

# A Questionnaire Guide to Web Accessibility

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## 1. An Approach to Achieving Web Instrument Accessibility

Statistical agencies around the world are required to field accessible web survey instruments. While there are general web accessibility standards (such as the US Section 508), there is little guidance on what accessibility means for a complex web questionnaire. Complicating the situation is that the people who produce these elaborate web survey instruments may not have adequate knowledge of accessibility issues.

While this paper uses the term 'accessibility', of equal importance is that the web survey instrument be understandable and useable for a blind user with a screen reader. 'Accessibility' encompasses many disabilities besides blindness such as other visual deficiencies, motor, hearing, and cognitive disabilities (Brenner 2013). It is possible that a web survey is technically accessible but not understandable and useable to people using screen readers and other assistive technologies. This paper concentrates on web-survey accessibility for the blind.

Most example screens used in this document are based on real-life examples from surveys worked on by the author. For many of the screens there was considerable discussion and experimentation with clients, study directors, specification writers, and programmers about the best way to **visually** display the survey concepts. This paper proposes ways in which these screens can also be portrayed, **aurally** and **linearly**, to the screen-reading user. This work is preliminary. The improvements to Blaise IS, while profound and well executed, have been made too recently to test these suggestions. This paper has a few goals:

- Describe some important Blaise IS accessibility features.
- Motivate organizations to take up and complete this work; that is, produce a standard set of guidelines for web survey accessibility which people can use to judge their instrument's web accessibility and usability for complex screens. This standard would be based on model questions and screens and would suggest ways that each kind of screen can achieve accessibility.
- Compare and contrast visual web design versus aural web design for complex screens.
- Find ways to make one instrument design work for both sighted and blind users.
- Give information for Blaise 5 screen accessibility requirements.

### 1.1 Acknowledgements

The Blaise Team underwrote the hours spent on this research and writing and improved Blaise IS accessibility. Tim Carati of the Blaise Team provided technical help and gave many key insights and explanations. MMP Survey Services, LLC paid for a JAWS license, wrote two example datamodels, tested, and suggested improvements.

Most examples are from the author's work at Mathematica Policy Research, Inc. (MPR) and include screens from the National Survey of Recent College Graduates (sponsored by the National Science Foundation) and the Kauffman Firm Survey (sponsored by the Kauffman Foundation). Additionally, most screens in this document use MPR web survey standards, sometimes with adaptations to illustrate a point. Two screens are from University of Michigan Survey Research Center Web Survey Guidelines. The author thanks all three organizations for their help and their permission to use their example screens. Larry Malakhoff of the US Census Bureau hosted me for several hours a few years ago and showed me many things regarding screen-reader technology, and I thank him for his time and sharing. I also thank Jim O'Reilly of Westat for pursuing accessibility issues with The Blaise Team over the years. Linda

Bandeh of MPR, Karen Brenner of Westat, Larry Malakhoff of the US Census Bureau, Tim Carati of Statistics Netherlands, and Esme Pierzchala (daughter) reviewed a late version of this paper and provided key comments. For two of them, I lifted text right out of their emails and plopped it in with attribution. I am grateful to all four reviewers.

## 1.2 Important Blaise Accessibility Features

☞ Important Blaise Accessibility features are marked with a pointed finger.

## 2. Blaise IS Model Instruments

Two Blaise IS model instruments were created to illustrate model screens. These are now part of the Blaise 4.8.4 distribution under the Samples\Internet\Interview\BISAccessibility folder. These two instruments are called Forms and Grids. Both datamodels illustrate issues with multiple items per page.

- The Forms screens either have single items or have two or more related items. For multi-item screens, the user must understand the whole screen and how its items express a survey concept when combined. Examples in sections 3.1 and 3.2 are from the Forms datamodel.
- The Grids screens are tabular screens. These screens have several or many items. For example, there is a household roster grid and business related grids. Examples given in Section 3.3 are from the Grids datamodel.

## 3. Visual versus Spoken Experience

Sighted web-survey users have several means to understand complex screens.

- They can assess the screen as a whole, and study its parts in any order.
- They can take the time to study a screen, and all items on the screen, to understand how the items relate to one another and how they together express a survey concept.
- They can see visual cues such as question formats, indentations, colors and shadings, text that can be bolded, underscored, or italicized, indentations, and grid lines to organize the page.

Blind users rely on screen readers that read the underlying HTML of a web screen.

- A screen reader proceeds linearly through a web screen from left to right and from top to bottom.
- Blind users have to build up a mental image of the screen in order to understand the screen.
- While users can dictate the rate of reading, back-up, and fast forward, this navigational ability does not approach that of sighted users.

Computer users who make use of screen readers have many options they can set in order to make the screen reader behave the way they desire. This includes how much is read from Windows, the rate of speech, the way the voice is synthesized, and so forth. Examine the following from Figure 18a below.

**“How many children who live with you as part of your family are . . .”**

On one of my computers the screen reader will read the ellipses at the end as **“dot dot dot”**. On the other computer these periods are ignored. This is due to different setting levels between the computers. On a practical level, the web-survey producers cannot assume anything about screen reader configuration. This is a personal choice by the blind user and this configuration choice must be honored.

Screen-reading technology makes websites accessible with varying degrees of success depending on the website. It is up to web survey producers to field web survey screens that can be understood well enough to be useful to the blind respondent through the use of a screen reader.

In the following discussion, the term 'item' refers to a place where a value must be entered. An item may be a question or it may be part of a question. This distinction is important because a screen reader operates on the level of an item. That is, it stops at an item and waits for an answer from the user.

### 3.1 Single-Item Examples

Figure 1 and Speech Listing 1 illustrate differences in question presentation, for a simple single-item, between sighted and blind users. In Figure 1, the visual presentation, bolded text is question text while underscore clarifies the intent of the question. Unbolded italicized text is an instruction and unbolded plain text is for answer choices. Speech Listing 1 gives verbatim text expressed by the screen reader.

**Figure 1: Item showing the Uses of Visual Screen Standards**

**What is the highest level of education you have attained?**

*Choose one answer.*

- Elementary school
- Some high school
- Graduated high school
- Some college
- Graduated college
- Some graduate school
- Masters or higher degree

#### **Speech Listing 1: Text read by the Screen Reader**

**"What is the highest level of education you have attained? Choose one answer. Elementary school radio button not checked."**

☞ The question text is read only at the first choice.

The screen reader says words one after another without stopping. It does not differentiate bolded, underscored or italicized text. It reads the text of the first radio button and indicates that the cursor has landed on a radio button question, and that this first option has not been chosen. Then it stops. By context, the user can guess that there are additional choices and would know to use arrow keys to navigate the list. On the other hand, the screen reader gives no idea of how many choices there are. The sighted user can immediately spot the appropriate choice and can use the mouse to check it. The blind user must listen to each choice in turn. (Note: If any of the choices has already been checked, Blaise IS focuses that choice.)

For this question, the instruction is superfluous for both kinds of users. Note that the instruction intrudes between the question and the answer choices. For some questions, for a blind user, this placement may get in the way of understanding the question. On other questions however, the instruction is useful or necessary.

Figure 2 shows a similar construction but with a much longer list of choices. Speech Listing 2 gives the text that the screen reader expresses.

## Figure 2: A Radio-Button Item with many Choices

**We need to assign a standardized educational code to the field of study you just listed.**

*From the list below, please select one category that best describes the field of study for this degree.*

- Agricultural Sciences
- Biological or Life Sciences
- Business Management and Administrative Sciences
- Computer and Information Sciences
- Conservation and Natural Resources
- Education
- Engineering and Engineering-Related Technologies
- Health and Related Sciences
- Languages, Linguistics, Literature or Letters
- Liberal Arts or General Studies
- Library Science
- Mathematics and Statistics
- Physical Sciences
- Philosophy, Religion or Theology
- Psychology
- Social Sciences or History
- Social Work
- Visual or Performing Arts, or
- OTHER Field Not Listed

### Speech Listing 2:

**"We need to assign a standardized educational code to the field of study you just listed. From the list below, please select one category that best describes the field of study for this degree. There are 19 categories in alphabetical order. Agricultural Sciences radio button not checked."**

The shaded text in Listing 2 is additional instruction text that is available only to the screen reader. This additional text is in the source code. The idea is to give the blind user an idea of the size and organization of the list. This speech-only text is given in the same spirit as the underscored text or instruction text is given for the sighted user.

☞ The hidden text is produced by using a text font color that matches the color of the screen. This is an implementation feature by the author. It may or may not be a good idea.

Figures 3 and 4 show some clarification text inserted for both sighted and blind users. The second *Name* field in Figure 3a indicates the field length. Figure 3b and Speech Listing 3b shows why this is necessary for blind users.

### Figure 3a: Name Field with and without Instruction Text

**What is your name?**

Name

**What is your name?**

*Please type up to 20 characters.*

Name

In Figure 3b below, when trying to type the name **Mark Matthew Joseph Pierzchala**, the sighted user can see that no text past the third name can be typed. However, the speech reader does not (or may not) indicate that the text limit has been reached and it keeps reading the text the user is typing past the 20

characters. The blind user may think that the whole 4-part name has been typed (which it has been) and stored (which it has not been).

**Figure 3b: Typing a Name with more than 20 Characters**

**What is your name?**

*Please type up to 20 characters.*

Name  ×

**Speech Listing 3b: Speech Expressed while the User types a Long Name**

"M a r k space M a t t h e w space J o s e p h space P i e r z c h a l a"

The top question of Figure 4 illustrates a traditional method of presenting an open question where the typed answer can be many words. To the sighted user, the size of the box indicates that a long answer is invited. The screen reader, on the other hand, does not relate this information to the blind user.

The second open question contains part of an instruction. Speech Listing 4 shows shaded text which is spoken but not seen. This is given since the mouse is not useful to the blind user and since the Enter key just starts a new paragraph in the text box.

**Figure 4: Providing instructions to Sighted and Blind Users**

**Please state how the accident happened.**

**Please state how the accident happened.**

*You can type up to several paragraphs.*

**Speech Listing 4: Second Open Question**

"Please state how the accident happened. You can type up to several paragraphs. **Press the Tab key to leave the question.**"

This instruction text could be provided to the sighted user too.

Figure 5a shows 2 examples from the University of Michigan Survey Research Center.

## Figure 5a: Dollar and Percent Questions

### What was your household income in 2010?

*Enter to the nearest dollar.*

\$  .00

**By this time next year, what is the percent chance that the value of your home will have GONE UP by more than 10 PERCENT compared to what it is worth today?**

*Enter a number between 0 and 100.*

%

These examples contain symbols to the left and right of the data entry box that help clarify, to the sighted user, the kind of answer that is requested. Speech Listing 5a lists the first question, the answer to the first question, and the second question. Note that the speech reader stops after the \$ until the user enters a number. Then it continues, but with "dot 00" before it begins reading the next question (see shaded text).

### Speech Listing 5a:

Screen reader from screen: "What was your household income in 2010? Enter to the nearest dollar."

Screen reader from user data entry: "45000"

Screen reader from screen: ".dot 00 By this time next year, what is the percent chance that the value of your house will have gone up by more than 10 percent compared to what it is worth today? Enter a number between 0 and 100 dot."

Both displays in Figure 5a are achieved through the use of multicolumn groups in Blaise IS. The .00 in Figure 5b and the % in Figure 5c are auxfields called *Cents* and *Percent* respectively. The \$ before the box in Figure 5b is description text associated with the field *HHIncome*. This is not read by the screen reader. Despite the fact that these symbols are not timely read, the instructions give the needed clarity.

### Figure 5b: Dollar Question in a Multicolumn Group

*Enter to the nearest dollar.*

\$   ← Auxfield Cents

### Figure 5c: Percent Question in a Multicolumn Group

*Enter a number between 0 and 100.*

← Auxfield Percent

(Note: There are ways to stop the screen reader from reading the .00; for example, this text could be implemented as a field description instead of field text. This example thus serves as a caution as to the kind of testing that is needed to correctly implement these constructions.)

## 3.2 Multiple Item Examples

The following examples show 2 or more items on a screen. These are further subdivided into (1) related items forming a question, (2) answer one item or another, (3) forms, and (4) juxtaposition of items.

### 3.2.1 Related Items Forming a Question

Some questions consist of two or more items. Examples include further-detail, other-specify, quantity-unit, phone number, date, and time questions. Figure 6a shows a further-detail question. The question first classifies an employer at a high level then refines the classification with the second question.

**Figure 6a: A Further-Detail Question**

**B 11. Which of the following best describes your principal employer during the week of April 1, 2006?  
Were you ...**

- Self employed or a business owner
- A private-sector employee
- A government employee
- Another type of employee

**Were you ...**

- In a local government (e.g., city, county, school district)
- In a state government (including state colleges/universities)
- In the U.S. military service, active duty or Commissioned Corps (e.g., USPHS, NOAA)
- In the U.S. government (e.g., civilian employee)

*Annotations:*  
Once this option is chosen, (points to 'A government employee')  
This further-detail item appears (points to the second question)

Contrast this web layout, optimized for a screen reader, with the original paper version of the question in Figure 6b. The high-level choices in Figure 6a are interspersed with the lower level choices on paper in Figure 6b. While a web survey could visually implement this question in the same format, it is hard to see how a screen reader could faithfully translate the question's intent. Interestingly, but not surprisingly, the question format of Figure 6a above also proved optimal for the telephone survey version of the questionnaire.

☞ The first question is marked as a critical question in Blaise IS so the next question appears quickly.

**Figure 6b: The Original Paper Format of the Further-Detail Question**

**B11. Which one of the following best describes your principal employer during the week of April 1, 2006? Were you...**

*Mark one answer.*

SELF-EMPLOYED or a BUSINESS OWNER

- 1  In a non-incorporated business, professional practice, or farm
- 2  In an incorporated business, professional practice, or farm

PRIVATE SECTOR employee

- 3  In a for-profit company or organization
- 4  In a non-profit organization (including tax-exempt and charitable organizations)

GOVERNMENT employee

- 5  In a local government (e.g., city, county, school district)
- 6  In a state government (including state colleges/universities)
- 7  In the U.S. military service, active duty or Commissioned Corps (e.g., USPHS, NOAA)
- 8  In the U.S. government (e.g., civilian employee)

OTHER type of employee

- 9  Other – *Specify type of employer*

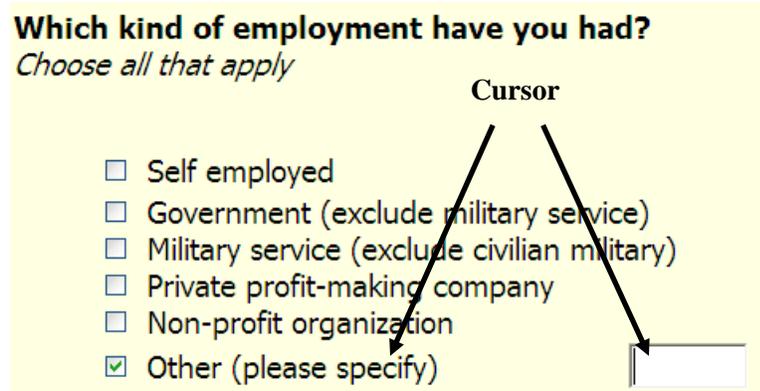
Figure 7 shows an 'other-specify' question consisting of 2 items. The second item, a place to type a text response, is only available if the *Other* choice is checked.

**Figure 7: An Other-Specify Question**

**Which kind of employment have you had?**  
*Choose all that apply*

Cursor

- Self employed
- Government (exclude military service)
- Military service (exclude civilian military)
- Private profit-making company
- Non-profit organization
- Other (please specify)



For the sighted user, the appearance of the box informs that an additional response is needed. For the blind user, prompting text is helpful as shown in Speech Listing 7.

☞ This is an other-specify group in Blaise IS.

### Speech Listing 7: Prompting text for the Specify Item

"Type other kind of employment in 20 characters or less."

Figure 8 shows two ways to implement a quantity-unit question for distance travelled. A helping text is inserted for the screen reader to inform the blind user of the question's two-part nature.

**Figure 8: A Quantity-Unit Question**

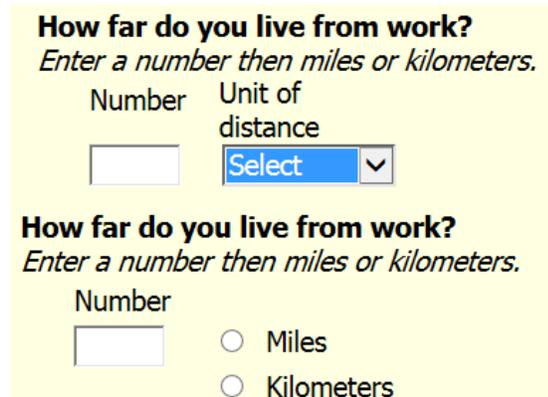
**How far do you live from work?**  
*Enter a number then miles or kilometers.*

|                      |   |
|----------------------|---|
| Number               | Unit of distance                        |
| <input type="text"/> | <input type="button" value="Select"/> ▾ |

**How far do you live from work?**  
*Enter a number then miles or kilometers.*

Number

|                      |                                  |
|----------------------|----------------------------------|
| <input type="text"/> | <input type="radio"/> Miles      |
|                      | <input type="radio"/> Kilometers |



☞ These are multi-column groups in Blaise IS. Special fieldpanes in the mode library help with these displays. These mode libraries are in the sample distribution.

Figure 9 shows a three-part date question. The instruction text is meant for the screen reader.

**Figure 9: A Three-Part Date Question**

**What is the date of your birth?**  
*Please enter month, day, and year starting with month.*

|                                     |                      |                      |
|-------------------------------------|----------------------|----------------------|
| Month                               | Day                  | Year                 |
| <input type="text" value="Select"/> | <input type="text"/> | <input type="text"/> |

Figure 10 shows a three-part time question.

**Figure 10: A Three-Part Time Question**

**What time did you eat this meal?**  
*Please enter hour, minute, and AM or PM starting with the hour.*

|                      |                      |                          |
|----------------------|----------------------|--------------------------|
| Hour                 | Minute               |                          |
| <input type="text"/> | <input type="text"/> | <input type="radio"/> AM |
|                      |                      | <input type="radio"/> PM |

**What time did you eat this meal?**  
*Please enter hour, minute, and AM or PM starting with the hour.*

|                      |                      |                                     |
|----------------------|----------------------|-------------------------------------|
| Hour                 | Minute               | AM or PM                            |
| <input type="text"/> | <input type="text"/> | <input type="text" value="Select"/> |

☞ These are multi-column groups in Blaise IS.

### 3.2.2 Answer One Item or the Other

Figure 11 gives an example where you want the user to enter a phone number with a North American format or a phone with a different format, but not both. In this kind of screen, you can indicate to the blind user that (1) a choice of formats is available and (2) how to get to the second choice.

**Figure 11: Enter a North American or International Phone Number**

**What is the phone number of this contact?**  
*Enter a U S or Canadian phone number starting with the area code, or for an international phone number, tab 3 times.*

|                      |                      |                      |
|----------------------|----------------------|----------------------|
| Area code            | Prefix               | Number               |
| <input type="text"/> | <input type="text"/> | <input type="text"/> |

**OR**

International phone

Figures 12 and 13 show more examples of choices of questions to answer. In Figure 12, the clarifying text is visibly on the screen.

### Figure 12: Enter a Graduation Date or confirm You did not graduate

**A 1. In what year did you receive your high school diploma or equivalency certificate?**  
*If you have neither, skip this question.*

Year (yyyy)

*Check here if you did not finish high school*

In Figure 13, there is a clarifying screen reader instruction, but it is hidden from view.

### Figure 13: Enter a U.S. State or a Canadian Province

**A 2. In what U S state or Canadian province or territory did you attend high school?**

U S state

OR

Canadian province or territory

### Speech Listing 13: Enter a U.S. State or a Canadian Province

"A 2. In what U S state or Canadian province or territory did you attend high school? **Skip the state combo box to enter a Canadian province or territory.**"

### 3.2.3 Forms

Figure 14 gives an example of a data entry form for a name collection. These kinds of screens are probably common enough that it is not necessary to give any special screen-reader instructions.

### Figure 14: A Form for a Name Collection

**Please enter your name in the boxes below.**

Title

First name \*

Middle name

Last name

Suffix

☞ Both examples of forms in this datamodel are achieved with special groups in Blaise IS.

☞ The leading text on the page, "Please enter your name in the boxes below." is text associated with an auxfield. The screen reader will read this text first then proceed to the text for each box in turn.

### 3.2.4 Juxtaposition

Juxtaposition is the practice of putting two similar items on the same web screen as a way to help the sighted user distinguish between them. Figures 15 and 16 below use juxtaposition.

The items in Figure 15 were originally placed one web page after another, but the questions are so visually similar, users could think they were answering the same question twice. The same-page layout clarified that situation. Additional text for the screen reader attempts to communicate this juxtaposition to the blind user (Screen Listing 15).

**Figure 15: Juxtaposition of Parents' Educational Achievement**

**What is the highest level of education your mother or female guardian achieved?**

- Elementary school
- Some high school
- Graduated high school
- Some college
- Graduated college
- Some graduate school
- Masters or higher degree
- Not applicable

**What is the highest level of education your father or male guardian achieved?**

- Elementary school
- Some high school
- Graduated high school
- Some college
- Graduated college
- Some graduate school
- Masters or higher degree
- Not applicable

### Screen Listing 15: Two Similar Items on the Same Page

**"There are two questions on this screen. The first is about your mother or female guardian and the second is about your father or male guardian. What is the highest level of education your mother or female guardian achieved? Elementary school radio button not checked. To change the selection press up or down arrow."**

The items in Figure 16 were placed side-by-side in order to help communicate to the user how the answers to the items should relate to one another. The arrangement helps to communicate a before-and-after relationship.

**Figure 16: Juxtaposition of Money Borrowed and Money still Owed**

**The first question asks about the TOTAL amount you have borrowed to finance undergraduate degrees you completed before October 1, 2010, and the second asks how much you still owed as of October 1, 2010.**

|  |   |
|--|---|
| <b>Total Amount Borrowed</b>   | <b>Amount Still Owed as of October 1, 2010</b>            |
| <input checked="" type="radio"/> Did not earn a degree at this level | <input type="radio"/> Did not earn a degree at this level |
| <input type="radio"/> None   | <input type="radio"/> None                                |
| <input type="radio"/> \$1 - \$5,000                                  | <input type="radio"/> \$1 - \$5,000                       |
| <input type="radio"/> \$5,001 - \$10,000                             | <input type="radio"/> \$5,001 - \$10,000                  |
| <input type="radio"/> \$10,001 - \$15,000                            | <input type="radio"/> \$10,001 - \$15,000                 |
| <input type="radio"/> \$15,001 - \$20,000                            | <input type="radio"/> \$15,001 - \$20,000                 |
| <input type="radio"/> \$20,001 - \$25,000                            | <input type="radio"/> \$20,001 - \$25,000                 |
| <input type="radio"/> \$25,001 - \$30,000                            | <input type="radio"/> \$25,001 - \$30,000                 |
| <input type="radio"/> \$30,001 - \$35,000                            | <input type="radio"/> \$30,001 - \$35,000                 |
| <input type="radio"/> \$35,000 or more                               | <input type="radio"/> \$35,000 or more                    |

☞ These side-by-side displays are achieved with multi-column groups in Blaise IS.

## Screen Listing 16: Two Similar Items on the Same Page

"**There are two questions on this screen.** The first question asks about the total amount you have borrowed to finance undergraduate degrees you completed before October 1, 2010, and the second asks how much you still owed as of October 1 2010. **What is the total amount you borrowed?** Did not earn a degree at this level radio button not checked. Radio button not checked. To change the selection press up or down arrow."

In order to communicate the juxtaposition to the blind user, the first shaded text above was added. In order to clarify the question statement itself, the text "What is the total amount you borrowed?" replaces the column header.

## 3.3 Tabular Displays

Tabular screens, or grids, present additional challenges. They efficiently display and collect data. But the blind user might need more cues to navigate the screens, understand the questions, and provide correct answers. The strategies employed for tables extend those that are used for other multi-item displays.

### 3.3.1 Household Roster

A common table is the household roster. The one shown in Figure 17 has person rows and columns for Name, Gender, Age, and Relationship. A few strategies were used to present this information to the screen reader. First, information describing the entire page is given, (Speech Listing 17).

#### Speech Listing 17: Cursor in the First Row and First Column

"... the next screen collects a household roster. The household roster collects 3 or 4 items about each person in your household."

Second, text that is appropriate for each cell is given to the screen reader. Speech Listing 17a gives the screen-reader text for the first row. Speech Listing 17b shows the text for the second row.

**Figure 17: Household Roster**

What is your name?

|          | Name   | Gender   | Age | Relationship to you |
|----------|--------|--|-----|---------------------|
| Person 1 | Harold | <input checked="" type="radio"/> Male <input type="radio"/> Female | 61  |                     |
| Person 2 | Maude  | <input type="radio"/> Male <input checked="" type="radio"/> Female | 58  | Spouse or partner   |
| Person 3 | Ellen  | <input type="radio"/> Male <input checked="" type="radio"/> Female | 23  | Child               |
| Person 4 | David  | <input checked="" type="radio"/> Male <input type="radio"/> Female | 19  | Child               |

☞ For each cell in the table, if there is question text present, Blaise IS will read it. If there is no question text present, it will read the column header.

☞ The row header is read in the first column only. This is because row headers can be very lengthy (e.g., see Figure 19 below). The user can cause the screen reader to repeat the row header.

#### Speech Listing 17a: Cursor in the First Row and Name, Gender and Age Columns

Name: "Person 1 What is your name?"

Gender: "What is your gender or sex?"

Age: "How old are you?"

### Speech Listing 17b: Cursor in the Second Row for Name, Gender, Age, and Relationship

Name: “Person 2 What is the next person’s name?”

Gender: “What is the gender or sex of this person?”

Age: “How old is Maude?”

Relationship to you: “What is Maude’s relationship to you?”

Note that the screen reader operates the same way in the grid as it would if the questions were linearized, that is, as if they were taken out of the grid and placed one after another.

☞ The text fill is not used for Gender. This is because, upon experimentation, the screen reader would get ahead of the fill being in place (due to the time it takes for the server trip). For example, the text “What is the gender or sex of [Name]?” would be read as “What is the gender or sex of \_\_\_?”.

☞ The Name fields are critical Blaise IS fields in order to execute the rules so that fills can be used.

### 3.3.2 Items placed vertically to give a Tabular Display

Figure 18a shows a table-like structure that collects numbers of children in each age category. A fairly lengthy description of the page precedes the question. Additionally, the text above each cell describes the cell. In this example, all screen reader text is displayed on the screen for both the sighted and blind user.

#### Figure 18a: A Table-Like Display collecting Age Information

*This page asks you about your children's ages.*

*There are 5 age categories. Enter the number of children you have in each age category.*

*If there are no children in a category, please enter 0.*

#### How many children who live with you as part of your family are . . .

Children under age 2

Children aged 2 to 5

Children aged 6 to 11

Children aged 12 to 18

Children aged 19 or older

Figure 18b shows the original web-survey page from the 2008 survey.

**Figure 18b: The Original Display collecting Age Information**

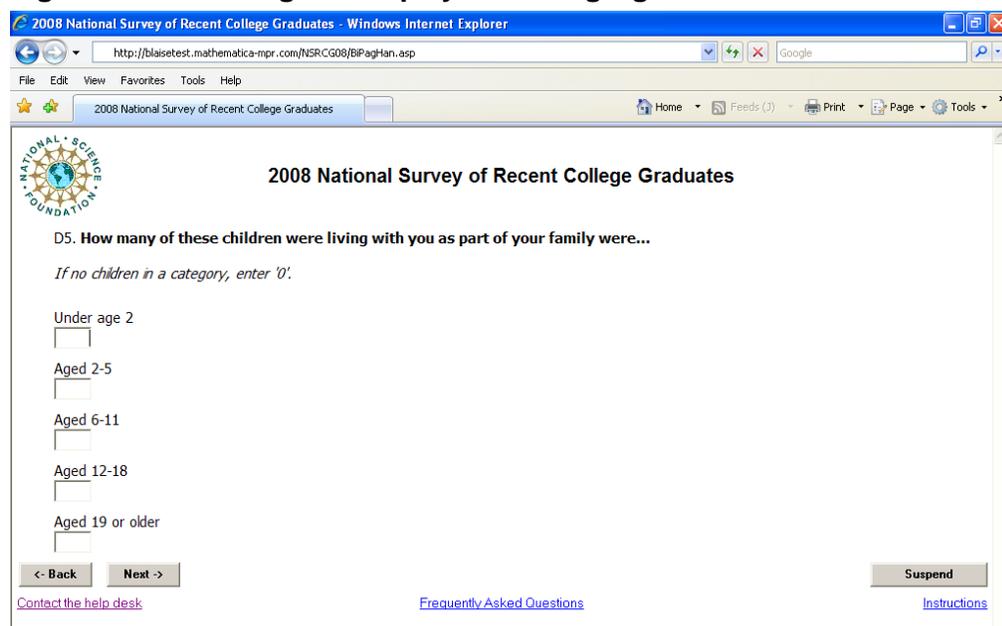


Figure 18a changes the original placement of the instruction text, placing it before the question stem, in order to avoid inserting lengthy instructions between the question and the answer boxes. It also gives clearer text for each category.

### 3.3.3 Table of Related Items

Figure 19 shows a question stem that relates to 10 yes/no items arranged in a tabular format. This is formed with a Group Table group in Blaise IS. For a sighted user, rows with alternate shading help separate one item from another. However, the screen reader will not notice the shading. On the other hand, it keeps things straight by landing on each item separately until it is answered or skipped.

**Figure 19: Table of Related Items**

**Thinking back to the time you took community college courses, for which of the following reasons did you take those courses from a community college? Was it . . .**

|   | Yes                              | No                    |
|---|----------------------------------|-----------------------|
| To earn college credits while still attending high school?                                | <input checked="" type="radio"/> | <input type="radio"/> |
| To complete an associates degree?   | <input type="radio"/>            | <input type="radio"/> |
| To prepare for college / increase chance of acceptance to a 4-year college or university? | <input type="radio"/>            | <input type="radio"/> |
| To earn credits for a bachelor's degree?  | <input type="radio"/>            | <input type="radio"/> |
| For financial reasons, for example because of the cost of a 4-year school?                | <input type="radio"/>            | <input type="radio"/> |
| To gain further skills or knowledge in your academic or occupational field?               | <input type="radio"/>            | <input type="radio"/> |
| To facilitate a change in your academic or occupational field?                            | <input type="radio"/>            | <input type="radio"/> |
| To increase opportunities for promotion, advancement or higher salary?                    | <input type="radio"/>            | <input type="radio"/> |
| For leisure or personal interest?   | <input type="radio"/>            | <input type="radio"/> |
| For some other reason?  | <input type="radio"/>            | <input type="radio"/> |

☞ Blaise IS will read the question stem when it arrives at the first row, first choice. It will not read it again unless the user requests it from the screen reader.

☞ Blaise IS will read the row header once when it arrives at the row.

### 3.3.4 Name Collection Grid

Figure 20 shows a grid used to collect first and last names of business owners. The cell for the first name of the first owner is highlighted. The screen reader will read "Owner first name edit". This seems clear enough so no special features were added to this page for the screen reader.

**Figure 20: Name Collection Grid**

Please record the first and last names of these owners who joined **ABC Business** between December 31, 2011 and December 31, 2012.

|       | First name           | Last name            |
|-------|----------------------|----------------------|
| Owner | <input type="text"/> | <input type="text"/> |
| Owner | <input type="text"/> | <input type="text"/> |

### 3.3.5 Table collecting Sales Data

Figure 21 shows a matrix that collects percent of sales to three kinds of customer. It could be built like the age-category table in Figure 18a, but the tabular appearance reinforces that percents should add to 100%.

**Figure 21: Table-Like Structure collecting Sales Data**

**D 7. Now we'd like to learn more about the type of customers that **ABC Business** had during calendar year 2012. Please estimate the percent of the business' sales that were made to individuals, businesses, and government agencies.**

*Please indicate the percent for each type of customer.  
The total of percents should equal 100%.*

|  | Percent of sales     |
|--|----------------------|
| Percent of sales to <b>individuals?</b><br><i>Please enter a number from 0 to 100.</i>         | <input type="text"/> |
| Percent of sales to other <b>businesses?</b><br><i>Please enter a number from 0 to 100.</i>    | <input type="text"/> |
| Percent of sales to <b>government agencies?</b><br><i>Please enter a number from 0 to 100.</i> | <input type="text"/> |

All text appears on the screen and is available to both the screen reader and the sighted user.

Note that in grids, form elements in all rows need to be labeled to be accessible (Malakhoff 2013).

☞ When the cursor is at the first cell, the screen reader says the question stem and the row header. For the second and third cells, the screen reader automatically reads only the row header text.

### 3.3.6 Two Column Table with Dependency

Figure 22 shows a grid with two columns. It is the most difficult table in this sample.

**Figure 22: Table collecting Financing Data**

**F 7. Please indicate which of the following debt financing options you personally have used during calendar year 2012 on behalf of ABC Business.**

*If you used a debt financing option, choose yes in the combo box, and a number 1 or greater for the number of times you used it.*

|   | Yes or No | Number used          |
|---|-----------|----------------------|
| Have you personally used credit cards for business-related purposes?  | Select ▾  | <input type="text"/> |
| Have you personally used personal loans from a bank or other financial institution, such as a mortgage or home equity loan used for business? | Select ▾  | <input type="text"/> |
| Have you personally used business or corporate credit cards issued in your name?  | Select ▾  | <input type="text"/> |
| Have you personally used personal loans from any family or friends?   | Select ▾  | <input type="text"/> |
| Have you personally used personal loans from any other individuals not associated with the management of the business?                        | Select ▾  | <input type="text"/> |
| Have you personally used any other sources (SPECIFY)?   | Select ▾  | <input type="text"/> |

This table is the hardest to handle for the screen reader due to the way that the second column depends on the first. The Yes/No column uses a combo box rather than radio buttons because with the radio buttons the use of the Tab key seemed confusing in this table. (For the author, there is a temptation to use the Tab key to jump from the Yes choice to the No choice but it goes to the next column as it should.)

## 4. The Pieces of the Puzzle

In order to produce accessible web instruments you need:

- Web-survey software that has accessibility capabilities
- A specification process and web-survey screen standards that take into account the needs of both sighted and blind users
- Programming and testing processes and standards that implement accessibility features as part of fielding an instrument.

If the web-survey software does not have accessible features, the survey will not be accessible. On the other hand, it is possible to produce a survey that is not accessible even if the underlying web-software system is accessible.

The web-survey producers should be able to make some assumptions about screen-reading users.

- The user has a basic grasp of the use of screen-reading technology, including pause, back-up, replay, and fast forward.
- The user can change the rate of speed of the screen reader.
- The user has experience in understanding various web-screen controls such as data entry boxes, drop-down menus, radio buttons, and check boxes.

### 4.1 Versions of Web Browsers, Screen Reader, and Blaise

It is not likely that any web-survey software can handle all combinations of web browsers and screen reading software. There are just too many combinations to program and test, literally numbering in the hundreds. Even the screen-reading software itself may not be able to handle all browsers or browser versions. The research for this paper used JAWS version 13.0.1006 with Windows Explorer version 10 on

a Windows 7 computer. JAWS is produced by Freedom Scientific, Inc. Internet Explorer is produced by Microsoft Corporation. A particular web survey may run well on other combinations, but no other combination was tested. Instruments were rendered in Blaise version 4.8.4.1840 as updated with style sheets and java script files from the Blaise Team as issues were found. The Blaise Survey Processing System is produced by Statistics Netherlands. Westat is the Blaise distributor in North America.

## 5. Annotated References

References are given for accessible survey software, Section 508, and some publications.

### 5.1 Web-Survey Software Claiming Accessibility

A few-second internet search for accessible web-survey software yielded two results.

The snap Surveys statement on accessibility is linked below. The document is from 2005. It works down the list of Section 508 checkpoints and describes how the software is accessible for each guideline.

<http://www.snapsurveys.com/accessibility/w3c.shtml#ch1>

Survey Monkey claims Section 508 certification. Check out the following links from 2008.

[http://help.surveymonkey.com/articles/en\\_US/kb/Are-your-surveys-508-compliant-and-accessible](http://help.surveymonkey.com/articles/en_US/kb/Are-your-surveys-508-compliant-and-accessible)

[http://s3.amazonaws.com/SurveyMonkeyFiles/508\\_Guide.pdf](http://s3.amazonaws.com/SurveyMonkeyFiles/508_Guide.pdf)

### 5.2 Section 508 of the U.S. Federal Disabilities Act

Section 508 is regulatory in nature and applies to software procurement. It is part of a much broader law that applies to web accessibility. All US government agencies must follow these requirements.

<http://www.section508.gov/>

<http://www.section508.gov/index.cfm?fuseAction=stds>

### 5.3 Two Good Book References

This first book, by Mick Couper, is a very good guide to understandable visual web design.

Couper, M. P. (2008), *Designing Effective Web Surveys*, New York, NY: Cambridge University Press.

The second book, edited by Jim Thatcher, is a good reference on web accessibility.

Thatcher, Jim (editor), *Web Accessibility, Web Standards and Regulatory Compliance*, Berkeley, CA: Apress

### 5.4 Recent Fed CASIC Presentations

The Fed CASIC Conference, usually held in March each year at the US Bureau of Labor Statistics, often has sessions or presentations on accessibility and usability for web surveys. Following is a list of some PDF and Power Point presentations with links to each session. Some of these have good reference lists.

**Fed CASIC 2013** [https://fedcasic.dsd.census.gov/fc2013/index.php#5\\_1](https://fedcasic.dsd.census.gov/fc2013/index.php#5_1)

Bikmal S., Mohammed A., Jayanthi B. and Berry A. (2013), "Challenges in Making Web Surveys 508 Compliant", RTI International.

[https://fedcasic.dsd.census.gov/fc2013/ppt/2013%20FedCASIC\\_SBikmal\\_RTI.pdf](https://fedcasic.dsd.census.gov/fc2013/ppt/2013%20FedCASIC_SBikmal_RTI.pdf)

**Fed CASIC 2012** [https://fedcasic.dsd.census.gov/fc2012/index.php#4\\_3](https://fedcasic.dsd.census.gov/fc2012/index.php#4_3)

Horan J (2012), "Section 508 Standards REFRESH", US Department of Labor, Power Point available through [https://fedcasic.dsd.census.gov/fc2012/index.php#4\\_3](https://fedcasic.dsd.census.gov/fc2012/index.php#4_3)

Brenner K. (2012) "Accessibility Testing: The Role of Tools, ATs, and Manual Methods" (Westat) [https://fedcasic.dsd.census.gov/fc2012/ppt/07\\_brenner.pdf](https://fedcasic.dsd.census.gov/fc2012/ppt/07_brenner.pdf)

Bikmal S. and Sattaluri S. (2012) "Usability vs.. Accessibility in Websites/Web Surveys" (RTI International) [https://fedcasic.dsd.census.gov/fc2012/ppt/07\\_bikmal.pdf](https://fedcasic.dsd.census.gov/fc2012/ppt/07_bikmal.pdf)

**Fed CASIC 2010** <https://fedcasic.dsd.census.gov/fc2010/index.php#11>

Brenner K. and Grant E. (2010) "Incorporating Accessibility in the Development Process" (Westat), Power Point available through <https://fedcasic.dsd.census.gov/fc2010/index.php#11>

Malakhoff L. (2010) "Accessible Web Survey Tools" (US Census Bureau), Power Point available through <https://fedcasic.dsd.census.gov/fc2010/index.php#11>

Matulewicz H. H. and Coburn J. (2010) "Universal Accessibility in Web Survey Design: Practical Guidelines for Implementation (Mathematica Policy Research, Inc.), Power Point available through <https://fedcasic.dsd.census.gov/fc2010/index.php#11>

**Fed CASIC 2009** <https://fedcasic.dsd.census.gov/fc2009/index.php#1>

Lawler L. (2009) "Achieving Section 508 Compliance" US Census Bureau

## **5.5 International Blaise Users Group Presentations**

This is a list of related previous IBUC presentations.

O'Reilly J. (2006) "Blaise IS and Accessibility" (Westat) <http://www.blaiseusers.org/2006/Papers/239.pdf>

Pierzchala M. (2006) "Disparate Modes and Their Effects on Instrument Design" (Mathematica Policy Research, Inc.) <http://www.blaiseusers.org/2006/Papers/207.pdf>

Pierzchala M., Wright D., Wilson C. and Guerino P. (2004) "Instrument Design for a Blaise Multimode Web, CATI, and Paper Survey" (Mathematica Policy Research, Inc.) <http://www.blaiseusers.org/2004/papers/24.pdf>

## **5.6 Incredibly Useful Website**

This is one of several useful websites. Webaim stands for Web Accessibility In Mind.

<http://www.webaim.org>

## **5.7 Personal Communication References**

Brenner, K (2013). Personal communication, July 25, 2013.

Malakhoff, L (2013). Personal communication, July 24, 2013. Also, I visited Larry in December 2010 for an introduction to JAWS and the art of using a screen reader.