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Electronic Surveys: Advantages and Disadvantages Over Traditional Print Surveys

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The world is in the midst of an electronic communications revolution.

While many people have adopted electronic communication extensively, others are very slow to change. As a result, the potential for a discontinuity between people who communicate via traditional methods and those who use electronic media has developed. The rapid evolution of computer hardware and software has provided a catalyst for businesses to redesign their products and processes. In a similar manner this technological revolution has given researchers the ability to design and collect survey data in new ways. Computer-based and Web-based surveys have been developed that make the electronic collection of data easier than ever. However, there are numerous uncertainties regarding issues such as the willingness of respondents to fill out a computerized or Web-based survey, the relative accuracy and reliability of responses, and the best methods of applying these data collection techniques.

As part of a study designed to examine various aspects of online retailing of office supply products, we designed a mini-experiment to compare two data collection methods—a four-page, printed survey sent out by regular mail and a computerized version of the same survey sent to participants on a computer disk. This article examines the potential advantages and disadvantages of administering a survey via computer and reports our experiences and findings.

Advantages of Computer Surveys

There are numerous advantages of a computer-administered survey, many of which

are due to the greater ability to present or record information. Questions can be written with more complete descriptions because a computer survey is not space-constrained, as with a printed one. For example, a question that refers to a specific technology or business practice assumes that the respondent is familiar with the technology or practice. However, this assumption is clearly not always true and a computerized survey can be set up to either provide a definition automatically or as a pop-up feature in much the same way as a link in a Website. The recent problems with the 2000 presidential election in Florida illustrate that even a simple survey or ballot can run into difficulties. Electronic surveys offer new methods of controlling for dimpled chads, pregnant chads, and hanging chads—but only if they are carefully designed to emphasize ease of use for all users—as the paper Florida ballots were not! Experts have lobbied for electronic surveys as a way of simplifying and securing elections for years (Cranor and Cytron, 1997). Perhaps now they will find a more receptive audience.

Another potential advantage of electronic surveys is the ability to include pictures, special formatting, audio or video links along with straight text. Researchers can use these features to emphasize or draw attention to critical aspects of a question or ask a new type of question. It can be very helpful to include multimedia features for a couple of reasons. First, multiple formats can help clarify the questions being asked—a picture or video clip can add substance to a written description. In a similar fashion, the multimedia capability of the electronic surveys allows researchers to ask for specific responses to audio or

visual questions. Second, and perhaps more importantly, the fundamental problem with collecting data of any kind with a survey is the challenge associated with capturing the attention and time of respondents. Because we live in a dynamic world where much of the population is enthralled with their electronic gizmos—whether it is a Palm Pilot, cell phone, Game Boy, Nintendo, laptop computer or any of thousands of other business or play devices—electronic surveys offer an opportunity to capture attention in creative ways. Our belief when starting this data collection project was that a properly designed computer survey might have a hard time capturing the respondent's attention on first sight—hence a lower response rate. But we believe that once started, the computer survey might collect more reliable and valid data if we could provide the “fun feel” of a game or some other electronic assistant. As with many of the other electronic devices listed (think of email for one), we believe that people use these devices because they seem painless and productive, even though they may not always help us communicate or produce more efficiently. In short, a computer survey with the same number of questions as a printed survey may give the perception of taking less time to complete. This is particularly true since the respondent can quickly visualize the length of a print survey, but is unable to judge the length of a computer survey. We thus took precautions to communicate the expected length of time for completion (15-20 minutes) and to put a notification that appeared halfway through the survey apprising respondents of their progress and remaining questions.

Disadvantages and Drawbacks

Unfortunately, nothing in life is free—there are also some significant drawbacks with electronic surveys. Probably the biggest downside is that people are often not completely comfortable with computer technologies. Even people who are fairly computer savvy are not always willing to spend time learning or trying to figure out a new application that they will not use again. Therefore, it is very important to try to target and control for this factor as much as possible. The other primary concern involves the issue of data quality. Are

responses to electronic surveys identical, similar, or different than traditional print surveys? In what ways do they differ? Arguments can be made on either side—in some ways the data ought to be of better quality because of the ability to present information in a more interactive, dynamic framework. But other problems may lead to poorer quality—for example, the relative computer comfort level may be highly associated with data quality (along with the survey's layout and presentation). A paper survey offers a quick, obvious look at its contents, whereas a computer survey is more hidden. Another argument against electronic surveys is that the data may be biased because of the nature of data collection. For example, if you ask a question about comfort level with technology, the results may be higher because of self selection—respondents who are “comfortable” using the computer to respond to the survey are also more comfortable with technology in general.

At least three other issues crop up with respect to electronic surveys. There is a potentially higher risk of lost data—e-mails can get lost in the ether, or, in our case, the physical computer disks can get damaged in transit. (Interestingly, we had three or four respondents who sent the computer disk back with no responses. We are not sure whether this was an accident, or if the person was trying to send the disk back without completing it in order to get the \$15 rebate we promised. This trick is harder to pull with a paper survey!) We also experienced difficulties preparing the computer disks for mailing. The software we used to administer the survey needed to be written onto every disk—with an average time of about 1.5 minutes per disk. This can become a problem when sending out 400 computer disks. We had a research assistant helping with this, but obviously the 10 hours spent loading and unloading disks into a disk drive were not the most exciting! A last concern is the issue of computer viruses—many respondents are leery of transmissions or disks from people they do not know and researchers must be cognizant of the risk of receiving a virus in return. In short, there are many potential problems with electronic surveys, yet many of these problems can be limited by careful study design.

The Literature on Electronic Data Collection

There is a fairly extensive literature on electronic data collection techniques, but most of it examines only a single issue or design factor at a time. Space does not permit a long review of the literature, so we will summarize the extant questions we have found (for a more complete literature review, please contact one of the authors). Some of the questions that have arisen from prior studies utilizing electronic surveys include: (1) Do electronic surveys and paper surveys elicit comparable response rates to one another? (2) Do people who respond to surveys using different media types respond differently to questions? (3) How can electronic collection methods be designed to enhance their usefulness as information collection tools? Our goal is to provide researchers with some personal insights from our findings—both positive and negative, rather than to present a statistical study of relative reliability, validity, and quality. Thus, the following section presents an overview of our experiences.

What We Found

Our contact sample consisted of 1,000 customers who had purchased products over the Internet from a leading retailer of office supplies. The full survey was conducted using two methods. First, approximately 60% of the sample was contacted with a traditional printed survey (four pages in length), accompanied by a cover letter explaining that we would provide participants with a survey summary and a \$15 rebate bonus. The cover letter also explained that we would keep all results anonymous and only report aggregate findings. The office supply company we worked with also provided a letter stating their interest in the study and explaining that the authors were acting as independent, non-biased, third-party researchers. The second data collection method involved using a computer survey program named Sensus. This program (available from Sawtooth Technologies at <http://www.sawtooth.com/>) allows a written survey instrument to be coded on a floppy disk using fairly simple programming rules. The respondent then is asked to load the disk into their computer, go to the start menu and type “a:run” (we developed form labels for the disks with

the respondent's name and these instructions). From this point, the program runs by itself and the user clicks through questions sequentially and then places the finished disk in a business-reply envelope and mails it back.

Our research design allows a controlled comparison of two different data collection methods. It also differs from a similar study by Goldby, Savitskie, Stank, Vickery (2001) in that we mailed out physical computer disks rather than the electronic mail approach they used. Both approaches have pluses and minuses. Since there has been little application of electronic surveys in operations management studies, our goal here is to present our preliminary findings in order to provide some insights for other operations management scholars considering the use of electronic surveys.

We sent out a total of 1,045 surveys in our first round of mailings. Several steps were taken to increase the response rate, including the inclusion of a business-reply envelope, an incentive to complete the survey, and the use of several follow-up letters. The first reminder letter was mailed two weeks later re-emphasizing the confidential nature and importance of the survey. A second follow-up letter and a second copy of the survey were mailed to companies that had not filled out the original after six weeks. Very few (less than 5%) of the mailings were returned due to incorrect addresses or the contact person having left the company. This high accuracy rate is due to the currency of the database we received—most of our contact list had conducted business with the office supplies retailer within the last six months.

Finally, we selected 2,000 names because the office supplies retailer decided to pre-email these customers and ask if it was okay for us to contact them. Those who responded "no" were deleted from the list. This was done to uphold a privacy policy regarding customer information not being sold or given away. Less than 5% of the customers pre-contacted by email noted that they did not want to be included in the study.

The final tally consisted of 416 usable responses out of 1,045 total surveys, representing a 39.8% response rate. The response rates for the printed (261/631 = 41.4%) and computer version of the sur-

vey (155/414 = 37.4%) were almost identical. The overall response rate is higher than that seen in similar operations management studies (Kathuria, 2000). Our evidence suggests that it is possible to obtain response rates for electronic surveys that are comparable to those for printed surveys. Based on our experience, we believe that there are several actions that can be taken to improve response rates. These include:

- Carefully targeting the sample (in this case an Internet purchasing study sent to Internet customers of a major retailer).
- Careful explanation of the purpose and usage of the survey data, along with clear letters of endorsement from the sponsoring company.
- Follow-up, follow-up, and more follow-up. Wear them down and be persistent!
- Provide a clear incentive for participating in the survey.
- Make it easy to complete.
- Send something tangible. We sent the computerized survey on an actual disk rather than as an attachment or as a link to a Website. Our feeling is that people are less likely to throw out something tangible. In contrast, an email is easy to delete.

There is nothing new or particularly creative about the first five points above. In fact, these principles apply equally well to any type of survey instrument. However, we believe that with electronic surveys it is very important to increase the tangibility. People tend to respond differently to something they can touch. Our goal was to put a disk in their hands that they might feel guilty about throwing out. Once they opened the appropriate file, the disk would also make it easier for them to fill out the survey. It completely surprised us that this worked as well as it did!

One interesting outcome was that we had five respondents who could not open the computer version of the survey—either because of some hardware difficulty or because they had an Apple computer and our survey was IBM-compatible. This represents less than 5% of our sample, so the problem does not appear to be huge, but it is worth watching. In these five cases we had the respondents fill out a print version of the survey. Of course, we do not know if there were many more potential respondents to the computer survey who

did not fill it out because of similar difficulties. This is certainly something researchers need to carefully consider and do their best to minimize. An important factor to consider is to develop the instrument with the lowest common denominator in mind. To put it another way, many of the respondents have computer equipment that is old and outdated and will not be able to handle programs developed on newer software.

A third interesting finding from our study involves the relationship between the time to complete the survey and survey quality. The computer survey recorded the start and end time for each respondent, thus allowing us to compute the length of time spent completing the survey. As shown in Figure 1, the average response time was 17 minutes, 53 seconds, but there is a wide variation in individual times. One of the questions that we are currently examining is whether the time taken to complete the survey correlates with the "quality" of the data. For example, it is possible that respondents who filled the survey out quickly (four took less than six minutes) did so by simply putting their fingers on autopilot and not really reading and thinking through the questions. That is very likely the case for the one respondent who completed the entire questionnaire in 1.5 minutes (unless this person was a speed-reader!) We are in the process of conducting in-depth assessment of the respondents at the two ends of the spectrum (quick and slow responses). Clearly, the ability to track the time spent filling out the survey offers some value to researchers who seek to balance and optimize both quantity and quality of respondents.

Another interesting outcome from the computer version of the survey is the range of written responses to more open-ended questions. Obviously, a printed survey can have open-ended questions, but there are two basic problems: (1) the respondent has to write his/her response, which can be difficult and hard to read; and (2) the researcher needs to enter the response into the database. Electronic surveys address both of these problems. We found that while many respondents did not respond to open-ended questions, many did—often voluminously. This less-structured feedback often provides interesting insights, as well as some amusing ones. The comments we received regarding the best/worst features of the

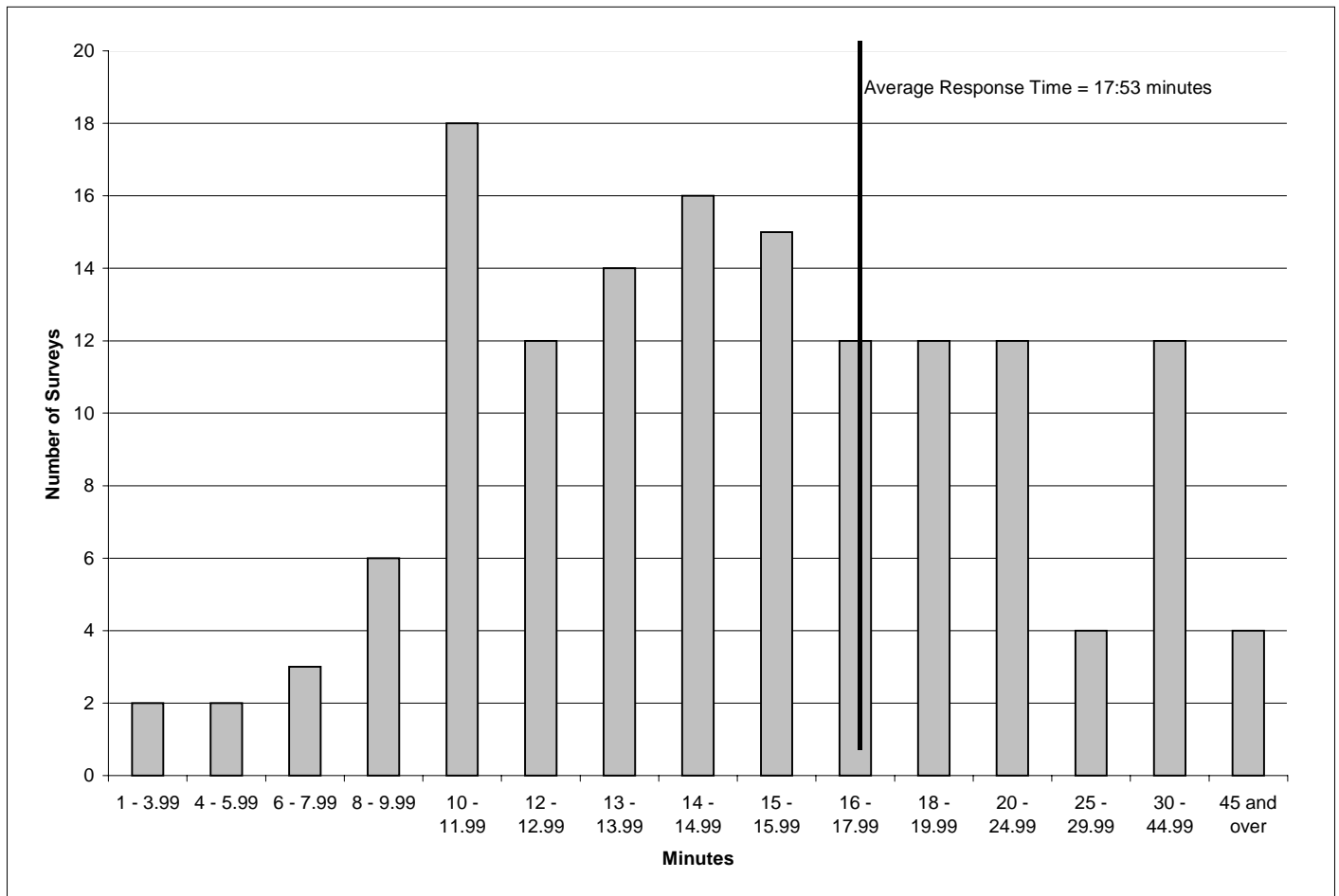


Figure 1: Distribution of response times for computer-based survey.

office supply products Website we were studying ranged from “I wish we could do ALL shopping on-line, it is fast and convenient” to “It BITES.” Obviously, there are some disparate opinions!

Summary

Overall, our initial venture to collect information via an electronic survey was fairly successful. However, numerous questions remain regarding future applications of this methodology. While we achieved comparable response rates and aggregate measures of data reliability/validity (means, standard deviations, and Cronbach’s alphas were similar for the two data collection methods), we found the usage of electronic surveys to be more time and effort intensive. We are currently in the process of performing more sophisticated data analysis to compare the relative data “quality” of

computer versus print surveys. Essentially the decision whether to use electronic surveys in the future boils down to a relative weighting of (1) data quality and (2) data-gathering cost. We believe that our implementation of this technology helped improve data quality, but at a slightly increased data-gathering cost. There is a great deal of potential to improve both dimensions, but there is also a need for a great deal more study to determine the efficacy of electronic surveys as well as the best methodology for utilizing this tool. ■

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