

How design elements influence web surveys

Synopsis of current literature.

Introduction

With the increasing use of the internet, public opinion surveys are rapidly switching from paper- or telephone-based to web-based.^{1,2,3} Several authors have noted lower response rates from web-based surveys than from their paper counterparts^{3,4}, and recent research has focused on factors to increase response rates of internet surveys. Two major components of this problem can be identified: increasing the number of participants in the survey, and increasing the numbers who complete the survey. This report focuses on latter, by considering various design elements that may reduce measurement error and dropout rates.

The format of paper questionnaires has been the subject of much research, and has been well summarized by Dillman¹ and others. Frary⁵ provided the following guidelines for paper questionnaires, many of which may be applicable to web surveys:

- Keep the questionnaire brief and concise.
- Get feedback on the initial list of questions.
- Locate personal or confidential questions at the end of the surveys.
- Order categories from lower to higher, e.g., Never Frequently.
- Consider combining categories.
- Ask responders to rate both positive and negative stimuli.
- Choose appropriate response category language and logic; “tend to” is better than “strongly.”
- Avoid open-ended questions.
- Avoid the response “other.”
- Avoid category proliferation.
- Avoid scale point proliferation.
- Avoid responses at scale mid-point and neutral responses.
- Avoid asking responders to rank responses.

In addition, Dillman¹ presents the following general guidelines:

- Group questions by subject, then response type.
- List questions from the most salient to the least salient.
- Ask specific questions after general questions.

- The first questions should apply to everyone, be easy, interesting, and connected to the purpose of the survey.

Dillman¹ also provided the following very specific guidelines to reduce measurement error and increase response rates:

1. *Define the navigational path.*
 - a. Write each question in a way that minimizes the need to reread portions in order to comprehend the response task.
 - b. Place instructions exactly where needed, and not at the beginning of the questionnaire.
 - c. Place items with the same response categories into an item-in-a-series format.
 - d. Ask one question at a time.
 - e. Minimize the use of matrices.
2. *Create visual navigational guides and use them consistently.*
 - a. Increase size of written elements to attract attention.
 - b. Increase brightness or color to attract attention and establish appropriate groupings.
 - c. Use spacing and similarity to identify appropriate groupings.
 - d. Maintain simplicity, regularity, and symmetry to ease response task.
 - e. Begin asking questions in upper left quadrant, and place any info not needed by respondent in lower right quadrant.
 - f. Use the largest and/or brightest symbols to identify the starting point on each page.
 - g. Identify the beginning of each succeeding question in a consistent way.
 - h. Number questions consecutively and simply, from beginning to end.
 - i. Use a consistent figure/ground format to encourage reading of all words.
 - j. Limit use of reverse print to section headings and/or question numbers.
 - k. Place more blank space between questions than between the subcomponents of questions.
 - l. Use dark print for questions and light print for answer choices.

- m. Place special instructions inside of question numbers and not as free-standing entities.
- n. Optional or occasionally needed instructions should be separated from the question statement by font or symbol variations.
- o. Do not place instructions in a separate instruction book or a separate section of the questionnaire.
- p. Use of lightly shaded colors as background fields on which to write all questions provides an effective navigational guide to respondents, with questions on a lightly shaded background and information not in navigational path elsewhere on a white background.
- q. When shaded background fields are used, identification of all answer spaces in white helps to reduce item non-response.
- r. List answer categories vertically instead of horizontally.
- s. Place answer spaces consistently to the left or right of category labels, preferably on the left side.
- t. Use numbers or simple answer boxes for recording of answers.
- u. Vertical alignment of question subcomponents among consecutive questions eases the response task.
- v. Avoid double- or triple-banking of answer choices (listing answers in 2-3 columns).
- w. Maintain spacing between answer choices that is consistent with measurement intent.
- x. Maintain consistencies throughout a questionnaire in the direction scales are displayed.
- y. Use shorter lines to prevent words from being skipped.

In their work on design of web survey questionnaires, Manfreda et al.⁴ found that there were no consistent published guidelines for web surveys, but recommended following regular questionnaire guidelines. They identified the following common mistakes in questionnaire design: thematic and chronological references were not clearly stated; questions contained more than one thematic reference; expressions and phrases unfamiliar to respondents were being used; answer categories did not meet the demands of classification; and some answer categories were unsuitable.

Placing surveys into web format dramatically increases the ease with which multiple design elements can be incorporated and modified. However, web surveys potentially have larger measurement error than paper surveys due to poor design and the possibility that internet users tend to read more quickly, and be more impatient and more discriminating than off-line readers.⁴ Addressed here are 4 elements of

web surveys that are easily incorporated/modified, and potentially influence measurement error and response rate: color; inclusion of graphical elements; the number of questions per page; and the type of response box used.

Color

Although Dillman¹ states that there is little evidence that color by itself has a significant impact on response rates, he provides several suggestions for using color appropriately as part of web surveys. He suggests that the use of color be restrained so that consistency and readability are maintained, navigational flow is unimpeded, and measurement properties of questions are maintained. He lists the following as his preferences for web survey questionnaires:

- Black lettering on a white background.
- Reversed print or color box for questions numbers.
- Different colors for special instructions
- Muted colors for individual screen logos.
- Initial page and last page may have more color.

Newark's guide to web page design⁶ lists color as one of the most important component of effective web pages. Although not limited to web surveys, their suggestions are as follows:

- Limit your color palette to no more than 3 colors to reduce visual clutter.
- Use colors that are appropriate to the theme of your web site.
- Use colors found in key photos or graphics on your web page for added harmony.
- Avoid harsh, oversaturated colors. Desaturate colors to approximate colors found in nature and textiles.

Inclusion of graphical elements

The inclusion of graphical elements, such as logos, animation, photos, and watermarks, may provide visual interest on a web page. However, in general, use of such elements has been cautioned against due to the variability of user systems and the increased download time.^{2,4} Such increased download times may increase dropout rates for survey participants. The target audience may be a primary consideration here, as younger users may have faster computers and be more accustomed to a barrage of graphical images. For a wider audience that might include users with slower computers and/or slower internet connections, use of graphics should be more restricted to avoid differential dropout rates by some users.

Manfreda et al.⁴ found that including graphics resulted in more respondents abandoning the survey, but decreased item non-response. Several researchers recommended inclusion of a progress meter, usually in graphical form.^{1,2,4}

Number of questions per page

Web surveys can be formatted in 2 primary ways: 1. all of the questions are listed on one long page in which respondents scroll down to see sequential questions, or 2. each question is listed on a page, and respondents click to see each new page with a new question. Currently, there is no consensus as to which represents a “better” format. Dillman¹ prefers a single page format with scrolling, whereas Schonlau et al.² state that scrolling increases abandonment, and prefer a multi-page format. Manfreda et al.⁴ found that multiple questions on a page increases correlation among the answers, however non-response may be greater and abandonment higher in a multi-page design. They found that responding time was higher for a multi-page design, possibly as a result of the respondents having to separately move to each page. For a single page format, they found that there was higher question non-response, especially for questions in a grid format.

Type of input box

Two types of response input forms are normally used in web surveys: drop down boxes, and radio buttons (Figure 1).

The figure consists of two screenshots of web survey questions. The top screenshot shows a question titled "1. Please indicate your classification:" with three radio button options: "Adjunct/Visiting/Lecturer", "Tenure-track", and "Tenured". The bottom screenshot shows a question titled "Please indicate your agreement with the following:" with three sub-questions: "1. I can demonstrate awareness of contemporary managerial issues", "2. I understand the stochastic nature of management systems", and "3. I understand and can relate to the human element of management tasks". To the right of these sub-questions is a drop-down menu with a "Select choice" button and a list of options: "Agree strongly", "Agree", "Neutral", "Disagree", and "Disagree strongly".

Figure 1. Examples of questions using radio buttons for inputting responses (top) and drop-down boxes (bottom).

Dillman¹ found that drop-down boxes were more difficult to use, and possibly confusing for respondents. He suggested that drop-down boxes be used sparingly, but also that they may be useful for long-lists of responses.

Radio buttons have the advantages that they look more like paper surveys, and all answers are visible to respondents.⁷ However, once an answer is chosen, it is not possible to erase it, but it is possible to change it.^{1,7} Radio buttons take slightly longer to download than do drop-down boxes, possibly filtering out respondents with slower internet connections. However, may take less time to fill out because they require only one click instead of the two clicks required to respond to drop-down boxes.^{7,8}

Drop-down boxes also have their advantages. They can be downloaded faster than radio buttons, it is easier to reset answers, and they take up less room on computer screens, especially for long lists of answers.^{7,8} In general, however, drop-down boxes appear to be more difficult to use than radio buttons.¹

The problem of choosing between radio buttons and drop-down boxes is well summarized by Heerwegh and Loosveldt:⁷

“...we conclude that the choice between radio buttons and drop-down boxes is not self-evident. Even though a slight preference for radio buttons to drop-down boxes could seem justified, we would argue that the designer of the web survey needs to evaluate the benefits and disadvantages of each of these response formats in the light of his or her own project.” (p. 482).

Indeed, the authors go on to suggest that alternating between radio buttons and drop-down boxes throughout the questionnaire could reduce monotony.

Conclusions

Although there appears to be no clear-cut formula for the ideal format for a web survey, several components can be isolated from the above review.

- Keep the survey as short and simple as possible.
- Color can be an effective way to add interest, increase navigational flow, and increase response rates, but must be used carefully.
- Consider the minimum computer speeds and internet connections when contemplating the amount and type of graphical elements to include.
- A one-page format with scrolling is preferably to a multi-page format with one question per page.
- Use radio buttons except for long lists of answers, very slow internet connections, or large increase in computer overhead for programming.

Figure 2 shows an example of a web survey that incorporates many of the above elements.

LEADERSHIP
<p><i>Concerning direction and priorities of the school</i></p> <p><u>2. Articulates a compelling vision for the School.</u></p> <p><input type="radio"/> Strongly agree</p> <p><input type="radio"/> Agree</p> <p><input type="radio"/> Neutral</p> <p><input type="radio"/> Disagree</p> <p><input type="radio"/> Strongly disagree</p> <p><input type="radio"/> Not applicable</p> <p><u>3. Establishes clear and appropriate goals for the School.</u></p> <p><input type="radio"/> Strongly agree</p> <p><input type="radio"/> Agree</p> <p><input type="radio"/> Neutral</p> <p><input type="radio"/> Disagree</p> <p><input type="radio"/> Strongly disagree</p> <p><input type="radio"/> Not applicable</p> <p><u>4. Effectively manages disagreement/debate about direction and priorities.</u></p> <p><input type="radio"/> Strongly agree</p> <p><input type="radio"/> Agree</p> <p><input type="radio"/> Neutral</p> <p><input type="radio"/> Disagree</p> <p><input type="radio"/> Strongly disagree</p> <p><input type="radio"/> Not applicable</p>

Figure 2. An example of a web survey that incorporates suggested elements of color, response format, and page format.

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