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Design and Development of a Process for Web-based Survey Research

A number of recent scholarly articles have examined the role of Internet-based technology in areas such as making education more accessible, promoting learning, containing cost, and improving research (Fetterman, 1998; Owsten, 1997; Roschelle & Pea, 1999). In all cases the Internet is viewed as a vehicle that allows for easy dissemination and collection of information. The Web can be used for obtaining and processing large amounts of data of the type often sought in survey research using self-administered questionnaires. The purpose of these notes is twofold: (a) to describe the work we have done in the development of a Web-based surveying system; and (b) to explain how such a system is currently being used to obtain survey results from schools across the province of Alberta, Canada.

The purpose of the survey was to obtain information about the Canadian children's literature used by elementary schoolteachers in Alberta classrooms. It was originally intended that contact with schools and data collection would be conducted by mail. However, during the early (1997) conceptual phase of this project, the Alberta provincial government announced its intention to have all schools throughout the province linked to the Internet before the year 2000. We viewed this commitment as an opportunity to design, develop, and deliver our survey over the Internet because our target population would have equal access.

From the 53 school districts (out of a possible 63) consenting to the study, 945 schools were invited to participate. Of these, 216 school principals responded, 207 providing consent. Based on this level of participation we decided to forgo our initial stratified random sampling approach and instead survey all 207 consenting schools. We received 110 completed surveys (i.e., 53% return rate). No follow-up communication was attempted with the schools at that time.

The principal of each participating school was provided (via e-mail or fax) with a user log-in identification (id), password (pw), and the survey Web site address. Each principal was asked to select an appropriate teacher and pass the information to that teacher. The use of a log-in id and pw prevented unauthenticated users (children or any Internet "surfer" who accidentally came upon the site) from gaining access to the survey. During the log-in participants were presented with a brief explanation of the survey, the ethical guidelines, and an

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assurance of anonymity. Their use of the log-in id and pw was an acknowledgement of their consent for the researchers to use the data.

A number of factors guided our approach to the survey. First, access to the instrument had to be as simple as possible for all survey participants. Second, the respondents had to be able to complete the survey instrument with the same relative ease as if they had received the survey on paper. Third, a relatively simple security system was needed (we call it *respondent authentication*) to ensure the integrity of the data. Fourth, we had to ensure that all data would be safe from any external tampering. Finally, the data had to be stored in a format that could easily be read by our data analysis software package SPSS.

Completion of the questionnaire required only "minimal" computer skills: the ability to use a mouse, type on a word processor, use an Internet browser (e.g., Microsoft Internet Explorer version 3.0 or higher), and to enter a URL, for example, www.education.ualberta.ca/literature/. The computer hardware platform was not an issue because both PC and Macintosh platforms support Internet browsers.

The questionnaire was designed to be an online form that consisted of radio buttons for use with categorical data and Likert scale items. Rank-order items required the respondent to enter a number. Short-answer items required the respondent to type an answer into a text box on the form; they could cut and paste from a word processor if they chose to do so. When the questionnaire was complete the respondent was asked to click a SUBMIT button, and data were then transferred from the respondent's local computer to our Web server. All required questionnaire items had to be completed before the questionnaire would be accepted by the Web server and stored as an individual record in the database. If one left questions blank and pressed the SUBMIT button, the system informed the respondent which items still had to be completed. Only on completion of these items could the questionnaire be submitted. This prevented respondents from submitting partly completed questionnaires that contained missing data. Once the questionnaire was submitted, the respondent was notified that the data had been received.

The data from each questionnaire were automatically stored as a record in a relational database on a Web server and backed up via the Faculty of Education's computer system. All data files were secure and could be accessed only by the researchers or by the Web server programmer. There was no record regarding which participant filled out the questionnaire nor of the school the participant was from. The questionnaire Web site was secure from outside access through various levels of password protection. Once the data were obtained they could quickly be imported "as is" into SPSS for analysis (with the exception of short-answer text fields). This process is currently being applied to the data collected to date.

Essentially, a self-administered Web page questionnaire appears to have a number of advantages. Three important ones are: (a) fast access to the survey instrument, (b) protection against missing data, and (c) the data obtained can be automatically analyzed or saved in file format that can be directly uploaded into a program such as SPSS. In all cases there is a cost saving because reliance on the traditional postal service is greatly reduced and data input and coding errors are a non-issue (assuming the program works correctly).

Some disadvantages include: participants need access to the Internet, they must be willing to use a computer to complete the survey, and both the respondents' (client) system/network and surveyors' (host) system/network can encounter problems. We are unsure of how many schools turned down our request because they feared using technology, or how many potential respondents in the consenting schools failed to answer the questionnaire due to technology phobia. As Fink and Kosecoff (1998) note, "for some time to come, certain respondents (such as some who prefer to take cyberspace slowly) will continue to mistrust computers and computer-based surveys" (p. 7).

References

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