

Assistive Technology Assessment 3
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ICATER Assistive Technology Device/Software Evaluation Form

Device or Software Name:

PixWriter 3.2 is a software program from SunCastle Technology that provides instruction in writing. It targets a broad spectrum of students, from pre-kindergarten through young adult. It facilitates this instruction by connecting the printed word with the spoken word, through a bank of text vocabulary and pictures. It supports vocalization to reinforce sight-word recognition of the text as the student generates it. It is particularly well suited for students with physical and cognitive disabilities, ranging from moderate to severe, as it supports the selection of wholeword buttons, and single-switch scanning for computer access to create written documents. PixWriter can be utilized both in classroom and in home environments, as it is relatively easy to install, set up, and support.

Device or Software Category (1 Point):

PixWriter falls into the Computer Access AT category, since it interprets text and graphics and renders them into speech. It also falls into the Instructional Aids AT category, since it can be used effectively in working with students with autism, ADHD, and other disabilities (including physical disabilities especially those involve loss of fine motor control) that make writing text difficult.

Device or Software Cost (1 Point):

PixWriter is available through a consortium including SunCastle, Attainment Corporation, and Slater Technology, for \$199 for a single user license. Multiuser licenses are not available per the websites, but in some literature there is an allusion to the possibility of discounts for multiple user purchases.

Place on AT Continuum and Why? (2 Points)

PixWriter falls primarily into the High Tech area of the AT Continuum. The functionality that characterizes it as a High Tech entity are that it requires relatively sophisticated electronics (e.g., a personal computer (or Mac) with a relatively large screen, and a properly configured version of the Windows (or Mac O/S) operating system), a power source (i.e., electric current, or a battery), and it contains relatively

sophisticated code to perform its functions. Characteristics that place PixWriter in the Mid-tech area include wide availability (via their website and through numerous educational and non-profit service organizations), and some training to become familiar and comfortable with its functionality (although the product is quite intuitive).

Who can this device or software benefit and how? (3 Points)

PixWriter is specifically designed for instructing a broad spectrum students to achieve mastery in writing. Recent data suggest that many students struggle to meet proficiency in the area of written expression (U.S. Department of Education, 2011, cited in Pennington, 2016)). Pennington notes that “writing requires the near simultaneous execution of an amalgam of skills that must correspond closely to a given context... a grasp of basic writing conventions (e.g., punctuation, syntax, and spelling), sufficient vocabulary, and have an idea of what one (ed) might want to read in a message.” (Pennington, 2016). Furthermore, this alignment of skills is often most difficult for students with moderate to severe disabilities (MSD), who face several challenges in acquiring writing repertoires, such as a) difficulty developing basic communication skills, b) difficulty acquiring the spelling and manual handwriting skills employed by their same-aged peers to complete writing tasks, c) limited exposure to intervention in the acquisition of writing repertoires (as researchers and educational policy makers have only recently attended to writing instruction for this population), and d) limited research in teaching writing to students with MSD, providing little guidance to practitioners on how to deliver high quality writing instruction. (Pennington, 2016).

PixWriter is designed to address each of the four challenges noted above. It does this by supporting the following five educational objectives:

1) Students are to produce written work

PixWriter connects the printed word with the spoken word. Writing is accomplished by selecting prefilled vocabulary buttons. Sight-word recognition is increased because students hear the words spoken as the words are written. Difficulties of letter formation, computer access, sound-symbol relationships, spelling, and fine-motor control are minimized through selection of wholeword buttons. Single-switch scanning for computer access enables students with physical limitations to create written documents. The written product is legible. Vocabulary is presented to the student so he/she will communicate his/her message clearly and concisely. PixWriter can be used in classroom and home environments.

2) Students are to write for a variety of purposes

Created vocabulary word banks enable students to write to cover a broad range of topics (e.g., letters, notes, emails and recipes); to complete assignments, contribute to class reports, and answer literal and inferential questions. Students can write about their home and school activities. Written language goals are addressed, such as

writing complete sentences or paragraphs, learning grammar rules, and completing creative writing assignments. Vocabulary setups allow students to write expository, narrative, or fictional compositions.

3) Students are to revise written communication.

Auditory feedback of their sentences help students proofread, revise, and edit. Revisions can be made by inserting omitted words into sentences deleting unnecessary words substituting words and graphics correcting punctuation.

4) Students are to apply thinking and problem solving skills to their writing.

Picture-assisted writing helps students identify words and their meanings. Using PixWriter, students can answer questions requiring them to draw conclusions, discriminate between fact and opinion, and predict future events. Using graphic organizers with PixWriter, students plan and write drafts. The content of the vocabulary word bank allows students to explain and describe plot, characters, and themes from their reading. Students incorporate sequence words like first, next, and then to write coherently. Vocabulary word banks help students focus on the words to include in their documents.

5) Students are to learn writing conventions

Color coding buttons helps students write complete sentences including verbs, modifiers, and conjunctions. Automatic capitalization can be turned off so students practice rules for beginning sentences and proper nouns. Repeated practice with sight words helps students learn correct spelling and usage. Auditory feedback allows students to listen to their words, phrases, and sentences for correct syntax, and clarity of meaning.

In the following section, the means by which PixWriter delivers against these objectives is examined.

Create a comprehensive list of device or software features and explain how each works: (4 Points)

PixWriter contains a good array of functionality for students and instructors to collaborate in the teaching of writing.

Procurement and installation are simple. From the SunCastle Technology website (www.suncastle.com, or www.attainmentcompany.com) the appropriate version is downloaded for the Windows or Mac platform. The software installs based upon typical or custom configuration, and the user provides the appropriate license keys to enable the software.

A summary of the key features of PixWriter is listed below.

Function/Window	Feature	Description
Main	File	Performs standard Windows (or Mac) file management functions (e.g. New, Save, Delete)
Main	Edit	Performs standard Windows (or Mac) document management functions (e.g. Copy, Cut, Paste)
Main	Option	Supports numerous customization functions specific to PixWriter (see Options section)
Main	Speech	Supports the configuration of the Speech feature (e.g., speed of speech, accent, voice)
Paper	Paper	Supports the display of the writing project generated by the student. This includes text, the Buttons from the Word Bank, and other symbols added by the user.
Toolbar	Palette	Determines the color to be used when the user selects an object, whether text, a Button, etc.
Toolbar	Get Pictures	Initiates the retrieval of images from the default directory
Toolbar	Phrase Edit Box	The area where the user enters text to be displayed in the Paper
Toolbar	Punctuation	Four punctuation marks (comma, period, question mark, exclamation point) that, when selected, are inserted into the text
Toolbar	Speak	Controls the vocalization of text from the Paper
Toolbar	Locked	Determines whether the user can move, add, or delete a Button
Toolbar	Erase	Deletes the text and/or Buttons from the Paper
Main/Option	Punctuation	Determines the size of the Punctuation Button
Main/Option	Speak	Determines the size of the Speak Button
Main/Option	Erase	Determines the size of the Erase Button
Main/Option	Word Bank	Determines the availability of the Word Bank to the user
Main/Option	Setup Scan	Opens the Scan dialogue box for Single-Switch Scanning and Two-Switch Step Scanning.
Main/Option	Text Size	Adjusts text in the Paper to a larger or smaller size
Main/Option	Picture Size	Adjusts Buttons in the Paper to a larger or smaller size
Main/Option	Font	Controls the font to be displayed in the Paper
Main/Option	Button Number	Determines the number of Buttons to appear in the Word Bank (4, 16, 36, 64)
Main/Option	Gender	Determines the gender pronouns to be used in the writing assignment in the Paper.
Main/Option	Picture Color	Determines whether any of the pictures (including Buttons) appear in color or black & white within the Paper
Main/Option	Sync Document/ Button Font	Determines whether the font used in the Buttons and the text in the Paper will be the same
Main/Option	Pictures on Buttons	Determines if the text within the Paper will have text within the Buttons
Main/Option	Pix Cards	Formats PECS cards for classroom use
Main/Option	Smaller/Larger	Determines the size of the pictures (including Buttons)

	Pictures/Text	and text in the Paper
Main/Option	AutoCapitalize	Determines if the first word of a new sentence will be automatically capitalized in the Paper
Main/Option	Spanish	Determines whether PixWriter will operate using an English or Spanish Word Bank

Describe the interface the user interacts with when using this program, how is this beneficial, what parts of it are confusing, and how it affects people with multiple disabilities (ex those with physical and visual impairments)? (3 Points)

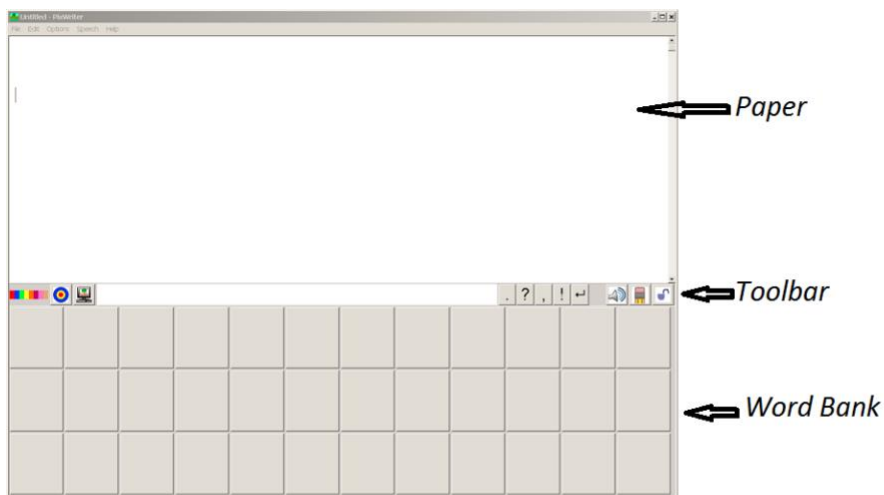
PixWriter operates with a well-designed GUI, with each object clearly labeled, and with the main areas for workflow logically laid out. Pointing devices including joystick, mouse, and even touch screen are supported, thus enabling most users, even those with moderate to severe disabilities (MSD) to use PixWriter. Every graphical object can also be enabled through a keystroke combination. This facilitates usability for those who are not able (or patient enough) to accurately operate a point or other pointing device.

Some of the essential features of PixWriter will be described below, in the context of the GUI.

The initial screen is the PixWriter Main Page. When PixWriter opens, the user notices the PixWriter screen is divided into three areas: the **Paper, the Toolbar, and the Wordbank.**

The diagram below shows the important areas on the main window.

Main Window



The next diagram illustrates the main functions of the Toolbar.

Tool Bar

Palette Target Get Pictures

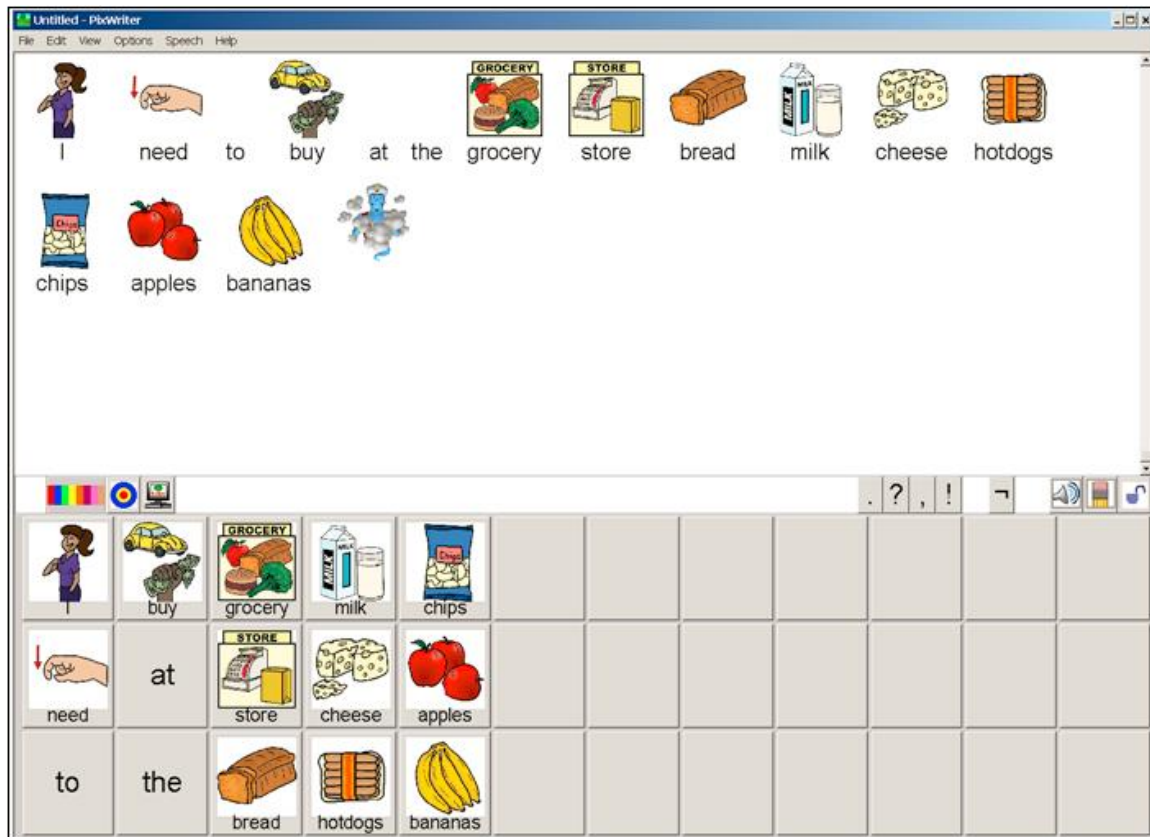
Punctuation Speak Erase Locked



To create entries in the Word Bank, the user simply follows these steps:

1. Type a word in the Paper portion of the screen.
2. Hit the spacebar to make a button. Capitalize proper nouns and the word "I."
3. Continue typing words followed by the spacebar until all the desired vocabulary is in the Word Bank.

These steps are illustrated in the diagram below.



There are numerous techniques to create efficiencies in the writing process though PixWriter. For example, the Phrase Edit Box located in the Tool Bar allows you to fill one button with two or three words that are represented by one Literacy Support Picture™ (LSP). To create an LSP, click in the Phrase Edit Box to activate it. The cursor will flash in the Phrase Edit Box.

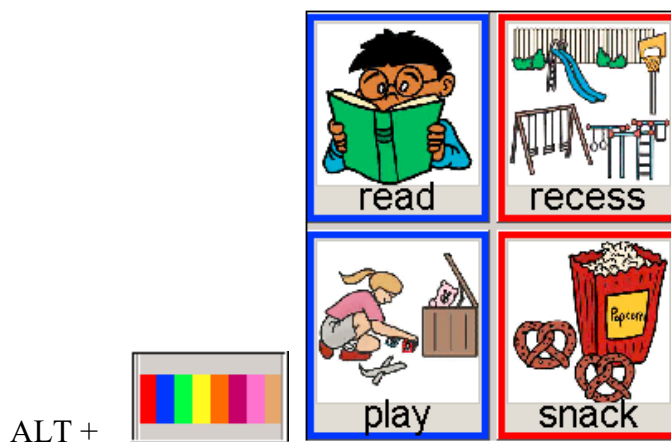


Type your words in the Phrase Edit Box and select the Get Pictures (or Parse) Button. A button will fill with the words and one picture. These steps are illustrated in the diagram below.



At times, students find that organizing the pictures into logical groups (i.e., verbs, nouns, and prepositions) helps them to create stories more quickly. The Coloring Button Borders enable such a classification. To activate this feature:

1. Hold down the Alt key and click the desired color on the Palette in the Tool Bar.
 2. Continue to hold down the Alt key and click on a button to add the color border.
- Several buttons can be colored with subsequent clicks.
3. Click on the Palette to select another color and repeat.
 4. The user may change a colored button back to black by holding Shift and Alt keys and clicking the button.



The user can move, delete, or copy buttons through the following operations:

- To move a button, hold the Shift key and drag a button to move it. If another picture or word is in the location, the pictures/words will swap positions.
- To delete a button, hold the Control key (ctrl) and click a button to delete it from the Word Bank.
- To duplicate a button, hold the Shift key and click on the desired button.

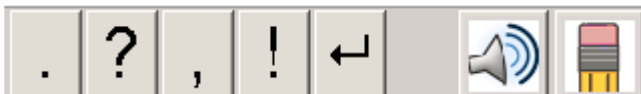
The instructor may wish to prevent the addition or deletion of the buttons in the Word Bank. This can be achieved by locking the Word Bank. To do so, execute the following steps:

1. Click the Lock button on the Tool Bar. This will prevent accidental changes in the Word Bank
2. To unlock the Word Bank, use the Edit Menu or Ctrl + L.



Note that the keyboard is always active, even when the Word Bank is locked.

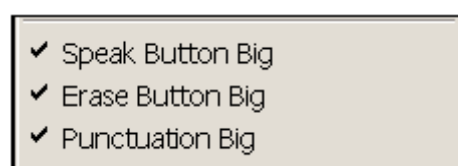
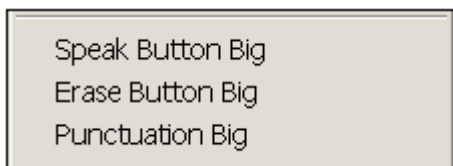
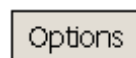
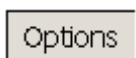
The Punctuation, Return, Erase and Speak buttons are in the Tool Bar. These buttons are active in the Tool Bar and students can click on any of these buttons while writing.



If desired, the Punctuation, Erase and Speak buttons can be moved into the Word Bank. Some reasons for moving the buttons to the Word Bank are to:

1. emphasize adding punctuation in a student's written work
2. address visual concerns for recognizing and selecting these buttons
3. toggle the availability of the buttons during scanning mode.

To execute this, select Punctuation Big, Speak Button Big or Erase Button Big in the Options Menu. PixWriter will place these buttons in the last spaces in the Word Bank.

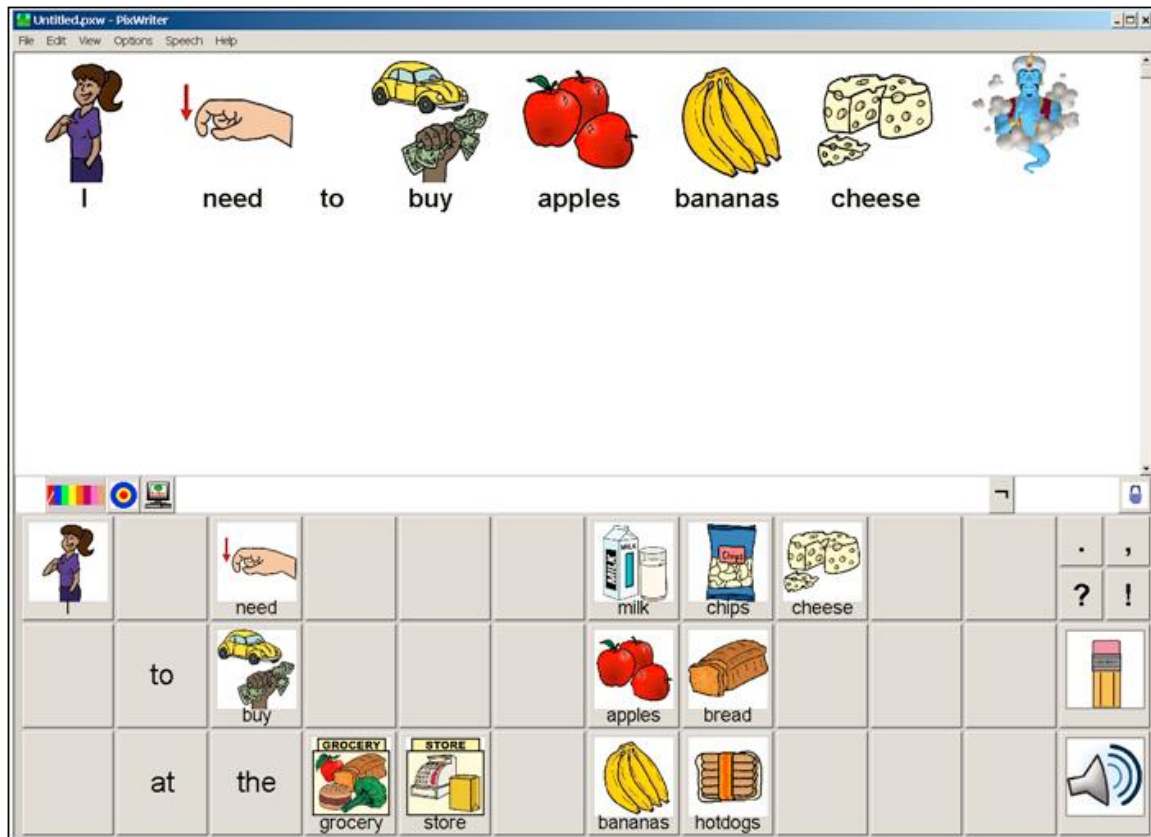




The Speak button performs the following functions:

1. Selecting the Speak button will cause the words showing on the Paper to be read by the computer. The words will be highlighted as they are read. The user can stop the speech by selecting the Speak button again.
2. If a single picture is selected from the Paper and the Speak button is selected, only that word will be spoken.
3. If a single word is selected from the Paper and the Speak button is selected, the computer will begin reading from that point. You can stop the speech by selecting the Speak button again.

Writing with PixWriter can involve the Mouse, Touch Window, Joystick or Similar Device. To begin, click on a button to write the picture/word on the Paper.



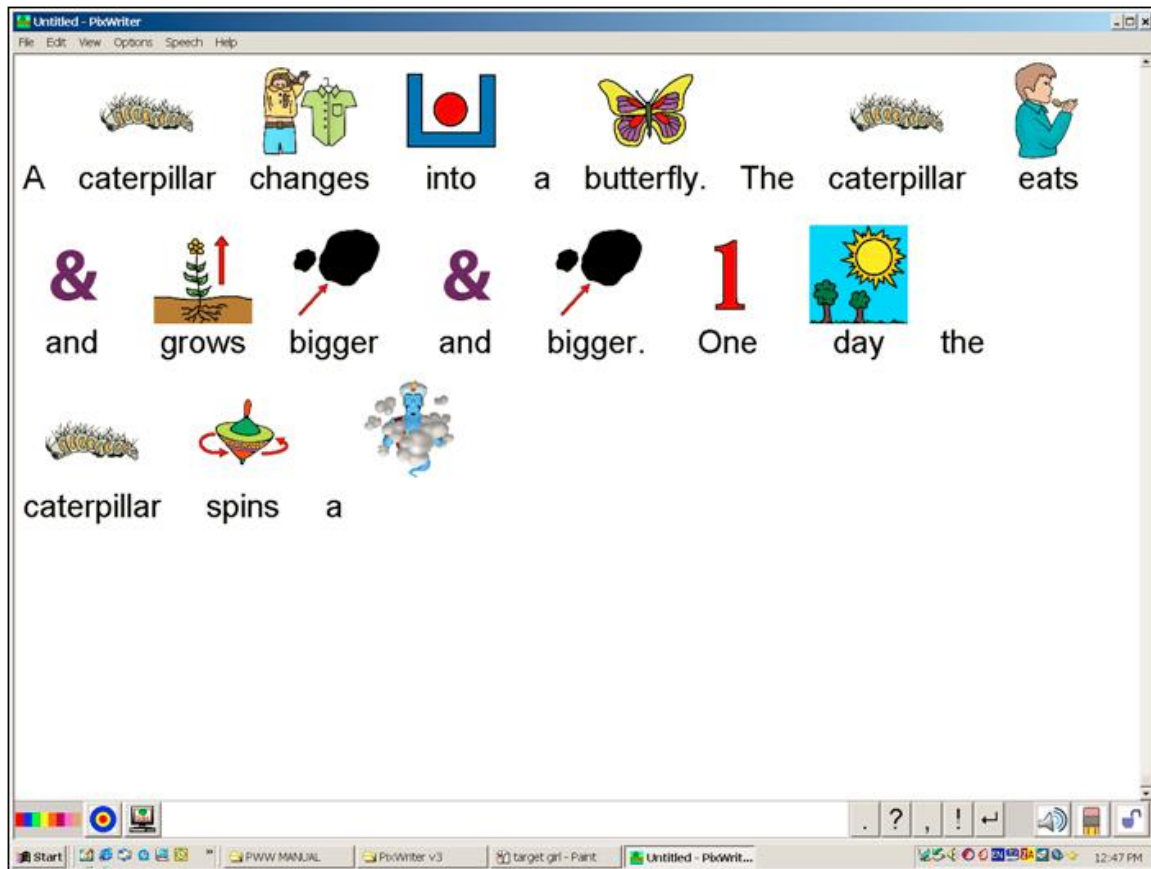
To write directly from the keyboard, type and press the spacebar to put words on the paper. Even if the Word Bank is completely filled or locked, words will appear on the paper and the LSP supporting that picture will be paired with the word in the Paper area.

In the case where no buttons are showing:

1. Go to the Options Menu and select Hide Word Bank. The Word Bank will disappear, but the Tool Bar will remain available

Options

Hide Word Bank



2. Return to the Options Menu and select Show Word Bank to bring the Word Bank back to the screen.

Options

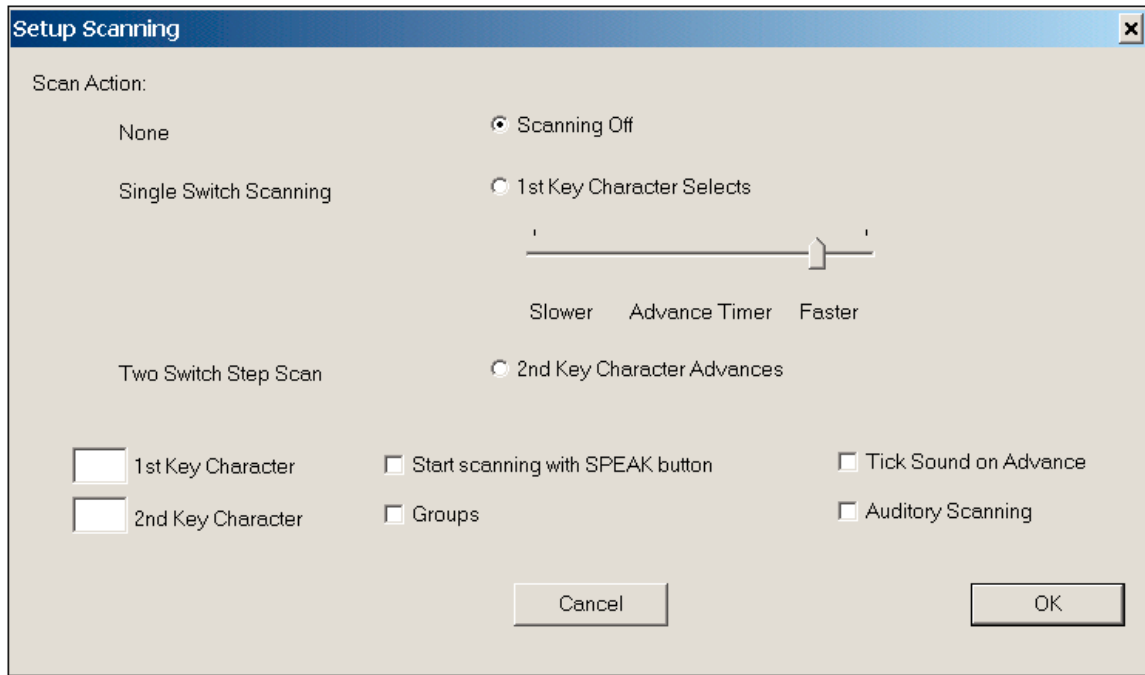
Show Word Bank

To write using switches, the user selects Setup Scan in the Options Menu to set the parameters.

Options

Setup Scan...	F8
Toggle Scan On/Off	Ctrl+= or F7

The user sees the following window:



There are two scanning options available: Single-Switch Scanning and Two-Switch Step Scanning. In single-switch scanning, the user hits the switch to start the scanning. PixWriter moves the highlighter from one button (or group) to another using the time interval set in the Advance Timer. Pressing the switch on a highlighted button will print that word/graphic on the Paper.

1. Set your Single Switch Interface Action according to the directions included in your interface instructions. Check your switch interface for possible settings (for example, #1 for Switch 1).
 2. Type the character in the 1st Key Character box in the bottom section of the dialog. When designating a key character, be sure to type in a printable character (i.e., letters, numbers, and punctuation).
 3. Move the slider to the speed desired for the scanning. The time between advancing the scanning ranges from 6 seconds to a couple of tenths of a second.
 4. Select any or all of the program options which are shown at the bottom of the dialog.
- Start Scan with Big Speak Button. The Speak Button must be in the Word Bank to be scanned. Starting here allows the student to listen to what he/she has written before continuing with the written language assignment. This option is only available when Groups (see below) is not selected.

- Groups. The Word Bank contents are scanned in groups to speed up locating the desired word. After the Group has been selected, the individual words within that group are scanned.
- Tick Sound on Advance. A soft “tick” is heard as the scanning moves from button to button or group to group.
- Auditory Scanning. Selecting this option will turn on auditory scanning of the individual buttons. The words will be spoken as the buttons are scanned. NOTE: If the scanning speed is very rapid, some words may not be said entirely. Adjust speed if needed.

5. Click OK.

In two-speed scanning mode, a switch advances the scanning. When the desired word has been highlighted, another switch selects that word and prints it on the Paper. There is no timed interval in two-switch step scanning, since the user determines how quickly the scanning advances from button to button.

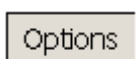
1. Since two switches are in use in this scanning mode, you will have to designate two key characters in order for the switch interface to recognize the two switches. Check your switch interface for possible key characters to use.
2. Enter the 1st and 2nd Key Characters in the boxes at the bottom of the dialog.
3. When designating key characters, be sure to type in printable characters (i.e., letters, numbers, and punctuation).
4. Make your selections for options. (See step #4 in Single-Switch Scanning above for a description of each option.)
5. Click OK.

After the scanning options have been set and you return to the main screen, the Tool Bar contains an indication of the scan settings. The key character(s) you designated appear next to the Return button in the Tool Bar.



When scan settings are active, press ESC to turn them off or select the menu item

To change the size of words on the Paper, select Smaller Text (Ctrl + 3) or Larger Text (Ctrl + 4) in the Options Menu. Repeat the selection to get the desired text size.



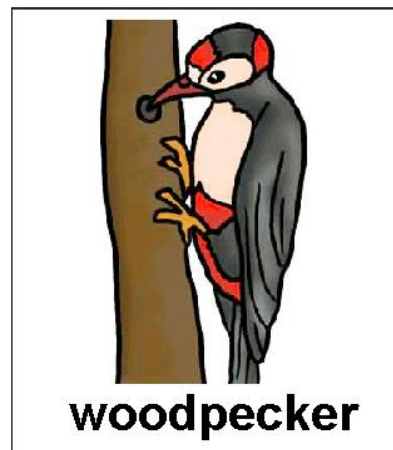
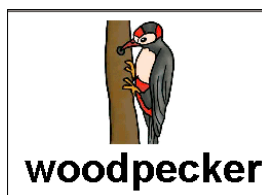
Smaller Text	Ctrl+3
Larger Text	Ctrl+4



To changing the size of pictures on the Paper, select Smaller Pictures (Ctrl + 1) or Larger Pictures (Ctrl + 2) from the Options Menu. Repeat the selection to get the desired picture size.

Options

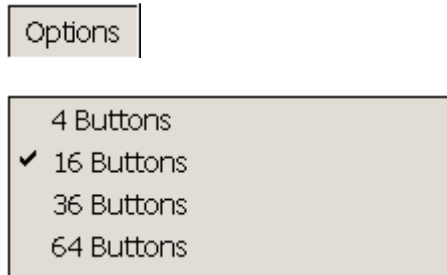
Smaller Pictures	Ctrl+1
Larger Pictures	Ctrl+2



The PixWriter literacy support picture library provides additional pictures of over 10,500 graphics. The user can select how many of these buttons that appear in the Word Bank.

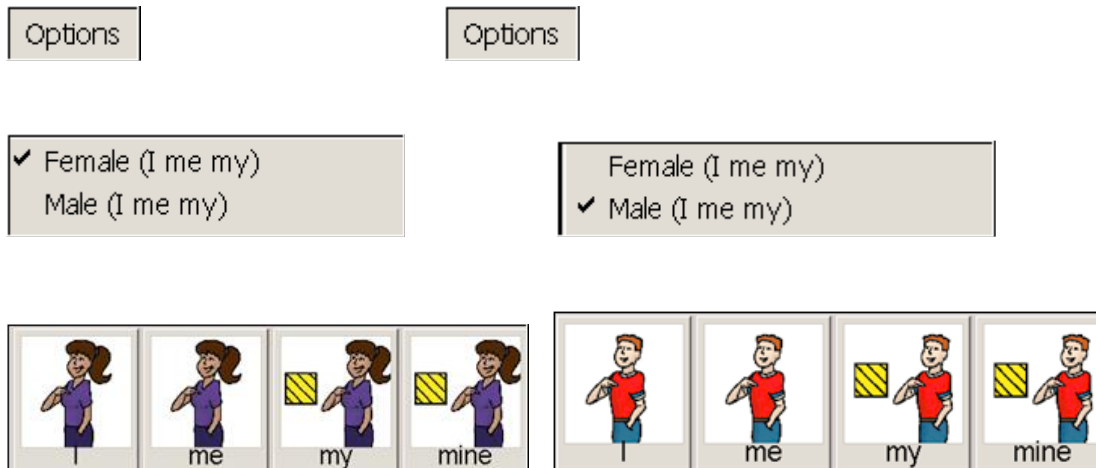
To do so:

1. Go to the Options Menu.
2. Select 4, 16, 36, or 64 Buttons. The default Word Bank is 36 buttons.



The user can select which personal pronoun is appropriate for their gender. This has the effect of personalizing a Word Bank to reflect the gender of the person writing or a character in a story. All personal first-person pronouns (I, me, my, mine) will appear as male or female depending upon your selection.

To execute this function, go to the Options Menu and select the appropriate gender.



There are many more functions and features contained in PixWriter. The examples offered above illustrate the power and configurability of the software.

Compare and contrast this device or software to one similar product: (4 Points)

Read and Write Gold is available for nearly all Windows operating systems, as well as for Macintosh. Read and Write Gold has some of the same features as PixWriter, in particular as relates to vocalization of speech. A complete list of the functionality

contained within Read and Write Gold can be found at <https://www.texthelp.com/en-us/products/read-and-write-family>.

Unlike PixWriter, Read and Write Gold provides text masking. This is important for visually or behaviorally disabled users for whom large amounts of screen text are problematic, and who benefit from isolating a small area of text, and especially in a bimodal (text and speech) setting.

A cursory examination of the Read and Write Gold product resulted in these observations:

- Procurement and installation was as simple as for PixWriter
- The user interface of each product was effective and easy to understand and use.
- Text formatting and control, including font size, color, and contrast, were not as full-featured as for PixWriter
- Writing capabilities were quite different as for PixWriter, since it doesn't support the same type of correlation between a picture and a word.

The pricing model for Read and Write Gold also differs somewhat from that of PixWriter. Licenses are available for educational institutions as well as for corporations, while PixWriter has only one type of license. An individual educational license is available for \$645, which is the same price as the educational license. These licenses differ only slightly, with the corporate version geared to support users of English as a Second Language (ESL) or with dyslexia, while the education package is geared to the student market. Like PixWriter, I couldn't find multi-user pricing for Read and Write Gold. More information is available at <https://www.texthelp.com/en-us/products/read-and-write-family>.

What difficulty would someone using this program encounter? (2 Points)

One model for evaluating the efficacy of software is to compare and contrast four factors: usability, value, adoptability, and desirability (adopted from Guo, 2012).

Usability is about how easily users can complete their intended tasks using a product. PixWriter is thoughtfully designed to assure ease of use and a logical flow between features, and it is apparent that it was developed with an eye toward supporting students with various disabilities (e.g. dysgraphia, dyslexia, attention deficient (hyperactivity) disorder (ADD/ADHD), autism spectrum disorder (ASD)). I expected that a product with functionality as broad and deep as this one would suffer from usability issues, but I discovered the entire package was written in a consistent, robust, and compliant manner

Value is related to the other elements of user experience such as usability and desirability, but essentially correlates to a product's functionality and features. As noted above, PixWriter has a more-than-adequate palette of features and functionality to remote the writing process. PixWriter comes in at a very reasonable price point of \$199.

Adoptability relates to the ease of access to the features of a product, while value relates to a product's features and content. To improve adoptability, a product should address the natural context in which a user first gets exposed to their product and how it impacts the design of the workflow. As noted above, PixWriter is designed with multiple constituencies in mind, but with features that definitely support the moderate to severely disabled (MSD) user—those with a range of behavioral or learning disabilities. In this case, I found that the workflow between and among the features is clear, and is actualized through a minimum number of selection.

Finally, a desirable product must be engaging and relevant to users, without sidetracks and loose ends. PixWriter definitely scores well in this area. I went to www.attainmentcompany.com and reviewed the help area (there were nearly 3800 different threads). It certainly appears that there is a high degree of user satisfaction with PixWriter.

Discuss the amount of training necessary to use this properly. (1 Point)

There are videos available at no charge that guide the user and the instructor through the key features of PixWriter. I would judge the learning curve to be relatively flat, while keeping in mind that PixWriter is geared toward users who have great difficulty in performing the typical analytical tasks expected in writing. A user with MSD will definitely require an instructor to both reinforce the conceptual activities in writing, as well as to illustrate how to actualize those using PixWriter.

What changes to the device or software need to be made to make it better work for its target population? (2 Points)

I tried very hard to pierce through any weaknesses in this product, and to identify areas for improvement. As it is mature, with a wide following, PixWriter is a solid entry into this space.

What factors of this device may lead to abandonment? (2 Points)

The major factors that could lead a user to abandon PixWriter are threefold: frustration with its capabilities; frustration with its performance; and frustration with the support. Any of these are sufficient to cause any user to slow or halt their use of PixWriter. In my limited experience, I would judge that users should take care to both ensure their hardware stack is up to the requirements that SunCastle specifies, as well as maintaining software patches and otherwise ensuring they are on the current release. In addition, while I saw no particular performance deficit, setting reasonable expectations for the performance of the product is vital to user acceptance and adoption. Users with older equipment may find PixWriter to be slower than they expect. Finally, vendor support for technical and functional matters is crucial to maintaining good usage patterns. Even

though SunCastle makes no particular commitment on response time, there was no evidence in the help area that suggested a significant issue in this area.

Bibliography

Pennington, Robert C. (2016). Write on! Using Assistive Technology and Systematic Instruction to Teach Sentence Writing to Students with Moderate to Severe Disability. *Journal of Special Education Technology, Vol. 1*, pp. 1-8