Screen–based Controls (Widgets)

In order to interact with a website, users

usually require the use of screen-based controls (sometimes known as 'widgets'). Besides the pervasive link, commonly used screen-based controls include pushbuttons, radio buttons, check boxes, drop-down lists and entry fields. Designers should ensure that they use familiar widgets in a conventional or commonly-used manner.

When pushbuttons are used, ensure that they look like pushbuttons and that they are clearly labeled. In some cases, the pushbuttons will need to be prioritized to facilitate their proper use.

Radio buttons are used to select from among two or more mutually-exclusive selections. Check boxes should be used to make binary choices, e.g., 'yes' or 'no'. Drop-down lists are generally used to select one item from among many. To speed user performance, show default values when appropriate, and do not limit the number of viewable list box options.

Entry fields are used when filling-out forms and entering text into search boxes. Designers should try to minimize the amount of information entered by users. Each entry field should be clearly and consistently labeled, with the labels placed close to the entry fields. Designers should also clearly distinguish between "required" and "optional" data entry fields, and attempt to minimize the use of the Shift key.

To facilitate fast entry of information, designers should automatically place the cursor in the first data entry field, provide labels for each field (e.g., pounds, miles, etc.), and provide auto-tabbing functionality. In order to increase accuracy of data entry, partition long data items into smaller units, enable the software to automatically detect errors, and do not require case-sensitive data entries. Showing users their data entries can increase accuracy. For experienced users, the fastest possible entry of information will come from allowing users to use entry fields instead of selecting from list boxes.

Guideline: Distinguish clearly and consistently between required and optional data entry fields.

Relative Importance:
①②③④⑤

Strength of Evidence:
①②③○○

Comments: Users should be able to easily determine which data entry fields are required and which are optional. Many websites are currently using an asterisk in front of the label for required fields. Other sites are adding the word "required" near the label. One study found that bolded text is preferred when compared to the use of chevrons (>>>), checkmarks, or color to indicate required fields.

Sources: Bailey, 1996; Fowler, 1998; Morrell, et al., 2002; Tullis and Pons, 1997.

Example:

Asterisks (*) and labeling data entry field names with "(required)" are two popular and effective methods of distinguishing between optional and required data entry fields.

13:2 Detect Errors Automatically

13:3 Minimize User Data Entry

Relative Importance:
①②③④⑤

Strength of Evidence:
①②③○○

Guideline: Use the computer to detect errors made by users.
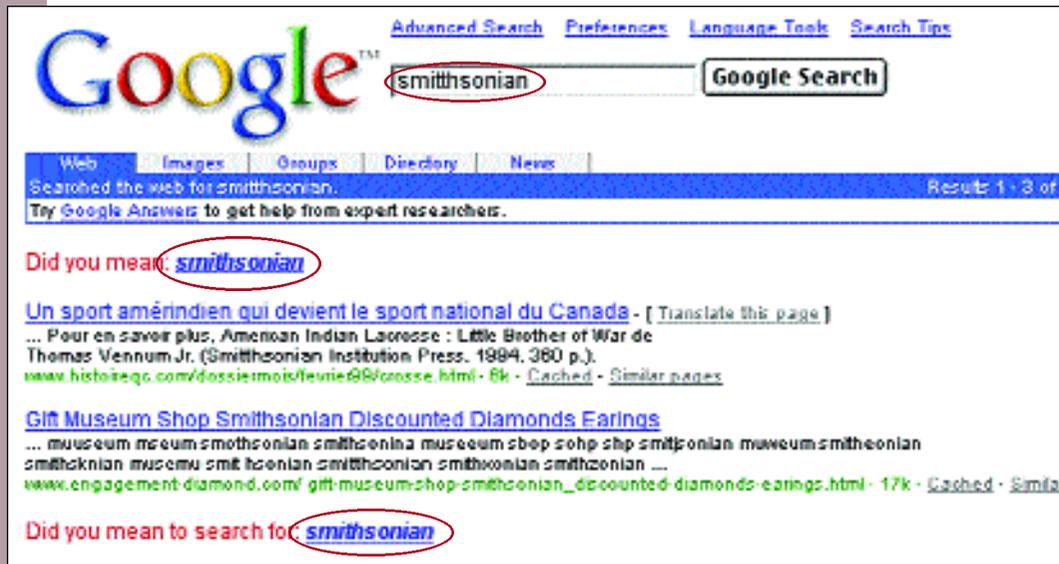
Comments: Do not expect users to make correct entries. Anticipate possible user errors and allocate responsibility to the computer to identify these mistakes and suggest corrections. For example, if a date is entered as "February 31," the computer should generate an error message asking for a revised entry. Some user entries may not need checking, or may not be amenable to computer checking.

Sources: Bailey, 1983; Pew and Rollins, 1975; Smith and Mosier, 1986.

Example:

Relative Importance:
①②③④⑤

Strength of Evidence:
①②③○○

Guideline: Do not require users to enter the same information more than once.

Comments: Requiring re-entry of data imposes an additional task on users, and increases the possibility of entry errors. When entries made by users on one page are required on another page, the computer should retrieve the original entries, rather than requiring re-entry of the same information. In general, require users to make as few entries as possible.

Sources: Czaja and Sharit, 1997; Smith and Mosier, 1986; Zimmerman, et al., 2002.

Example:

Clicking this button will prompt the server to copy information from the "Billing Address" column to the "Shipping Address" column, thus eliminating the need for users to re-input the data (if it is the same).

This website minimizes user data entry by remembering IDs.

See page xxi for detailed descriptions of the rating scales
①②③④○

13:4 Label Data Entry Fields Clearly

Relative Importance:
①②③④⑤

Strength of Evidence:
①②③○○

Guideline: Display an associated label for each data entry field to help users understand what entries are desired.

Comments: Employ descriptive labels that clearly, concisely and unambiguously define the required entry. Make labels distinct enough so that readers do not confuse them with the data entries themselves. This can be done by bolding the labels or providing other visual cues such as an asterisk.

Do not create new jargon when labeling data entry fields. Use common terms (e.g., male, female) rather than arbitrary labels (e.g., Group 1, Group 2). If the meaning of a proposed label is in doubt, conduct usability testing with an appropriate sample of qualified users.

Sources: Pew and Rollins, 1975; Smith and Mosier, 1986.

Example:

A good design—
Each data entry field has an associated descriptive label.

See page xxi
for detailed descriptions
of the rating scales
①②③④○

13:5 Put Labels Close to Data Entry Fields

Relative Importance:
①②③④⑤

Strength of Evidence:
①②○○○

Guideline: Ensure that labels are close enough to their associated data entry fields so that users will recognize the label as describing the data entry field.

Comments: All labels and related information should be close to the data entry field to enable users to easily relate the label and entries required.

Sources: Engel and Granda, 1975; Evans, 1998; Galitz, 2002; Smith and Mosier, 1986.

Example:

Placing labels very close to the data entry fields allows users to rapidly relate the label and the required entries.

Placing labels away from the data entry field slows users' entry rates.

13:6 Label Pushbuttons Clearly

Relative Importance:
①②③④○

Strength of Evidence:
①②○○○

Guideline: Ensure that a pushbutton's label clearly indicates its action.

Comments: The label of a pushbutton should clearly indicate the action that will be applied when the pushbutton is clicked. Common pushbutton labels include "Update," "Go," "Submit," "Cancel," "Enter," "Home," "Next," "Previous."

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995.

Example:

Effective use of short phrases leaves no doubt in the user's mind as to what will happen when the pushbutton is clicked.

13:7 Label Data Entry Fields Consistently

Relative Importance:
①②③④○

Strength of Evidence:
①②③○○

Guideline: Ensure that data entry labels are worded consistently, so that the same data item is given the same label if it appears on different pages.

Comments: If possible, employ consistent labeling conventions. For example, do not use single words or phrases for some labels and short sentences for others, or use verbs for some and nouns for others.

Sources: Evans, 1998; Mahajan and Shneiderman, 1997; Smith and Mosier, 1986.

13:8 Allow Users to See Their Entered Data

Relative Importance:
①②③④○

Strength of Evidence:
①②③○○

Guideline: Create data entry fields that are large enough to show all of the entered data without scrolling.

Comments: Users should be able to see their entire entry at one time. There always will be some users who will enter more data than can be seen without scrolling; however, try to minimize the need to scroll or move the cursor to see all the data for that field. If there is a character limit for a particular field, state that near the entry field.

Sources: Bailey, 1996; Czaja and Sharit, 1997; Fowler, 1998.

Example:

Text box expands vertically so that a user can see even very-long entries without having to scroll horizontally.

Data entry fields should be wide enough so that the user can see their entire entry without scrolling.

13:9 Display Default Values

Relative Importance:
① ② ③ ④ ○

Strength of Evidence:
① ② ○ ○ ○

Guideline: Display default values whenever a likely default choice can be defined.

Comments: When likely default values can be defined, offer those values to speed data entry. The initial or default item could be the most frequently selected item or the last item selected by that user. In general, do not use the default position to display a heading or label for that widget.

Sources: Ahlstrom and Longo, 2001; Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995; Smith and Mosier, 1986.

Example:

Title	Item	Quantity	Unit Price	Delete?
2002 IRS Tax CD-ROM.	IRS2002PUB1796A*CD	1	$22.00	☐
		SubTotal:	$22.00	

Continue Shopping   Update Basket   Clear Basket

The National Park Service
Reservation Center

You may select a Park from the drop down list or simply click on the appropriate spot on the map.

Acadia National Park

Select Park

Please review all messages and information provided below. It is important that you read and understand this information prior to completing your reservation.

Once you have read all the campground information, select your equipment type and desired arrival date using the appropriate drop down lists. Click on the **CHECK AVAILABILITY** button to continue.

LOOP A (2003)
ASSATEAGUE STATE PARK

Equipment Type : One Tent
Check In Date : 01-May-2003

Check Availability

13:10 Use a Minimum of Two Radio Buttons

Relative Importance:
① ② ③ ④ ○

Strength of Evidence:
① ② ○ ○ ○

Guideline: Never use one radio button alone.

Comments: Use at least two radio buttons together. If users can choose not to activate any of the radio button choices, provide a choice labeled "None."

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995.

13:11 Use Radio Buttons for Mutually Exclusive Selections

Relative Importance:
① ② ③ ○ ○

Strength of Evidence:
① ② ③ ④ ○

Guideline: Provide radio buttons when users need to choose one response from a list of mutually exclusive options.

Comments: Radio buttons should be used when there is a need to select from among mutually exclusive items. Users should be able to click on the button or its text label to make their selection. Assign one of the radio button choices as the default when appropriate. One study reported that for making mutually exclusive selections, radio buttons elicit reliably better performance than drop-down lists. Radio buttons are also preferred over both open lists and drop-down lists.

Sources: Bailey, 1983; Bailey, 1996; Fowler, 1998; Galitz, 2002; Johnsgard, et al., 1995; Marcus, Smilonich and Thompson, 1995; Tullis and Kodimer, 1992.

Example:

If a user must be constrained to selecting one item in a list, employ radio buttons rather than check boxes.

When you use the U.S. Department of Education's (ED
(Please check only one)
○ Student
◉ Teacher
○ Education administrator or manager
○ Parent or family member
○ Researcher or analyst
○ Policy maker or legislator
○ Librarian
○ Writer or reporter
○ Other *(please specify)* |_____|

See page xxi for detailed descriptions of the rating scales
① ② ③ ④ ○

13:12 Use Check Boxes to Enable Multiple Selections

Guideline: Use a check box control to allow users to select one or more items from a list of possible choices.

Relative Importance:
①②③○○

Strength of Evidence:
①②③○○

Comments: Each check box should be able to be selected independently of all other check boxes. One study showed that for making multiple selections from a list of non-mutually exclusive items, check boxes elicit the fastest performance and are preferred over all other widgets. Users should be able to click on either the box or the text label.

Sources: Bailey, 1996; Fowler, 1998; Galitz, 2002; Johnsgard, et al., 1995; Marcus, Smilonich and Thompson, 1995.

Example:

Check boxes are most appropriately used in these examples because users may wish to order more than one product or select more than one file format—convention dictates that check boxes be used when more than one item in a list may be selected.

Media Type: ☑ DVD
☐ CD-ROM 1
☐ CD-ROM 2
☑ CD-ROM 3
☐ CD-ROM 4
☑ CD-ROM 5
☐ 8mm high density tar tape

Total cost of selections: $

We want to provide information in for_____ue: us understand how you prefer to use information and in what formats.

a. Short documents

How do you prefer to use short documents? *(Please check all that apply)*
☐ View/read online
☐ Download to view offline
☐ Download to print
☐ Download to edit or manipulate
What file format(s) do you prefer? *(Please check all that apply)*
☐ Hypertext markup language (.html)
☐ Plain ASCII text (.txt)
☐ Adobe Acrobat (.pdf)
☐ Compressed file (.zip)
☐ Other *(please specify)*

13:13 Use Familiar Widgets

Guideline: Use widgets that are familiar to your users and employ them in their commonly used manner.

Relative Importance:
①②③○○

Strength of Evidence:
①②③○○

Comments: Do not assume that all users are familiar with all available widgets. Unfamiliar widgets will slow some users, and cause others to not use the widget because they do not know how to make it work properly. For instance, one study showed that some users, particularly older users, do not know how to use a drop-down list box.

In choosing widgets, designers typically consider such issues as the amount of available screen "real estate," reducing the number of user clicks, and whether the user will be choosing one from among many items, or several items at once. Usability test the performance and acceptability of widgets to ensure they do not confuse or slow users.

Sources: Bailey, Koyani and Nall, 2000; Nall, Koyani and Lafond, 2001.

Example:

The circled widget is used in an unconventional manner. Users might expect this widget to be a text entry box. However, when a user places their cursor in the entry area, it invokes the linked text in the box at left from which the user must select the car type. A drop-down box would be a more suitable widget.

Users do not expect radio buttons to be used in this manner.

See page xxi for detailed descriptions of the rating scales
①②③④○

13:14 Use a Single Data Entry Method

Relative Importance:
①②③○○

Strength of Evidence:
①②③④○

Guideline: Design data entry transactions so that users can stay with one entry method as long as possible.

Comments: Do not have users shift back and forth between data entry methods. Requiring users to make numerous shifts from keyboard to mouse to keyboard can substantially slow their entry speed.

Sources: Czaja and Sharit, 1997; Engel and Granda, 1975; Foley and Wallace, 1974; Smith and Mosier, 1986.

Example: In this example, data entry methods are used consistently so that users do not have to shift back and forth between mouse entry and keyboard entry.

This design forces users to switch between keyboard entry and mouse entry methods, and will slow the user's data entry task.

13:15 Partition Long Data Items

Relative Importance:
①②③○○

Strength of Evidence:
①②○○○

Guideline: Partition long data items into shorter sections for both data entry and data display.

Comments: Partitioning long data items can aid users in detecting entry errors, and can reduce erroneous entries. For example, it is easier to enter and verify a ten digit telephone number when entered as three groups, NNN-NNN-NNNN. Similarly, ZIP+4 codes and social security numbers are best partitioned.

Sources: Mayhew, 1992; Smith and Mosier, 1986.

Example: The "Phone Number" entry field is partitioned correctly. However, the "ZIP+4" field should be broken out into two fields (one 5 digits long, and one 4 digits long, separated by a hyphen).

See page xxi
for detailed descriptions
of the rating scales
①②③④○

13:16 Do Not Make User-Entered Codes Case Sensitive

Guideline: Treat upper- and lowercase letters as equivalent when users are entering codes.

Relative Importance:
①②③○○

Strength of Evidence:
①②○○○

Comments: Do not make user-entered codes case sensitive unless there is a valid reason for doing so (such as increased security of passwords). If required, clearly inform users if they must enter codes in a case specific manner. When retaining data entered by users, show the data as it was entered by the user.

Sources: Ahlstrom and Longo, 2001; Smith and Mosier, 1986.

13:17 Place Cursor in First Data Entry Field

Guideline: Place (automatically) a blinking cursor at the beginning of the first data entry field when a data entry form is displayed on a page.

Relative Importance:
①②③○○

Strength of Evidence:
①②○○○

Comments: Users should not be required to move the mouse pointer to the first data entry field and click on the mouse button to activate the field. Designers should consider, however, that programming this automatic cursor placement might negatively impact the performance of screen reader software.

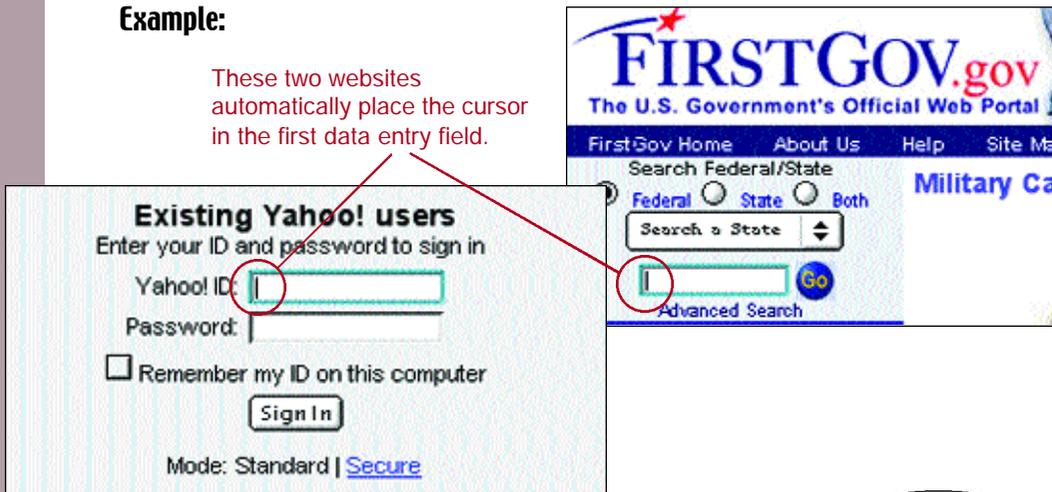**Sources:** Ahlstrom and Longo, 2001; Smith and Mosier, 1986.

Example:

These two websites automatically place the cursor in the first data entry field.

13:18 Provide Auto-tabbing Functionality

Guideline: Provide auto-tabbing functionality for frequent users with advanced Web interaction skills.

Relative Importance:
①②③○○

Strength of Evidence:
①②③○○

Comments: Auto-tabbing can significantly reduce data entry times for frequent users by not requiring them to manually tab from field to field.

Sources: Ahlstrom and Longo, 2001; Pew and Rollins, 1975; Smith and Mosier, 1986.

13:19 Label Units of Measurement

Relative Importance:
①②③○○

Strength of Evidence:
①②③○○

Guideline: When using data entry fields, specify the desired measurement units with the field labels rather than requiring users to enter them.

Comments: Designers should include units such as minutes, ounces, or centimeters, etc. as part of the data entry field label. This will reduce the number of keystrokes required of users (speeding the data entry process), and reduce the chance of errors.

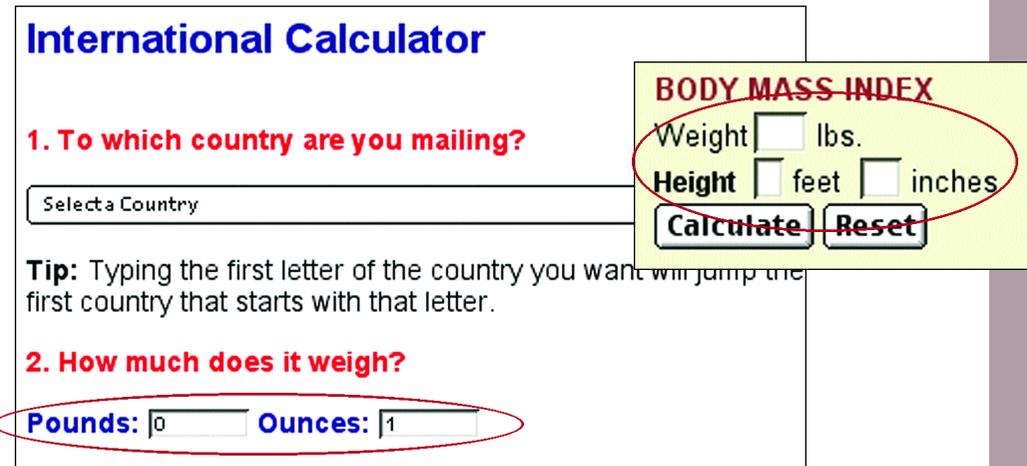**Sources:** Pew and Rollins, 1975; Smith and Mosier, 1986.

Example:

13:20 Ensure that Double-Clicking Will Not Cause Problems

Guideline: Ensure that double-clicking on a link will not cause undesirable or confusing results.

Relative Importance:
①②③〇〇

Strength of Evidence:
①②〇〇〇

Comments: Many users double-click on a link when only one click is needed. Developers cannot stop users from double-clicking, but they should try to reduce the negative consequences of this behavior. Usability testing has indicated that if users start with quick double-clicks, they tend to continue to do this for most of the test. Sometimes, when both clicks are detected by the computer, the first click selects one link and the second click selects a second link, causing unexpected (i.e., puzzling) results.

Sources: Bailey, Koyani and Nall, 2000; Fakun and Greenough, 2002.

13:21 Do Not Limit Viewable List Box Options

Guideline: When using open lists, show as many options as possible.

Relative Importance:
①②〇〇〇

Strength of Evidence:
①②③〇〇

Comments: Scrolling to find an item in a list box can take extra time. In one study, an open list that showed only three (of five) options was used. To see the hidden two items, users had to scroll. The need to scroll was not obvious to users who were not familiar with list boxes, and slowed down those that did know to scroll.

Sources: Bailey, Koyani and Nall, 2000; Zimmerman, et al., 2002.

Example:

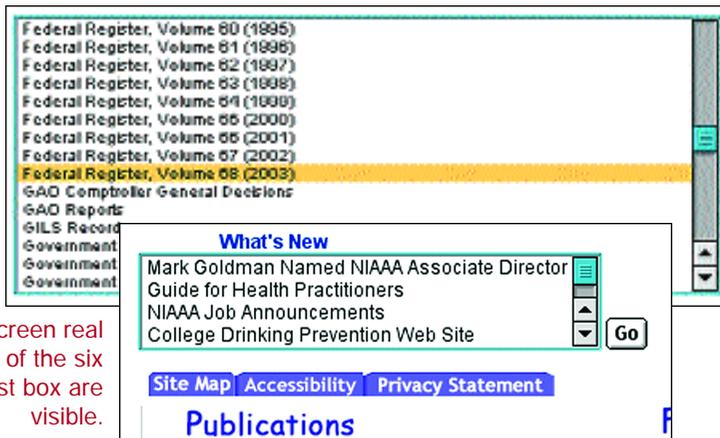This open list shows as many options as possible given the amount of available screen real estate.

Despite plenty of screen real estate, only four of the six items in this list box are visible.

13:22 Use Open Lists to Select One from Many

Guideline: Use open lists rather than drop-down (pull-down) lists to select one from many.

Relative Importance:
①②〇〇〇

Strength of Evidence:
①②〇〇〇

Comments: Generally, the more items users can see in a list (without scrolling), the faster their responses will be, and the fewer omission errors they will make. Ideally, users should be able to see all available items without scrolling.

When compared with drop-down lists, open lists tend to elicit faster performance primarily because drop-down lists require an extra click to open. However, if a list is extremely long, a drop-down list may be better. The available research does not indicate the upper number limit of items that should be displayed in a list.

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995.

Example:

In this example, the designers opted to use a drop-down list to conserve screen real estate. This is a trade-off, however, as a drop-down list will slow users when compared with an open list.

13:23 Prioritize Pushbuttons

Relative Importance:
❶❷◯◯◯

Strength of Evidence:
❶❷◯◯◯

Guideline: Use location and highlighting to prioritize pushbuttons.

Comments: If one pushbutton in a group of pushbuttons is used more frequently than the others, put that button in the first position. Also make the most frequently used button the default action, i.e., that which is activated when users press the Enter key.

Sources: Bailey, 1996; Fowler, 1998; Marcus, Smilonich and Thompson, 1995.

Example:

The "Search" button is placed in the first position.

The Library of Congress

THOMAS
Legislative Information on the Internet

In the Spirit of Thomas Jefferson, a service of The Library of Congress

Congress Now: House Floor This Week | House Floor Now | Senate Schedule

Search Bill Text 108th Congress (2003-2004):
Bill Number [ ] Word/Phrase [ ] [Search] [Clear]

Quick Links: House | House Clerk | House Directory | Senate | Senate Directory | GPO

LINKS	LEGISLATION	CONGRESSIONAL RECORD	COMMITTEE INFORMATION
About THOMAS	Bill Summary & Status 93rd - 108th	This Congress by Date	Committee Reports 104th - 108th
THOMAS FAQ		Text Search 101st - 108th	
Congress & Legislative Agencies	Bill Text 101st - 108th		House Committees Homepages
How Congress Makes Laws: House	Senate	Public Laws 93rd - 108th	Index 104th - 108th	Senate Committees Homepages
		Roll Call Votes 101st - 108th	

See page xxi for detailed descriptions of the rating scales
❶❷❸❹◯

13:24 Minimize Use of the Shift Key

Relative Importance:
❶◯◯◯◯

Strength of Evidence:
❶❷❸❹◯

Guideline: Design data entry transactions to minimize use of the Shift key.

Comments: If possible, designers should not require users to enter characters that require the use the Shift key. Using the Shift key imposes a demand for extra user attention and time. For example, the designer can include symbols such as the dollar or percent sign near data entry fields rather than requiring users to enter those characters. Designers also can treat upper- and lowercases as equivalent when entered by users.

Sources: Card, Moran and Newell, 1980b; John, 1996; Smith and Mosier, 1986.
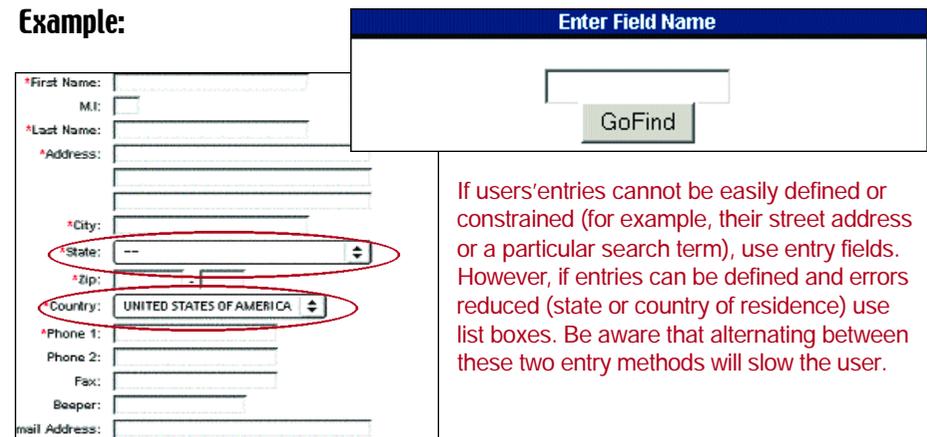
13:25 Use Data Entry Fields to Speed Performance

Guideline: Require users to enter information using data entry fields (instead of selecting from list boxes) if you are designing to speed human performance.

Relative Importance:
❶◯◯◯◯

Strength of Evidence:
❶❷❸❹❺

Comments: At least two studies have compared the effectiveness of text entry versus selection (list boxes) for entering dates and making airline reservations. Both studies found text entry methods were faster and preferred over all other methods. However, use of text entry fields tends to elicit more errors.

Sources: Bailey, 1996; Czaja and Sharit, 1997; Fowler, 1998; Gould, et al., 1988; Gould, et al., 1989; Greene, et al., 1988; Greene, et al., 1992; Marcus, Smilonich and Thompson, 1995; Tullis and Kodimer, 1992.

Example:

Enter Field Name
[ ] [GoFind]

*First Name: [ ]
M.I.: [ ]
*Last Name: [ ]
*Address: [ ]
[ ]
*City: [ ]
*State: [--]
*Zip: [ ] - [ ]
*Country: [UNITED STATES OF AMERICA]
*Phone 1: [ ]
Phone 2: [ ]
Fax: [ ]
Beeper: [ ]
mail Address: [ ]

If users'entries cannot be easily defined or constrained (for example, their street address or a particular search term), use entry fields. However, if entries can be defined and errors reduced (state or country of residence) use list boxes. Be aware that alternating between these two entry methods will slow the user.