GUIDELINES FOR DESIGNING AND IMPLEMENTING INTERNET SURVEYS

Current research on the design and implementation of Internet surveys has yet to produce an authoritative set of rules on constructing and fielding these surveys most effectively.[1] Nevertheless, through trial and error, the state of the art is gradually evolving. We anticipate that over the next few years the practice of designing and implementing Internet-based surveys will be refined significantly.

In this chapter, we provide some guidelines that we have found useful in the design and implementation of Internet surveys. We offer these suggestions as a starting point for making conscious decisions about the specific implementation details of an Internet survey. We base our suggestions on our recent, direct experience with Web and e-mail surveys, what we have gleaned from the literature on Internet-based surveys, and on the general principles of conventional survey practice.

QUESTIONNAIRE DESIGN

The following list provides some tips on how to leverage the plus-points of surveying with electronic media, how to simplify your presentation, and how to design user-friendly input mechanisms.

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[1] General recommendations for designing and conducting surveys can be found in American Association for Public Opinion Research (1997), Dillman (2000), and Fowler (1993). Chapter 11 of Dillman provides specific recommendations for designing Web and e-mail surveys, many of which we have included in this chapter.

1. **List only a few questions per screen.** Present only one, or very few, questions per screen so that respondents do not have to scroll down to get to the next question. Excessive scrolling can become a burden to respondents and lengthy Web pages can give the impression that the survey is too long to complete, both of which have the potential to negatively impact response rates. However, there is some preliminary evidence that when multiple questions are placed on the same screen, respondents frame their responses to one question in the context of the other questions, and some respondents appear to read ahead before answering the first question on the screen (Fuchs, 2001). This implies that researchers should group questions on a single screen if they desire such behavior or put them on separate screens if they want to discourage it. Also, there is some evidence that using only a single screen or a few screens for short surveys minimizes respondent "abandonment" (starting but not completing a survey) whereas using a single screen and forcing the respondent to scroll down in long surveys increases abandonment.

2. **Eliminate unnecessary questions.** Avoid questions that have answers the computer can determine, such as the date the questionnaire is filled out.

3. **Use graphics sparingly.** In a Web-based survey, graphics can significantly slow the downloading of a Web page, especially if users are likely to connect to the Internet using a modem (as opposed to broadband, DSL (digital subscriber line), or some other high-speed connection). Slow downloads are likely to frustrate some respondents and thereby decrease response rates.[2] For example, Dillman et al. (1998) found that a "plain" survey resulted in a slightly higher response rate than a "fancy" survey. However, as Dillman points out, that response penalty will decrease as overall transmission speeds increase. Alternatively, provide the respondent with the choice of a survey either with or without graphics.

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[2]This does not apply to the WebTV approach that Knowledge Networks uses because Knowledge Network's surveys are preloaded onto the computer. Therefore, the use of graphics does not slow down the survey process.

4. **Be aware of how respondents may interpret questions in light of accompanying graphics.** Although unnecessary graphics should be avoided, sometimes a picture *is* worth a thousand words. But, when a photo is used, bear in mind that respondents tend to interpret questions in the context of the photo. Care must be taken that the photo does not alter the intended meaning of the question. Figure 5.1 illustrates this point. Respondents may wonder whether the question is asking specifically about grocery shopping or about shopping in general. (Knowledge Networks is aware of this issue and points it out to its clients.)

5. **Use matrix questions[3] sparingly.** With any response mode, matrix questions place an extra burden on the respondent because they require a lot of work to be done within a single screen. Therefore, they should be used with caution. In addition, it is impossible to predict exactly how a matrix question will look on a respondent's Web browser. If displayed poorly, a matrix question may be even more difficult for the respondent to read and comprehend. On the other hand, Couper et al. (2001) found that matrix questions reduced completion time and the number of missing items in the data. Nonetheless, on balance, we feel that matrix questions should be used sparingly.

6. **Reduce response errors by restricting response choices.** Zhang (2000, p. 66) gives examples of how respondents might answer a question about their years of Internet experience (for instance, "3–4, ~5, or 15?"). In this context, Zhang points out that "a predefined response format is helpful to achieve uniformity of data, which will reduce the workload in data cleaning and processing. However, a flexible format may be more respondent-friendly."

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[3]A *matrix question* consists of several individual multiple choice questions that have the same response options (for example, "Strongly Disagree," "Disagree," "Neutral," "Agree," and "Strongly Agree"). The questions are arranged in a matrix format with each row corresponding to a question and each column to an answer choice. A case study in Chapter Six contains an example of a matrix question.
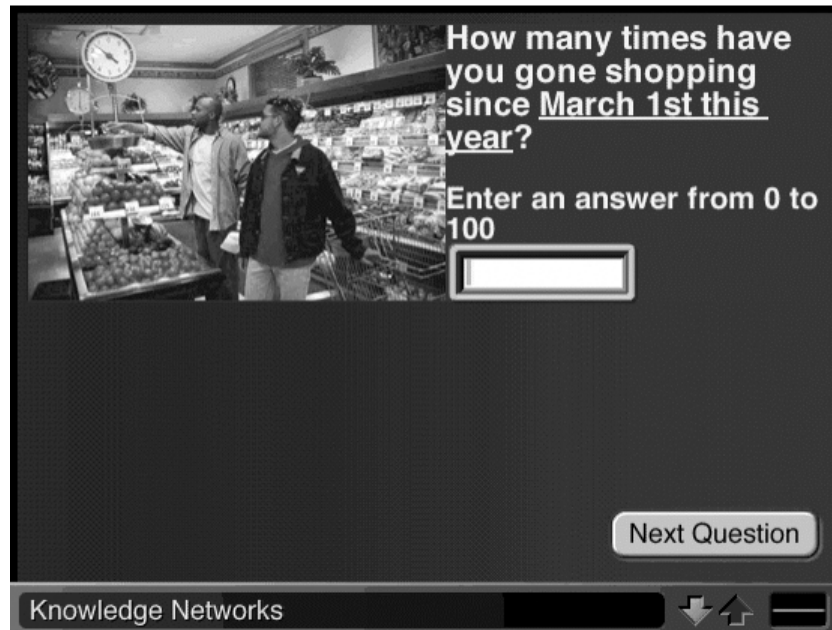
Screen shot courtesy of Knowledge Networks.

Figure 5.1—Use of a Photo to Illustrate a Survey Question

In Web surveys, two tools are used within the Web page interface to restrict respondents' choices: radio buttons[4] (named after the tuner knobs on older radios) and drop boxes. Both are used in multiple-choice questions to which the respondent is allowed to choose only one answer. Radio buttons are useful when the number of choices is relatively small. Because the other choices are automatically deselected when one choice is made, radio buttons reinforce the rule that no more than one answer may be given to a question.

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[4]*Radio buttons* present several answer choices, only one of which can be selected. If the respondent selects a second choice, the first choice is automatically deselected.

Drop boxes[5] are used when the number of potential choices is large. For example, for the question "In which state do you live?" the drop box could have 51 items.

7. **Force answers only on rare occasions.** With Internet surveys, it is possible to prevent respondents from moving to subsequent questions until they have answered a previous question or completed a previous section. Forcing respondents to answer questions should be used only on rare occasions because the respondent may become annoyed and give an arbitrary or deliberately false answer in order to proceed to the next screen or stop taking the survey altogether. One exception to this rule is for screening questions that must be completed prior to the start of the actual survey. Dillman (1998) also makes this point, although it is one that is often ignored. The advantage to forcing answers is that the researcher does not have to deal with missing data (that is, decreased item nonresponse), but this advantage is more than offset by the increased unit nonresponse. Figure 5.2 illustrates a way to notify respondents that they have failed to answer a question while still allowing them to continue if they wish to do so.

8. **Make error/warning messages as specific as possible.** Ideally, an error message should be placed directly above or below the unanswered or incorrectly answered item. At a minimum, the error message should be specific about where the error occurred and, if possible, the nature of the problem. Redirecting the respondent to a screen that states, for example, "The previous page contains an error," or to a display of cryptic error codes is not desirable. Harris Interactive places an error message directly above the error and even rearranges the items in matrix questions such that the completed items are clearly separated from the missing items.

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[5]When a user clicks on a drop box arrow, another box with a (potentially large) number of possible answer choices pops up on screen. A user can select his or her choice by highlighting it with the pointer arrow and clicking.

...... You forgot to answer Q2.1 ......

Use the Prev button we've provided if you'd like to answer. If not, click on Next for the next question.

Figure 5.2—Reminder Message to Respondent About a Missed Question

9. **Always password protect Web surveys.** With e-mail, postal mail, and telephone surveys, the survey media provide the means to restrict survey participation that are largely under the control of the surveyor. This is less true of Web surveys because, unless access is restricted in some way, Web sites are open to all browsers and, therefore, the public at large. Thus, user passwords are needed to restrict access and uniquely identify respondents; passwords also can be embedded in a Web site's URL (uniform resource locator, otherwise known as the "Web address") (see, for example, Crawford et al., 2001). Some systems require a user name and password; others require only a password. When only a password is used, it is important to ensure that it cannot be guessed easily.[6] Also, the letter l and the digit 1 are easy to confuse, as are the digit 0 and the letter O (Schleyer and Forrest, 2000). One may want to construct passwords that do not use any of these four symbols or alert respondents to the possible confusion when an incorrect password is entered. Of course, restricting access for a convenience sample does not make sense, so passwords would not be an issue in that case.

10. **Ensure that respondents' privacy and their perception of privacy are protected.** Because there is the risk that transmissions

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[6]For example, given 500 respondents, a three-digit password is not sufficient. An accidental visitor to the Web site or a mischievous respondent could easily guess a valid password in that case. It is probably best to use at least a four- or five-character password that contains both letters and numbers. There are about 1.68 million distinct passwords, consisting of both digits and letters, that are four characters in length, and about 60 million distinct passwords that are five characters in length, if no distinction is made between uppercase and lowercase letters. Zhang (2000) used a ten-digit password and reports that 91.6 percent of the legitimate attempts by a user to enter his or her password were successful on the first try, and all respondents eventually succeeded in entering a password of this length.

sent over the Internet may be observed by unauthorized users, all survey data should be encrypted. Therefore, after completing a survey, a respondent may be redirected to an "unsecured site" and depending on how the respondent's browser preferences are set, he or she may get a warning about unsecured data transmission. If the respondent is not familiar with messages such as this or does not understand that the survey has already been completed, the respondent may become concerned. A message, such as the following, displayed just before respondents leave a secure area can alleviate any concerns they may have: "Your answers have been securely transferred to our server. As you leave our Web site, your Web browser may warn you about leaving an encrypted site. This is normal. If you get this warning, simply click OK and you will be forwarded to our non-encrypted homepage that you can browse or leave as you wish. If you do not get the warning, do not worry. Your answers will still be securely transferred with no problem."

11. **Provide some indication of survey progress.** With a mail survey, the respondent can easily flip through the pages to see how much of the survey has been completed so far. Without the ability to page through the instrument, or some other means of determining how much of the survey has been done, the survey may appear to have a seemingly endless stream of questions. In this case, a graphical progress indicator (see Figure 5.3) is especially useful.

Crawford et al. (2001) report that progress indicators can have a negative effect if they indicate that respondents are progressing very slowly through the instrument and can add to download time. Further, there is some evidence that for long surveys and surveys in which the indicator is not properly calibrated, the

**Figure 5.3—Visual Indicator of a Respondent's
Survey Progress**

progress indicators may increase respondent abandonment. In addition, because the meters indicating the survey progress are tied to individual questions, they can be only *approximately* right for any one respondent. (Because of skip patterns, one respondent might answer a different number of questions than another respondent.) On balance, we feel that it is desirable to give an approximate measure of completion at least a few times during the survey. Alternatively, providing a menu that outlines the sections of the survey can also enable the respondent to monitor his or her progress.

12. **Allow respondents to interrupt and then reenter the survey.[7]** Respondents who cannot complete a survey in one sitting should be offered the option of stopping at some point and resuming later. This allows the respondent to close out of the survey window, go off line, and then go back to the Web site later on to finish. Both Harris Interactive and Knowledge Networks give respondents this option. Some panels do not, including the panels used by the Web survey company Greenfield Online (www.greenfieldonline.com).

13. **Carefully handle respondents who fail a screening test.** Depending on the nature of a survey and the respondent population, access to a Web survey can be restricted until a respondent has passed the screening questions.[8] Unlike with mail surveys, respondents who are ineligible to take a particular Web survey because they did not pass the screening questions may be restricted from even reading the survey, much less completing it. Two possible approaches involve excluding respondents from a survey as soon as they fail a screening question, or allowing all respondents to complete the entire survey and eliminate ineligible respondents later on.

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[7]This option applies only to surveys with multiple screens. It does not apply to surveys in which the respondent scrolls down from question to question.

[8]If a respondent has a particular interest in completing a survey, there is the danger that the respondent may go back and change his or her answers to the screening questions in order to be allowed to continue. This hazard also exists with mail surveys but not with telephone surveys because respondents cannot change their answers after finding out that they failed the screening test.

14. **Give respondents something in return.** Incentives have been shown to increase response rates. For Internet surveys that do not have an initial mail contact, an incentive might consist of electronic cash or an electronic gift certificate good for purchases from an Internet retailer, or may involve various lottery schemes.[9] The extent to which postal mail survey incentives are transferable to Internet surveys is unknown. For mail surveys, incentives work best when given before the survey is completed, rather than after.[10] Another completely different way of rewarding a respondent is to send survey results via e-mail after the survey is completed.

15. **Take advantage of the media's presentation capabilities.** Options for presenting paper-based surveys are limited by the medium. Generally, they are printed in black-and-white to reduce cost, explanations and special help are minimized to limit the length of a document (or make sure it does not *appear* to be too long), and questions are presented sequentially. Internet-based surveys do not necessarily have these limitations nor do they have to imitate their paper equivalents.[11] For example:

- Hypertext (hyperlinks to other documents) can be used to link "help" screens to detailed definitions or explanations. Thus, via the use of hypertext, additional resources can be made available to the respondent without increasing the apparent length of the survey instrument.

- Color is available at little or no additional cost and, when properly used, can provide visual cues that may simplify the survey

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[9]A *lottery scheme* implies that only a few, rather than all, respondents receive an incentive. The incentive in lottery schemes is typically much more valuable than incentives that are mailed to all sample members or to all nonrespondents.

[10]In the former case, the incentive appeals to the respondent's good conscience; he or she may feel compelled to respond having already received a reward. In the latter case, the incentive is perceived as a payment for a service rendered. The respondent may then feel that he or she has a morally legitimate choice to render the service in exchange for the payment or not. Because the incentives typically are small, he or she may be less likely to respond.

[11]Note that when respondents can choose to respond to a survey via the Web or through another mode, it is important to keep the two versions of the survey similar in appearance to avoid a "mode effect" from the differing visual layout. Research in this area is ongoing.

process. For example, instructions can be presented in one color, questions can be shown in another color, and help or error messages can be in a third color. But, caution is in order because colors may appear differently when viewed by different browsers, and overuse of color can result in a less-than-professional appearance.

- Certain interactive tasks can be programmed for the Web but are not easily accomplished over the phone or by postal mail. For example, a respondent might be asked to arrange a collection of photos into groups of related photos and then assign names to the groups he or she has created. In another example, the respondent may be asked to peruse a Web site as part of the survey process and then reply to questions about the experience or what he or she may have learned from it. Such responses might enable a researcher to gain insights into how to construct Web sites more effectively.

AUTOMATION

This section offers some tips on employing automation in the survey instrument.

1. **Automate skip patterns.** As with logic checks, make the program (rather than the respondent) manage skip patterns. This will eliminate errors and, from the respondent's point of view, simplify the process of taking the survey.

2. **Automatically validate input, if possible.** *Input validation* is a logical check of a respondent's answers. Logical checks are based on so-called validation rules. Input data validation improves data quality and saves time in data preparation. For example, if the respondent attempts to check both "None of the above" and one of the options in a multiple-choice question, this mistake can be pointed out to the respondent. Or, if the respondent is asked for the year of his or her birth and enters the current year instead, the respondent can be given the opportunity to correct the mistake. However, such validation should be user friendly and simply identify the mistake to the user. As we discuss later, it is important not to force an answer but, rather, if

the respondent chooses not to correct the mistake, the program should accept it and note a data-entry error.

3. **Take advantage of the media's ability to track respondent behavior.** A Web survey computer program can be used to collect more than just respondents' answers. The program can also collect information on how much time a respondent spends on each question or on the whole survey, the number of visits a respondent makes to a Web site in order to complete a survey, the sequence in which a respondent completes survey questions (if nonsequential progression through the survey is allowed), and other such behaviors. This information can be used during pretesting to improve an instrument, and can be used to identify problem areas during fielding and to design better surveys in the future.

4. **Take into account the costs of automation.** Incorporation of logic checking and automatic question skipping may require more-extensive software programs and programming. There are two issues to consider with this: (1) Automated features may be expensive to implement cost-wise, in that they may require a significant amount of programming expertise, and (2) the addition of validation rules means that some respondents' computers may no longer be able to access the survey.

FIELDING

Here, we offer some suggestions on implementing and fielding an Internet survey, including tips on pretesting, problem reporting, and follow-up with respondents.

1. **Thoroughly test the survey.** Because of various, and often unpredictable, software and hardware incompatibilities, it is important to rigorously and extensively pretest any Internet-based survey instrument. This pretesting should include the following:

- Testing using different computing platforms, both Mac and PC, with various hardware configurations.

- Testing with different browsers, including early and later versions of Internet Explorer, Netscape Navigator/Communicator, and the AOL browser.[12]

- Testing with different connection speeds. One respondent's on-line experience may be very different from another's depending on his or her Internet connection. In particular, the survey should be tested with slow modem connections.

- Testing of skip patterns (particularly when the survey might be filled out in more than one session, test skip patterns in the second session that depend on answers in the first session).

- After the initial responses arrive, double-check to see that no obvious errors were overlooked.

2. **If a large number of respondents are contacted via e-mail, stagger the e-mail invitations.** If numerous e-mail invitations are sent all at once, rather than staggered over a period of time, the Web server will be flooded with responses for the first hour. And if the Web server is unable to handle the onslaught, respondents may be unable to fill out the survey because they won't be able to access the server.

3. **Enable respondents to report problems.** Respondents may encounter unforeseen problems, such as difficulty in accessing a survey with a PIN (personal identification number). Almost certainly, some respondents will experience some type of problem with the survey. Thus, a "help desk" should be established that respondents can contact easily by e-mail and/or a toll-free telephone number. In our experience, the volume of "help" e-mails and phone calls with Internet surveys is higher than what would be expected with mail surveys.

4. **Anticipate potential changes while the survey is in the field.** Changes may become necessary after a Web survey is in the field in two cases:

- When an error in the programming is detected (for example, an incorrect skip pattern or an incorrect input validation rule for the

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[12]We strongly recommend testing with the AOL browser as numerous problems with early versions of this browser have been reported in the literature.

answer to a question). Changes at this point are undesirable. If the error is not serious, it may be best to simply not correct it.

- When changes to the data the respondent enters are needed (for example, when the PIN that allows access to the survey is loaded incorrectly by the programmer or researcher, or when a respondent accidentally presses the wrong button in the screener, which shuts the respondent out of the survey and does not give the respondent the chance to correct his or her error). In cases such as this, it would be desirable to change the data to allow the respondent to get back into the survey.

5. **Make sure that researchers or survey sponsors can access the Web survey during fielding.** Be prepared for survey sponsors to suddenly decide that they want to take a second look at the survey. Or, researchers may need to gain access to test a complaint from a respondent. One way of ensuring that survey sponsors or researchers can gain access to a survey after it is in the field is to set aside an extra set of passwords just for those individuals.

6. **Remember to follow up on incomplete surveys.** If possible, send a follow-up reminder by e-mail to people who have only partially completed a survey. Respondents who leave a survey halfway through, intending to return to it at a later date, may not automatically appear on the update reports on surveys in progress. At the end of the survey period, data from respondents who did not finish filling out the survey should be retrieved and downloaded to the database.

In the next chapter, we present a number of Internet survey cases, many of which have employed, to a greater or lesser degree, the recommended guidelines we have outlined in this chapter.