Use of Internet Tools for Survey Research

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Over the past two decades, organizational researchers have used and assessed the effectiveness of various Internet tools for conducting surveys. The various Internet tools used included email, the Web, and a combination of email and the Web. As with any evolving data collection tool, the use of various Internet tools must be carefully examined. This paper presents an overview of major issues that organizational researchers need to consider when assessing the appropriateness of using Internet tools for survey data collection. Specifically, the following topics are addressed in this paper: confidentiality and security issues, non-respondent follow up, progress indicators, response completeness and quality, response options, response rates, response speed, restricted assess, sample selection, survey method resource savings, technical issues, and Web survey design features.

Starting with the first exchange of information among computers in the late 1960s, the Internet has grown to the point that its impact is felt around the world. Among the many groups of people affected by the Internet are organizational researchers who conduct surveys. The first Internet tool used for survey research was email. Organizational researchers have been using or exploring the feasibility of email use as a survey data collection tool since the 1980s (e.g., Bachmann, Elfrink, & Vazzana, 1996; Couper, Blair, & Triplett, 1999; Kiesler & Sproull, 1986; Kittleson, 1997; Mehta & Sivadas, 1995; Parker, 1992; Schaefer & Dillman, 1998; Schuldt & Totten, 1994; Shermis & Lombard, 1999; Sproull, 1986; Tse et al., 1995).

During the early years of email use, surveys were often simply embedded in email messages and sent to recipients who were asked to respond by using the reply feature to provide the requested information. Evolving from this early use of email delivered surveys, a second Internet tool, the Web, began to be used by organizational researchers for survey data collection (e.g., Coomber, 1997; Witte, Amoroso, & Howard, 2000). Frequently, these early Web surveys were simply placed on a hosting server and linked to various Web sites so visitors to those locations could find and complete them. Most recently, organizational researchers have explored a combination approach by using both email and the Web for survey data collection (e.g., Jones & Pitt, 1999; Swoboda, Mühlberger, Weitkunat, & Schneeweib, 1997; Truell, Bartlett, & Alexander, 2002). With the combination approach, email provides the participant contact mode. Once contacted, participants who agree to participate are then directed to a Web site to complete the survey.

As could be expected, the use of Internet tools for survey research has generated much discussion in the literature regarding its usefulness to organizational researchers. Couper (2000), for example, suggested "that soon Internet (and, in particular, Web) surveys will replace traditional methods of survey data collection" (p. 464). In addition, Schaefer and Dillman (1998) noted that "electronic mail and the Internet provide a promising means for conducting future surveys as the proportion of people accessible through E-mail or the Internet continues to rise" (p. 378). Other researchers cautioned that the appropriateness of Internet tools for survey data collection is dependent upon research settings and goals (Truell et al., 2002). Further, Couper, Traugott, and Lamias (2001) reported that the use of Web surveys is growing, but little research has been conducted of their features.

Since the importance of examining new research techniques is essential (Truell, 1997), the purpose of this paper is to summarize what is known about the major issues surrounding the use of Internet tools for survey research. Providing a

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summary of the major topics surrounding Internet tools used for surveys will allow organizational researchers to make informed decisions. Specifically, the following issues are discussed: confidentiality and security issues, non-respondent follow up, progress indicators, response completeness and quality, response options, response rates, response speed, restricted assess, sample selection, survey method resource savings, technical issues, and Web survey design features.

Confidentiality and Security Issues

Couper et al. (1999) noted that confidentiality was a concern when using email for survey data collection. In their study, they asked participants to provide candid views about their employers. Couper et al. postulated that the lack of anonymity of email might have resulted in reduced numbers of participants who were willing to complete and return the survey. Confidentiality concerns may have arisen because returned surveys contained participant email addresses and because ingoing and outgoing email messages are routinely backed up. Nichols and Sedivia (1998) reported that a number of participants in their study of company research and development activities were reluctant to reply to a Web survey for security reasons. More specifically, participants were concerned with the potential security breaches possible when submitting survey information via the Web.

Non-respondent Follow-ups

Both the timing and number of follow-ups with non-respondents have been discussed in the literature. Truell et al. (2002), suggested that a shorter period between follow-ups of non-respondents in Web surveys might be appropriate. They made this recommendation by noting that 85% of the Web surveys in their study were returned within one week of the initial and follow-up survey distributions. Jones and Pitt (1999) supported the shorter timing between follow-ups to non-respondents.

In a study comparing postal mail, email, and email/Web survey methods, Jones and Pitt reported that 89% of email and email/Web surveys respondents completed the surveys within five days.

Crawford, Couper, and Lamias (2001) examined both the number and timing of follow-ups to non-respondents. More specifically, one group of participants was sent first and second follow-ups on days two and four, respectively. By comparison, a second group of participants was sent only one reminder five days after initial contact. Not surprisingly, Crawford et al. noted that reminder notices were found to immediately affect the return speed of completed responses. Kittleson (1997) examined the follow-up effectiveness of surveys distributed via email. For reference, the follow-up frequencies for the four participant groups were zero, one, two, and three, respectively. Results of Kittleson's study indicated that any follow up of non-respondents approximately doubled response rates. Kittleson recommended a minimum of one follow up to non-respondents from four to seven days following the original survey distribution. Schafer and Dillman (1998) supported Kittleson's view when they noted that for a "...survey to be successful, it seems important that multiple contacts be made" (p. 380).

Progress Indicators

One feature that organizational researchers may include as part of a Web survey is an indicator on the web page that shows the respondents how far through the survey they have progressed. Couper et al. (2001) conducted a study in which they compared the response rates of surveys with and without progress indicators. Results of the study indicated that 89.9% of participants receiving surveys with progress indicators completed the survey as compared to 86.4% of those who did not receive surveys with progress indicators. No significant difference was found in the completion rates between the two approaches. In a related study, Crawford et al. (2001) hypothesized that a progress indicator would encourage more of the participants who began the survey to finish it and reduce abandonment. In their study, a text rather than graphical form was used to indicate progress. Opposite to expectations, the progress indicator had a negative effect on survey completion rates. More specifically, 74.4% of the respondents completed the survey with no progress indicator as compared

to 68.5% of those whose survey indicated their progress.

Response Completeness and Quality

Schafer and Dillman (1998) noted, "…it is necessary to demonstrate that the quality of data is equivalent to that of other survey methods" (p. 381). Thus, it comes as no surprise that researchers have examined the response completeness and quality of data collected with Internet tool surveys. Schonlau, Fricker, and Elliott (2002) noted there is some evidence that data collected via Internet tools is of a slightly higher completeness and quality than data collected via more traditional survey research methods such as postal mail. Several researchers using Internet tools for survey data collection support the Schonlau et al. observation of higher response completeness and quality of surveys using Internet tools. For example, Truell et al. (2002) examined the response completeness of Web and mail distributed surveys. Results of their investigation revealed that Web and mail surveys differed significantly regarding response completeness. The Web surveys were significantly more complete than were the mail surveys. Further, Schleyler and Forrest (2000) reported that participants responding via the Web completed more of the survey than did those responding to alternative response options.

Response Options

Organizational researchers have reported participant preferences for returning Internet tool surveys by an alternative means such as fax or mail. Zhang (1999) noted participant choice of response method might be influenced by factors such as their Web use and perceived ability to use it. Thus, Zhang suggested that organizational researchers provide alternative response options such as fax or mail or run the risk of receiving Web surveys from only those respondents willing to reply via Internet tools. Zhang made this recommendation based on the results of his own study in which 20% of the usable responses (77.6% return rate) were returned via fax or mail. This result indicates that there may be individuals who still prefer to complete paper surveys and would likely become non-respondents if not given alternative response options. The need to provide alternative response options was supported by the work of Schleyer and Forrest (2000). Schleyer and Forrest reported that 16% of the respondents in their study of dental professionals responded via an alternative method such as fax. Nichols and Sedivi (1998) and Shermis and Lombard (1999) have also reported that participants returned Web surveys via alternative methods. Lastly, Truell (1997) reported that providing a variety of available response options to participants is among the strengths of email as a survey delivery method.

Response Rates

Response rates of surveys are frequently used to assess data quality (Shermis & Lombard, 1999). In general, Internet tool surveys have produced mixed results. For example, Crawford et al. (2001) reported a response rate of 34.5% including partially completed surveys in a study involving university students. Crawford et al. noted that a 41.5% response was achieved in a similar mail survey of students at the same university and on the same topic. In addition, Shermis and Lombard (1999) achieved an overall response rate of 35% that was significantly higher than the response rate achieved using a Web survey. They noted that the Web survey produced a lower response rate in spite of the fact that this group received one follow-up reminder and the paper survey group did not. Nichols and Sedivi (1998) reported response rates of 68% and 84% obtained for Web and mail surveys, respectively. By comparison, Truell et al. (2002) reported response rates of 51% for the Web and 53% for mail surveys in their study involving leaders in business education. They noted no statistical and little practical difference in the response proportion for the two survey distribution methods. Schleyer and Forrest (2000) reported a 64.4% response rate to a Web survey after three follow-ups with non-respondents. They noted that additional surveys were returned via alternative methods increasing their total response rate to 74.2%.

Response Speed

The response speed of surveys distributed by Internet tools has also been examined. Results of several studies supported the belief that the use of Internet tools results in significantly faster responses to researchers when compared to other survey distribution methods such as mail. For example, Truell et al. (2002) compared the response speed of Web and mail distributed surveys. The results of their study indicated that the Web surveys were returned significantly faster than were mail surveys. On average, the Web and mail surveys were returned in 9.22 and 16.43 days over two rounds of distribution, respectively.

Restricted Access

Internet tool surveys can be confounded by unrestricted access and duplication of responses when participants submit the survey multiple times. To prevent the problems associated with unrestricted assess, Crawford et al. (2001) and Kaye and Johnson (1999) suggested restricting access to the survey site. Crawford et al. discussed two approaches to limit access to Internet tool surveys. The first approach involves embedding a unique identifier (ID) into the Uniform Resource Locator (URL). With this approach, recipients simply click on the URL embedded in an email invitation to participate. The participants are automatically directed to a Web site hosting the survey where it can be completed. The second approach involves providing a password that the respondent must enter in the opening screen of the Web site to gain access to the survey. With either approach, researchers are able to restrict access to the survey to those individuals selected to participate as well as monitor who has responded for follow up purposes.

Sample Selection

Samples are frequently categorized into one of two categories: probability and non-probability (Martella, Nelson, & Marchand-Martella, 1999). Sample selection is important since organizational researchers usually seek to generalize to the population from which the sample was selected.

Schonlau et al. (2002) reported that surveys using Internet tools have used census, non-probability, and probability approaches for selecting participants. Schonlau et al. noted that closed populations might provide organizational researchers with the best opportunity to select a probability sample. Closed populations are those in which every member of the target population can be both identified as being a member of the target population and having access to both email and the Web. For example, universities typically provide their faculty with access to both email and the Web. Thus, it would be possible to select a random sample from such a closed population. Other researchers have discussed various non-probability sampling techniques for use with Internet tool surveys (e.g., Schillewaert, Langerak, & Duhamel, 1998).

Survey Method Resource Savings

Among the benefits associated with the use of Internet tool surveys are the potential for lower project costs and the consumption of fewer resources. (Schmidt, 1997). The results of studies analyzing the economic costs of projects have been mixed. For example, Schleyer and Forrest (2000) calculated the cost-effectiveness of a Web survey as compared to an equivalent mail survey. Results of their comparison revealed that the Web survey was 38% cheaper than an equivalent mail survey would have been. By contrast, Couper et al. (1999) noted that they did not achieve expected cost savings in their study due to high startup costs, technical problems, and low response rates. Regarding the use of fewer resources, Truell (1997) noted the environmental friendliness of email surveys as their use requires using "few if any envelopes, ink cartridges, paper, paper clips, staples, and other resources that may harm the environment" (p. 59).

Technical Issues

Organizational researchers using Internet tools for survey data collection reported a number of technical issues beyond the control of the researchers. For example, Zhang (1999) noted that software, hardware, and network speed can all influence responses to Internet tool surveys.

Further, Schleyler and Forrest (2000) reported a number of technical issues such as server timeout and password or ID confusion during their Web survey of dental professionals. For instance, they reported that some participants experienced server timeout due to slow modem speed during survey completion. Schleyler and Forrest also noted participant confusion with numbers and letters used for passwords or IDs. Expressly, they noted participant confusion when the numeral zero, the letter *o*, the numeral one, and the lowercase letter *l* were used as part of the password or ID.

In addition, Kaye and Johnson (1999) noted that the Web survey display might vary from browser to browser. As such, survey items that might be affected include text wrapping, font size and style, image alignment, placement, sizes, and color. Zhang (1999) reported problems with survey layout on low-resolution monitors, problems with going back to previous parts of the survey, problems printing a completed survey, and problems loading the survey from home computers via low-speed modems. Shermis and Lombard (1999) reported that over half of the respondents to their Web survey needed assistance to complete the instrument. Shermis and Lombard noted that in a large-scale study, the number of calls for assistance would be unacceptable and that most calls related to username, password, and browser configuration problems.

Web Survey Design Features

Several researchers investigated various Internet tool survey design features (Couper et al. 2001; Dillman, Tortora, Conradt, & Bowker, 1998). For example, Dillman et al. hypothesized that incorporating advanced page layout design features to create Web surveys would not necessarily translate into higher completion rates or better quality data when compared to simply designed Internet surveys. Thus, Dillman et al. conducted a survey in which they compared plain and fancy Web survey designs on response rates. Results of their study produced response rates of 41.1% and 36.29% for the plain and fancy designs, respectively. In addition, Dillman et al. found that the plain version was more fully completed as participants, on average, answered 166 and 156

pages on the plain and fancy forms, respectively. Thus, the results of the Dillman et al. study suggests that a simple Web survey design may produce higher response and completion rates than a fancy Web survey design.

Further, Couper et al. (2001) hypothesized that survey design would have an impact on participant response behavior. To test their hypothesis, Couper et al. examined completion times and data completeness for multiple and single-item screens. Results of their study indicated that there was a faster completion time and fewer missing data for multiple-item screens than there was for single-item screens. In addition, Couper et al. explored radio button versus long and short text-box entry designs. Results of their exploration were mixed. Specifically, Couper et al. noted that entry boxes were easier to skip than were radio button versions and thus produced more missing data. A review of long and short text box entry design responses revealed that the long text box entry version resulted in different responses than the short text entry box version. Thus, Couper et al. postulated that minor formatting changes could influence participant responses to Internet surveys.

Summary

Over the past 20 years, organizational researchers have used and assessed the effectiveness of various Internet tools for conducting surveys. Email, the Web, and a combination of email and the Web are all Internet tools that have been used for survey data collection. As with any evolving data collection tool, the use of various Internet tools for survey data collection by organizational researchers must be carefully examined.

Organizational researchers need to be sensitive to the confidentiality and security issues associated with the use of Internet survey tools, as participants may be unwilling to provide candid responses to a survey if their anonymity is not assured. Non-respondent follow-up is another important issue, because the frequency and timing between follow-ups for Internet tool surveys is different from those follow-up procedures used with traditional paper and pencil surveys. The use of technical features such as progress indicators should be contemplated by organizational researchers, though the findings of

several studies examining the use of progress indicators are mixed. The response completeness and quality desired must be determined. Studies examining the response completeness and quality of Internet tool surveys have reported comparable or higher completeness and quality of responses when compared to paper and pencil surveys. Participant response options to an Internet tool survey must be considered. Response options to Internet tool surveys have included email, fax, postal mail, or web-based survey. Acceptable response rates are another important consideration for organizational researchers, as the response rates of Internet tool surveys when compared to paper and pencil survey response rates have been reported as mixed in the literature.

Response speeds are also an important factor for organizational researchers to consider. The literature supports the notion that faster response speeds are achieved through the use of Internet tool surveys when compared to paper and pencil surveys. How surveys are going to be accessed by participants is another concern of organizational researchers. Approaches for accessing Internet tool surveys in the literature include embedding a unique identifier into the URL and providing participants with a password to access the survey. Sample selection, important for generalizing the findings, is also an important issue for organizational researchers considering the use of an Internet tool survey. The use of closed populations seem to provide the best opportunities for generalization. The cost of conducting an Internet tool survey is another concern for organizational researchers. Examinations of Internet tools survey expenses as compared to paper and pencil survey methods have yielded mixed results. In addition, a variety of technical issues such as hardware and software, network connections, password, and IDs must be examined by organizational researchers for their potential impact. Web survey designs such as plain and fancy have resulted in different response rates being achieved. Thus, it is necessary that organizational researchers review a host of issues associated with the use of Internet tools before selecting them for use in a particular setting.

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