
The Study of Foreign Languages by Students Who Are Blind Using the JAWS Screen Reader and a Refreshable Braille Display

Gaylen Kapperman, Elizabeth Koster, and Rachel Burman

We contend that the effectiveness in studying foreign languages by students who are blind can be greatly increased with the use of a properly configured screen reader, Job Access With Speech (JAWS), and a braille display. We assert that foreign language instruction should not be limited to auditory input from an instructor and JAWS alone, since being able to read and write the language is also of paramount importance. As a consequence, it is vital that a refreshable braille display should be included in the array of technology used by a foreign language student who is blind. We have developed this Practice Report, which describes how a braille display along with version 17 of JAWS that has been properly configured for foreign languages might be used in foreign language study, to meet a need that is currently not served through the Universal Design for Learning educational framework. Unfortunately, foreign language materials and the wide array of formats in which they are presented cannot be accessed by learners who use braille and screen readers consistently to access print. The aim of our work is to contribute one way in which this population can gain access to the tools needed to study another language using assistive technology. The procedures described are most appropriate for use with English-speaking students who are studying second and third languages. We do not believe that the methods presented are appropriate for students who are learning English as a second language.

Kapperman and Sticken (2003) were the first to describe a technologically based procedure for providing braille-reading students the capability to complete their written for-

eign language schoolwork in the foreign language under study for teachers who do not know braille. The procedures outlined in this report are intended to enable a braille-reading student to study a foreign language independently, without the assistance of a teacher of students with visual impairments. By the method described here, if the foreign language content can be accessed via computer, if the student's computer is equipped with the proper technology, and if the student is competent in using the technology, he or she will not need a teacher of visually impaired students to provide any additional service for the student to access the content.

METHODOLOGY

There are two major approaches that we will describe. The first focuses on the language-detection facility found in JAWS. The second focuses on the inclusion of a foreign language synthesizer. The advantages of both approaches are detailed.

Materials tagged for foreign language

In the first method, a JAWS user will utilize the language-detection capability of JAWS, which can recognize eight foreign languages and two versions of English if the imbedded speech synthesizer called Eloquence is being used. The languages, are: Spanish (Spain), Spanish (Mexico), French (Canada), French (France), German, Italian, and Portuguese. If the print or text version of a language has language tags imbedded, then JAWS will speak the language. (Note that the tags are not visible to the computer user either visually or tactually.) In short, if the content was originally written in the language using the proper foreign language keyboard, language tags will have been inserted into it. For example, if the language-detection facility of JAWS is turned on, when the computer user moves to a website that was originally developed using a language other than English, JAWS will speak it in that language if the language is

included in the group of languages that JAWS recognizes. Additionally, when the braille display is connected, the proper foreign language characters will be displayed and JAWS will automatically speak the language and display it properly in braille. The major advantage of this approach is that the user need not download and install a foreign language synthesizer. The major disadvantage is that the written material must have originally been tagged for the language. This approach will not enable the foreign language capability of JAWS to function if, for example, printed foreign language material has been scanned to create an electronic document such as a PDF document. Under those circumstances, JAWS will not recognize the content as having been written in a foreign language, and JAWS may attempt to pronounce the words as though they were English words. If material will be presented to the student in this form, then the proper foreign language synthesizer must be downloaded and installed. The second method details the necessary steps.

If one is limited to using the language-detection facility in JAWS, then the material must be tagged. If the material has been properly prepared in its tagged form, when the student reviews the material with JAWS, the screen reader will speak the language properly and the braille symbols will be presented correctly on the braille display.

If the material is to be prepared in a foreign language, the proper keyboard in Microsoft Word should be invoked. The details on how to accomplish this task are described in a subsequent section, Invoking foreign language keyboards.

Once the proper keyboard has been made operational, one can use that keyboard to type the information in the symbols used by the foreign language. Thus, at any time when the file has been opened in a subsequent session, JAWS will recognize the language tags and will speak and display any symbols in that language. One need not

“re-invoke” the keyboard to enable this process to occur. But if one wishes to write additional content in the language, then the proper keyboard will need to be made operational. Thus, in every instance in which the foreign language is to be written, the appropriate keyboard must be operational.

It is possible to include two or more languages in the same document, since JAWS will recognize all available languages if each has been properly tagged. If one wanted to create a document that included writing in the foreign language and also in English, one need only invoke the foreign language keyboard, write in the foreign language, and then switch to the English keyboard and write in English. In subsequent sessions, when the student reads and listens to the content, he or she need only move through the content using the usual JAWS keystroke commands to listen to the content in whichever language it had originally been written. On the other hand, if the student were to respond in the other language by writing, then the proper keyboard must be invoked before writing. The steps used to switch keyboards are described in the Invoking foreign language keyboards section.

Materials not tagged in a foreign language

The second method involves downloading and installing the proper foreign language synthesizer. The synthesizer is software that enables JAWS to function in the language for which the synthesizer is designed. This procedure is required if a language other than those previously mentioned is to be read by the JAWS user, as well as when the content is not displayed with foreign language tags, since the JAWS language-detection facility does not function when the language is not tagged. Thus, the proper foreign language synthesizer must be installed to ensure that the content is spoken correctly by JAWS in the desired language as well as displayed properly on the braille display.

If more than one foreign language is required, more than one synthesizer needs to be downloaded. The document that is being reviewed using JAWS must be read by JAWS with the proper synthesizer active. A prescribed set of keystrokes is needed to switch synthesizers to enable JAWS to function properly in the desired language. For example, to switch from English to a foreign language and back again to English, the computer user would start from the English synthesizer, follow the steps to switch to the foreign language synthesizer, then switch back to English with the same set of keystrokes. The sequence of keystrokes is described in the section Changing Vocalizer Expressive on JAWS Professional.

It is necessary to switch synthesizers when the content has not been tagged for a specific language, thus rendering the language-detection facility of JAWS inoperative. By making computer users aware of tagged and untagged material and how each are read and displayed by JAWS, they can utilize the appropriate method to access or produce materials in a foreign language. The authors recommend being familiar with both methods described in this report in order to use JAWS and the refreshable braille display most effectively.

Invoking foreign language keyboards

The following steps describe how to install a foreign language keyboard:

1. Different keyboard options are located at Control Panel/Language.
2. From the Language menu, a variety of languages and keyboard options can be selected. (Note: Depending on the operating system, there are built-in shortcuts for changing the input language.)

Windows XP and subsequent versions, including Windows 8, require the use of Alt+Shift to switch between keyboard lay-

outs (the OS versions following Windows 8 require the use of WindowsKey+Space bar to change the input keyboard).

Also, if JAWS has been configured to detect languages automatically, which should be the default setting, as one reads the content JAWS will speak in the language in which the content was written using the proper keyboard. If the content has been written in two or more languages, JAWS will automatically recognize the language in which the content was written and will subsequently speak it in that language as long as "Detect language" has been set to "On" in the JAWS array of settings.

There are specific instructions for the various Windows operating systems for Setting Different Keyboards. As an example, here is the series of steps for Windows 7:

1. go to Start Menu;
2. go to Control Panel;
3. under Clock, Language, and Region, select Change Keyboards or other Input Methods;
4. select Keyboards and Languages tab;
5. select Change Keyboards;
6. under General, at the list of keyboards that are installed, select Add for additional keyboard languages;
7. find and select the desired language;
8. under the selected language will be keyboard options, including a U.S. keyboard option (we recommended that users click both on the language button and the U.S. button when using a standard QWERTY keyboard); and
9. select Apply and OK to exit out of the menu.

For Windows versions 8.1 and more recent versions on laptop computers, JAWS commands may vary slightly based on the keyboard layout (for example, Alt+Fn+F4 may be needed to close a window instead of Alt+F4). It should also be noted that more than one language keyboard can be installed.

In order to switch from one keyboard to another, one must press Alt+Shift.

When the language is switched in Word, the status line display shows which language is operative. Unfortunately, JAWS will not indicate which language is operative. A sighted user can view the language indicator on the status line, but a person who is blind must use a series of simple keystrokes to determine which language is operative. Press F6 to enable JAWS to read the status line. The name of the language that is currently operative, among many other parameters, is located on the status line. One must use the arrow keys to move from one parameter to another. Once the language parameter has been reached, JAWS will speak the name clearly. Then, press the Escape key to exit the status line. The reading function is operative, and one can begin the normal input of the language that has been chosen. This process must be repeated to change to the second or subsequent languages. To reiterate, press Alt+Shift to change to a different language, press F6 to read the status line, press Escape, and begin typing in the language that is now operative.

Foreign language accented letters

Microsoft Word has certain shortcuts for typing accented letters. For example, to type a vowel with an acute accent (á, é, í, ó, ú, ý) one first holds down the Ctrl key while typing an apostrophe. The accented letter appears when you type any vowel. Any other key pressed after the Ctrl+apostrophe combination causes the computer to ring a bell. The computer will keep beeping an objection each time you press an incorrect key until finally you either type a vowel or press the Spacebar (to turn off the Ctrl+apostrophe request).

There are several other such combinations in MS Word. Ctrl+Grave accent (the key to the left of the number “1” on the top row of keys) puts a grave accent over the next vowel typed. The tilde (“~”) is the same key shifted, so holding down both the Ctrl and Shift keys

Microsoft Word keystroke shortcuts for creating foreign characters

Á, á, É, é, Í, í, Ó, ó, Ú, ú

Ctrl+' [apostrophe], then the letter. If the letter is upper case, press the Shift key with the letter

Ñ, ñ

Ctrl+Shift+~ , then the letter

Û, ü, Ä, ä, Ö, ö

Ctrl+Shift+: , then the letter

¿

Alt+Ctrl+Shift+?

¡

Alt+Ctrl+Shift+!

Box 1

while pressing the Grave accent key, and then typing an “n” or “N” will produce an ñ or Ñ. The “6” key becomes a circumflex accent when shifted, so Ctrl+Shift+6 followed by either “a,” “e,” “i,” “o,” or “u” generates “â,” “ê,” “î,” “ô,” and “û,” respectively. To put a cedilla underneath the letter “c,” use Ctrl+comma before typing “c” or “C” to get “ç” or “Ç.” Additional keystrokes are described in Box 1.

Developing worksheets in more than one language

To develop worksheets in a foreign language and English, follow these steps:

- Invoke the foreign keyboard using Word as described above.
- Type the foreign language content.
- Switch to the English keyboard.
- Transfer to the English keyboard by pressing Alt followed by Shift. This command changes the language in Word as long as the desired language has already been invoked.

- Once the English keyboard is operative, one can input the content in English.
- If content in the foreign language is called for once again, repeat the steps to switch back to the foreign language keyboard.

Through this method, one can switch from one language to another as needed throughout the document.

Because the foreign language was produced using the foreign language keyboard, it is tagged for that language. When the English content is written, the English language tags have also been inserted. Since JAWS has the capability of recognizing the tags for certain languages, when JAWS reads the foreign language content, it will speak it in that language. At the same time, when the cursor moves over the English language content, JAWS will speak English because that content was tagged for English. This method is excellent for producing worksheets in which two or more languages can be included and can be recognized by JAWS. Using this procedure, if one were to use a braille display the display would show the foreign language in the foreign language braille symbols, and the English language content would be shown in American braille symbols.

Installing a foreign language synthesizer

As of this writing, the Vocalizer Synthesizer that is used with JAWS 17 can recognize 40 different languages. To install a copy of the synthesizer:

1. go to the Freedom Scientific website: <https://www.freedomscientific.com/downloads/synthesizers>;
2. go to the dropdown menu for Synthesizer, and select Vocalizer Expressive;
3. go to the dropdown menu for Language, and select the desired language (there will usually be a few voices to choose from, and you may listen to samples);

5. when choosing a specific synthesizer voice, select Download Premium High (recommended) or Download Premium (downloading will take several minutes); and
6. the user will then be given a series of steps for the installation of the synthesizer.

After installing the synthesizer, do the following to set it up:

1. after installing, restart JAWS;
2. after restarting JAWS, go to Options, Voice Adjustment;
3. go to the dropdown menu by Profile Name, and select the installed Vocalizer Expressive;
4. go to the dropdown menu by Synthesizer Language, and select the desired language;
5. set the language as Primary (you will then have the option with a pop-up menu to type a name for the synthesizer, and whether or not to set it as the default language);
6. select Apply; and
7. select Save As.

Changing Vocalizer Expressive on JAWS Professional

In this arrangement, JAWS will not automatically switch from one language to another. The steps describe how to manually switch synthesizers:

1. go to the JAWS menu;
2. choose L for Languages;
3. choose V for Voice Profiles;
4. choose D for Default; then
5. use arrow keys to select Vocalizer Expressive for the desired language, and the selected synthesizer will be active.

To switch to a different synthesizer (for example, to switch back to English), repeat the steps outlined above.

Braille display punctuation and symbols for accented letters

<i>Punctuation</i>	à [“a” grave]	<i>German accents</i>
. [period]	dots 1-2-3-5-6-8	ä [“a” umlaut]
dots 4-6	ù [“u” grave]	dots 3-4-5-8
braille capital indicator	dots 2-3-4-5-6-8	ö [“o” umlaut]
Dot 7		dots 2-4-6-8
! [exclamation point]	<i>Circumflex vowels</i>	ü [“u” umlaut]
dots 2-3-4-6	â [“a” circumflex]	dots 1-2-5-6-8
¡ [inverted exclamation point (Spanish)]	dots 1-6-7-8	ß [double “s”]
dots 2-3-5	ê [“e” circumflex]	dots 2-3-4 written twice
? [question mark]	dots 1-2-6-7-8	
dots 1-4-5-6	î [“i” circumflex]	<i>Spanish accents</i>
¿ [inverted question mark (Spanish)]	dots 1-4-6-7-8	á [“a” acute]
dots 3-8	ô [“o” circumflex]	dots 1-6-8
, [comma]	dots 1-4-5-6-7-8	é [“e” acute]
dot 2	û [“u” circumflex]	dots 1-2-6-8
:	dots 1-5-6-7-8	í [“i” acute]
dots 1-5-6		dots 1-4-6-8
;	<i>Diaeresis vowels</i>	ó [“o” acute]
dots 5-6	Ë [“e” diaeresis]	dots 1-4-5-6
	dots 1-2-4-6-8	ú [“u” acute]
<i>French accents</i>	Ï [“e” diaeresis]	dots 1-5-6-8
ç [“c” cedilla]	dots 1-2-4-5-6-8	ñ [“n” tilde]
dots 1-2-3-4-6	Ü [“u” diaeresis]	dots 1-5-6-8
é [“e” acute]	dots 1-2-5-6-8	ü [“u” diaeresis]
dots 1-2-6-8		dots 1-2-5-6-8
	<i>Diphthong</i>	
<i>Grave accents</i>	œ [“oe” diphthong]	
è [“e” grave]	dots 4-6-7	
dots 2-3-4-6-8		

Box 2

Foreign language braille symbols shown on the braille display

When foreign languages are displayed, no braille contractions are used. Foreign languages are displayed letter for letter, with spe-

cial accented letters being correctly shown in “computer” braille. For example, in German, the “a umlaut” (the letter “a” with two dots above it) is shown in braille as dots 3-4-5 (the “ar” sign in English braille). In German, that

symbol represents “a umlaut.” Punctuation marks will also be those included in computer braille code. Thus, for example, the period is represented by dots 4-6. The punctuation marks along with the braille symbols representing the accented letters are shown in Box 2. It should be noted that if the braille display is equipped with keys, the student can use those keys to write content in addition to using the computer keyboard. Using the keystrokes described in Box 1, this task can be accomplished.

RESOURCES

Theroundtable is a list for individuals who are blind and others who are interested in using technology for work in foreign languages. The list is generally composed of persons who are blind and who are very competent translators or teachers of foreign languages. One can join the list and then pose questions, and the list members are extremely helpful and very knowledgeable. More information about Theroundtable can be found online at: <http://lists.screenreview.org/listinfo.cgi/theroundtable-screenreview.org>; or by writing: theroundtable@lists.screenreview.org. In addition, the Braille Authority of North America website (www.brailleauthority.org) lists rules governing the braille of foreign language symbols.

CONCLUSION

The procedures described in this report offer students who are blind the capability of studying foreign languages independently without

the assistance of individuals who are sighted. Given that foreign language content can be input into a computer equipped with JAWS and a braille display, and if the student is a competent braille reader and a competent user of assistive technology in the form of JAWS, neither the teacher of visually impaired students nor the foreign language teacher needs to provide any assistance other than that which is generally provided to students who are sighted. This solution to the all-too-prevalent obstacle found in the provision of accessible materials for foreign language study can be used by students who are blind in any post-secondary educational setting as well as in middle school and high school. For those individuals who wish to be involved in foreign languages as a professional career, the procedures can also be used in the workplace.

REFERENCE

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Gaylen Kapperman, Ed.D., professor emeritus, Visual Disabilities Program, Northern Illinois University, Graham Hall 232, DeKalb, IL 60115; e-mail: gkapperman@niu.edu. Elizabeth Koster, M.S.Ed., graduate research assistant, Visual Disabilities Program, Northern Illinois University, DeKalb, IL; e-mail: lizzy.fos@gmail.com. Rachel Burman, M.S.Ed., graduate research assistant, Visual Disabilities Program, Northern Illinois University, DeKalb, IL; e-mail: burman.rachel@gmail.com.