

New Technology in Survey Research: Does it Improve Response Rates?

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Abstract

The use of survey instruments to gather research data is a common practice among researchers. New technology and media of communication have expanded the opportunities for using survey instruments. One question of interest may be how the surveyed population will react to new methods of data collection. This study reports on the survey response rates for four different combinations of distribution and response media. Eight hundred survey questionnaires were sent to accounting academicians to study the reaction to different forms of surveying. The different media included traditional mail, e-mail, and the World Wide Web. The differences in response rate for the different response modes were evaluated and conclusions are presented. The results may prove helpful to researchers who use the survey instrument in obtaining research data. They may also provide information on the use of new technology by accounting academicians, a group that would be presupposed as using new technology media for communication.

Introduction

Collection of research data via survey instruments is a vital activity in many research contexts. These contexts range from asking new customers to fill out survey cards packed with new products to surveys conducted by trained psychologists and sociologists. Gathering data with a survey is oftentimes the method that best provides the information needed to address the research question under investigation. Any research seeking to understand phenomena involving the perceptions, opinions, etc. of people will usually use some form of survey

to elicit the data desired by the investigators. New technology and media of communication have expanded the opportunities for using surveys in the collection of such information.

Because surveys have been relied upon so heavily as a data collection method, it is not surprising that there is a significant body of research literature studying a variety of topics related to surveys. One particular topic concerns survey response rates using various media (e.g., interviews, mailings, telephone, facsimile, etc.). New technology presents opportunities with cost/benefit tradeoffs that are different from well-established methods of data collection via

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surveys. Relatively little is known about the effects of adapting survey instruments to recently developed technologies.

Electronic mail (e-mail) offers a new technological medium for conducting survey research. While this medium is somewhat similar to regular mail surveys (relative to interviewing or telephone surveys), the differences between electronic mail (EM) and regular mail (RM) are significant enough that findings regarding mailed surveys cannot be assumed to be the same for e-mail (Kiesler & Sproull, 1986; Hutchison et al., 1998). Another new technology medium that can be used to collect survey data is the World Wide Web (WWW). Like e-mail, gathering survey data via the WWW utilizes computer networks like the Internet. Specially designed web forms that allow for input are used to collect survey data. Little research has been done concerning the characteristics of survey research when instruments are sent and returned using e-mail or the WWW (Mehta & Sivadas, 1995; Hutchison et al., 1998).

One particular item of interest in survey research is response rate. Information about characteristics of survey responses for different modes of survey distribution and response should prove helpful to researchers making cost/benefit tradeoffs during research design. Since researchers have constrained resources for research activities, information about the costs/benefits of different data gathering options is useful when making these tradeoffs. Such information is particularly useful when weighing choices about the most effective methods for accomplishing research objectives.

This study reports evidence about survey responses when different media are used to send and receive survey instruments. In particular, survey response data obtained from administering a survey instrument using regular mail, e-mail or the WWW for distribution and/or response is examined.

Survey Methods

E-mail

Survey research via e-mail is a relatively new alternative to traditional, mailed surveys. There are certain similarities and differences between these methods. One similarity is that messages can be sent to individuals because each individual has a unique address for both e-mail and regular mail. Additionally, messages can be sent around the world and are delivered by a mechanism other than the sender. Finally, the communication process is essentially the same in that one person composes a message, sends it and often will anticipate a response.

One of the differences between regular mail and e-mail is delivery speed. Blattberg and Glazer (1993) suggest that because of the speed at which messages travel, communication processes that tended to be one-way have now been transformed into a two-way communication process. Feedback is sufficiently timely to be meaningful in this process. This phenomenon is evident in "chat rooms" and at times when two people are using e-mail simultaneously. Speed of delivery also enables the e-mail user to know much sooner if the message has been sent to an undeliverable address. Another difference is that the cost of e-mail is less than regular mail, especially in instances where a high volume of mail is sent. A difference of particular interest to researchers is that when a message is sent via e-mail as opposed to regular mail, there is a higher likelihood that it will be read by the intended recipient. This is because the message is less likely to be screened by another person if it is sent via e-mail (Dyson, 1993). Thus, e-mail may provide more assurance that the researchers are receiving data from the desired group. A further difference is that the population currently able to utilize e-mail is much smaller than those who receive regular mail. Those using e-mail usually have more education and wealth and thus the researcher must ensure that the sample most appropriate for the research question has access

to this technology. An interesting behavioral difference is that respondents to e-mail surveys tend to be more candid and frank than those responding to regular mail surveys (Kiesler & Sproull, 1986). Researchers suggest that the cause of this behavioral difference is the reduction of social context involved in communicating via e-mail.

WWW

Surveys utilizing the WWW are quite different than regular mail surveys. An important difference between traditional surveys and WWW surveys is that the respondent must go and find the survey rather than having it come to him, as with a mail survey. Surveys are posted to a web site and anyone visiting the web site can complete the survey. This characteristic of WWW surveys results in reduced control by the researcher over who answers the survey. This could be an issue because of the self-selection of those choosing to respond. The researcher has no objective method of determining why those who responded decided to do so. One possible way to alleviate this potential problem may be to selectively request individuals to answer the survey. This request will require the use of some form of solicitation, i.e. regular mail or e-mail.

A major benefit of using the WWW to gather data is that software is available to have responses input immediately into a pre-designed database. Survey data does not need to be converted to an electronic form by the researcher. This benefit eliminates one of the time-consuming elements of survey research. This may reduce the overall cost of administering a survey by as much as 30 percent (Ferrara and Nolan, 1974). The cost of this software is small, relative to the cost of manually inputting the data. Thus, the WWW mode of survey data gathering has the potential to significantly reduce one of the significant costs of doing survey research. Another difference is the WWW, while growing in size and popularity by astounding proportions, is available only to a limited popu-

lation--those who have access to the necessary hardware and software. This group consists of a disproportionate number who are educated and belong to an upper socio-economic class. However, as long as researchers want to study populations having access to the required technology, using the WWW is an attractive option.

Research Methodology

Surveys were sent via different media to a sample of Accounting Faculty from US universities and colleges with e-mail addresses listed in the 1998-1999 Accounting Faculty Directory (Hasselback 1998). The requirement of an e-mail address was to limit our sample to individuals that self reported a tendency to use technology for correspondence. After the initial selection, the subjects were randomly assigned to one of four treatment groups with 200 subjects in each group.

The four treatment groups were developed using different combinations of sending and receiving survey instruments. Two different distribution modes and four different response modes were used. The two distribution modes were via regular mail or e-mail. The four response modes were via regular mail, e-mail, WWW, or a choice of regular mail or WWW. The resulting groups, specified as distribution/response, were regular mail/regular mail (RM/RM), regular mail/regular mail or WWW (RM/RMoWWW), e-mail/WWW (EM/WWW), and e-mail/e-mail (EM/EM).

Two hundred surveys were sent for each of the four conditions. In the first condition (RM/RM), surveys were sent via regular mail and the surveys were returned to the authors via regular mail. Efforts were made to simplify returning the surveys. Specifically, an introductory letter, the survey and the return address were all included on one sheet of paper. Upon opening the stapled packet, respondents saw the brief introductory letter. The letter indicated that participating in the survey consisted of filling in

responses, stapling it closed and dropping it in the mail. The survey was on the reverse side of the letter. Postage was also prepaid so participants did not incur any expense if they chose to respond.

The surveys for the second condition (RM/RMoWWW) were also sent via regular mail. However, recipients could choose to either respond via regular mail or via the WWW using a web site of one of the authors. The URL (Uniform Resource Locator) of this web site was included in the letter describing the survey. The survey web form was very easy to complete and send back to the researchers. Drop-down option boxes were used to answer on a Likert scale. The actual survey instrument can be viewed at <http://cobweb.usl.edu/users/odom0022/survey.html>.

In the third condition (EM/WWW), potential respondents were sent an e-mail message with the subject title "Accounting Forecasting Exercise." This message asked the recipients to respond to the survey by clicking on a "hotlink" included in the message. The "hotlink" connected the recipient to the aforementioned web site. If the respondents' e-mail software did not have the "hotlink" option, the URL was provided in the message. An electronic version of the survey was not sent with the e-mail message requiring the respondent to actually access the web form on the WWW.

The surveys in the fourth condition (EM/EM) were sent via e-mail. A short introductory note indicated that the survey could be responded to by using the "Reply" feature included in e-mail software. Recipients responded by typing their answer to the questions (1-7 on a Likert Scale) in blanks provided for answers.

Both the WWW and e-mail versions of the response modes were tested beforehand to ensure they were functional. The survey instruments were identical for each of the treatment groups with the only exception being the me-

dium. With the e-mail delivery mode, notifications of undeliverable messages were received for some of the messages. When this happened, the e-mail was sent to a new address until a total of 200 per condition had been sent with no further undeliverable messages being received.

One difficulty of survey research is that unless the researcher chooses to gather data via face-to-face interviews, they have little control over who actually completes the survey. For both distribution conditions, it is possible that even though the surveys were delivered, the desired recipient never actually received or read it. Of the 800 surveys sent, 2 (regular mail) were returned as undeliverable. We know that a minimum of 106, the total number of responses received, were actually received and read.

Results

The focus of this study is response rates of surveys with differing modes of distribution and response. Four different combinations of distribution mode and response mode were used. The response rates for the four different conditions are shown in Table 1.

The response rates for the four conditions show some interesting differences. The most obvious difference relates to distribution mode. In both conditions wherein surveys were distributed via regular mail, the response rate was over twice as high as the conditions wherein the surveys were distributed via e-mail. This occurred even with the potential bias toward e-mail delivery, i.e. any returned as undeliverable were resent to a different e-mail address until 200 in each e-mail distribution mode group were delivered. This difference between distribution modes was tested using a t-test for proportions by collapsing across the response mode dimension. The difference was highly significant ($t = 4.38$). Table 2 shows the data using this view. Additionally, with the respondents in group 2 given a choice between responding via regular mail or the WWW, over 10 times as many sub-

Table 1
Response Rates by Distribution and Response Mode

Distribution Mode	Response Mode	Response Rate
Regular Mail	Regular Mail	18.5%
Regular Mail	Regular Mail or World Wide Web	via RM-17% via WWW-1.5%
E-mail	World Wide Web	7%
E-mail	E-mail	9%

Table 2
Response Rates by Distribution Mode

Distribution Mode	Response Rate
Regular Mail	18.5%
E-mail	8%

jects chose regular mail. This difference when tested using a t-statistic was also found to be highly significant ($t = 5.10$). A comparison was also made between the two response modes in the e-mail distribution mode. This difference was not statistically significant ($t = .74$).

Discussion

The *a priori* expectation regarding response rates was that they would be somewhat higher than 5 percent and probably no higher than 30 percent, as is typical for mail surveys (Alreck & Settle, 1985). Because of limited prior research, the expectations of response rates for the electronic media were based on the researchers personal beliefs. We found no prior studies examining the issue of different response modes and thus had no existing research to serve as a benchmark. Second, since we randomly selected recipients for the four different conditions, we felt there would be no difference in the likelihood of responses due to the respondents' attitudes toward completing and returning surveys. However, based on the overall subject pool being a more advanced group with a predisposed use of e-mail, the researchers believed that groups with the more technologically oriented response modes would have a higher response rate. Additionally, between the e-mail

and WWW response modes, the expectation was that the e-mail response mode would be the highest.

As presented previously, the initial belief that the more technologically oriented response modes would have a higher response rate was disproved by more than a 2 to 1 margin. Also, even though the e-mail response mode resulted in more responses than the WWW response mode, the difference was not significant. Finally, when given a choice of responding using new technology or regular mail (Group 2), regular mail was chosen by tenfold.

The results of this experiment suggest that the choice of distribution mode and response mode in survey research have a significant effect on response rates. There are many possible reasons for this effect. One possible explanation for the difference in response rates between the distribution modes is that the differences between regular mail and e-mail affected the likelihood of individual accounting faculty responding to the survey. Probably the most importance factor in understanding this difference in response rates relates to the capability and knowledge of the response group with respect to regular mail and e-mail. All the intended recipients were certainly capable and sufficiently knowledgeable to re-

ceive regular mail. However, it is likely that many lacked either the capability or the knowledge or both to receive e-mail. The capability to receive e-mail means having the technological infrastructure to receive electronic messages. This includes required hardware at both the institutional and individual level. It also includes the necessary software, as well as assigned addresses. It is highly unlikely that any of the institutions to which e-mail was sent lacked the capability to receive the messages. This is because every member of the sample had a published e-mail address. Also, since all messages were delivered, it seems highly unlikely that any of the institutions to which messages were sent lacked capability at the institutional level. However, the individual faculty members may have lacked the capability. For example, even though we selected our sample from faculty with listed e-mail addresses, it is possible that some of those faculty members did not have a computer (either by choice or resource constraint) to access messages sent to them. A more likely scenario is that while the intended recipients did have the capability to receive e-mail messages, they did not have the knowledge to access the messages. Individuals lacking the requisite knowledge to send a survey response would be highly unlikely to actually send one. This is more likely because e-mail is a fairly recent innovation in communication media. This possible lack of knowledge regarding computers suggests an important issue that will be discussed in more detail.

Another possible reason for the observed difference in response rates is that the intended recipients were more familiar with regular mail and than with e-mail. A likely behavioral implication of this difference is that people are more vigilant in checking their regular mail than their e-mail. The frequency of checking e-mail may be low (e.g. once per month) as a result of this lack of familiarity. This would certainly reduce the likelihood of a response to our survey.

Another potential reason to explain the difference in response rates is that regular mail is tangible and e-mail is intangible. When a survey is received via regular mail, it occupies space wherever the recipient decides to place it. Its presence serves as a passive reminder that it has not yet been completed or sent. On the other hand, a survey received via e-mail does not occupy space in the environment in which the recipient works. Unless this person is viewing past e-mail messages received, the e-mail message will not remind this person that the message still needs to be responded to. Thus, this feature of regular mail may have increased the likelihood of responding to the surveys sent via that medium.

Still another potential explanation is that responding to the surveys sent via e-mail required more effort than those sent via regular mail. In preparing the surveys for all four conditions, we strove to simplify the response procedure as much as possible. Because the survey was short (seven questions), it probably took less than two minutes to read the brief cover letter, circle responses and staple it closed. Perhaps because of the ease of completing the regular mail survey, replying via the WWW represented a more time consuming task, and thus fewer people responded. However, the survey sent via e-mail and responded to via e-mail or the WWW was comparable to the RM/RM survey in ease of response. Once the message was opened, the respondent in the EM/EM condition had to invoke the reply mode of the e-mail software, type in seven responses and then send the reply. This could easily be done in approximately the same amount of time required to complete the regular mail version. The respondent in the EM/WWW condition responded by clicking on a "hotlink" in the e-mail message. Doing this connected the respondent to the web page that contained the survey. Responding to the survey required the respondent to fill in the date and select a number from 1 to 7 (7 point Likert scale) from a drop-down option box for each of the questions. The completion time is comparable to the RM/RM

and EM/EM conditions unless opening the browser took a long time (e.g. two or three minutes). In spite of the similarity of ease of completion for the RM/RM, EM/EM and EM/WWW conditions, there was still a significant difference in response rates between the regular mail and e-mail distribution mode conditions.

Perhaps the most interesting result from Table 1 is that when respondents were given the choice between completing the survey via regular mail or using the WWW, they overwhelmingly chose regular mail. The most likely explanation for this result is that responding to the survey via the WWW was perceived to require more effort than responding via regular mail. Similarly, since most accounting faculty are more familiar with regular mail surveys than web-based surveys, they might have simply responded to the survey based on this factor.

Conclusion

Based upon the results of this experiment, survey distribution modes and response modes are important choices for researchers to consider when planning to use this data gathering methodology. The advent of new technology has expanded the researchers' options for data gathering media with electronic means of gathering survey data offering significant benefits of reduced costs and greater speed in receiving responses. These benefits are timely because of the increasingly tight constraints on resources available to researchers. On the other hand, certain characteristics of electronic data gathering modes must be carefully considered by those doing this kind of research. One critical factor is consideration of the population to whom surveys will be sent. Those who possess the capability and knowledge to reply to surveys via electronic means represent a specific population (higher socio-economic status and higher education level). If the desired group does not fit this description, then choosing an electronic means of gathering data would not be a wise choice. Ad-

ditionally, even when this specific population is tapped, the response rates may not be as high as with a traditional mail survey.

Another conclusion relates to accounting faculty in the US. The survey provided no information regarding the level of computer knowledge of accounting faculty in the US and it is difficult to ascertain this group's computer knowledge without additional data. Nevertheless, an interesting paradox is suggested by the response rate data. If the regular mail and e-mail distribution groups were equally likely to respond to surveys, there must be an alternative reason for the lower response rate for electronically distributed surveys. As mentioned earlier, lack of individual capability and/or knowledge regarding electronic communication are likely reasons. The results are consistent with this explanation. This explanation is also consistent with the phenomenon of an inherent hesitancy or resistance to adopt new methods to accomplish necessary tasks. There is no reason to believe that accounting faculty would be immune to this phenomenon. To the extent that the results are driven by lack of computer knowledge, there is a need to overcome hesitancy and promote computer literacy/fluency among accounting faculty. This is particularly important because of the technological density of the contemporary workplace faced by accounting students entering the workforce.

Suggestions for Future Research

The results of this experiment suggest some additional questions to be investigated. First, the results suggest the possibility that computer fluency among US accounting faculty may be lower than expected. Understanding how and for what purposes accounting faculty use existing technology would be helpful in assessing how effectively students are being prepared for their careers. This is especially important given the emphasis of technology in initiatives like the AICPA's CPA VISION PROJECT and those sponsored by the Accounting

Education Change Commission. Second, additional surveys on different topics need to be studied to determine if the topic of the survey instrument may generate more interest. Finally, this type of research needs to be conducted using more diverse subject groups. 📖

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