MEDIA LESSONS

from the National Capital FreeNet

How the Canadian National Capital FreeNet is used by thousands—largely for interpersonal communication—has deep implications for the future of commercial online services, as well as for the traditional mass electronic media.

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North American futurists and politicians alike see development of an electronic infrastructure for an information superhighway as an important national goal, much like development of railroads and other transportation systems in the 19th century. The information superhighway is supposed to enhance communications and commerce and lead to development of a modern information economy and a sophisticated electronically literate society, helping people communicate, work, and live better [4, 5, 7].

Not clear, however, is what services will be carried on this network and who will use it. There is talk of entertainment services, movies on demand, and perhaps electronic banking and commerce. But such services may not have the profound impact necessary to justify all the attention and financial investment. What services should be delivered? What services are people willing to pay for that will contribute to the national economy? What kinds of users are likely to want these services? Needed is a careful examination of who might use the information superhighway, what services they will use, and how it will affect their lives.

An early form of the information superhighway exists as the Internet, a worldwide electronic network accessible to perhaps 57 million people [9]. Its services include email and news, library searches, and electronic commerce. Perhaps an examination of today's systems can help us anticipate the users and services of tomorrow's infrastructure. Some have argued, however, that the Internet and other online services are not appropriate for comparison with the coming information superhighway, because the Internet and the commercial online services are too expensive and too technologically sophisticated, their use still limited to a small, specialized subset of the population. The information superhighway is supposed to have broader appeal and be more affordable and easier to use than the existing services [1].

Perhaps the least expensive and easiest to use of the current services are the various community networks, often called FreeNets. FreeNets are nonprofit community online systems providing such services as email, discussion groups, and information exchanges [3, 11]. They are often organized around a donation model, much like public television, in which funding comes from individual donations, corporate sponsorship, and government grants. FreeNet users either do not have

to pay any fees or are charged minimal fees. Besides being asked for donations, users are encouraged to volunteer their time to develop and run the systems. Users also often have a direct say in the management and organization of their services.

The National Capital FreeNet (NCF) in Ottawa, Canada (http://www.ncf.carleton.ca) is one of the largest—with 62,000 users (in 1997)—and most successful—with 14,000 connections per day (in 1996)—examples of such systems. The mission statement of the NCF describes the project and its goals as a "free, computer-based information-sharing network, linking the people and organizations of the region, providing useful information, and enabling an open exchange of ideas with the world. Community involvement makes NCF an important and accessible meeting place and prepares people for full participation in a rapidly changing communications environment."

The NCF was launched in February 1992 and by the fall of 1994 had grown to 29,000 registered users, with approximately 20,000 active users accessing the service during any two-month period. Users enjoy such services as email, local and international (Usenet) discussion groups, library search and information retrieval services, and connections to other systems on the Internet.

The NCF is free, accessible to the community, and relatively easy to use. A look at the system offers valuable information for planning future services. An extensive continuing evaluation of the NCF begun in 1994 involves user surveys and records of system usage. Areas of investigation have included user characteristics, as well as their access methods, use of the system, and personal and social effects.

User Characteristics. In a survey of active NCF users, 85% of the respondents reported living in the local region. In contrast, S.E. Anderson [2], in a preliminary study of the use of an online system, reported that only 24% of the Cleveland FreeNet users she surveyed came from the local Cleveland region. In Amsterdam, only 45% of the Digital City users surveyed were from the local region [10], a finding that suggests that NCF is primarily a local community service and that comparisons with the local census data are of interest.

There was a large gender imbalance (82% male) in the NCF population in 1994, although the population is relatively diverse when compared with other systems, such as the Cleveland FreeNet, where 83% of the users were male [2], and Digital City, where 91% of the users were male [10], or the World-Wide Web, whose users are 90% male [8].

A broad age distribution is represented on the system (see Figure 1), ranging from preteens to senior citizens and averaging 34 years. A comparison with the results from the overall 1992 census of the local region [12] indicates the distribution of the ages of NCF members is similar to that in the local region, with some under representation of people in the extremely low and high age ranges (under 15 and over 65), and a corresponding over representation in the middle age ranges (15–24 years).

NCF users also have a wide range of education levels, similar to the demographics of the local region (see Figure 2). The Ottawa region is dominated by public-service and high-tech workers, leading to a highly educated population. The largest category for NCF users was university graduates, followed by graduate or professional degrees and some college or university. NCF users differ most from the local population in percentage of university educated, which was over 50% (also the largest cat-

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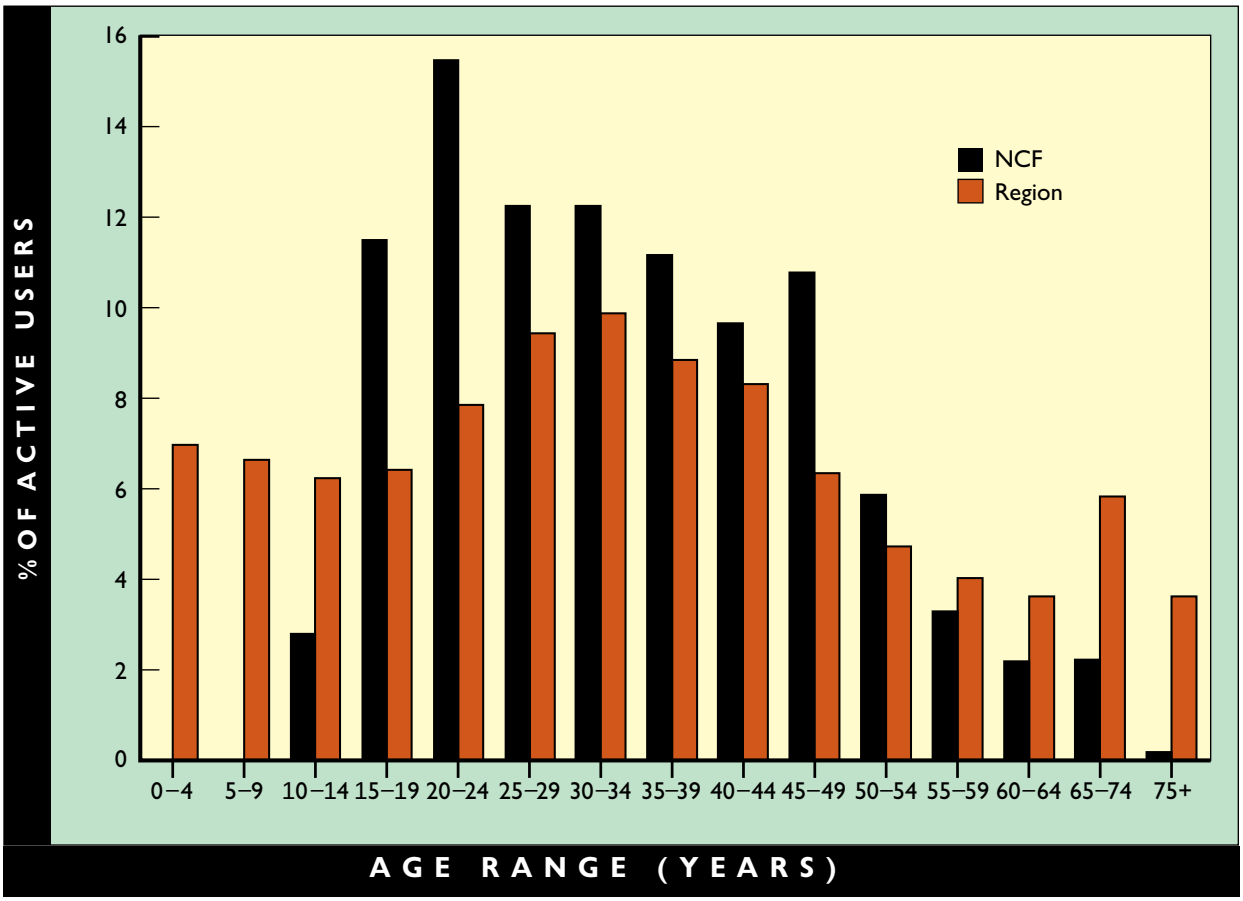

Figure 1. Age distribution compared with census data for the local region

egory for the region at 20%). There were also fewer NCF users with a grade-school education than might be expected from the regional data.

Income levels for NCF users, especially household incomes, are comparable to those for the local region (see Figure 3). The largest category of NCF users was household incomes greater than $70,000 (all amounts in Canadian dollars), which is comparable to the data for the local region. NCF users are both better off than the local community (incomes over $70,000) and less well off (incomes under $9,000), but the overall distribution of income levels is similar.

We found that NCF users are not a specialized group in the community; rather, they have a broad range of backgrounds and characteristics.

Connection methods and use. The NCF is accessible via dial-in connections using a modem, via telnet connections across the Internet, and via public-access terminals located in some regional libraries and public buildings. The most frequent access method was modem (79% of the users rely on modems for some of their connections; 48% reported that modems were their only access method). Connection via the Internet was reported by 40% of the users; 15% access the system only via the Internet. Only 15% of the users reported using public terminals for any of their connections, and only 1% relied on public terminals for all of their connections.

The introduction of NCF has influenced how users spend their time. While most users spend

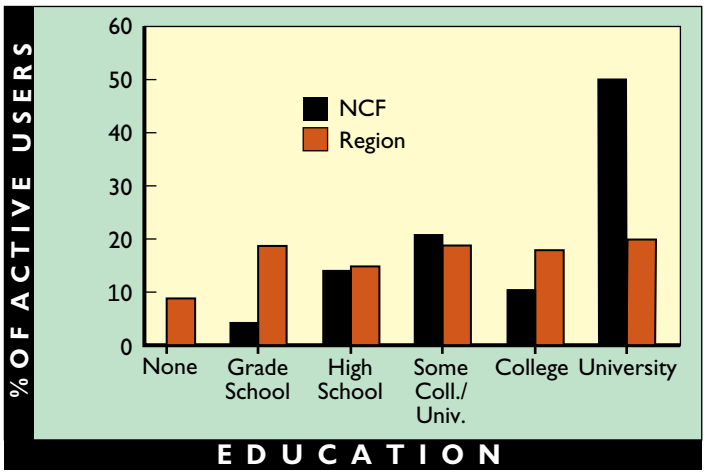

Figure 2. Education distribution compared with census data for the local region

less than five hours per week on the system, some connect for a lot longer. The mean time spent online for the nearly 20,000 active users in 1994 was 1.62 hours per week, which translates into a total of 32,400 person-hours per week on the system, or 193 person-minutes per minute. This finding means that in the minute it has taken you to read this paragraph, NCF users have spent a total of 193 minutes using the system. Such use means there must be an effect on other activities that users could be doing (such as watching television).

NCF has also meant a boost for the local business community. For example, 85% of surveyed users reported living in the local region, and 26% of the active users bought a new modem to access the system (only 11% of the surveyed remote users reported buying a modem). With approximately 20,000 active users, modem buying translates into a big financial benefit for the local business community. At a cost of about $100 per modem, NCF-related modem buying is responsible for approximately $442,000 in local modem sales.

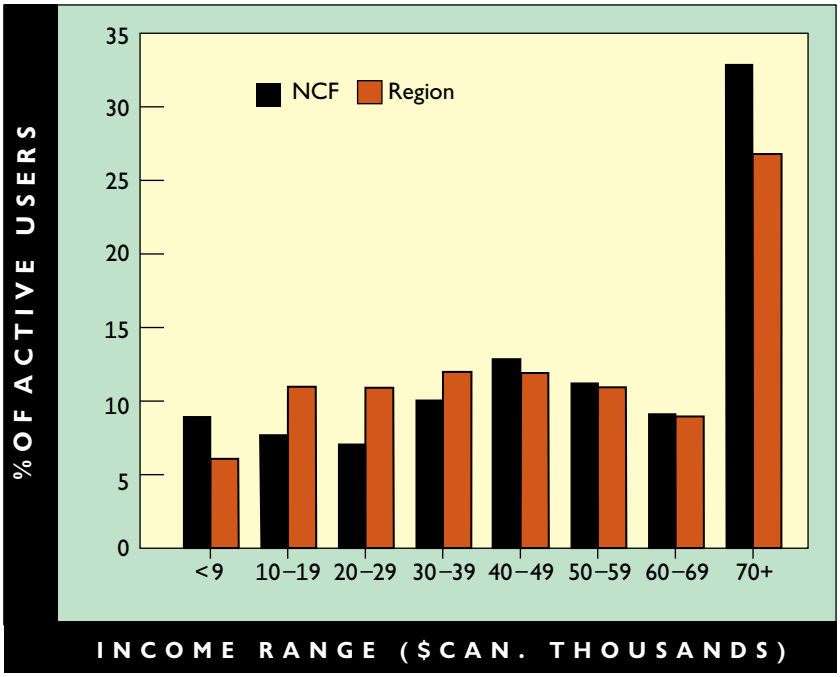

Figure 3. Household incomes compared with census data for the local region

The regional telephone company, Bell Canada, has also benefited financially. The survey found that 10% of local NCF users bought a new phone line to access the system. Extrapolating from the survey results shows that NCF use has lead to at least 1,700 additional local phone lines ordered from the phone company, and at $12 per month, this translates into continuing revenues of approximately $20,400 per month. NCF users may also purchase a "call answer" service so callers can leave messages while the user is using the phone to connect to the system—and is a further source of revenue not measured here. In addition, the NCF itself pays for 169 phone lines into its system at a cost of $3,800 per month, so total revenue for the telephone company is $24,200 per month, or $290,400 per year it would otherwise not collect.

The NCF may also be successful in introducing users to the Internet and creating a market for Internet service providers. For example, 69% of NCF users reported they were "very" or "extremely" interested in more complete Internet services as a result of using NCF. This suggests a potential for 11,730 local customers of Internet services. If the cost of that service is $300/year, there is a potential $3.5 million-per-year market in Internet services from active NCF members. Not clear is how many NCF users are willing to pay for Internet services, although the findings still demonstrate an increased awareness and interest as a result of using the system.

Not all NCF-usage effects have been positive. NCF users reported spending time waiting for modem connections to access the system. The average wait was 10 minutes, and system records showed that users connected to the system an average of 3.74 times per week. The survey also found that 79% of the users use a modem to connect to the system for 85% of their connections. Extrapolating from these results reveals that users spend 502,282 minutes per week waiting to connect to the system, meaning that for each minute that passes, NCF users spend 50 minutes waiting to get on the system.

The results may also have implications for NCF operations, as well as for the operations of similar systems. The NCF can be characterized as a system providing two types of services: access to an electronic network and content provided by the community and its members. Nearly 50% of the users rely on direct dial-up connections to the NCF for all their connections, suggesting that providing access to the network is an important role of the NCF and that a service just providing content without providing access might be less successful. On the other hand, while providing access is an important role for the NCF, library and other public terminals were used by only a small portion of the users, and complete reliance on these con-

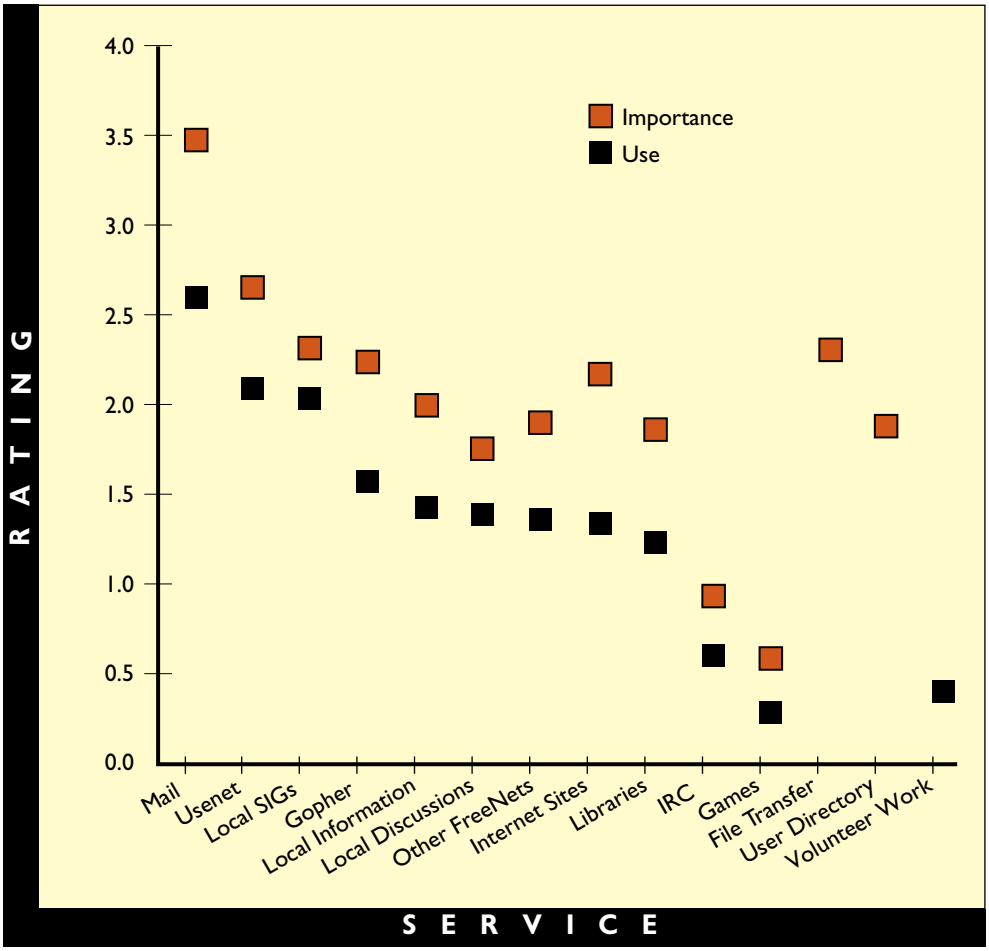

Figure 4. Importance and use ratings for various NCF services

nections was rare. It is far more common for users to use connections from home or work locations.

Using the services. NCF users were asked to rate their use of various services on a scale ranging from "never" to "frequently" and the importance of services on a scale ranging from "not at all" to "extremely" (see Figure 4). Communication services, in the form of email and public discussions, are the main services used on NCF and were rated as most important. Email was the most used and most important service. Public discussion services, such as Usenet and special interest groups (SIGs), were also popular services. Information services, such as menu information, Gopher, and access to libraries through the Internet, were less important (a Web service was not available on the NCF at the time of the study). Finally, the recreational services, such as online games and Internet Relay Chat (IRC), a real-time, text-based conversation service, were used least and rated as least important.

The finding that communication services are the system's key use has implications for the marketing of commercial online services. Much of the advertising of online services focuses on information services, such as the Web; potential customers are told about all the great information they can find when using the service. Our analysis suggests that marketing focused on interpersonal communications may also be successful in attracting customers.

An NCF goal common to most community networks is "to encourage and to revitalize community involvement" [6]. NCF users were asked whether "the NCF encouraged you to get more involved in community life"; the most common responses were "not at all" and "slightly." These were also the most common responses when users were asked whether "the NCF has been an important aid to community action" and whether it helped "identify support groups" in the community. These results suggest that the goal of increased community involvement is not being reached.

Reasons for this failure are not clear. It is possible that NCF simply does not contain enough community information to be a benefit in this area. It is also possible that members are not using the system to access community information or do community activities but instead use it for personal communication. Another possibility is that users *are* learning more about their community and getting involved without realizing it. Moreover, only a small percentage of the population may get involved in community activities in the first place, so these results may merely reflect that general pattern.

Another NCF goal is to allow its members to learn skills necessary to be information- and computer-literate while providing easy access to valuable information. NCF users were asked about the benefits of using the system (see Table 1). They reported improved computer literacy and some improvement in general liter-

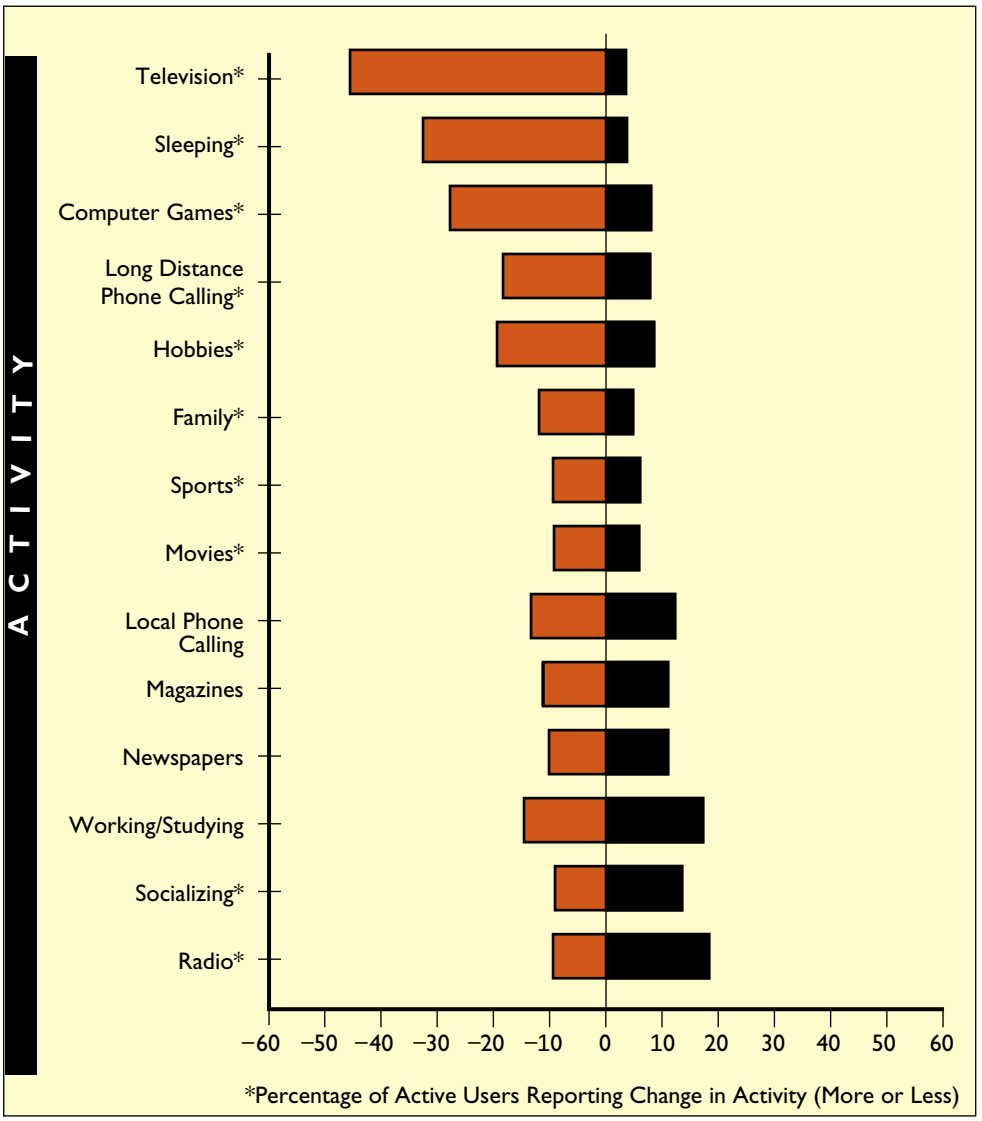

Figure 5. Effects of NCF use on various activities (asterisks represent statistically significant changes)

acy. They also reported that the system was often beneficial for informal learning. Many users also said that their knowledge of the Internet had increased a great deal since they had been using NCF. Thus, it appears that the goal of personal learning is being reached.

Using the system can also have a strong influence on users' lives. For example, users were asked whether they were spending more, less, or the same amount of time on a variety of activities since they started using NCF (see Figure 5). The greatest change in activity was in the amount of time watching television; 46% reported watching less television and only 4% reported watching more television (the other users reported no change).

NCF users also reported spending less time sleeping, playing computer games (not on the NCF), doing hobbies (not on the NCF), participating in family activities, participating in sports or other athletic activities, and going to movies. Two activities showed a significant increase after users joined the NCF: socializing (not on the NCF) and listening to the radio. The increased time spent listening to the radio is particularly interesting, especially in contrast to the results for television viewing. It is possible to listen to the radio while using the system, but simultaneous TV viewing is difficult because of the visual nature of both activities. Not clear is whether radio listening has increased to make up for not watching TV.

An activity of particular interest is telephone use. One result of the NCF's giving members free access to a global communications system is a decrease in use of

Table 1. Percentage of users reporting NCF benefits for various activities

Activity	Percent Reporting Benefit
Improving computer literacy	71.9
Informal learning	66.8
Social interactions (discussions with and meeting people)	62.7
Entertainment	57.0
Work or business	44.3
Government access and participation	41.2
Contacting relatives	40.4
Improving general literacy	31.3
Access to social services	28.4
Access to commercial services (such as shopping)	14.8
Teaching	14.2
Access to professional services (such as doctors and lawyers)	9.4
Formal learning (actual courses)	8.5

the telephone for voice calls, especially long-distance calls, since NCF users can avoid long-distance charges by communicating via email. NCF users indicated they spend less time making long-distance voice calls but reported no significant change in local calls. Thus, computer networks, especially those with free access or flat-rate charges that are deployed widely, may hurt the revenues of long-distance carriers.

Then there is the social impact the system might have. For example, Stoll [13], a vocal critic of online culture, has argued that computer networks can be socially isolating rather than socially facilitating. Users may be spending time connected to computer networks at the expense of face-to-face social interactions and involvement. Some NCF users report spending less time with their families and less time on sports and hobbies. However, many users also report spending more time socializing (not on the NCF) and that the system has been beneficial for meeting people and engaging in discussions. Users also report the system is useful for maintaining contacts with friends and relatives who may not be nearby. There may be a change in the nature of the socializing computer network users engage in, but there was little indication in our survey for the isolation Stoll cited.

It is interesting to note that women reported more benefits in the areas of socialization than men, as well as a more positive overall impact. The social and interactive nature of this community network system may make it particularly useful and enjoyable for women. If this conclusion is correct, it may be possible to address the poor representation of women on the system (18% in our study) by emphasizing the social aspects of the service.

The extent of these effects on users' lives is not known, but it may represent significant changes in their lifestyles. Overall, only 4% of the surveyed users reported that the system had no effect on their lives; 95% reported a positive effect, and 47% described the effect as "large."

Conclusions

Analyzing the users and uses of the NCF reveals that such systems can have significant local participation, attracting people from a broad range of backgrounds. This FreeNet has allowed many thousands of people to go online, suggesting that future services on the information superhighway could have broad appeal. We have seen that the services provided on communications networks can significantly affect how people spend their time and their use of more traditional information and communication products (such as television and telephones).

These findings also have implications for the development and marketing of commercial network services. Much of the advertising for online services has emphasized the information aspects of the service, often focusing on the Web. However, users in our study reported that socializing and entertainment are important benefits of using the system and that they could be emphasized in developing and marketing a service. Moreover, interpersonal communication seems to be a key use of the NCF in terms of both maintaining contacts (perhaps avoiding long-distance telephone charges) and meeting new people. Users also reported benefits in learning more about computers—a result that could be developed and emphasized in other services. C

References

1. Anderson, R.H., Bikson, T.K., Law, S.A., Mitchell, B.M., Kedzie, C.R., Keltner, B., Panis, C.W.A., Pliskin, J., and Srinagesh, P. Universal Access to E-Mail: Feasibility and Social Implications. RAND Rep. MR-650-MF, Santa Monica, Calif., 1995. (see: http://www.rand.org/publications/MR/ MR650/index.html)
2. Anderson, S.E. Factors associated with usage of a public telecomputing system. Ed.D. dissertation, Curry School of Education, Univ. of Virginia, Charlottesville, 1992. University Microfilms No. 9324908.
3. Beamish, A. Communities online: Community-based computer networks. Masters' thesis, Dept. of Urban Studies and Planning, MIT, Cambridge, Mass., 1995. (see: alberti.mit.edu/arch/4.207/anneb/thesis/toc.html)
4. Bell Canada. The information highway and Canada's economy. Bell Canada, 1995. (see: bell.ca/bell/eng/iway/beacon/bieco.html)
5. Industry Canada. The Canadian information highway: Building Canada's information and communications infrastructure, 1994. (see: info.ic.gc.ca/info-highway/reports/building/rpt-fnl.txt)
6. National Capital FreeNet. A proposal to fund the National Capital FreeNet community computing system, 1993. (see: ncf.carleton.ca/freeport/freenet/papers/fund/menu)
7. NTIA (National Telecommunications and Information Administration). The national information infrastructure: Agenda for action. U.S. National Telecommunications and Information Administration, Washington, D.C., 1993. (see: sunsite.unc.edu/nii/toc.html)
8. Pitkow, J.E., and Recker, M.M. Using the Web as a survey tool: Results from the second WWW user survey. J. Comp. Nets. and ISDN Syst. 27, 6 (June 1995). (see: cc.gatech.edu/gvu/user_surveys/survey-09-1994)
9. Quarterman, J. 1997 Users and hosts of the Internet and the matrix. *Matrix News* 7, 1 (Jan. 1997), 4.
10. Schalken, K., and Tops, P. The Digital City: A study into the backgrounds and opinions of its residents. Paper presented to the Canadian Community Networks Conference (Aug. 15–17, 1994, Ottawa, Canada). (see: ncf.carleton.ca/freeport/freenet/conferences/com-net94/conference_ papers/dcity.txt)
11. Schuler, D. Community networks: Building a new participatory medium. *Commun. ACM 37*, 1 (Jan. 1994), 39–51.
12. Statistics Canada. Profile of census tracts in Ottawa-Hull. Parts A and B. 1991 Census of Canada. Industry, Science and Technology Canada, Ottawa, 1992.
13. Stoll, C. *Silicon Snake Oil: Second Thoughts on the Information Highway*. Doubleday, New York, 1995.

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