

[http://lap.umd.edu/survey\\_design/index.html](http://lap.umd.edu/survey_design/index.html)

2006-03-06



This site provides design guidelines and principles for Web-based survey instruments based on a Human-Computer Interaction approach. It is hoped to give the Web survey practitioners, especially the beginners, practical design guidelines and an opportunity to view Web surveys as a multidisciplinary field.

By Web-based surveys, we mean surveys that are displayed on the World Wide Web (WWW) via a standard format.

The "questionnaire design" in this site is only for Web-based surveys and explicitly deals with design features of the Website, such as colors, sound effects, video clips, screen layouts, navigational issues, etc., due to the special nature of Web-based surveys. Thus, the traditional components of questionnaire design, such as wording and ordering, are out of the scope of this project.

For those who are familiar with the survey error framework, it should be noted that this site is dedicated to reducing the Measurement and Nonresponse error arising from survey instruments. Coverage and Sampling errors and Measurement and Nonresponse error arising from other sources are not discussed.

For any comments, suggestions or questions, please contact [webmaster@lap.umd.edu](mailto:webmaster@lap.umd.edu).

This section provides tips and guidelines resulting from several research efforts, as a means to promote the best practices regarding the design and implementation of web-based surveys.

The presented guidelines are integrated from [Norman \(2001\)](#), [Couper et al. \(2001\)](#), [Tourangeau et al.\(2000\)](#), [Dillman\(1999\)](#), [Dillman et al. \(1998\)](#) and [Norman\(1990\)](#).

## **1 Navigation**

### 1.1 Automation

## **2 Usability / Accessibility**

### 2.1 Usability

### 2.2 Accessibility

### 2.3 Consistency

### 2.4 Use of color

### 2.5 Use of Multimedia Features

## **3 Web-based questionnaires**

### 3.1 Web-based questionnaire design

### 3.2 Question formatting

#### 3.2.1 Use of color

#### 3.2.2 Use of Multimedia Features

#### 3.2.3 Choice of Response Format

##### 3.2.3.1 Radio button

##### 3.2.3.2 Check boxes

##### 3.2.3.3 Drop-down boxes

##### 3.2.3.4 Text input

#### 3.2.4 Response Categories

#### 3.2.5 Automation

### 3.3 Questionnaire layout

#### 3.3.1 Use of color

#### 3.3.2 Use of Multimedia Features

#### 3.3.3 Overall structure

#### 3.3.4 Instructions

#### 3.3.5 First Page

#### 3.3.6 Access control

#### 3.3.7 Automation

# 1 Navigation

- Definition: [Navigation](#)
- Allow respondents to easily navigate the survey.
- Streamline forward movement through the questionnaire while allowing backtracking and changing of answers.
- Construct web-based questionnaires so that they scroll from question to question unless order effects are a major concern, large numbers of questions must be skipped, and/or a mixed-mode survey is being done for which telephone interview and web results will be combined.
- When the number of answer choices exceeds the number that can be displayed on the screen, consider double-clicking with appropriate navigational instructions being added.
- When respondents complete the survey in a forward, linear manner, either the whole form or the single item implementations can be used as long as navigational functions are clear and easy to use.
- When correction and editing tasks require the respondent to find items, the whole form implementation can be used to aid in the searching for items.
- Paged surveys that are not congruent with sections are to be avoided.
- Sectioned surveys that require scrolling should clearly indicate that additional items must be accessed by scrolling to them.
- Indexes to sections and pages are of marginal benefit and may sometimes lead to confusion.

## 1.1 Automation

- Definition: [Automation](#)
- Branching: Automate conditional branching when possible, but allow the respondent to override branching if there is a need or desire to do so on the part of the respondent.
- Automate skip patterns: to eliminate errors and to simplify the process of taking the survey from the respondent's point of view, make the program, rather than the respondent, manage skip patterns.
- Automatically validate input, if possible: input validation improves data quality and saves time in data preparation. However, such validation should be user friendly and simply identify the mistake of the user.
- Take advantage of the media's ability to track respondent behavior: a web-based survey can be used to collect more than just respondent's answers. 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 the survey, and other such behaviors could also be collected.
- Take into account the costs of automation: incorporation of logic checking and automatic question skipping may require more-extensive software programs and programming.

## 2 Usability / Accessibility

### 2.1 Usability

- Definition: [Usability](#)
- Be aware that survey respondents bring various backgrounds, experience and motivations to the survey.
- Assume that respondents are all novice to your questionnaire but they have some or minimal experience with web page browsing.
- The purpose of the design strategy is training respondents not over time but in the same survey session.
- Get respondents with minimal computer literacy to overcome their limited knowledge and perhaps fear of the computer in order to respond.
- Make error/warning messages as specific as possible: ideally, an error message should be placed directly above or below the unanswered item, and it should be specific about where the error occurred and, if possible, the nature of the problem.
- Provide some indication of survey progress: a graphical progress indicator can be especially useful as a means to inform respondents how much of the survey has been done. It is desirable to give respondents an approximate measure of their progress at least a few times during the survey.
- Allow respondents to interrupt and then reenter the survey: respondents who cannot complete a survey in one sitting should be offered the option of stopping at some point and resuming later.
- Provide feedback: Use graphical symbols or words that convey a sense of where the respondent is in the completion progress, but avoid ones that require advanced programming.
- Error messages: Phrase "error" messages in a positive, helpful manner that suggests how to complete a question.
- Additional feedback: If there is a routine flow or burst of automatic entry of data, notify the user at the end of that flow of any errors.
- Validating data: When the respondent is allowed to answer all questions, implement logic and consistency checks on conditional branches.
- When context matters, provide form-based views of sections to help to clarify the meaning of items and the interrelationships among items.
- It must be remembered that although good design seems intuitive, it requires empirical verification before final implementation.

### 2.2 Accessibility

- Definition: [Acessibility](#)
- Be consistent across a variety of hardware and software systems.
- Avoid differences in the visual appearance of questions that result from different screen configurations, operating systems, browsers, partial screen displays, and wrap-around text.
- If necessary, instruct respondents to maximize the screen.

## 2.3 Consistency

- Definition: [Consistency](#)
- Be consistent: show information in the same places.
- Inconsistency in response format may lead to user error. [\[Example\]](#)
- Follow the same format, alignment and color scheme.
- Accommodate the respondents' anticipation.
- Design an interface consistent with users' understanding of the task.
- Using a system encourages formation of behavior patterns.
- When appropriate, keep response options consistent.
- When response options change, draw attention to the change in some way, for example, change the layout of the responses or require navigation to a new page that optionally instructs the user that the response options have changed.
- Educate the respondent to be familiar with the questionnaire format as quickly as possible.

## 2.4 Use of color

- Reserve red for emergency messages or critical icons. [\[Example\]](#)
- Avoid red-green distinctions.
- Do not use intense combinations of colors: respondents may lose attention.
- Keep the background color simple and from interrupting the task.
- Visual focus should be on primary task.
- When using grid format for a long list of responses, alternate the background colors for each response category.
- Restrain the use of color so that figure/ground consistency and readability are maintained and navigational flow is unimpeded.

## 2.5 Use of Multimedia Features

- Graphical images, sound, and moving images are considered multimedia features. Use them only when they are core for understanding the question.
- Usage of multimedia features may limit the accessibility, increase the measurement error by the limited accessibility and consistency across different systems and decrease response rates due to increase loading time.
- Be cautious about the congruence between the images/sound and information
- Pictures and sound may convey unintended meanings, thus, lowers the validity of the answers.
- 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 a high-speed connection.
- Be aware of how respondents may interpret questions in light of accompanying graphics: when graphics or pictures are used, bear in mind that respondents tend to interpret questions in the context of those graphics

and pictures.

## **2.6 Making Corrections**

- If possible, implement edits immediately after the entry of a field or set of fields to maintain the context of the item.
- If an error is detected on a later page, provide a quick path back to correct the error, or provide a pop-up field to re-enter the information.
- If an error is the combined result of several fields, guide the user successively to those fields or, if possible, provide a pop-up screen showing all of the relevant information and providing fields to correct the information.
- When correction and editing tasks require the respondent to find items, the whole form implementation can be used to aid in searching for items.

## **3 Web-based questionnaires**

### **3.1 Web-based questionnaire design**

- Web-based survey questionnaire design is NOT web design.
- Web-based survey questionnaire design does not solve all problems related to the web surveys; Web-based questionnaire design can decrease or increase parts of measurement, nonresponse and coverage error.
- Web-based surveys assume that respondents can read. Such an assumption may exclude populations where literacy is a problem: according to the National Adult Literacy Survey, nearly 25% of US adult population has extremely limited literacy in English. About 20% of that category have visual difficulties that interfere with their ability to read printed material; almost 25% are immigrants.
- Web-based surveys assume that respondents have access to a computer, which may exclude economically disadvantaged populations.
- Web-based surveys require that responses be entered electronically, which may exclude physically disabled populations.
- Although few substantive differences between computer-based and paper-based surveys have been found, those differences that have been found often reflect changes in the design of the instrument. Most of these changes involve apparently innocuous modification of the layout; still, these changes may make it harder or easier to complete the questions, and they may convey different expectations about the kinds of information required.

### **3.2 Question formatting**

#### **3.2.1 Use of color**

- Take advantage of graphic design theory: A proper use of color could provide visual cues that may simplify the web-based survey process.

#### **3.2.2 Use of Multimedia Features**

- Take advantage of the media's presentation capabilities: Web-based surveys could include hypertext links to help and additional resources as part of the survey instrument without increasing its apparent length.
- Be aware of how respondents may interpret questions in light of accompanying graphics: When graphics or pictures are used, bear in

mind that respondents tend to interpret questions in the context of those graphics and pictures. [\[Example\]](#)

- Always ask whether the multimedia material is an enhancement that solves an information problem or whether it is a distraction ("eye candy").

### **3.2.3 Choice of Response Format**

- Use matrix questions sparingly: Matrix questions place an extra burden on the respondent because they require a lot of work to be done within a single screen. In addition, it is impossible to predict exactly how a matrix question will look on a respondent's web browser. Therefore, they should be used with caution.
  - [Example: Simple Matrix](#)
  - [Example: Complex Matrix](#)

#### **3.2.3.1 Radio button**

- The size does not change even when font size changes.
- Require precision in clicking.
- Appropriate for "select only one" from mutually exclusive items.
- Avoid default-filled radio buttons, since they may be misunderstood as an answer when respondents do not choose any answer.

#### **3.2.3.2 Check boxes**

- When there are too many options, use a matrix format.
  - [Example: Simple Matrix](#)
- Use "check all that apply" only when necessary, since respondents tend to merely satisfy their task rather than optimizing.
- When "none of above" is needed, provide it with a radio button. Avoid erroneous check on this choice with the chosen responses.

#### **3.2.3.3 Drop-down boxes**

- Use sparingly: they are best for a very long list. (eg. State/country of residence, prescription drugs, etc)
- Drop-down boxes require 3 mouse actions whereas other response formats require only one. Thus, use drop-down format only when the increased mouse action is worthwhile.
- Not appropriate for items where typing is quicker (eg. Year of birth)
- Permit type-ahead look up, since it prevents tedious scrolling.
- Do not make the first option visible in drop-down boxes: it may mislead the respondents and it may be misunderstood as an answer when respondents do not choose any answer.
- Give visual cues for the task in drop-down boxes. (eg. "select one")

- Avoid multiple selections on drop-down boxes: use check boxes.
- Depending on the place on the screen, use drop-up boxes.

#### **3.2.3.4 Text input**

- The Size of the box should meet the amount of the required information.
- Provide sufficient space for text input.
- Provide concise and clear input guidance. (eg. MM/DD/YYYY for the birth date)
- Avoid scrolling around the input box. If necessary, keep it vertical.

#### **3.2.4 Response Categories**

- Preprogram to check the error in input (eg. the input do not sum to 100%; check some response options and "none of above" option) and provide feedback if erroneous input is caught.
- Implement category randomization when needed.
- Provide an open-ended field with the "others" option.
- When order matters (5-point scale), pay attention to the response labels and spacing.
- Reduce response errors by restricting response choices: 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. It is suggested to use radio buttons when the number of choices is relatively small, and drop boxes when the number of potential choices is large. [\[Example\]](#)
- Force answers only on rare occasions: 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.

#### **3.2.5 Automation**

- Automatically validate input, if possible: Input validation improves data quality and saves time in data preparation. However, such validation should be user friendly and simply identify the mistake of the user. [\[Example\]](#)

### **3.3 Questionnaire layout**

#### **3.3.1 Use of color**

- Take advantage of graphic design theory: A proper use of color could provide visual cues that may simplify the web-based survey process.

#### **3.3.2 Use of Multimedia Features**

- Take advantage of the media's presentation capabilities: Web-based surveys could include hypertext links to help and additional resources as part of the survey instrument without increasing its apparent length.

- 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 a high-speed connection.
- Be aware of how respondents may interpret questions in light of accompanying graphics: When graphics or pictures are used, bear in mind that respondents tend to interpret questions in the context of those graphics and pictures.
  - [Example: Graphics](#)
- Always ask whether the multimedia material is an enhancement that solves an information problem or whether it is a distraction ("eye candy").

### 3.3.3 Overall structure

- Place logo on the top left and menus on the left vertically.
- Left alignment of the questions and answers.
- Place the response format on the left of each response categories.
- Vertical alignment has more white space thus it is visually appealing and results in less problems with alignment and formatting
- Be cautious about the sense of scale (eg. column space for Likert scale) in horizontal alignment.
- Keep the answer labels visible for the grid design.
- Predict the visual flow and align the questions, answers and proceeding buttons accordingly.
- Decrease the movement time by decreasing the distance between the selected response check box (or radio button, etc) and the 'Next/Submit' button.
- Present questions in hierarchically ordered structure.
- Provide cognitive comforts; respondents do not need to go back and forth in their memory to retrieve.
- Preprogram the skip pattern (branching).
- Decrease item nonresponse error
- Decisions about whether to display questions on the same page together or on separate screens can impact the data collected.
- A group of questions considered together may convey information about the purpose of the questions and may elicit different responses than if the questions were presented one at a time across multiple pages.
- Designers can help guide the user's mental model by providing appropriate question context. Such context may be conveyed in many ways, including question wording, response wording, introductory explanation, or as above, may be implied by surrounding questions.
- Consider several design options: all questions in one page, related questions grouped on the same page, or one question per page.

- The grouping of response options may impact the responses recorded.
- If it is significant that responses or questions fall into distinct groups, call attention to the fact in some way, for example grouping or labeling.
- List a few questions per screen: Excessive scrolling can become a burden to respondents and lengthy web pages can give the impression that the survey is too long to complete. There is some evidence that using a single screen or a few screens for short surveys minimizes respondents abandonment, whereas using a single screen and forcing the respondent to scroll down in long surveys increases abandonment.
- Eliminate unnecessary questions: Avoid questions that have answers that the computer can determine, such as the date the questionnaire is filled out.
- Begin the web questionnaire with a question that is fully visible on the first screen of the questionnaire, and will be easily comprehended and answered by all respondents.
- Present each question in a consistent format, including question numbers, instructions, space between lines, and space between question and answers.
- Limit the length to decrease the likelihood of a long line of prose being allowed to extend across the screen of the respondent's browser.
- Do not require respondents to provide an answer to each question before being allowed to answer any subsequent ones. It is suggested to include a "prefer not to answer" and/or "don't know" category for every item than to force respondents to answer every question.
- Organize and partition an on-line survey to correspond with the organization of semantic knowledge in memory. Then how should the survey be partitioned on-line into pages? Should it be Item-based, Form-based, or somewhere in between?
- Paged surveys that are not congruent with sections are to be avoided.
- Sectioned surveys that require scrolling should clearly indicate that additional items must be accessed by scrolling to them.
- Indexes to sections and pages are of marginal benefit and may sometimes lead to confusion.
- Hide inappropriate and irrelevant questions to shorten the apparent length of the questionnaire and make such questions available only if the respondent specifically needs or wishes to view them.

#### **3.3.4 Instructions**

- Provide instructions. Unlike the traditional face-to-face or telephone surveys, web-based surveys are not administered by an interviewer who motivates, clarifies and probes the respondents. [\[Example\]](#)
- Embedded instructions distract respondents from their main task.
- Provide a help button to access the instructions.

- Instructions on the pop-up windows may disturb respondents
- Enable respondents to report problems: 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 toll-free phone number.
- Provide specific instructions on how to take each necessary computer action for responding to the questionnaire. Answering techniques may be obvious for experienced users, but need to be explained to less experienced respondents.
- Provide computer operation instructions as part of each question where the action is to be taken, not in a separate section prior to the beginning of the questionnaire.
- Reduce the branching instructions to a minimum to reduce reading time, confusion, and perceived difficulty of the questionnaire.

### **3.3.5 First Page**

- Introduce the web questionnaire with a welcome screen that is motivational, emphasizes the ease of responding and instructs respondents about how to proceed to the next page. [\[Example\]](#)
- Choose for the first question an item that is likely to be interesting to most respondents, easily answered and fully visible on the welcome screen of the questionnaire.
- The first impression determines the web-based survey response rate.

### **3.3.6 Access control**

- Provide a PIN number for limiting access only to authorized users in order to:
  - Prevent duplicates and foreign elements (coverage error).
  - Secure Confidentiality.
  - Let the researcher take control over the access.
- Always password protect web-based surveys: User passwords are necessary to restrict access and uniquely identify web-based survey respondents. Of course, restricting access for a convenience sample does not make sense, so passwords would not be issued in that particular case.
- Ensure that respondents' privacy and their perception of privacy are protected: Because there is the risk that transmissions sent over the Internet may be observed by unauthorized users, all survey data should be encrypted. A message explaining such procedures in a clear way, and displayed just before respondents leave a secure area can alleviate any privacy or security concerns they may have.
- Carefully handle respondents who fail a screening test: Depending on the nature of a survey and the respondent population, access to a web-based questionnaire can be restricted until a respondent has passed the screening questions. 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.

### **3.3.7 Automation**

- Automating a survey instrument provides many important benefits, including conditional branching, error checking and correction, questions search, question sort, calculations, and others.
- Be aware of the burden transferred from the user to the computer in the migration of paper-based surveys to web-based surveys to predict impacts of data collection.
- It may be an issue that users rely too much on the automation and are less likely to detect certain types of errors.