Computer Assisted Interviewing
The Design and Application of Survey Software
to the Wired Suburb Project*

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As corporate, government, and academic organizations continue to adopt computer assisted interviewing (CAI) acronyms such as CAPI and CSAI have become common place in the research environment. Computer Assisted Personal Interviewing (CAPI) and Computerized Self-Administered Interviewing (CSAI) share the benefits of automating many aspects of the data collection process. CAI technologies can successfully perform many functions of a trained interviewer including administering contingency questions appropriate for a specific participant, and personalizing a survey by using background information collected over the duration of the interview. The most attractive aspect of this technology probably remains the elimination of the time and costs associated with the separate step of entering information into a computer for data analysis.

With so many survey organizations adopting CAI the debate is no longer whether we should use CAI, but how CAI can be used most effectively in the academic setting. This paper follows the use of Internet (Web) and personal computer (PC) based interviewing in the University of Toronto's Wired Suburb Project. The use of CAI in this project is different from many other examples in the use of social network questions, a time-use diary, and Web and PC-based interviewing of a small residential population. The purpose of this paper is to develop an understanding of why CAI may be more appropriate for some research projects than others, to explore specific problems with the technology and approach used in this study, and to explore specific challenges for the use of CAI in social network and time-use analysis.

The Wired Suburb Project

Before discussing the use of CAI in this project a brief introduction to the study is appropriate. The Wired Suburb Project is a joint investigation by Keith Hampton and Barry Wellman of the Department of Sociology, University of Toronto. The significance of this research relates to scholarly debates about the growth of computer mediated communication (CMC) and concerns for the loss of civil society and the increased individualization and privatization of life in the Western world. The development of computer-supported social networks holds the prospect of enhancing both non-local (global) and very local communities. On the one hand, computer and telecommunication networks enable long-distance contact, and the bandwidth they provide could be wide enough to support community-like ties of sociability and support as well as more instrumental relationships. On the other hand, the increased movement into the home, of the interface for communication technologies, ties people involved in computer supported activities to the location of the technology, their place of residence. The development of online communities and home based CMC should encourage online communicators to stay at home more and be attentive to their local surroundings. The combination of local and global community activity may bring about a *glocalization* of community encouraging a reappearance of the civic society that has been argued to be in decline throughout the Western world.

The ideal setting to conduct research on the effects of computer mediated communication in the home would be a new residential community equipped with the most advanced forms of in-home communication technology. *Netville* is the pseudonym for one of the few residential developments in North America where all of the homes in the community had a series of advanced communication technologies installed as a part of their design. Until January 1999, residents of Netville had the opportunity to participate in a "high bandwidth trial" of new information and communication technologies. A local network provided residents with high-speed access to the Internet, specialized on-line CD-ROM content, videophone technology, an on-line jukebox, local discussion forums, and access to online health practitioners. A group of public and private organizations formed a Consortium to provide Netville with the infrastructure of telecommunication goods and services at no charge. Approximately 65 percent of households in Netville participated in the high bandwidth trial and as a result had access to advanced communication technologies for up to two years (for a complete introduction to the Netville project see Hampton and Wellman, 1999a).

Between June 1997, when the Netville project was launched, and April 1999, data was collected through ethnographic observations, online discussion forums, focus groups, and a series of surveys administered using CAI. These surveys include information on previous housing, geographic perception, personal networks, community alienation, social trust, work, experience with technology, time-use, and basic demographic information. The survey was to be administered to all household members, 18 years of age or older, at both a pre-move and post-move stage, but as will be explained, a number of factors confounded this process resulting in a more limited data collection. The pre-move survey was to be administered approximately three months prior to moving into Netville and the post-move survey approximately one year after living in the community. The pre-move survey would also be adapted for use with residents who had moved into Netville before they could be contacted for a pre-move survey.

Why CAI?

CAI was incorporated into the research design of the Wired Suburb Project only after a traditional face-to-face survey instrument was under construction. In the summer of 1997, the Netville project was still in its infancy, and, as most projects in their youth, there was no immediate source of funding. There was not sufficient financing available to conduct two waves of face-to-face interviews, or to conduct the subsequent coding and data entry for the estimated 400 participants in the population. The desired use of social network questions made cost cutting alternatives, such as surveying a sample of the population, or scaling down the scope of the survey, undesirable or impossible.

The primary focus of the Wired Suburb Project is an investigation of the social networks that exist within the relatively small geographical area of the Netville site, and of the potentially wider spanning personal networks of individual participants'. To interview a sample of participants from the estimated 200 homes to be built in the community would have meant losing vital information on the whole network of social ties between Netville residents (see Erickson and Nosanchuk, 1983). Additional data collected through the survey, including time-use, levels of social trust and alienation, experience with technology, participation in civic and leisure activities, work habits, and the usual demographic information, also required a survey that was both lengthy and detailed. A desire to collect extensive and detailed data outweighed the immediate financial means of the study, and CAI appeared as an attractive means of avoiding the extra cost associated with face-to-face and pen-and-paper interviews.

The most significant factor besides financial restraints motivating the use of CAI was a concern for how participants would react to survey data being collected by a researcher who was also collecting ethnographic data as a fellow resident. Following in the footsteps of Herbert Gans (1967), while developing the survey I was also preparing to make my home in Netville where I would live and work in the community for nearly two years. There was some concern about my ability to fit in and be accepted as a resident of Netville while simultaneously conducting personal interviews with the same population. Gans provided further evidence of an impending conflict (personal communication: 14 July 1997) in reporting the difficulties he experienced interviewing the residents of Levittown who saw him as a fellow resident and not as a trained interviewer. Suspecting that residents of Netville would react negatively, or chose to conceal information during interviews, we decided that if an ethnography was to continue, another method of interviewing residents had to be explored.

The very nature of the Netville population provided a solution to our financial and ethnographic concerns. Once participants had moved into Netville they would have universal high-speed access to the Internet. For the post-move phase of the interviewing process we could deliver the survey using CSAI over the Web. However, this did not solve the immediate problem of the pre-move survey where there was no guarantee participants would have the necessary Internet access to complete an online questionnaire.

Results from a mail survey, conducted by the Consortium, of the first 44 households to move into Netville revealed that 77.3 percent of all participants had a home computer before moving into the community. The high rate of computer ownership suggested that CSAI delivered on a PC would allow the majority of participants access to the survey during the pre-move phase of the study. Assuming that a large proportion of remaining participants would have access to a computer, and possibly the Internet, from either their place of work, or through an acquaintance, we anticipated that most of the pre-move population could be surveyed without resorting to face-to-face interviews. To reach the remaining pre-move population, which would not have access to a computer, we would make arrangements to deliver laptop computers to participants homes.

To simplify the survey design process, and to limit any differences between a survey completed on the Web, and one completed on a PC, a CSAI program that could conduct both Web and PC-based interviewing was the objective of an initial software search. We found CAI packages that could conduct either Web surveys, or PC-based interviewing, but few that could do both Web and PC-based surveys. Many of the CAI programs we reviewed appeared to be geared more toward the needs of market researchers, and less toward the needs of academic researchers, who generally require greater control over question configuration and survey design. Certain question types, specifically those used for the social network and time-use sections of the questionnaire, were missing from most packages and it was uncertain if existing software could be adapted to meet our needs. To design a survey that was guaranteed to be consistent across both the Web and PC versions, and to maintain control over question design, we felt it necessary to develop our own CAI software for this study.

Software Design

In September 1997 I worked with a local computer programmer, Ross Barclay, to design a software package that would meet the needs of the Wired Suburb Project. This software was designed with the following functions in mid:

- A *Windows* based interface that would easily allow the survey designer to input questions into the survey software.

- The PC version had to work on the simplest of computers and be easy to install and operate.

- The Web version had to be accessible using the greatest possible range of Internet browsers.

- In addition to the standard questions and functions of traditional CAI software, we had to incorporate social network and time-use questions.

- It should be possible to stop and restart the survey to incorporate the use of the time-use diary.

- The Web and PC versions had to look and behave as similarly as possible.

It took more than six months to design a fully functional version of what we later called *Validity Survey Software* (VSS).

The final version of VSS allowed for considerable flexibility in question design. The design interface prompts users to select a question type, to enter the text of the question, and where appropriate create response categories. The design interface then organizes question information into a series of files

Table 1. Question Types

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Yes/No	Select Yes or No.
Short Answer	Enter a series of numbers, or a short textual response.
Open-ended	Write a response up to a few paragraphs in length.
Select One - Fixed Response	A list of possible responses - only one can be selected.
Select Many - Fixed Responses	A list of possible responses - any number of categories can be selected.
Rank Items	Rank all available options.
Likert Scales	Enter a number corresponding to the Likert scale displayed on the screen.
List Answers	Provide a list of responses (for example a list of names, addresses, organizations, etc.).
Date	Enter a date in day, month, and year fields.
Time-Use	A series of questions based on the Statistics Canada General Social Survey (GSS), Time Use Questionnaire.
Social Cognition	A social network question type used in conjunction with a list of names to determine the extent that "person A" knows "person B" (i.e., they don't know each other, they know each other, they are close).

Table 2. Optional Survey Processes

Contingency Questions	skip questions not applicable to a participant.
Variable Recall	Use an answer from a previous question as part of a future question.
List Combine	Lists generated by the participant over a series of questions are combined into a new list and any double names are removed. Combined lists can be used in future questions as response categories, or questions can be asked for each item in a list.
Advanced Lists	The same question asked about each item in a list.
Survey Restart	If a participant loses their Internet connection, or their computer loses power, the survey automatically continues from where the participant left off.
Survey Splitter	The survey can be divided into sections to be completed over numerous sittings.
Graphics, Sound, and HTML	The Web-based survey supports options such as graphics, sound, and other HTML properties.

used for both Web and PC interviewing. The process of manually editing questions in the format used by VSS is so simple that the design interface was often abandoned in favor of a simple text editor. Table 1 and 2 summarize the different question types and the range of options incorporated into the software.

Since participants have varied technical abilities, and use computers with different operating systems and varying processor speeds, the PC version of VSS had to be easy to use and install. The PC-based survey is completely contained on a single floppy disk. No files are ever transferred to a participant's hard drive, and all that is required to run the software is a computer with at least a 286 processor, and 640K of memory. The floppy disk was distributed to participants with a set of simple instructions, and, once completed, the survey disk was returned by mail. Instructions on how to complete the survey were simple (1) turn off your computer, (2) slide the floppy disk into the disk drive, and (3) turn on the computer and the survey will start automatically.

Since participants could complete the pre-move phase of the survey using either the Web or PC-based survey it was important to reduce any response effect originating from differences between the two survey interfaces. Since the Web survey requires the use of an Internet browser, such as *Netscape*, it was impossible to exactly replicate for the PC interface. Figure 1 is an example of a question using the Web survey and Figure 2 shows the same question as displayed on the PC. The presentation quality was extremely limited in the PC questionnaire by its corresponding *DOS* interface. Making this technology accessible for those with even the most basic of computers meant omitting the use of a mouse, color, sound, graphics, or any of the more advanced functions potentially available for use in the Web version.

A series of internal consistency checks were introduced to reduce data entry errors. For example, when entering a date the participant is presented with a self-correction screen advising them if a number higher than 12 is entered for the month, or higher than thirty-one for the day. For ranking questions, when two items have been ranked the same, an answer is ranking higher than the total number of items, or an attempt is made to move past the question before all items have been ranked, a similar self-correction screen appears. Although not used in the wired suburb survey VSS can be used to make questions "mandatory" which means the software will not advance to the next question until a response is provided.
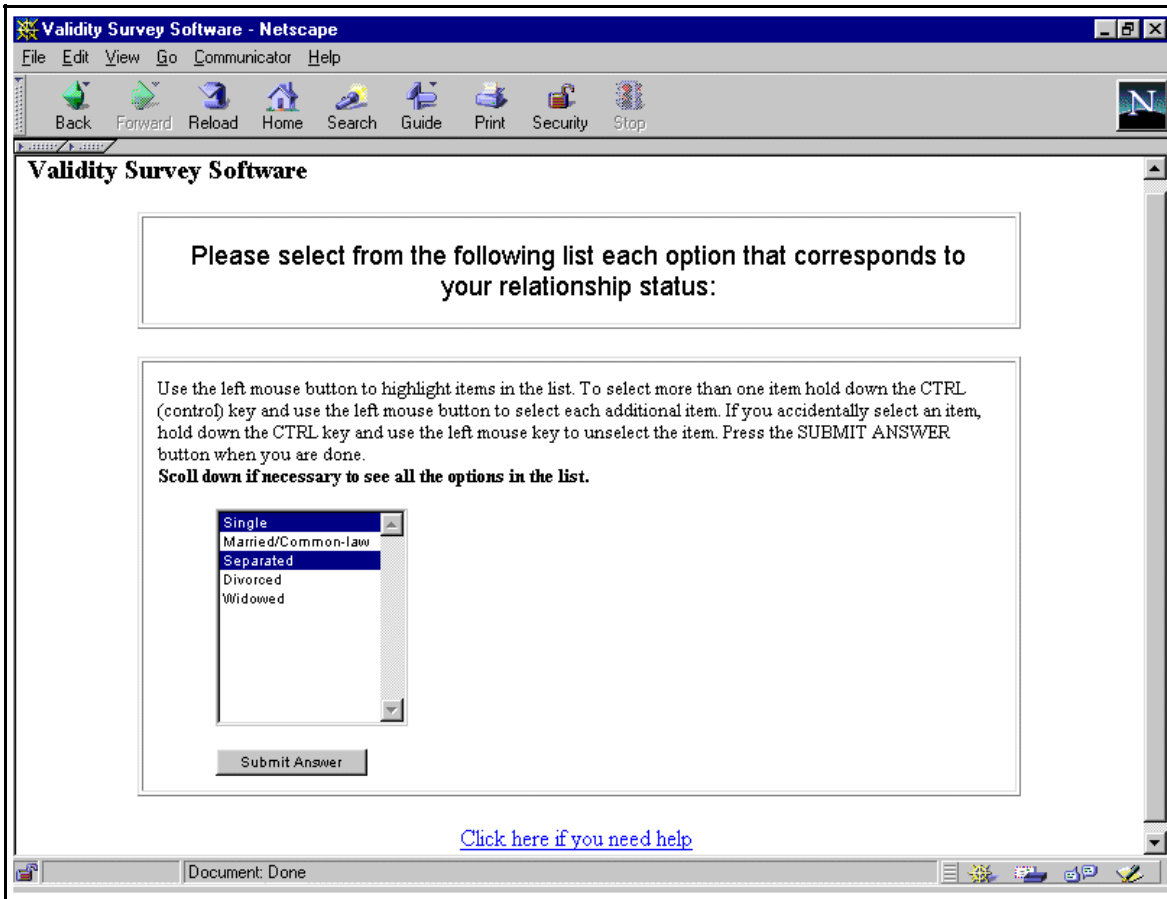
Figure 1. An example of a question on the Web survey.
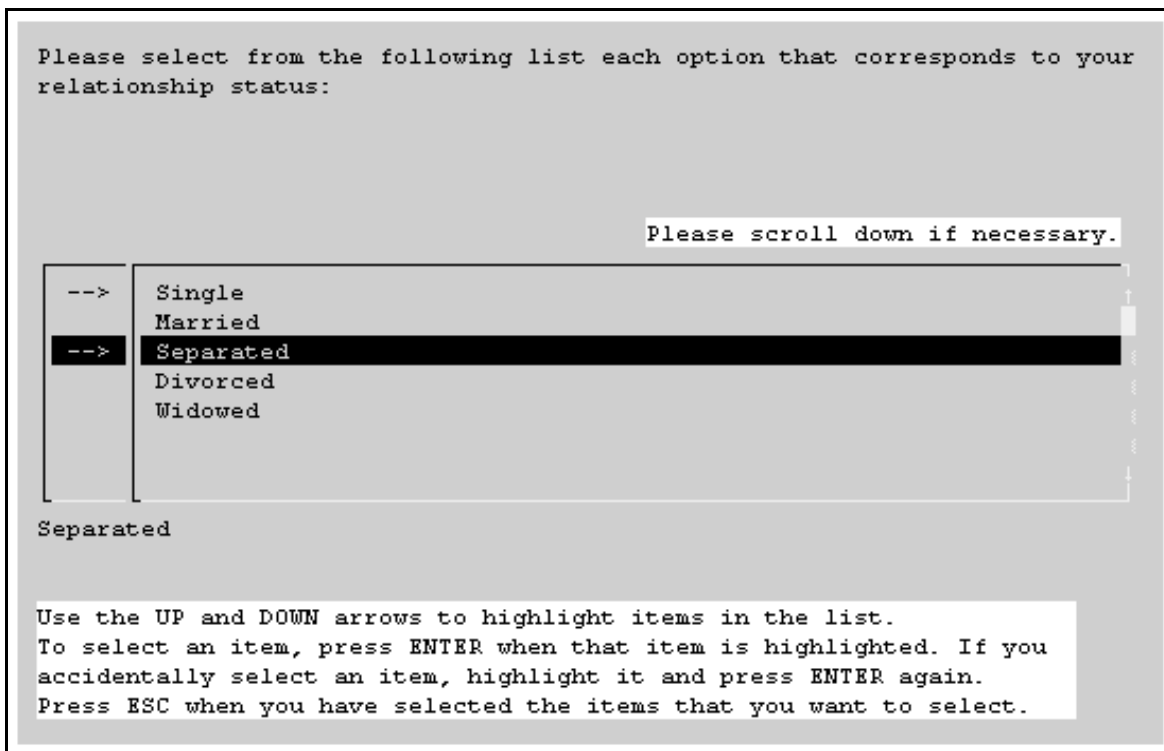
Figure 2. An example of a question on the PC survey.

Fixed response questions, which ask for a choice of one item from a number of categories, are controlled to prevent more than one item from being selected. Close-ended questions, which allow for the selection of more than one category, enable participants to unselect items as easily as they are selected.

CAI and Social Network Analysis

The first type of network question used in the Netville survey was a whole network survey that involves presenting participants with a list of neighbourhood residents while asking them "do you recognize this person?". There was no problem in the CAI-implementation of this type of question and we eventually presented participants with a list of up to 271 names. In addition to asking whom they recognized, we were also able to collect detailed information on each name selected. In practice, the reaction to this type of question was very positive. Participants found it easy to scroll through lists presented on the computer screen, almost all seemed to enjoy the exercise, and many reported how interesting they found the question. The second type of network question, personal networks, was considerably more complex and problematic to use with CAI.

For the personal network questions participants were presented with thirteen questions aimed at eliciting names that made up their personal network (many of these questions are based on Fischer (1982); and Wellman (1979)). Examples of the questions used include:

- From time to time, most people discuss important matters with other people. Who are the people with whom you discuss matters important to you?

- When you feel just a bit down or depressed, who do you turn to when you want to talk about it?

- If you needed to borrow a large sum of money, say $1,000, who would you ask for help?

In response to these questions, participants are asked to provide a list of names, one per line, using only first names and last initials. First names and last initials were used to create a sense of anonymity and reduce any fear that we would attempt to contact the people listed. Once participants listed names, VSS took the thirteen separate lists, removed any double names, and creates a master list that contained all of the people listed. This master list was then used to ask for more detailed information on each member of the personal network including: demographic information, where and how they met, how often they communicated, and through what means.

The personal network questions were successful in generating lists of names that contained the members of participants' personal networks. As anticipated, participants often listed the same names in response to more than one of the thirteen network questions. What was unexpected, and discovered through pretesting, were the many ways that a participant could list the same name in different ways. For example the name "Brenda G", could be listed as "brenda g" with lowercase letters, "BrEndA G" with a combination of upper and lowercase letters, or the name could be followed by a period, an extra space, or other miscellaneous characters. One participant even proceeded the name of his partner with that of a sideways happy face, or "emoticon"; made with a colon, plus sign, and a bracket. Each variation of a name entered by a participant is, in reality, the same person, but, because of its different appearance, each is treated by the software as a unique item. For participants, this meant that they were asked a series of detailed questions about the same person in their personal network over and over for each variation of that same name. This had the effect of increasing the length of an already long survey and frustrating participants by presenting them with what they perceived as repetitive questions. To solve this problem, VSS examines each name in the list, truncates everything after the last letter, converts all characters to upper-case, and then checks for duplicate names. Even with these changes, we could not develop a successful way of preventing errors resulting from participants spelling the same name differently in multiple questions, or ignored instructions and listing people by title, such as "my in-laws," rather than by proper name.

CAI and Time-Use Analysis

The time-use section was largely based on questions from the Statistics Canada *General Social Survey (GSS) Time Use Questionnaire* (1997). The intent was for participants to complete a self-administered time-budget diary including information on each activity that they perform in a single day. To accomplish this by using CAI, without assigning participants handheld computers, we positioned the time-use section at the end of the interview and ask participants to return to the survey after the next workday to complete their diary. In this respect, the time-use diary was completely dependent on how well participants could recall the activities of the previous day. The reason for asking participants to return, rather than complete the diary immediately, was to allow for time to consider and remember daily activities, as well as to avoid diaries of weekend activities.

After participants had received instructions on what the diary involved, and on which day of the week to return, the survey would stop until restarted. When the participant returned to the survey, they were given instructions on how to proceed. The first question asked what activity they were doing at 4:00am on the target day. Participants could then choose from a menu that listed the following main activities:

- Paid Work, and Activities Related to Paid Work.
- Shopping for Goods and Services.
- Commuting and Travel.
- Education, School, and Related Activities; Socializing.
- Housekeeping, Domestic Work, Cooking, Maintenance, and Repair.
- Active Leisure.
- Child Care.
- Health Care.
- Personal Care, Sleep, Meals and Other Related Activities.
- Watching Sports, Movies and Other Entertainment Events.
- Civic and Voluntary Activity.
- Television, Internet, Media, Reading and Other Passive Leisure.

When participants selected a category, they were presented a more detailed list of possible activities and asked to select the activity in which they participated. If the participant could not find the appropriate activity they could easily search through other categories, or simply enter their activity in the provided text box. The advantage of the menu-driven activity guide was that it allowed participants to see a range of possible activities, thus probing for events that they may otherwise have overlooked in their daily activities, and it provided for the automated coding of activities. After selecting an activity, participants were asked another series of questions on whom they were with, where they were, how they felt while involved in that activity, and the time the activity ended. If an activity was considered "personal" by the participant all questions were skipped until the time the activity ended. The time-use diary sequence was repeated, beginning with the time the previous activity ended, for a complete twenty-four hour period.

CSAI in Practice

Between April and August 1998, twenty-three Web and forty-seven PC questionnaires were distributed for the pre-move phase of the Wired Suburb Project. The procedure for distributing questionnaires involved, first, contacting participants by letter in the months prior to their expected move. Second, having a research assistant call participants by telephone to answer questions about the study, identify the number of eligible participants, and to secure permission to participate in the survey. Third, with the exception of those households without access to a computer, survey packages were mailed to participants containing a consent form, a return envelope, directions on how to access the Web survey, or a floppy disk with instructions for the PC questionnaire. Lastly, participants were sent a

postcard after the first week, received follow-up telephone calls after two weeks, and were contacted up to two additional times as reminders to complete the survey.

Those households that did not have access to a computer were an exception to the normal procedure for questionnaire distribution and acquired all related material, including a laptop computer, through home delivery. The number of households without access to a computer was greater than expected (close to 35 percent) and, as a result, there was a heavier than anticipated demand for laptop deliveries. Laptops were lent to participants for an initial period of one week, but this was often extended to a second week to allow time for all participants within a household to complete the survey. An initial supply of only two laptops, eventually increased to four, combined with a population dispersed over the Greater Toronto Area, meant that we often had participants waiting for computer delivery. The response rate for the pre-move survey was lower than expected, in part as a result of the use of CAI, but also in response to a number of external events.

Shortly after the pre-move survey began it was obvious that things were not going to go exactly as planned. Construction problems, planning issues, and a series of labor strikes delayed home construction up to six months. Participants, who were preparing to move into their new homes, were given revised occupation dates, and, over time, homeowners were forced to find alternative housing in the interim between vacating their old home and moving into Netville. Families often chose to move in with extended family members for the duration of the delay. The unexpected mobility of pre-move participants made it difficult, if not impossible, to locate them for pre-move interviews. When participants could be contacted they were often hostile toward anything associated with the development and subsequently refused to participate, or, as a result of their interim living arrangements, they had new time commitments limiting their chance to participate.

Of the first seventy questionnaires 50 percent of participants who used the Web, or who had been mailed the PC survey, returned a completed survey. The response rate was considerably higher (80 percent) for those participants who had been delivered a laptop. We suspect that the response rate was affected by a number of other factors unrelated to CAI. For example, the questionnaire took on average two hours to complete. The timing: it was administered over the summer months, when many had planned extended vacations away from home. The placement of the lengthy and sometimes exhausting personal network questions at the start of the survey. However, it cannot be discounted that the CAI technology may also have played a role in the response rate. Many families who initially requested Web questionnaires lost access to the Internet while preparing to move, and this increased the length of time between questionnaire distribution and completion, as arrangements had to be made to send out PC-based questionnaires.

In September 1998, the Consortium member responsible for Netville's local network started suggesting that they may discontinue supplying the community with access to the high-speed local network and withdrawal from the project. Faced with the possibility of our site losing its unique status, watching as many families cancelled their plans to move to Netville, and given that pre-move participants were often in temporary situations not part of their normal living arrangements, we deciding to delay any further pre-move interviewing.

The pre-move questionnaire was modified for use with existing Netville residents, and using the procedure developed during the pre-move survey, we began to distribute the new Web questionnaires in mid-September 1998. Few changes were made to the content of the questionnaire other than the displacement of the personal network section from the middle to near the beginning of the questionnaire (as we felt this was the most important data we wanted to be sure participants completed this section). Since all participants had high-speed Internet access over the community's local network, the survey process was simplified by using only Web CSAI. The one change we made to our survey methodology was the inclusion of a small incentive, a gift certificate with the survey package for a free specialty coffee at a local coffee house, and plans for the draw of a gift certificate worth $500 in computer equipment from all completed questionnaires.

At the end of October 1998 the Consortium unexpectedly announced that Netville residents would no longer be given access to the local network and corresponding services in the new year. When the Consortium made this announcement, Netville residents quickly began to mobilize, using their networked connectivity, in an attempt that would ultimately prove fruitless in forcing the Consortium into continuing the project (for a complete discussion see Hampton & Wellman, 1999b). The community uprising resulted in the survey once again being suspended to prevent contamination as a result of the community's political activities.

When the Consortium made its announcement, we had contacted 126 potential participants in 66 households currently living in Netville. Given that we had been gradually contacting participants since mid-September, the majority had received the postcard reminder, but only a small proportion had received follow-up telephone calls. Only 25 percent of participants, representing 40 percent of households, had the opportunity to begin the survey prior to the Consortium's announcement. Sixty percent of those who started the survey completed it, but there was no indication that those who had not yet completed the survey would have done so without further encouragement from the research team. The initial poor rate of completion was likely a result of using a Web-based survey, the length of the survey, and the location of the personal network questions at the start of the survey.

CAPI in Practice

The end of the Netville project meant that we no longer had the time, or the population, that we expected when we started the survey process. It was no longer going to be possible to interview residents at two points in time. Given our new time frame, and the realization that our use of CSAI was delivering a response rate close to what we could expect through mail questionnaires, we reverted to Computer Assisted Personal Interviewing (CAPI) for the remainder of the survey process. CAPI was made possible by installing the existing VSS on the same laptops we had once delivered as part of the pre-move survey. By this time we had received funding from the Social Science and Humanities Research Council of Canada and were not under the same financial restraints that prompted the initial use of CAI. There were approximately 40 households where one person had not yet completed a survey, and we expanded this by approximately 40 additional homes, to include households within Netville which were never given access to the local network or its services (a natural comparison group). The full survey process gave us a cross-section of residents including those who "intended" to move into Netville and those who had lived in the community with access to the high-speed network from not at all to two years time.

For the remaining personal interviews we decreased the time necessary to complete the survey from two hours to approximately ninety minutes by removing the time-use section, moving the personal network section to an optional second half of the survey, and moving Likert and short answer questions to a short mail survey. During CAPI, participants responded either positively, or with ambivalence, to the presence of a laptop. A minority of participants became uncomfortable if they could not see the computer screen, but this was easy to overcome by positioning the laptop so both the interviewer and participant could look at the computer. Participants universally reacted positively to taking control of the laptop, by scrolling with the arrow keys and selecting with the enter key, when presented with the whole network "list of neighbourhood residents" type of question. It may even have been possible to let participants take more control of the laptop by allowing them to answer questions on their own while under the supervision of an interviewer. Interviewers were also supplied with a notepad to record comments made by participants that were not directly related to questions being asked. Interviewers could then enter their notes into a comments section at the end of the questionnaire once they had left the interview setting.

During personal interviewing the majority of participants completed all parts of the survey and our response rate, although not finalized at the time of this paper, was high. The location of Netville, as a suburb, continued to make it difficult to arrange interviews with participants who, in addition to a busy lifestyle, spent a good deal of time commuting. The fact that the Consortium ended the project prior to the date expected by residents, made securing interviews more difficult. However, my presence within

the community played a large role in maintaining positive community relations and in successfully obtaining interviews. In addition, a large number of Netville residents purchased high-speed cable-modem access to the Internet at the end of the project and this allowed us to continue interviewing for a few additional months in 1999.

Some Conclusions

Post-interview consultation with a number of pre-move participants suggests that CSAI may have at least one distinct advantage over pen-and-paper questionnaires and other forms of CAI. For open-ended questions, where participants are given the opportunity to respond by typing in their own answer, participants have what can be perceived as unlimited space to provide a response. For this type of question, the text box, where answers are entered, continues to scroll down and grow in length for as long as the participant feels compelled to answer. This is unlike pen-and-paper surveys, where participants have limited space, and unlike other forms of computer assisted and personal interviewing, where a participant may feel restricted from fully expressing themselves by time and by the presence of an interviewer.

CSAI insures that each participant is presented with an identical series of questions and probes. There are no concerns for any bias that may result from the presence and expectations of an interviewer, or from how an interviewer reacts to the participant. Removing the interviewer from the surveying process removes not only the cost associated with that interviewer, but interviewer bias that can originate from the expectations, actions, attitude, tone, or comments made outside of the interview schedule. Intercoder reliability can be reduced, even eliminated, and any transcribing errors result directly from the participants spelling, grammatical, and typing skills, and in some respect this may be useful information in its own right. Removing one medium between the participant and the survey instrument may also increase a sense of anonymity. However, popularized concerns about the pitfalls of releasing personal information over the Internet may counter perceptions of confidentiality and anonymity unless care is taken to reinforce the scholarly and confidential nature of the research project.

The software used in CAI is capable of manipulating questions much faster than a personal interviewer, and potentially with much more accuracy and complexity. In the Wired Suburb Project this opens up the possibility of using questions that are not easily incorporated into more traditional survey designs. Personal network questions, where a generated list of names is redirected for more detailed questioning, is but one example. The time-use diary, another example, was used to improve upon existing time-use question models. For the first time, it was possible to easily and efficiently combine the time-use diary with data on a participant's social network. In response to questions about whom a participant was with the GSS could only provide precontrived categories such as: Alone, Spouse/Partner, Child(ren), Other Family Members, or Friends. In this question, we were able to take an extra step and include the names of family and personal network members. A similar process was used to ask participants where they participated in an activity, thus, the categories of "Home," "Work Place," "Someone Else's Home," and "Other Place," were replaced with addresses previously collected as part of other questions.

Surveys can also be personalized for the participant by using background information provided by answers to previous questions. The names of family members, jobs, or other information specific to the participants can be integrated into the survey to increase both understanding and the personal relevance of questions. Although not used in the Netville study, it is also possible to increase understanding and interest through the use of visual aids and other multimedia effects. However, in using these devises it is important to consider any subsection of your population that may be omitted from study because of their lack of access to sufficient technology.

Unlike many studies, the Wired Suburb Project was fortunate to have a population that had relatively easy access to the necessary technology for Web and PC-based interviews. The single largest factor that will determine the suitability of CAI for other projects is the extent to which the population has access to the necessary computer technology. The most suitable research projects for this technology

will remain those populations that are intrinsically connected with technology, such as government institutions, large organizations, and populations connected through the Internet. For those situations where a population, or section of the population, lacks appropriate access to technology a method like our laptop drop-off may be an appropriate solution. Allowing participants to borrow the necessary technology also implies a commitment to participate and to work within your schedule that, in our case, improved the number and rate of responses.

It is clear from the Netville project that CSAI and CAPI have individual advantages, and disadvantages, that must be weighed against the characteristics of the research setting and the type of data intended for collection. At the time we chose to use CAI we were entering a research setting very different from the one we ultimately ended up investigation. The evolving nature of longitudinal research suggests discretion and the ability to alter a research approach in response to changes in the population or research setting. It is rarely possible to foresee the day-to-day complications within a research project, and often the methods that look so impressive, on paper, bare no resemblance to how events in the research setting will unfold. With this in mind, I hope that the suggestions and observations from our experience in the Netville project can serve to guide others in their decision to use CAI.

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