network members contacted in-person decreased for those with e-Neighbors, regardless of the extent of their participation (sending email to the neighborhood list or not). The average e-Neighbors participant lost 2.51 face-to-face encounters, 8.84% of the in-person contact with their network, in each year of the study.

It is unclear why residents who maintained face-to-face contact with a smaller proportion of their network self-selected to participate in e-Neighbors. However, it is likely that this self-selection was partially responsible for the trend of reduced in-person contact over time. The failure to find a difference between active and passive participants on the neighborhood email list suggests that those who engaged face-to-face with a smaller proportion of their network gravitated toward a technology that they felt would reinforce a need for even less face-to-face contact. e-Neighbors either passively allowed an exiting individual trend toward less face-to-face contact to continue, or it justified a further reduction in face-to-face contact amongst those who already had less contact with their network. Still, even though the trend was toward reduced in-person contact, prior to reviewing the neighborhood roster, 18 participants in the first and 11 in the second year of the study reported meeting at least one new neighbor in-person for the first time as a result of e-Neighbors (Table 6). Amongst those who met a new neighbor the trend was towards multiple new face-to-face encounters, over 50% reported meeting more than five new neighbors.

## **Contact by Telephone**

Comparing control and experimental groups, there were no differences in telephone communication across neighborhoods at the start of the study or over time (Table 5). Individuals tended to not change the number of neighbors with whom they communicated by telephone. There was a tendency for men to have fewer phone contacts than women (-0.74), and for those with children (1.02), and those with a very longer tenancy (0.04/year) to have phone contact with more network members. Those who were married also tended to maintain phone contact with a slightly larger proportion of their network (2.33%). Prior to being presented with the neighborhood roster, when e-Neighbors users were asked if the technology they were provided had changed telephone contact with neighbors, 14 in the first year and 9 in the second reported talking to a new neighbor on the phone as a result of using the service they were provided (Table 6).

## **Contact by Email**

Prior to the e-Neighbors intervention there were very few emails exchanged between neighbors of either the control or experimental neighborhoods. What email that was exchanged was intensive with a small number of neighbors. There was a statistically significant, although numerically small difference between the experimental and control suburban neighborhoods in the proportion of neighborhood ties emailed at the start of the study (Table 5). Residents of the experimental neighborhood who chose to enroll in e-Neighbors emailed an average of 1.12% fewer of their local ties before the experimental intervention began. After the e-Neighbor intervention, only those who actively participated by sending email to the neighborhood email list also sent personal emails to more of their network members (in addition to email to the neighborhood list). The increase in the number of ties emailed was modest, averaging 0.33 additional ties per year. Early Internet adopters in both the control and experimental neighborhoods experienced a similar small increase in each year of the study

(the average Internet user with seven years of Internet experience gained 0.21 email ties per year in the study while someone who had only been online for two years gained an average of 0.06 email ties per year). Couples also had slightly more local email ties (0.24). Before seeing the neighborhood roster, when participants were asked how many new neighbors they had emailed as a result of the e-Neighbors services, 24% reported emailing at least one new neighbor in the first year of the study, and 21% reported at least one new email tie in the second year (Table 6). Of those, 20% reported emailing 5 or more neighbors whom they previously did not know.

## **DISCUSSION**

This paper explores the contexts under which Internet technologies are capable of bridging electronic and parochial spaces to augment neighborhood social networks. It was hypothesized that the influence of an experimental intervention, consisting of a neighborhood email discussion list and website, would vary depending on neighborhood characteristics. In particular, neighborhoods with an existing propensity for local interaction, characterized by high residential stability, the presence of children, a strong sense of community, and an interest in building neighborhood ties, would have a higher rate of adoption. In areas where the experimental services were widely adopted, it was hypothesized that the neighborhood email list would enable diverse neighborhood exchanges that would increase the size of neighborhood networks and the frequency of interactions on and offline. In addition, it was hypothesized that Internet use in general was becoming increasingly embed into everyday neighborhood interactions.

Of the three neighborhood settings tested through the e-Neighbors study, only one neighborhood widely adopted the interventions for use as local media: the suburban neighborhood. The intervention had the lowest levels of adoption in the apartment building; the neighborhood with the lowest level of residential stability, fewest cohabitating couples, lowest proportion of children, lowest rate of home ownership, little preexisting

sense of community, and low sense of community obligation. Few in the apartment building visited the neighborhood website and only one message was ever sent to the neighborhood email list. This was despite the fact that the apartment building contained the youngest population of the four study neighborhoods, presumably the most technology savvy, and prior to the intervention the majority of residents – more than any of the other study neighborhoods – expressed a desire to have additional contact with their neighbors. The gated neighborhood experienced slightly higher levels of adoption than the apartment building, but at its peak adoption was still low and dissipated over time. In many ways the context of the gated community resembled the suburbs, but with a reduced focus on children. It was also the only study neighborhood with a preexisting neighborhood association and presumably existing channels of communication. Pre-intervention a significant number of gated residents were also not in favor of establishing additional contact with their neighbors. In both the apartment and gated community, neighborhood contextual characteristics overwhelmed any individual desire to use the technology locally.

The suburban neighborhood contained many of the characteristics identified by the neighborhood effects and social ecology literature as contributing to greater propensity for local tie formation. The e-Neighbors services experienced high rates of adoption, and, as anticipated the neighborhood email list was used at higher levels than the neighborhood website. The email list was used to discuss local services, local politics, local issues, and collective action. Only those residents of the experimental suburb who actively participated in the neighborhood list experienced a change in the size of their networks, an average increase of four new ties in each year of the study. As hypothesized, new ties formed as a result of the e-Neighbors intervention were “weak,” not strong close ties. There was little support for the hypothesis that contact would lead to contact. Those who had less face-to-face contact in the experimental suburb before the intervention were more likely to adopt the technology, but adoption of e-Neighbors did not reverse the existing trend, the tendency toward less face-to-face continued and was possibly reinforced. There was no change as a result of the intervention in the

number of neighbors contacted by telephone. However, those who actively participated, by sending messages to the neighborhood email list, began, although at a very limited rate, to email a larger number of neighborhood ties.

This study supports the hypothesis that Internet use is increasingly embedded into neighborhood networks, and in surprising ways. A significant relationship exists between time of Internet adoption and neighborhood relationships. Early Internet users had smaller networks at the start of this study, but their networks were more robust than others. Those who were amongst the earliest to adopt the Internet may have been more socially isolated than people in general, or a pattern may exist where initial adoption of the Internet corresponds to a drop in social capital that is ultimately mended over time. Unlike late and non-adopters, who experienced a decline in neighborhood network size over the two years participants were followed, early adopters experienced a reasonable level of growth in the size of their local network. In addition, the longer a person had been online the more neighbors they maintained contact with by email. This suggests that Internet use does not privatize; it does not isolate people from the parochial realm of the neighborhood. Internet use over extended periods appears to be an antidote to privatism, it affords the formation of local social networks.

### *What does this mean for neighborhood networks?*

The space of places and the space of flows can be bridged within the parochial realm. Variation has always existed within and between neighborhoods in the ability to form local networks. As first identified by Janowitz (1952), in his study of the community press as a local medium, stage in the life-cycle as it relates to family status is of primary importance in how a local medium influences community involvement. The defining role of life-cycle and contextual effects contrasts with Internet research that has focused on psychological factors, such as the role of introversion and extroversion in the social outcomes of Internet use, which largely omit group dynamics that influence Internet use.

As Internet use continues to expand, a bridge between electronic connectivity and local connectivity forms naturally as Internet use is embedded into everyday life. The evidence here suggests that the Internet is already slowly building local social networks, at least in those neighborhoods where context favors local tie formation. A simple email discussion list further enables local connectivity. Neighborhoods that already have an interest in building community, with the neighborhood context to back it up, are most likely to profit from a neighborhood email list. Within neighborhoods, those who have smaller networks on average, and consequently are the most likely to have a deficit of power and access to information, are the most likely to participate. However, the benefits of an email list are only available to those who actively participate, by sending messages to the neighborhood list. Lurkers experience no change in their network size as a result of observing. Still, the rewards of using the Internet to communicate locally do not appear to come in the form of a significant increase in contact through other mediums of communication, the telephone or face-to-face. However, it is unclear just how much multiplexity or frequency of contact matters in the parochial realm. Despite the tendency of classical social disorganization theory to emphasize the role of strong, frequent interactions, the existence of a large number of weak ties may be more important for collective action, collective efficacy, and neighborhood safety than frequent in-person contact, or regular contact of any type (Bellair, 1997, Sampson and Groves, 1989).

While lurkers do not benefit from neighborhood email lists in terms of the size of their local networks, the content of neighborhood discussion lists suggests that there may be additional individual, network and societal benefits. Studies of community email lists have consistently found that their use is primarily for information seeking and household aid, but they are occasionally used to express opinions and discuss politics, civic duties, and collective action (Hampton, 2003, Mesch and Levanon, 2003). As explored by Wyatt, Katz and Kim (2000), ordinary political conversation does not exclusively belong to the public realm. Ordinary political conversation frequently takes places in the private spaces of home and workplaces and is intertwined with everyday discussions of common events. These informal discussions are correlated with opinion quality and

broader political participation. However, political conversation within the private realm is usually held with close social ties, those who tend to agree and reinforce shared opinions (Erickson, 1997). Purposeful, although informal political conversation in the parochial realm enables exposure to more diverse opinions. Conversation with diverse others may lead to new opinions, more deliberative democracy, and greater political action.

### *Social network gap?*

At the level of neighborhood networks, the haves are more likely to benefit from use of the Internet than the have nots. Within neighborhoods, low Internet penetration has the same effect on neighborhood ties as residential instability; both constrain friendship choice. Those without the technology, and those in neighborhoods without an existing propensity towards local tie formation, are structurally disadvantaged twice over; they are unlikely to build local community with or without the use of information and communication technologies. For those with economic means, even if currently at an early life stage where local community is not a priority, stage in the life-cycle, family status, and residential setting will change, and when local community becomes important, it is more likely to form, and even more so when the Internet is integrated into the parochial realm. For those of lower socioeconomic status, residential mobility is a reduced option as they undergo changes in life-cycle and family status, and when mobility does occur, it is less likely to provide access to a neighborhood context that supports the formation of local social ties –with or without the advent of new media. Unless traditional community networking initiatives, those that provide a neighborhood email list, a technology infrastructure, and training, continue and expand the work they have done in less privileged neighborhoods, the “social network gap” between rich and poor, inner city and suburb, will continue to grow.

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<sup>1</sup> A limited number of community networking studies have done empirical evaluations of community relationships, including the Camfield Estates-MIT Creating Community Connections Project (Pinkett and O’Bryant, 2003) and the Blacksburg Electronic Village (Kavanaugh et al, 2005).

<sup>2</sup> For an extensive review of local ICT initiatives across informatics, sociology, and communications see Gaved and Anderson (2006)

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<sup>3</sup> There were significant inconsistencies between the lists of residents compiled by the local annual census, the reverse telephone directory, and projections based on the U.S. Census. For example, in estimating the population of adults in the apartment building, census tract data from the 2000 U.S. Census estimated that there would be 267 residents 18 years of age and older. However, the 2001 annual census for the City of Boston recorded 356 individuals by name over the age of 18, and the reverse telephone directory listed 188 unique names. When the City of Boston's census was combined with the reverse telephone directory, 442 unique names were produced. In an effort to improve the accuracy of the neighborhood rosters, a letter on university letterhead explaining the study and seeking participants was mailed annually to each person on the neighborhood rosters. Letters that were returned by the post office as "undeliverable" were removed from the neighborhood roster as part of the final analysis.

<sup>4</sup> Response rate based on U.S. Census estimates, population counts include all noninstitutionalized adults <18 years of age and all formal dwellings, assumes a 5% vacancy rate in the apartment building, 3% in the gated community, and 1% in the suburbs.

<sup>5</sup> Age was not included as a variable in this analysis because it correlated very strongly with tenancy, with older individuals likely to have lived in a neighborhood longer than younger individuals.

<sup>6</sup> Cramer's V confirms that the difference between neighborhoods was statistically significant. While the value of Cramer's V suggests a relatively weak relationship, caution should be taken in interpretation since two categories of the neighborhood variable measure the same construct (a suburban community). When the crosstabs were reanalyzed using one, or combined into a measure of both suburban neighborhoods (not shown), there was a small to moderate increase in both strength and significance of the relationships.

<sup>7</sup> No variable was modeled for use of the e-Neighbors website. Not only was use of the website very low, but those who used the site were the most likely to have sent a message to the neighborhood list.

<sup>8</sup> Intensity is calculated based on a participant's actual network size (number recognized), not on the potential network available within their neighborhood (neighborhood size).

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Table 1: Neighborhood characteristics.

	Apartment	Gated	Suburb	Control
Mean Age (years)	39.2	56.7	52.6	48.1
Married (%)	45.7	71.2	85.4	81.2
Male (%)	45.7	52.5	43.2	47.6
Caucasian (%)	77.8	100.0	90.8	85.9
Children at home (%)	14.8	20.3	56.2	62.4
Years of education (%)	16.8	16.1	16.9	16.1
Tenancy (years)	5.9	9.1	16.7	14.4
Residential stability $\geq$ 5 years (%)	25.3	64.9	66.9	64.7
Home owners (%)	0.0	96.6	91.4	88.2
Mean Internet use (years)	7.6	6.9	7.4	6.6
N	81	59	185	170

Table 2: Sense of community and existing community engagement.

	Apartment	Gated	Suburb	Control	
a. I have little to do with people who live in my neighborhood.	SA A N D SD	26.3 28.8 30.0 8.8 6.3	27.6 13.8 25.9 13.8 19.0	11.6 24.3 30.4 24.9 8.8	13.1 22.0 33.3 22.0 9.5
b. There is a strong ‘sense of community’ in my neighborhood.	SA A N D SD	3.8 6.3 40.0 27.5 22.5	12.1 31.0 29.3 13.8 13.8	5.5 30.9 33.7 20.4 9.4	6.0 25.0 41.7 17.3 10.1
c. I wish I had more contact with people in my neighborhood.	SA A N D SD	11.3 38.8 28.8 13.8 7.5	10.3 19.0 44.8 8.6 17.2	5.0 33.1 47.5 9.9 4.4	7.1 31.5 42.3 13.7 5.4
d. I feel an obligation to make a contribution to my neighborhood.	SA A N D SD	1.3 10.0 41.3 35.0 12.5	15.5 29.3 25.9 13.8 15.5	2.8 31.5 39.2 16.6 9.9	5.1 22.4 38.2 22.4 9.9
N		80	58	181	168

Table 3: Number of messages sent to neighborhood email list (number of senders in brackets).

	Apartment	Gated	Suburb	Control
Year 1	1 (1)	25 (8)	115 (42)	n/a
Year 2	0 (0)	2 (2)	271 (49)	n/a

Table 4: Number of visits to neighborhood website (number of visitors in brackets).

	Apartment	Gated	Suburb	Control
Year 1	32 (5)	52 (10)	134 (11)	n/a
Year 2	3 (2)	11 (2)	43 (6)	n/a

Table 5: HLM: Neighborhood networks and e-Neighbors in the suburban sites (N-level 1 = 705; N-level 2 = 341).

	Network Size	Number Close	Intensity Close	Number In-person	Intensity In-person	Number Phone	Intensity Phone	Number Email	Intensity Email
<b>Intercept</b>									
Intercept	21.38	11.82**	41.08***	11.44*	43.80***	1.74	5.33	-0.36	-0.40
e-Neighbors <sup>a</sup>	4.50	0.17	-6.69*	-0.99	-7.43*	-0.54	-2.74	-0.13	-1.12*
Not participate <sup>b</sup>	10.35*	0.84	-1.89	-0.61	-7.56	-0.57	-1.65	0.02	-0.16
Male	-7.52**	-0.03	7.12**	-0.57	5.85*	-0.74**	-1.05	-0.23*	-0.75
Tenancy (years)	0.82***	0.34***	0.27**	0.20***	-0.20	0.04**	-0.05	-0.01**	-0.06***
Married	0.22	0.84	4.52	0.85	5.01	-0.03	2.33*	0.24**	1.06**
Education (years)	-0.11	-0.58*	-1.54**	-0.28	-0.63	-0.02	0.10	0.04*	0.13
Children at home	6.36**	2.52**	6.50**	3.40**	8.09**	1.02***	1.96	0.17	0.32
Internet use (years)	-0.57*	-0.11	0.22	-0.12	0.20	-0.04	-0.09	-0.01	-0.04
<b>Slope</b>									
Intercept	-2.17*	0.14	1.65	0.25	2.20	0.18	0.09	0.04	-0.04
e-Neighbors <sup>a</sup>	-1.64	-1.21	0.00	-2.51**	-8.84**	-0.34	-1.47	-0.06	0.28
Not participate <sup>b</sup>	-1.29	0.61	-1.39	-0.31	-4.33	0.21	-0.21	-0.11	-0.47
Emailed list	4.36*	0.84	-0.94	0.81	0.44	0.07	0.47	0.33**	0.82
Internet use (years)	0.34**	0.03	-0.27	0.00	-0.26	0.00	0.00	0.03**	0.10*
% variance explained	27.01	27.52	16.95	11.79	22.18	14.39	9.84	12.22	13.91

<sup>a</sup> Dummy variable, reference category is the control suburban neighborhood.

<sup>b</sup> Resident of experimental suburban neighborhood that did not sign up for the e-Neighbors intervention.

\*p ≤ 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001

Table 6: New ties recalled by those enrolled in e-Neighbors suburban neighborhood (N = 94).<sup>a</sup>

	New Close	New Friends	New In-person	New Phone	New Email
Year 1	0	3	18	14	22
Year 2	1	5	11	9	19
Total	1	8	29	23	41

<sup>a</sup> Based on a series of five questions presented prior to the neighborhood roster that ask “in the past year” how many neighbors have you “met in person” / “talked on the phone” / “emailed” for the first time as result of the e-Neighbors services? How many would you consider to be “friends”? How many are “close friends”?