

# 5

## Designing and Developing the Survey Instrument

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Observations of people who try to complete Web surveys suggest that two sources of significant frustration are lack of computer knowledge and poor questionnaire design (Dillman & Bowker, 2001). This often leads to premature termination of the survey. This finding as well as other research illustrate the need for thoughtful consideration regarding the design of online surveys. Online surveys have more flexibility in how they look, the response options, and the types of media that can be used than mail surveys; therefore, their design has unique considerations.

In this chapter, we examine survey design techniques in terms of appearance, readability, user friendliness, and technical compatibility. Topics such as color, font type and size, formats for response options, navigational guides, and **download** time are addressed. We also offer suggestions for making the questionnaire appropriate for your sample and accessible to people with dyslexia and visual impairments.

### Questionnaire Design

The best survey questionnaires look professional and motivating, are easy to comprehend, are inviting and not intimidating, make answering the questions a clear and simple process, and are accessible to everyone in the target population. Many of the design principles applicable to self-administered

paper questionnaires can be effectively applied to Web-based questionnaires. For example, the first question should be easy to answer, requiring no more than a few seconds of respondents' time; the questions should progress in a logical fashion; questions relating to the same topic should be kept together; and bolding or italicizing can be used to direct participants' attention to important words. In addition to these basic principles of good design, there are a number of important factors for Web survey designers to evaluate when constructing an online questionnaire. For example, Web surveys offer the opportunity to use a variety of exciting bells and whistles, including the ability to embed colorful images, video, and audio to enhance questionnaires. When it comes to designing Web-based questionnaires, however, simplicity is usually best.

## Design Principles for Web-Based Questionnaires

Dillman (2000) identified a set of design principles that can be applied to Web-based questionnaires. These principles were an extension of the earlier work of Dillman, Tortora, and Bowker (1998). The principles were developed to account for the task of responding to online surveys, the computer resources required by the finished questionnaires, and the need to ensure compatibility across different computer platforms and **operating systems**. The following discussion is based on Dillman's design principles but modified to reflect recent developments in online survey software and the increasing familiarity with online surveys in the population.

### *Welcome Screen*

Introduce the Web questionnaire with a welcome screen that is motivational, emphasizes the ease of responding, and instructs respondents on the action needed for proceeding to the next page. This will be the first screen the respondent sees (unless there is a language selection screen) when he or she clicks on the link to the survey. The welcome screen provides an opportunity to describe or reiterate the purpose of the survey, explain how the respondent was selected for participation, discuss the conditions of anonymity and confidentiality, and explain how to collect or redeem incentives if applicable. Welcome screens are best when kept brief and are most appropriate for longer questionnaires. If the questionnaire is only one or two screens long, the welcome message could be included at the top of the first screen. (See Figure 5.1 for an example of a welcome screen.)

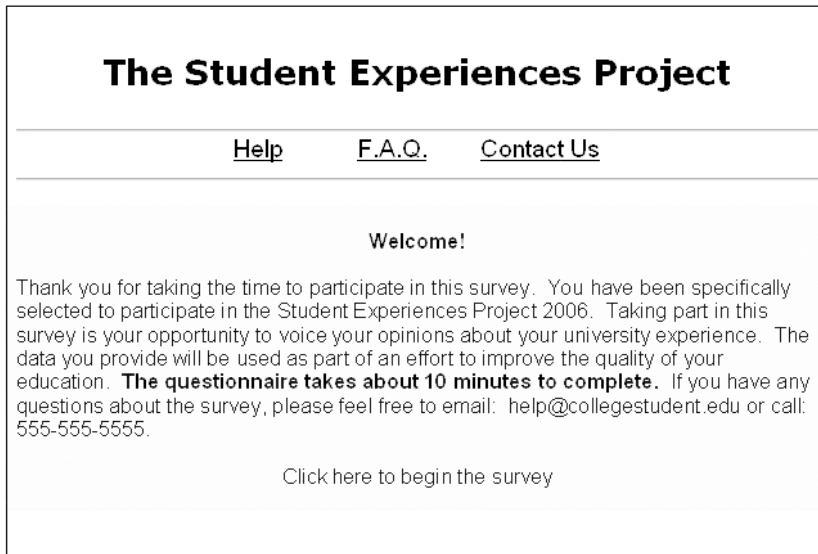


Figure 5.1 Welcome Page Example

### *Access Control*

Provide a personal identification number (PIN) number for limiting access to people in the sample. PIN codes (or passwords) are primarily necessary when working with probability samples from closed populations. When attempting to generalize survey results to populations, it is important that only those respondents selected for the sample complete the questionnaire; uninvited participants may or may not meet your inclusion criteria and could substantially distort the survey results. Passwords can be included on the survey invitation, and the space in which to enter the password should appear on the questionnaire welcome screen. The password should be kept simple and not too lengthy. Figure 5.2 is an example of a password field that may be included on a welcome page. (*Note:* It is generally not necessary to password protect questionnaires using nonprobability samples from open populations.)

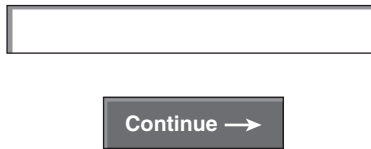
### *First Question*

As respondents work their way through questionnaires, they become more and more invested in the process and are less likely to abandon the survey.

## Student Experiences Survey

Please enter your password in the field below

**For example: aaa.aaa**



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**Figure 5.2** Password Protecting the Questionnaire

It stands to reason, then, that abandonment is most likely to occur early in the questionnaire. It is therefore essential that the first question be short, simple, and, if possible, fun for respondents. The first question sets the tone for the rest of the questionnaire; if it is lengthy or complicated or presents unfamiliar response scales, respondents may infer that this is indicative of all the questionnaire items and decide not to complete the survey. For these reasons, it is best to restrict first questions to closed-ended items that present radio buttons or check boxes for responses. Figure 5.3 shows two examples of first questions. Note that the first example requires respondents to indicate their satisfaction level and then rank each option; the second example requires one task and is presented in a familiar format.

### *Conventional Format*

Present each question in a conventional format similar to that normally used on self-administered paper questionnaires. Respondents may or may not be familiar with Web questionnaires, but it is likely that if you are

1.	Please indicate your satisfaction. Then rank the importance from 1 to 5.	Satisfaction			Importance Ranking
		Dissatisfied	Neutral	Satisfied	
	Software-R-Us as a place to work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
	The company's training program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
	Your compensation at Software-R-Us	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
	The company's equity structure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
	Your health care benefits at Software-R-Us	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

(a) Poor first question: requires ranking and rating of five items.

**1. How satisfied are you with the training you received from your supervisor?**

Completely satisfied   
  Somewhat satisfied   
  Neither satisfied nor dissatisfied   
  Somewhat dissatisfied   
  Completely dissatisfied

(b) Better first question: one question with a standard response scale.

**Figure 5.3** Examples of First Questions From a New Employee Survey

surveying adults, they will be familiar with paper questionnaires. Following the rules of good questionnaire design developed for paper questionnaires within the context of the Web survey will foster familiarity with the instrument and thus increase respondents' ability to complete the questionnaire quickly and accurately. Specifically, conventional **formatting** includes numbering questions, left justifying text, and presenting response options either to the right of or directly below the questions to which they refer.

### *Color*

Color can easily be added to online surveys without additional cost, and it can enhance the appearance of the survey, assist with navigation, and motivate the respondent; however, color should be used cautiously. The use of color should be restricted so that figure/ground consistency and readability are maintained, navigational flow is unimpeded, and measurement properties of questions are maintained. Also, colors do not necessarily have the same appearance on different computer screens, so for most purposes, it is safest to use the standard 256-color palette.

Colors generally have feelings and meanings associated with them. Table 5.1 lists some examples of common color associations for adults in the United States.

**Table 5.1** Color Associations for Adults in the United States

<i>Color</i>	<i>Positive Associations</i>	<i>Negative Associations</i>
Red	Power, love, fire, passion, intimacy, courage	Danger, aggression, blood, hot, stop
Green	Money, freshness, envy, nature, growth	Inexperience, misfortune
Purple	Royalty, luxury	
Pink	Female, cute, soft, gentle	
Blue	Male, sky, water, peace, truth, calm	Sadness, depression
Orange	Autumn, Halloween, creativity	Caution
Yellow	Happiness, sunshine, optimism, summer	Illness, hazard
Brown	Earth, nature	Bland
Gray	Maturity, dignity	Gloomy, conservative, boring
White	Winter, virginity, clean, innocent, truth, peace, snow	Cold, sterility, clinical
Black	Formality, style, power, depth	Death, evil, mourning, night, mystery, fear

Colors do not necessarily have the same meanings on an international level. For example, death and mourning are represented by white in Asia, yellow in the Philippines, and black in the United States. Be conscious of these differences in the meaning of color when you have an international response pool.

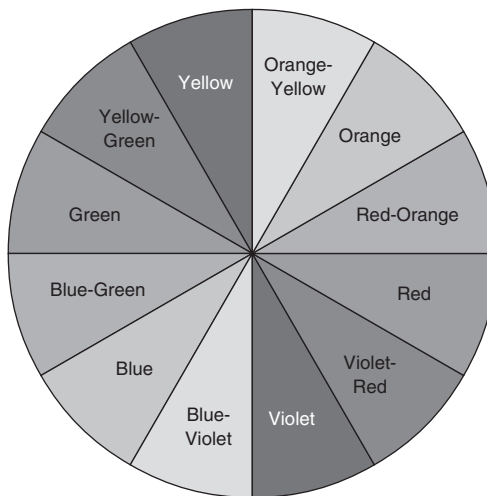
*Combining Colors.* Many survey software programs offer developers choices of color palettes that combine two or more colors for individual questionnaires. These combinations are often given labels such as “desert sunset,” “midnight ocean,” and “orange sherbet,” with the resulting design faintly resembling how one might imagine these scenes to be colored. It is tempting to experiment with these options; however, it is important to consider readability and mood when combining colors.

*Readability.* For maximum readability, there should be high contrast between the text color and the background color. Dark text on a light background is easy to read. It goes without saying that dark text on a dark background or light text on a light background is difficult to read. Light text on a dark background is also easy to read, but it should be used sparingly as it can be tiring to the eyes to read large amounts of text on a dark background. Below are some additional guidelines for using colors:

- Bright colors are easier to see than pastels.
- Using too many colors can create a confused and cluttered effect.
- Multi colors are useful for many charts, graphs, maps, and so on.
- Some people experience color insensitivity. The most common is reduced sensitivity to reds and greens; about 10% of men experience this “color blindness.” If you put red letters on a green background, 10% of the men in your audience will not be able to read your questionnaire.

*Mood.* Colors used in combination can create different moods and feelings compared with colors used alone. Basic color theory indicates that the following color combinations are harmonious:

- Two colors opposite of each other on the color wheel
- Any three colors equally spaced around the color wheel forming a triangle
- Any four colors forming a rectangle, each opposite of each other on the color wheel (see the 12-part color wheel in Figure 5.4)



**Figure 5.4** Twelve-Part Color Wheel

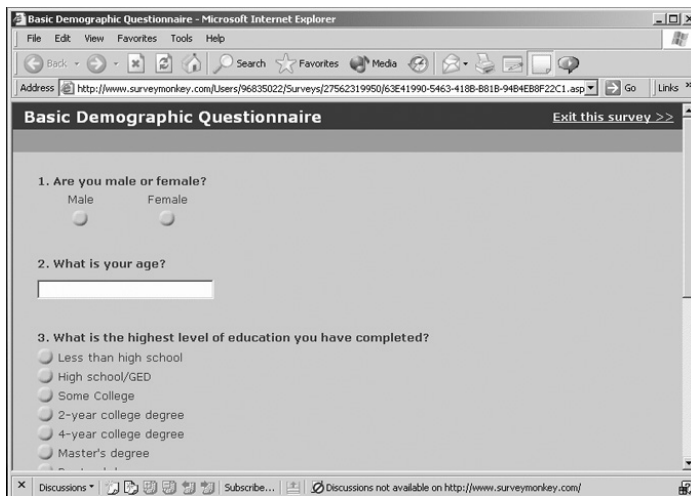
(For information on color and vision deficits, please see the section titled *Making Your Survey Accessible to Everyone*, later in this chapter.)

### *Technological Issues Related to Appearance*

Be attentive to differences in the visual appearance of questionnaires that result from different browsers, operating systems, screen configurations, partial screen displays, and wrap-around text.

Nonresponse to a survey can occur because of incompatibilities with hardware or software. What the developer sees on his or her screen is not necessarily what another viewer sees. It is important to test the survey using different browsers—that is, Internet Explorer, Netscape, and Firefox—as well as different operating systems—that is, Windows XP, Windows 2000, Mac OS, and so on.

Consider the physical placement and presentation of items when reviewing questionnaires on different computers. Problems with physical distance between points on response scales were noted by Dillman and Bowker (2001) when screen resolution configurations changed from  $800 \times 600$  to another configuration—that is,  $640 \times 480$  or  $1024 \times 768$ . These numbers represent the number of **pixels** that make up the vertical and horizontal dimensions on a computer screen and affect the appearance of text and images. Pixels per inch (ppi) is a measure of sharpness on a screen; in general, the more pixels there are, the sharper the screen image will be. (Figure 5.5 shows how the same questionnaire looks vastly different depending on the



(a) Demographic questionnaire using  $800 \times 600$  screen display



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Basic Demographic Questionnaire - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.surveymonkey.com/Users/76835022/Surveys/27562319950/63E41990-5463-4188-881B-94B4E8BF22C1.asp?u=2756231995004

**Basic Demographic Questionnaire** Exit this survey >>

1. Are you male or female?

Male Female

2. What is your age?

3. What is the highest level of education you have completed?

Less than high school  
 High school/GED  
 Some College  
 2-year college degree  
 4-year college degree  
 Master's degree  
 Doctoral degree  
 Professional degree

4. What is your own yearly income?

5. What is your current marital status?

Discussions not available on http://www.surveymonkey.com/

(b) Demographic questionnaire using  $1,024 \times 768$  screen display

Basic Demographic Questionnaire - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.surveymonkey.com/Users/76835022/Surveys/27562319950/63E41990-5463-4188-881B-94B4E8BF22C1.asp?u=2756231995004

**Basic Demographic Questionnaire** Exit this survey >>

1. Are you male or female?

Male Female

2. What is your age?

3. What is the highest level of education you have completed?

Less than high school  
 High school/GED  
 Some College  
 2-year college degree  
 4-year college degree  
 Master's degree  
 Doctoral degree  
 Professional degree

4. What is your own yearly income?

5. What is your current marital status?

Single, never married  
 Married  
 Separated  
 Divorced  
 Widowed

Next >>

Discussions not available on http://www.surveymonkey.com/

(c) Demographic questionnaire using  $1,280 \times 1,024$  screen display**Figure 5.5** Questionnaire Display With Different Screen Configurations

screen configuration.) According to [www.WebUsability.com](http://www.WebUsability.com), the most common monitor setting is  $1024 \times 768$  pixels or higher (60% of Web users),  $800 \times 600$  is the second most common setting, and less than 1% of Web users have their monitors set to  $640 \times 480$ .

There are two schools of thought when it comes to creating Web content, including online surveys, for different screen settings. The first advocates building surveys that can be easily viewed by the greatest number of individuals in your sample; currently, that means creating surveys with the  $1024 \times 768$  or higher screen configuration in mind. The second school of thought suggests developing surveys that can be viewed accurately by *all* potential respondents; that is, if any users still have their screens set to  $640 \times 480$ , the survey should be created with this fact in mind. Critics of this second position claim that you will end up with a questionnaire that looks amateurish on most screens, in order to accommodate less than 1% of Web users.

Computer technology and the way people use it is changing faster than we can write these words; in addition to testing questionnaires on a variety of computers, online survey researchers will need to investigate the current state of Web usability and evaluate those conditions in light of their particular target populations and survey objectives when deciding on the most appropriate way to display Web questionnaires.

### *Instructions*

Instructions for completing the questionnaire should always be included, no matter how obvious the procedure may seem. When writing directions, avoid jargon and do not use abbreviations without writing out the words first.<sup>1</sup> A link to a glossary of abbreviations and terms can be beneficial if you have doubts about respondents' familiarity with the terms. Directions need not be lengthy, but they should be comprehensive, especially for people who are unfamiliar with online surveys (see Figure 5.6). Consider writing brief directions and including a link to more detailed directions for people who may need them. It is best to place the links for the directions for answering specific questions next to the question instead of placing them all at the beginning of the survey and overwhelming the reader. For example, the first question that uses radio buttons may have a link that explains how to answer the question or change answers.

Instructions might address some or all of the following questions:

- Does the respondent have to answer all the questions?
- Can the respondent select only one answer for the question or more than one?
- How does the respondent move to the next question?

- Is there a time limit for completing the questionnaire?
- Can the respondent skip a question and return to it later?
- How does the respondent change an answer?
- Does the respondent need to single or double click on the answer?
- Can the respondent begin the survey and return to it later?
- If the respondent returns to complete the survey later, will he or she have to start all over again?

### Online Survey Instructions

- The survey is very simple to complete and should only take about 10 minutes or less of your time.
- If you are unsure about a specific service provided by your organization, you may choose to skip that question and complete it after you have obtained the information needed (re-clicking the link at a later time will return you automatically to uncompleted items, or you may also click the “back” key anytime while taking the survey).
- Only one response per individual please.
- You may move back to a previous page and revise your responses at any time. When all answers are completed, simply click the “submit” tab and you will be asked to select your gift of appreciation. **The first 50 respondents are eligible to receive NIKE running/walking shoes!**
- **All surveys should be completed by July 14, 2006!**
- Should you wish to complete the survey by hand we will be happy to mail a hard copy to you.
- Please contact us at 555-555-5555 if you need assistance. Remember: all surveys should be completed by July 14, 2006!
- Thank you for your participation.

**[Click here to begin the survey](#)**

Figure 5.6 Survey Instructions

For people who want to participate in the survey but prefer not to complete an online questionnaire or are unable to do so, it is important to provide information about alternative ways to participate—for example, by sending a paper version of the questionnaire via postal mail. Of course, if alternative modes of participation are allowed, it is necessary to configure the alternative questionnaires so that they resemble the online versions as closely as possible.

### *Formats for Response Options*

When creating online surveys, the developer has a choice of several ways to present the response options, including radio buttons, check boxes,

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drop-down menus, rank order matrices, constant sum, and open-ended text boxes. Regardless of the combination of response options you select, it is important to maintain consistency in terms of font type and size, width of response categories, and colors used throughout the questionnaire. Varying any of these elements may cause respondents to interpret some questions as being more important than others.

*Radio Buttons.* A radio button is a small circle with text next to it; when the respondent clicks on the circle, it is filled in with a smaller, solid circle or sometimes with a check mark (see Figure 5.7). Radio buttons are traditionally

**9. How often do you shop in the Lakeview District?**

- Daily
- About once a week
- About once a month
- Rarely
- Never

(a) Multiple choice

**10. Do you agree or disagree with the following statements about the store you visited?**

	Strongly Agree	Agree	Disagree	Strongly Disagree	N/A
The store was conveniently located.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The store hours were convenient for my shopping needs.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The store had a good selection of products.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The merchandise displays were attractive.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The merchandise I wanted was in stock.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

(b) Likert-type scale

**10. Using a 1 to 10 point scale where 1 means "not at all important" and 10 means "very important" how important are the following items to you when choosing a president? The candidate's ...**

	1	2	3	4	5	6	7	8	9	10
positions on issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
age	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
political party	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
honesty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
religion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
spouse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
military experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(c) One to 10-point rating scale

**Figure 5.7** Radio Button Examples

used when the respondent must select exactly one choice from a list—that is, clicking on a nonselected button will deselect whichever other button was previously selected. Radio buttons are useful for multiple-choice, Likert-type scale, and other scale questions. Generally, the response options for multiple-choice questions are listed vertically, while the options for rating scale questions are displayed horizontally, either next to the item or directly below it.

*Check Boxes.* A check box is a small box with text next to it. As the name implies, clicking on check boxes places a check mark in the selected box. They are most often used when respondents are permitted to select more than one option from a list, such as in the “select all that apply” type of question (see Figure 5.8). Check box responses, like radio button responses, can be programmed to accept only one response from a list if the researcher wishes.

**1. Which of the following sports have you participated in this month? (Check all that apply.)**

Tennis  
 Golf  
 Running  
 Swimming  
 Bike riding  
 Other (please specify)

**Figure 5.8** Check Box Example

*Drop-Down Menus.* A drop-down menu has a title that is visible, but the contents (response choices) are shown only when the respondent clicks the title or a small arrow next to the title. The participant selects from the list by dragging the mouse from the menu title to the response option and releasing or by clicking the title and then clicking the response choice (see Figure 5.9). If possible, and practical, it best to avoid using response categories in which the respondent cannot see all the options. Users may not be aware of how to use them or might not want to take the extra step to scroll down to see all the choices. One common problem among inexperienced Web users occurs when a default answer appears in the visible window of a drop-down menu (as in the first example in Figure 5.9). The respondent sees that the window is filled in and believes that he has already answered the question; or he may not realize that clicking on the arrow will provide more choices.

That being said, drop-down menus are effective when the list of response options is lengthy and would result in excessive scrolling on the page to see all the options and to get to the next question. It is important not to overuse drop-down menus—for example, for questions that have a few response

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**What is your country of citizenship?**

United States

- United States
- US Minor Outlying Islands
- Uruguay
- Uzbekistan
- Vanuatu
- Vatican City State
- Venezuela
- Viet Nam
- Virgin Islands (British)
- Virgin Islands (U.S.)
- Wallis/Futuna Islands

(a) Drop-down menu with a default option appearing in the visible text box

In which state do you live?

- Select One -

(b) Drop-down menu with an instruction appearing in the visible text box

**Figure 5.9** Drop-Down Menu Examples

options that can easily be displayed beneath or next to the question. Moreover, when drop-down menus are being used, the visible window should not be left blank or be filled in with a default option; instead, include a “click here” or “select one” instruction.

*Rank-Order Matrices.* A rank-order matrix allows respondents to rank a list of options in order of preference or importance (see Figure 5.10). Respondents are not permitted to give the same rank to more than one option, and all options must be ranked before the respondent is allowed to move on to the next question. Online surveys are a good venue for this type of question, because they will not accept the problematic answers that

**2. Please rank the following sources of information in your department. Place a "1" next to the source you prefer the most, a "2" next to the source you prefer second most, and so on. No two sources can have the same rank.**

- Immediate supervisor
- Company newsletter
- Coworkers
- E-mail distribution lists
- Bulletin boards

**Figure 5.10** Rank Order

sometimes appear on paper questionnaires, such as respondents reporting that all options are equally important by writing in a “1” next to every item on a list. However, they do require effort on the respondent’s part, and being forced to rank all items (or seeing error messages when trying to assign the same rank to two items) can cause frustration. To simplify the task, it is best to limit the number of items to be ranked to five or fewer.

*Constant Sum.* A constant sum question asks respondents to assign values or percentages across options so that the total sums to a predetermined amount. For example, you might want to know the percentage of an employee’s workday spent on a variety of tasks, such as inventory control, customer service, and correspondence. The same question could be asked in terms of number of hours per day, assuming that an employee works an 8-hour day.

Like the ranking question, constant sum requires a good deal of effort on the part of the respondent as he or she must consider each of the response options relative to the others and to the total. The potential for error is higher in constant sum than in other types of questions—for example, typing in a set of values that sum to more than 100% will activate an error message. Likewise, leaving empty boxes will result in error messages (a zero must be entered for activities in which the respondent is not engaged). The likely result of being faced with a series of error messages is abandonment of the survey. When considering using constant sum questions, evaluate the cognitive and technical difficulty of the task you are asking respondents to perform to ensure that it is appropriate for your target population. (See Figure 5.11 for an example of a constant sum question.)

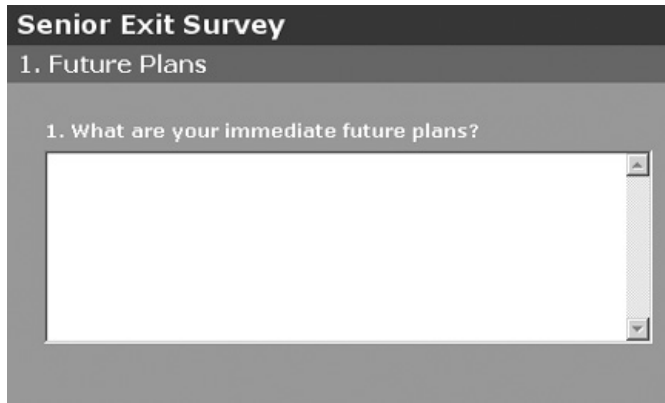
**2. Please indicate the percentage of your workday you spend on the following activities.  
(The total must add up to 100%)**

- Reading e-mail
- Answering the phone
- Taking orders
- Resolving customer complaints
- Developing new projects
- Other

**Figure 5.11** Constant Sum

*Open-Ended Text Boxes.* Open-ended text boxes allow respondents to type in free text. The sizes of text boxes vary widely; options include short boxes that require one-word answers, single-line boxes for short phrases or sentences, and long boxes for detailed answers or comments. The length of respondents’ answers will be guided by the amount of space they have to

write in. Of course, this doesn't mean that respondents will necessarily fill long comment boxes with text or even respond to them at all. However, if you're looking for short answers, providing a one-word or single-line box is a way to prevent respondents from expounding on their answers. Figure 5.12 is an example of an open-ended text box.

The image shows a screenshot of a web-based survey interface. At the top, there is a dark grey header with the text "Senior Exit Survey" in white. Below the header, the section "1. Future Plans" is displayed in a lighter grey background. The main content area has a white background and contains the question "1. What are your immediate future plans?". Below the question is a large, empty text input field with a vertical scrollbar on the right side, indicating it is an open-ended text box.

**Figure 5.12** Open-Ended Text Box

### *Requiring Answers*

It is best not to require respondents to provide an answer to each question before being allowed to answer any subsequent ones. Requiring answers to questions that may be difficult, embarrassing, or not applicable is frustrating to respondents and poses ethical issues. The ethical norm of voluntary participation applies to the survey as a whole and any part of it. In no other survey mode are respondents forced to answer particular questions. In interview questionnaires, respondents can refuse to answer any question and still continue with the survey; in paper questionnaires, they can simply leave questions unmarked. If you find it necessary to have answers to all questions, it is advisable to include the option of “don't know,” “not applicable,” or “decline to state” as possible choices.

### *One-Page Versus Multipage Questionnaires*

In many situations, it will be at the discretion of the questionnaire developer whether to place all the survey items on one page or on multipages. Some decisions are obvious: If the entire questionnaire is three or four questions long, it is not necessary to use multipages; if the survey contains dozens



of questions relating to a variety of topics, multipages are in order. Whenever skip logic is used, multipages are necessary. Figure 5.13 is an example of an “association membership questionnaire” where all the questions are on one page. The respondent scrolls from one question to the next and clicks the “submit” button when he or she is finished. It is a relatively simple procedure and closely resembles the process of completing a paper questionnaire, which may be useful if data from different survey modes are to be combined.

**Association Membership Questionnaire** Exit this survey >>

1. How long have you been a member of the Association?

Less than 6 months  
 6 months to one year  
 2-3 years  
 4-5 years  
 6 years or more

2. What kind of Association membership do you currently hold?

Associate  
 Emeritus  
 Student  
 Regular

3. What was your primary reason for joining the Association?

4. Are you male or female?

Male  
 Female

5. How important are the following Association member benefits to you?

	Not at all important	Very important
Association Event Discounts	<input type="radio"/>	<input type="radio"/>
Association Newsletters	<input type="radio"/>	<input type="radio"/>
Association Publication Discounts	<input type="radio"/>	<input type="radio"/>
Member Discount Benefits	<input type="radio"/>	<input type="radio"/>
Networking	<input type="radio"/>	<input type="radio"/>

6. Which of the following Association events have you attended in the past two years? (Select all that apply.)

Conferences  
 Section Events  
 Local Training Events  
 National Training Events

7. What do you think the Association could do differently to better serve its membership?

8. What do you feel is the most important benefit you receive from being a member of the Association?

**Submit >>**

**Figure 5.13** One-Page Questionnaire (Note: This entire questionnaire is contained on one Web page. Respondents scroll down the page to see all the questions.)

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Emery Box Company Employee Survey		Progress	0%
In which department do you work?			
<input type="radio"/> Manufacturing	<input type="radio"/> Sales	<input type="radio"/> Administration	
<input type="radio"/> R & D	<input type="radio"/> Marketing	<input type="radio"/> Human Resources	
<input type="button" value="Continue"/>			

(a) Multipage questionnaire (Screen 1)

		Level of Agreement				
		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
How much do you <b>Agree</b> or <b>Disagree</b> with each of the following statements about your supervisor?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gives me constructive criticism		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Praises me for good work		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is overly critical		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expects too much		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="button" value="Continue"/>						

(b) Multipage questionnaire (Screen 2)

		Progress	31%
Which forms of communication do you find helpful in keeping up with our company's goals? (Mark all that apply.)			
<input type="checkbox"/> Meetings	<input type="checkbox"/> Printed Newsletter	<input type="checkbox"/> None of these	
<input type="checkbox"/> E-mail Bulletins	<input type="checkbox"/> Departmental Bulletin Board		
<input type="checkbox"/> E-mail Newsletter	<input type="checkbox"/> Immediate Supervisor		
<input type="button" value="Continue"/>			

(c) Multipage questionnaire (Screen 3)

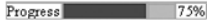
## Designing and Developing the Survey Instrument 77

Progress  69%

Which **one** form of communication do you find **most helpful** in keeping up with our company's goals?

<input type="radio"/>	Meetings
<input type="radio"/>	E-mail Bulletins
<input type="radio"/>	E-mail Newsletter


## (d) Multipage questionnaire (Screen 4)

Progress  75%




Which of the following employee benefits would you most like to see increased?

<input type="radio"/>	Vacation time
<input type="radio"/>	Sick leave
<input type="radio"/>	Family care leave
<input type="radio"/>	401K contributions
<input type="radio"/>	Health plan options
<input type="radio"/>	Other (please specify) <input type="text"/>

## (e) Multipage questionnaire (Screen 5)

Progress  88%

We are considering three new logos for our company. Which do you like best?

<input type="radio"/>		<input type="radio"/>		<input type="radio"/>	
-----------------------	---	-----------------------	---	-----------------------	---

Thank you very much for completing our survey.

## (f) Multipage questionnaire (Screen 6)

**Figure 5.14** Multipage Questionnaire

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It is possible to place each question on its own page (see Figure 5.14). Some researchers prefer this option because respondents focus on one question at a time, perhaps mitigating order effects. Order effects occur if respondents' answers to particular questions are influenced by previously recorded answers. The reasoning is that it is easier to scroll up on a single page than it is to hit the "back" button to review a previous answer.

The research evidence relating to respondent fatigue and premature termination of one-page versus multipage online surveys is ambiguous. Some of the evidence indicates that excessive scrolling is burdensome to respondents, while other research claims that too much clicking ("next," "back," etc.) is annoying. With the caveats regarding skip logic and possible order effects in mind, common sense suggests using one-page formats for short questionnaires and multipage formats for longer surveys, with questions grouped by topic or response format on the same pages.

*Double and Triple Banking*

When the number of answer choices exceeds the number that can be displayed on one screen, consider double (or triple) banking with appropriate navigational instructions added (see Figure 5.15). If the number of response

How old are you?	
<input type="radio"/> 14 years or younger	<input type="radio"/> 45-54
<input type="radio"/> 15-19	<input type="radio"/> 55-64
<input type="radio"/> 20-24	<input type="radio"/> 65-74
<input type="radio"/> 25-34	<input type="radio"/> 75-84
<input type="radio"/> 35-44	<input type="radio"/> 85 or older

(a) Double banking with box enclosure

3. Which of the following services do you use? (Select all that apply.)		
<input type="checkbox"/> Automatic Teller	<input type="checkbox"/> Checking	<input type="checkbox"/> Debit Card
<input type="checkbox"/> Direct Deposit	<input type="checkbox"/> Insurance	<input type="checkbox"/> Education Account
<input type="checkbox"/> Internet Services	<input type="checkbox"/> Loan Services	<input type="checkbox"/> Investment Account
<input type="checkbox"/> Retirement Account	<input type="checkbox"/> Savings Account	<input type="checkbox"/> Travel Club

(b) Triple banking with box enclosure

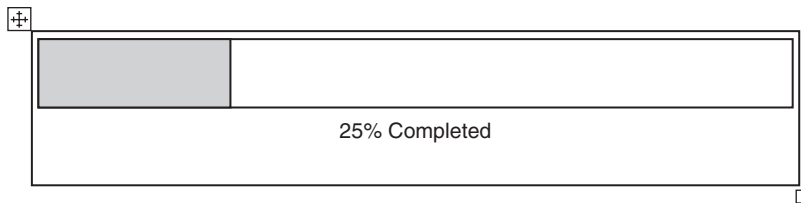
**Figure 5.15** Double and Triple Banking

options exceeds what will fit in two or three columns on one screen, consider other options such as drop-down menus.

### *Navigation Guides*

Getting lost when taking a survey is frustrating and can cause respondents to drop out before completing the survey. People taking the survey will have different levels of computer competency and comfort. Help respondents navigate through the survey within a short time and with limited frustration by providing clear directions and guideposts. Navigational guideposts assist the respondent in completing the survey without getting discouraged or lost. The guideposts are the road map of the survey.

As when looking at a road map, it is helpful for the reader to have an understanding of the location and how far he or she is from the destination point, which is the end of the survey. This can be done in different ways. One is to identify the screen number the respondent is currently on and the number of screens in total. For example, you could place screen numbers on each page, which would be similar to page numbers in a book—that is, screen 3 of 15. You also could identify the respondents' location by question number—for example, question 4 of 20. Another way is to identify the percentage of the survey that has been completed by using a progress bar (see Figure 5.16).



**Figure 5.16** Progress Bar

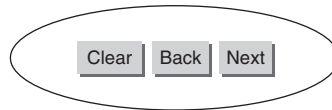
Signs also should be posted on your road map. The signs will indicate to the respondent how to go back, move forward, and submit the survey. Road signs usually have a designated color or shape—that is, brown signs indicate a historic site, yellow signs indicate caution, and “yield” signs are triangular. The signs that you post on your survey road map also should have consistent colors and shapes and be placed in a consistent location on each screen of the questionnaire (see Figure 5.17).

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5. Please answer the following questions in your own words.

- What most **attracts** you to this company?

- What most **irritates** you about this company?



**Figure 5.17** Navigation Aids

**Table 5.2** Examples of Serif and Sans Serif Fonts

<i>Serif Fonts</i>	<i>Sans Serif Fonts</i>
Times New Roman	Arial
Courier New	Verdana
Georgia	Comic Sans MS
Century Schoolbook	Century Gothic
Goudy Old Style	Tahoma
<i>Monotype Corsiva</i>	Bradley Hand ITC

### *Font Type and Text Size*

There are two main types of fonts: serif and sans serif. Serif fonts, such as Times New Roman, Courier New, and Georgia, have small appendages on the top and bottom of the letters. The appendages help to distinguish each letter and make it easier to read strings of text (see Table 5.2). The sans serif fonts, such as Arial, Verdana, and Comic Sans MS, are simpler and are generally better for short phrases such as headings (Morrison & Noyes, 2003). The question of interest to Web survey designers is what font type is the easiest and fastest to read and what font size is the most effective. A number of studies have focused on fonts for online reading.

A study conducted by Bernard and Mills (2000) examined Times New Roman and Arial fonts for readability, reading time, perception of legibility

and sharpness, and general preference. Thirty-five adult participants were asked to read passages with 10-point Arial, 12-point Arial, 10-point Times New Roman, and 12-point Times New Roman. The highlights of the study were as follows:

- No significant differences were found in detecting errors in the reading passage.
- Participants could read the passage fastest with 12-point Times New Roman ( $M = 365$  seconds); the 10-point Arial font came second ( $M = 368$  seconds).
- Participants reported on a 7-point scale that the 12-point Arial font ( $M = 5.7$ ) and 12-point Times New Roman font ( $M = 5.6$ ) were the most legible.
- Participants reported on a 7-point scale that the 12-point Arial font ( $M = 4.8$ ) and the 12-point Times New Roman font ( $M = 4.7$ ) were similar in their sharpness.
- The researchers determined that the mean preference choice between all font sizes, types, and formats was the 12-point Arial, followed by the 12-point Times New Roman font. The 12-point Arial was selected as the preferred choice approximately 33 times, and the 12-point Times New Roman was selected as the first choice approximately 27 times. Overall, there is a slight preference for the 12-point Arial font over the 12-point Times New Roman font for reading on the Web. The difference was not statistically significant.

In another study that assessed font types in terms of mood and the readers' general preference, similar results were found (Bernard, Mills, Peterson, & Storrer, 2001). Twenty-two adult participants were asked to read passages presented in the following 12-point fonts: Agency FB, Arial, Comic Sans MS, Tahoma, Verdana, Courier New, Georgia, Goudy Old Style, Century Schoolbook, Times New Roman, Bradley Hand ITC, and Monotype Corsiva.

The researchers first computed a reading score based on font legibility and its associated reading time. Participants were then asked to rate the fonts for readability and aesthetic appeal. No significant differences between font legibility were found. The top-rated three fonts in each of the categories and their scores can be found in Table 5.3. It is important to note that the differences between the top-rated fonts were minimal.

No significant differences were found in terms of legibility. Courier and Times were perceived as being the most businesslike, and Comic was perceived as being the most fun and youthful font. The two fonts Bradley and Corsiva were perceived as having the most personality and being the most elegant; they also were seen as being low in legibility and in businesslike appearance, and they obtained the lowest rating in font preference.

Bernard and Mills (2000) studied children's font preferences when reading online. Thirty-seven participants between 9 and 11 years of age were involved in a study that compared preferences of 12- and 14-point fonts. Four font types were evaluated: Arial, Times New Roman, Courier New, and Comic Sans MS. Children preferred the 14-point fonts as they were perceived as

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being easier and faster to read and more attractive. Comic Sans MS was the preferred choice in all three measures (easy to read, reading faster, and attractiveness), with Arial as the second choice. When surveying children, 14-point Comic Sans MS is the preferred choice.

**Table 5.3** Top Three Fonts in Each Category

<i>Reading Time</i>	<i>Perceived Legibility</i>	<i>Perceived as Being Businesslike</i>	<i>Perceived as Youthful and Fun</i>	<i>Font Preference</i>
1. Tahoma (270 seconds)	1. Courier	1. Times New Roman	1. Comic	1. Arial
2. Times New Roman (273 seconds)	2. Comic and Verdana	2. Courier	2. Bradley	2. Verdana and Georgia
3. Verdana (280 seconds)	3. Times New Roman	3. Schoolbook	3. Verdana	3. Comic

SOURCE: Data based on Bernard, Mills, Peterson, and Storrer (2001).

If your target audience is older adults, you also should use a 14-point font but opt for something like Arial. Twenty-seven participants ranging from 62 to 83 years of age were tested by Bernard, Liao, and Mills (2001). Four fonts were assessed in the study: Times New Roman, Georgia, Arial, and Verdana. Twelve- and 14-point font sizes were used in the study. In terms of readability, the 14-point font size had significantly greater reading efficiency than the 12-point font. The 14-point font also had faster reading time and a greater perception of legibility. The preferred fonts were the 14-point Arial and Georgia.

In sum, the number of studies on font types and online reading is limited, and none have been conducted specifically focusing on online surveys. Overall, Arial and Times New Roman are similar in terms of legibility and preference, and 14-point fonts are preferred by children and older adults.

### *Images, Graphs, and Charts*

Images, graphs, and charts should be used sparingly when creating online surveys. They can greatly increase the download time, and depending on your target audience, the respondents may not know how to interpret them. On the other hand, judicious use of images can provide a context for questionnaire



items and potentially increase the validity of answers. Figure 5.18 shows the same question presented with two different photos. Without having to read extra text, respondents are given an important clue about the context of the question and immediately understand that in the first question they should include visits to fast food restaurants, whereas the second refers to fine dining.

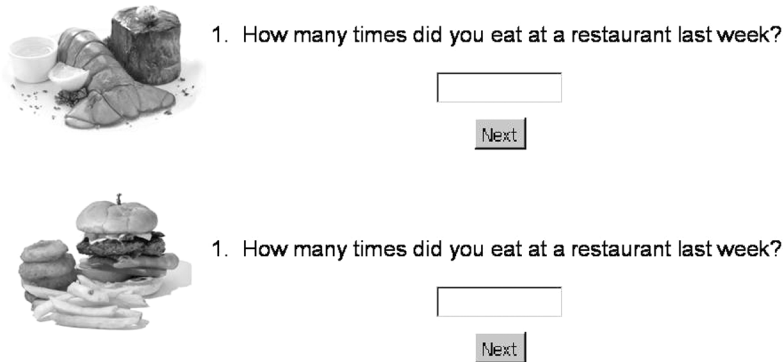


Figure 5.18 Questions With Images

### *Motion, Sound, and Links*

Technology enables survey designers to add motion, sound, links, graphics, and **java applets**. All these features can make the survey more attractive, enticing, interesting, and entertaining, but these same features also can increase the time to download the survey and even make the potential respondent's computer crash. Such experiences can cause a lower response rate or frustration with the organization that hosts or disseminated the survey. While these high-tech features are compelling, the rule of thumb when it comes to online survey design is to keep it simple. To estimate the download time of your survey, you can use a download time calculator, which you can access at <http://download.stormloader.com/>.

Dillman, Tortora, Conrad, and Bowker (1998) found that surveys that download faster had a higher response rate than more elaborate ones that took longer to download. The researchers created a plain version and a fancy version of the same survey. The plain version required 317K of memory, and the required time for transmission on a 28.8 modem was at least 120 seconds. This version had no HTML tables or color. The fancy version required 959K of memory and took approximately 345 seconds for transmission. Of the people who logged on to the plain version, 93.1% completed the entire survey; 82.1% who logged on to the fancy version completed the questionnaire. The

respondents of the plain survey completed an average of 166 questions. The respondents of the fancy survey completed an average of 156 questions.

## Making Your Survey Accessible to Everyone

To reduce coverage bias as much as possible, it is important that online surveys are accessible to everyone in the target population. Ensuring that individuals with visual or learning disabilities or who speak a different language can complete the questionnaire is methodologically sound, ethically responsible, and sometimes legally required.

### Language

If your target audience is an international one or includes people who may have limited English skills, you may want to consider translating your survey into languages other than English. Some software programs will allow the developer to convert a survey written in English into another language, while others such as Zoomerang will translate your survey and the responses into another language for a fee. Figure 5.19 shows how the Inquisite survey

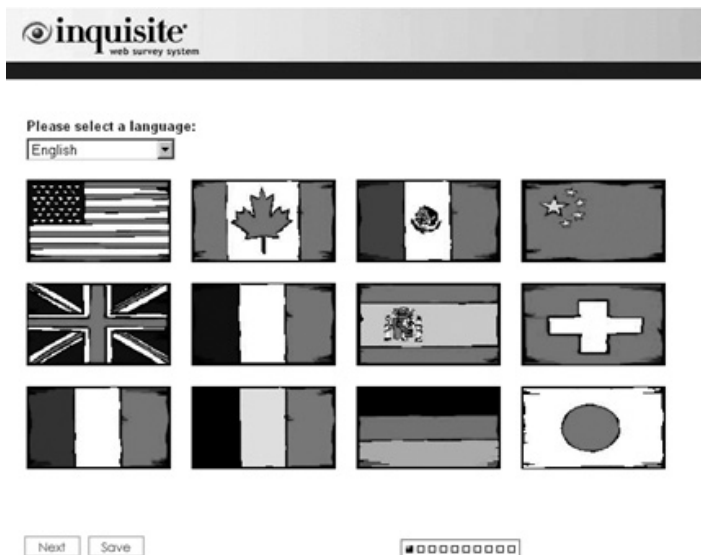


Figure 5.19 Language Selection Page

SOURCE: Reprinted with permission of Inquisite, Inc.

software system presents language options for respondents; this page should be the first one a respondent sees, before the welcome screen.

## Visual Impairments

For people with visual disabilities, there are assistive software programs called screen readers. These screen readers enable the person to listen to the information on the Web page as the software reads the content of the Web page out loud. Some Web-based hosts, such as WebSurveyor, are accessible to people using screen readers.

When using screen readers, one factor that can contribute to poor Web access relates to graphic images. Screen readers read basic text, so graphics that do not contain an ALT tag will not be read. The ALT tag provides the reader with textual information about the graphic image. This is really essential if the graphic contains a link. If an ALT tag does not exist, then the person using the screen reader will not know that the information exists. It is not difficult to create an ALT tag. For example, if you have an image that displays the words “Log In,” the HTML code may be as follows:

```
<IMG SRC="loginphoto.jpg" ALT="login">
```

When creating tables, organize the information from left to right instead of from top to bottom to help ensure greater understanding of the information (Academic Computing and Communications Center, n.d.).

To assist designers in creating accessible Web sites, the World Wide Web Consortium (W3C) created the Web Access Initiative guidelines. The W3C created 14 accessibility guidelines, which can be found at [www.w3.org/TR/WCAG10/#Guidelines](http://www.w3.org/TR/WCAG10/#Guidelines). You can test your page for accessibility in order to identify and resolve accessibility issues. The W3C has a Web site, [www.cast.org/bobby](http://www.cast.org/bobby), or you can use, [www.usablenet.com](http://www.usablenet.com).

Color deficits are another type of visual disability. About 8% of men and 0.5% of women have some form of color blindness (Newman, 2000). That could translate into 1 in 12 visitors for some Web sites. According to Newman, 99% of people who are color-blind have trouble distinguishing between red and green.

Bright and distinct colors are the easiest to distinguish. Using shades of a color can make it difficult to decipher. Exaggerate differences between foreground and background colors by using background colors that make the other image stand out—that is, red against white. Avoid colors of similar lightness near each other. Use more than one color to design your Web survey. If a link is in blue, then the reader may not be able to determine that it is a link.

Therefore, it is a good idea to make the link a different color and underline it as well.

## Learning Disabilities

Dyslexia is a reading disability that affects almost 10% of the United States population (Able Access Net, 1999). As many as 80% of all people with learning disabilities have dyslexia. A way to help dyslexic individuals read your online survey is to use the font called Read Regular. Read Regular is designed with an individual approach for each of the characters, creating difference in the actual characters and not mirroring letters. For example, the letter *b* is not mirrored to make the letter *d* in order to create a large character differentiation. The character shapes are simple and clear, creating consistency. The characters have been stripped down of all unnecessary details.

## Ensuring That Participants Respond Only Once

Researchers need to be cautious of receiving completed questionnaires from the same respondent multiple times. The ethical norm of respondent anonymity and the practical goal of eliciting only one response per person are at odds with each other; however, there are some techniques for preventing or identifying duplicate responses. Assigning a unique identifier to each respondent is the most effective way to prevent people from entering multiple responses. Without using a unique identifier, there are no 100% effective techniques to prevent people from submitting more than one questionnaire. Other strategies include the following:

- Compare host names or Internet protocol (IP) addresses of submissions. Every computer on the Internet has a unique identifying number called the IP address. You must have some knowledge of how these addresses are assigned on each network to make effective use of this technique. Because network address translation (NAT) has grown in popularity, it is common for many computers to share a single IP address. NAT involves rewriting the source and/or destination addresses of IP packets as they pass through a router or firewall. Most systems using NAT do so in order to enable multiple hosts on a private network to access the Internet using a single public IP address. Setting up the survey to automatically reject multiple responses from the same IP address is possible but not recommended. Usually, automatic rejection will result in the rejection of valid responses and allow people to give multiple responses by moving to a different computer.

- Check for series of data that have identical answers to the question set. This should be used in combination with one of the other checks.
- Make a gateway survey to the actual survey that accepts a one-time-use password. These passwords will be logged separately from the data collected, so there will be no way to link this password with the responses.

## Summary

Although some of the design principles applicable to paper questionnaires can be instructive for creating online questionnaires, Web-based surveys are unique and require careful consideration when it comes to layout, user friendliness, and technical requirements. A clear understanding of the demographic and Web usability profiles of the target audience will aid researchers in making appropriate choices about factors such as color, appearance, response options, and the amount and level of instructions necessary for particular surveys.

Online survey software and computer hardware are developing at break-neck pace, and the diffusion of computer technology in society is advancing equally rapidly. As more and more members of target populations become tech savvy and online surveys become the norm rather than a novelty, these guidelines for designing online questionnaires will require updating. It is incumbent on researchers using online data collection tools to keep track of the literature in the field and adjust their techniques for developing online survey instruments accordingly.

## Note

1. If an organization or group is more commonly known by an acronym, such as the FBI, it is preferable to use the acronym on first reference. *Federal Bureau of Investigation* not only takes longer to read but may actually create more confusion than it clears up.