**Using the Internet as a Vehicle for Research**

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**Times are changing, and the use of the Internet is proliferating. This article is the first of a two-part series examining the option of using the Internet for gathering research information. This article reviews the use of the Internet, including e-mail and the World Wide Web as data-collection vehicles.**

The Internet was originally conceived in the 1960s for the American military to communicate electronically. It entered into the public domain primarily through universities, businesses, and the government from the mid-1970s to the mid-1980s (Nesbary, 2000). The World Wide Web was created and released in 1991 to be used by the general public (Hobbes, 2000).

In 1998, 100 million people were using the Internet (Edworthy, 1999). By the year 2005, it is estimated that more than 1 billion people will use the Internet (Edworthy, 1999). Americans and Canadians account for 60% of the total number of users (Dillman & Bowker, 2001). Certain populations have been reported to have a high rate of Internet access: university professors, federal government employees, workers in many companies and corporations, and adolescents (Dillman, 2000). Internet users are becoming more representative of society as a whole. Gender gaps have narrowed quickly; female representation has increased from only 6% in 1994 to 47% in 1998 (Houston & Fiore, 1998). More seniors and persons with lower incomes also are accessing the Internet (Edworthy, 1999).

The self-administered survey has long been an economic alternative to the more costly and labor-intensive options of face-to-face and telephone interviews. With the ever-increasing popularity of the Internet, a new method of collecting data has never been easier or cheaper. However, there is very little scholarly research reported on the use of the Internet as a data-collection method. Within the occupational therapy field, discussion of this technique is still virtually absent. Consequently, occupational therapists may be unaware about this data-collection option and how to use the Internet to obtain their data.

**The literature provides little information in this area. A literature search of the electronic database Cumulative Index to Nursing and Allied Health Literature (CINAHL) was conducted covering the period January 1982 to May 2001. A search with the subject headings Internet, World Wide Web, and electronic mail combined with occupational therapy resulted in 12 articles. However, none of these articles addressed research methodology. They focused primarily on how to create a Web site and discussed the increasing phenomenon of clients accessing the Internet for gathering information. A further search on OTDBASE, an electronic database that covers more occupational therapy journals, found similar results, with no articles examining Internet survey methodology.**

Outside of occupational therapy, CINAHL revealed 2 articles in related allied health professional publications that addressed this topic (Fischbacher, Chappel, Edwards, & Summerton, 2000; Thomas, Leeseberg, Lafreniere, & Dumula, 2000). A search of the Web itself revealed several more publications, typically in marketing and advertising research, that were not found through the database searches. However, it is important to note that many of these articles were not peer reviewed, indicating caution about the quality of work completed.

**Internet Data-Collection Options: E-Mail and the Web**

Both e-mail and the Web involve computer-to-computer communication over the Internet. Data collection can range from small exploratory surveys of opinion among a well-defined group to large, international, controlled, multicenter studies. The literature discusses other methods, such as virtual focus groups and chat technology (Bauman, Arey, & Atak, 1998); however, these will not be addressed within this article.

Respondents need a certain level of skill to complete surveys with computers. Fortunately, accessibility is much better than even a decade ago primarily because of the continuous emergence of increasingly user-friendly computer systems. Respondents must have working knowledge of how to use a computer, which involves such tasks as knowing when to click, press the return key, delete, backspace, and push a key function. Most respondents are required to have manual dexterity and adequate vision to access the surveys. Yet, many adaptive computer programs can overlook these requirements for persons with different disabilities (e.g., visual impairment, limited use of upper extremities).

**E-Mail Survey**

The use of e-mail is the oldest and simplest form of obtaining data over the Internet. With this mode of surveying, respondents...
are sent an e-mail message that contains the survey either in the message itself or in an attachment. Respondents insert their answers into the space provided and return the survey via e-mail. The researcher then codes and analyzes the data received. The major weakness to using this method is that the researcher depends on the compatibility of respondents’ computer systems. The respondents’ computer needs to be able to download the file or open the attachment. Respondents may have different computer platforms (e.g., IBM, Macintosh) or may be working with older word processors. E-mail also is limited with respect to its visual stimulation, and the formatting often is altered because of differences in computer systems. Respondents’ software may use different fonts and line lengths, which alters the alignment of tables, columns, and checklists from the original version. To compound matters, the format may be altered again after the respondent returns the survey. One possible solution to the problem of altered formats is to use Rich Text Format (RTF), which is a Microsoft generic text format, but respondents also must have RTF capabilities on their computer systems.

Some e-mail software programs limit the length of the body of a message to 20 Kb of text (Thomas et al., 2000). This limit may translate into anywhere from 30 to 100 questions, depending on the amount of text in each question. Long e-mail surveys may require either multiple messages per survey or the use of attachments. Attachments allow e-mail surveys of virtually unlimited length; however, not all respondents are able to receive or open attachments.

I conducted an e-mail survey that examined the gerontological curriculum in Canadian occupational therapy programs. An Internet survey was sent to a gerontological professor at each program. The survey yielded 10 of 12 potential responses. When given the option of receiving the survey via e-mail or postal mail, all respondents requested the survey be sent through e-mail. Interestingly, 5 respondents returned the survey through e-mail, whereas 2 faxed the survey and 3 returned it through postal mail. These results reflect the high proportion of faculty members who have access to the Internet. However, they also demonstrate the varied levels of comfort of using the Internet for responding to surveys, with half of the respondents choosing to print the survey and complete it by hand.

Web Survey
Web-based surveys are newer to the “cyberworld” than e-mail surveys but involve a much more sophisticated method and a lot more flexibility and power. To access a Web survey, either respondents are directed to the survey Web site through another Web site or the researcher sends potential respondents an e-mail notifying them of the survey Web site location. Sending the selected group of respondents a password allows them controlled access to the survey. Respondents answer the survey on the Web and return it by clicking a Submit or Return button at the end of the survey form.

With the increasing popularity of the Web among the general population and with the creation of Hyper Text Mark-Up Language (HTML), which is the dominant programming language that enables simple and standardized input of answers, Web-based surveys provide a more controlled environment. HTML is specialized Web browser text that can transmit (or link) the user to another Web site by means of clicking on the hypertext link.

The Web also has more flexibility and capabilities than e-mail. Layouts for Web-based surveys can be made more attractive through the use of colors, designs, and scanned in pictures. Different platforms of computers do not limit access to the Web, but some incompatibilities in hardware and software when using the Web still exist. What the designer of the Web survey may see on his or her screen may not be what respondents see on their screens. For example, if different browsers (e.g., Netscape, Internet Explorer), higher levels of HTML (i.e., 4.0, 5.0), or advanced features of HTML are used in the survey, respondents with older browsers may not be able to access the survey. If they are able to access it, some of the response features may be altered in appearance on the screen (e.g., visual analog scale ratings may not be evenly dispersed). However, these issues are not nearly as drastic or commonly found as in e-mail surveys. In addition, the time taken to open a Web site varies from a few seconds to several minutes depending on the modem connection, caliber of the computer, and capabilities of some Internet Service Providers (ISPs). Dillman (2000) reported that people who live in higher income areas or in places that are more densely populated typically have better connections because of better ISP access and good telecommunications infrastructures.

Dillman (2000) reported that the tools available on Web-based surveys have several advantages over e-mail surveys:
• Radio buttons, checkboxes, and data-entry fields are possible in HTML and keep respondents from selecting more than one choice where only one is meaningful and from otherwise typing where no response is intended.
• Skipping instructions can be implicit rather than explicit; that is, questions can be presented in the proper order based on the respondent’s responses.
• Additional survey elements such as graphics, images, animations, and links to other Web pages may be incorporated into the survey.

However, lack of computer knowledge and poor questionnaire design can lead to premature termination of the Web-based survey. Dillman and Bowker (2001) observed respondents having difficulties with
• not knowing how to provide and erase certain answers (e.g., radio buttons that require clicking on a different answer choice vs. HTML boxes that require re-clicking the same box);
• not knowing what to do with drop-down menus;
• not being able to see all the answer choices without scrolling the page;
• being forced to answer every question, even when none of the choices seemed appropriate;
• not knowing how close to the end of the survey they were; and
• only being able to see one question at a time so that when their concentration was interrupted they had to figure out how to back up and see a previous question in order to answer the current one.

Patrick, Black, and Whalen (1995) performed a user demographic and satisfaction survey of the Community Free Net in Ottawa, Canada. They offered respondents
the choice of the survey through e-mail or the Web. Ninety-five percent of the 1,073 respondents chose the Web version over the e-mail version. This finding demonstrated that people may have strong preferences to completing Web-based surveys, which in turn suggests that using the Web may help to increase response rates in future surveys.

Tips for Administering Internet Surveys

Strategies to increase the effectiveness of Internet surveys are scattered throughout the literature. A need exists to focus on respondent-friendly surveys that interface effectively with multiple computers and browsers and to make the task of completing the survey simple and interesting. Other helpful hints include the following (Dillman, 2000; Schaefer & Dillman, 1998; Thomas et al., 2000):

• Consult expertise in Web site design.
• Begin with an interesting, but easy-to-answer question.
• Ensure respondent anonymity and data security.
• Use a multiple-contact strategy similar to regular mail surveys (i.e., notification letter). However, Schaefer and Dillman (1998) discovered that a paper notification letter led to a significantly lower return rate than a notification through the Internet.
• Include a replacement questionnaire with the reminder message.
• Personalize all e-mail contacts so that none are part of a mass mailing that reveals either multiple recipient addresses or a Listserv origin.
• Keep the cover letter brief to enable respondents to get to the first questions without having to scroll down the page.
• Inform respondents of alternative ways to respond (e.g., printing the survey and mailing back response).
• Limit the column width of the questionnaire to about 70 characters to decrease the likelihood of wrap-around text that puts questions and answer choices into strange and difficult-to-read displays.
• Provide instructions at the point they are needed.
• Create surveys with simpler features and less memory instead of leading-edge designs with the latest advanced features in order to be compatible with all the different ranges of computers and modems.

Researchers agree that no unique mode enables the information to be gathered without biases. One solution suggested to minimize bias is to use a mixed-mode survey (Dillman, 2000), a technique that combines different methods of data collection. E-mail can be used to survey persons with e-mail access, whereas more expensive methods, such as postal mail, can be used to survey those without access. By using this technique, researchers and clinicians can reduce sampling bias by providing an opportunity to obtain a more representative sample. Further research is needed, however, to understand the differences in responses between the different options.

Conclusion

Random sampling is arguably a primary significant advance in research methodology for the 20th century, and Internet-based data collection potentially will be a primary significant advance for the beginning of the 21st century. Internet surveys will become important in the next few years. Within the next 5 years, nearly all North American businesses and most households are predicted to have some level of Web access (Dillman, 2000). In addition, over time, more persons will become familiar with the many capabilities of their computers through practice and increasingly user-friendly computer systems. With the ever-increasing advancements of computer technology, including cheaper and more powerful computers and Internet improvements, Internet surveys are likely to emerge as a major means of performing research and evaluations within the occupational therapy realm.

References


