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## WordQ

Different writers use WordQ in different ways. It is used while typing, proofreading or to assist with reading. However, many writers use it for all three.

Using WordQ while you're typing helps struggling writers of all ages to get their ideas on the page. Elementary and middle school writers find it extremely helpful, as do English language learners[1]. WordQ makes spelling easier, and it saves time and energy. Many writers find they write better, with more accuracy and have the stamina to write for longer. This translates into an increase in the amount of writing they do. Writers usually experience an increase in the quality of their writing while using the words and sentences they want, instead of merely the words they can spell and the simple sentence structures they are confident with. Not surprisingly, writers find an improved sense of pride and ownership in their work.

[1] A note for assistive technology trainers and teachers: Many high school writers do a good job of getting their ideas captured by themselves, and may resist the recommendation that they should use it to help while their typing. They may choose to ignore the whole program once the session is over. Instead, ask them what techniques they have for proofreading, how effective they are, and how many grades they think they usually lose on assignments because of spelling, grammar, and punctuation errors. Then, show them how it can help with proofreading.

Using WordQ as a tool for proofreading enables writers to produce high quality written work, independently. Everyone knows the aggravation of finding a preventable error in their own work, after it has been submitted, e-mailed, or published. Using WordQ to proofread often means better grades for students, and for adults it means less embarrassment and a higher degree of professionalism. It is the least known function of WordQ, yet those who use it say it has the most substantial effect on the quality of their writing.

WordQ is primarily a writing tool, but it can also assist with reading. In any program where text can be selected, writers can have text read aloud. This is helpful for researching online, reading emails before responding, interacting on Facebook and instant-messaging and anywhere where text needs to be read. It is also perfect for light reading and browsing on the Internet.

WordQ is made of two integrated technologies: word prediction and speech feedback (also known as Text-to-Speech).

## Word Prediction:

This section outlines how to get started with WordQ, how it makes predictions, how to perform user techniques, and how WordQ was created.

**Word Prediction: Getting Started**

Word Prediction is turned "ON" and "OFF" by pressing the "words" button, or F9. There are three different ways to select words from the Prediction Box: the cursor keys, the mouse, and the number keys. Each has its own advantages and disadvantages.

**Selecting with Cursor Keys**

For most writers, using the arrow keys (or cursor keys) is the most effective way of using WordQ's prediction box. Whenever a writer wants to hear words from the prediction box, they can press the 'down arrow key'. When they find the word they want, pressing 'Enter' will select the word. Using the cursor keys is best practice for full-time users. There are several advantages to using the cursor keys. First, writers can hear the words before they select the one they want. Second, most writers can find the arrow keys without thinking or looking for them. Third, since the "down arrow key" cycles between words, every word can be accessed with the same button. This is ideal for writers with working memory problems, because distractions are eliminated and the focus is given to their word or their ideas. Fourth, this is the fastest and easiest way to integrate WordQ's word prediction into the writing process.

**Selecting with the Mouse**

The mouse can also be used to select words from the prediction box. Just point at the word to hear it, and click to choose it. This is the preferred method of teachers and parents that are supporting a student writer. There are two advantages to using the mouse. First, it is very easy to remember and simple to use, and second, a writer can listen to the different words available before selecting.

The main disadvantage of using the mouse is that it is slow and cumbersome. A writer must move their hand from the keyboard to the mouse, visually find the mouse pointer on the screen, find and select the word, and then move their hand back to the keyboard to continue typing.

**Selecting with Numbers**

Words can be selected from the prediction box by pressing the corresponding number on the keyboard. This has the distinct advantage of requiring a single key to select the word. This can be particularly important if the writer has motor difficulty.

The first disadvantage of this method is that the writer cannot hear their words spoken before WordQ writes it. The writer is required to read and identify their word before it is selected. For many writers this is difficult and they often read

things incorrectly. Thus, when they use the numbers, they risk selecting the wrong word.

The second disadvantage of using the numbers is that it requires strong working memory to go from one task (putting ideas down) to another (remembering the right number and finding it on the keyboard) and back again. The number itself creates a distraction that can interrupt the writing process.

The third disadvantage is that since the number keys are used for making predictions, when a writer wants to use them for digits, they will get words predicted instead.  e.g. if they want to write: "I am 15 years old" the easiest thing to do is turn off the Word Prediction by clicking the "Words" button (F9). Another long-term possibility is to turn off the option of selecting by numbers entirely: Options/Prediction/Selection/ "OFF" select by number. However, this disables the ability to use numbers for selecting the predicted words.

**How WordQ Predicts and Writing Techniques**

WordQ simultaneously predicts the next word based on what you've already written. It learns what you type, tries to complete your words, and if you are creatively spelling it provides likely predictions. Plus, if you know that you confuse homonyms, it can provide and read usage examples to remind you which spelling to use.

WordQ predict the next word because it knows that certain words are likely to follow other words. For example if the writer types "computer", it knows that is it likely that it will be followed by the word "system". If the writer types an "e", then it will predict likely words that start with "e", such as "engineer". WordQ cannot understand nor predict what the writer means. It can help find the next word, but it certainly cannot write a meaningful sentence without the writer's constant direction, much less a paragraph or a whole assignment.

WordQ learns which words a writers likes to use, and improves its prediction of those words over time. The first time "punctuation" is typed it will usually take eight letters before it is predicted. This is hardly a miraculous prediction. But after it is selected from the prediction box, the next time it will take two letters. The more writers use a word, the better WordQ will predict it.

WordQ completes words for you, which is similar to many cell phones with text prediction, such as T9. If you type "auto", it will then provide endings that would complete that word. It might list: auto, automatic, automobile, automatically, autographs. Sometimes WordQ doesn't provide the correct ending on a word. Many writers use a technique of selecting a word in the same family, and then use the

word prediction to help change the ending. For example a writer desires "completion", but they can't spell the entire word. They type "comp" and then look for predictions:

*company*

*computer*

*companies*

*complete*

*compared*

After listening to the options[2], they are certain "complete" is close, but it doesn't have the correct ending. They first select the word, then delete the ending, and finally look for new modifications.

[2]See the section on Speech Feedback for Word prediction.

1. Selected word: complete

2. Backspace to change the ending of: "complet"

3. New predictions available: complet

*complete*

*completely*

*completed*

*completion*

*completing*

WordQ adapts to writer's creative spelling. If a writer misspells a word and it cannot be completed, then WordQ will assume that it is misspelled, and make predictions accordingly.

For example: Telvon.

"Telvon" isn't a real word. No ending can be placed on it that will make it a real word. WordQ will make predictions based on the order and grouping of letters, at the same time factoring in the possibility of letter substitutions and omissions.

WordQ may predict:

television

twelve

telephone

telling

televisions

Above, the bolded letters are what it perceives as being in similar order and grouping as "Telvon". [3]

[3]WordQ recognizes many of the most common phonetic spellings for words. Many struggling writers have poor phonetic awareness. It is often greatly over simplifying the problem to assume that they are merely substituting "ph" for "f", or a "c" for a "k". While these substitutions happen, their errors aren't perfectly systematic. Writers often remember parts of words and have to guess at other parts, while forgetting letters and sometimes even entire syllables.

When designing a tool to assist with writing, it is important to understand the diversity of problems that writers have, and the techniques they may use. Generally speaking, most writers know how to spell short common words: "the" "and" "she" "food" "home". Yet longer words that are less common pose greater difficulty. Many writers remember how a word begins and/or ends, but the middle is often where they struggle the most. Longer words have larger middle sections that pose greater difficulty, whereas shorter words have no middle section at all and are easier.

Often, writers try to consider what they can remember about a word, as well as its general appearance. Certain letters and letter combinations can be particularly memorable in appearance. Of course, this largely depends on the student and the particular word. The letters "b" and "d", "p" and "q" and for some even "n" and "m" look so similar that they are bound to get confused. Yet, letters like "k" "w" "x" and "z" are unusual in appearance, and are easier to remember. It is true that "c" and "k" are often confused, but this is more a failure of phonemic ability when it is required, and not a question of what appears correct. For some students "k" stands out, for others it might be a "g". Likewise, double letters like "oo" and "ee" standout to many and are easier. This attention to appearance explains why many writers remember silent letters. Phonetically speaking, the letter shouldn't be there yet, because the writer has a sense of how the word should look, they decide to use it.

What this means is that some of the correct letters will often end up being in the word, even if not phonetically correct. Yet, it is still spelled incorrectly, because the letters aren't in the proper order, and some have been substituted and some

shouldn't be there at all. The design of a tool to help them needs to consider everything they know about the word, even what it sounds like: see our SpeakQ transcript to learn more.

WordQ aids helps to differentiate homonyms and homophones by offering, and reading, usage examples to remind you which spelling to use. Writers often know words that sound the same but are spelled differently. For example: their, there and they're; to, two, and too; then and than; or Mary, marry, and merry. Most writers know homonyms are easily confused and many cannot keep them straight. WordQ helps with homonyms by having usage examples built into the word prediction and identified by a grey arrow beside the word. Students can read and listen to the usage examples before selecting which word they want. When using the mouse, writers can hear a usage example by pointing and pausing over a word that has a grey arrow beside it. When using the cursor keys, a usage example can be seen by pressing right arrow key to hear it.

**Common Questions**

"Can I add words for WordQ to predict?"

Yes. WordQ has a vast vocabulary, but there may be additional single words, names, or places that a person may want to use. Words can be added to the main vocabulary: options/my words then enter the new word and click "Add" or press "Enter". WordQ also creates a list of used words that it doesn't recognize. They may be misspelled words, or words it just doesn't have in its vocabulary. You can review these words, and decide if you want to add them to the main vocabulary of the user file, or delete them from WordQ's memory by clicking on Options/My Words/Spelling.

"Can I make topic lists?"

Yes, but they are rarely ever used by writers. WordQ can modify its prediction ability by categorizing words in a specific topic. If a writer knows they are going to need words for a particular topic, they can select it from WordQ's pre-made topic lists, or create their own. This is a question that often comes from people comparing products. WordQ's competitors talk a lot about their topic lists. However, most writers never actually use them. To do so would require writers to think about and plan what kind of words they are going to use in advance. Practically speaking, most writers never do this kind of planning. Instructions for creating and using topic lists can be found here: options/help/WordQ user guide then page 21.

"Can I leave the prediction box in place?"

Yes. By default, the word prediction box is set to follow the cursor as it moves. Some writers find the movement distracting, and others with reading difficulty may have problems tracking the box as it moves across the page. The solution in either cases is to anchor the text box in place: option/prediction/ "leave in place"

## How WordQ's Word Prediction is Unique

WordQ developers start by creating an extensive and enormous library of electronic texts for a computer to process. This included books, newspapers, magazines, encyclopedias and more.

The computer begins by creating a long list of every word in the library. This list is millions of words long. Simultaneously, it notes how often a word is repeated. This list is actually too long to be useable, as is. It includes every misspelled word, thousands of acronyms, extremely unusual words, as well as those in foreign languages. The compilation of words is so long that if you made a word prediction program from it you would rarely get the word you wanted.

Developers trim the list down to about 15,000 words. This may sound small, but this vocabulary has just about every word you would want to use. Plus, you can still add words, like unusual names and places. With this trimmed vocabulary, developers then have the computer reprocess the library.

Next, when the computer reprocesses the library it changes its focus. It learns the statistics of how often any particular word follows any other word. For example, it concludes that "computer" is very commonly followed by the word "system". If the writer prompts a word with an "e" after computer then it will predict the words that commonly follow computer starting with an "e", for example: equipment, expert, engineer, etc.

## Speech Feedback

Speech Feedback can be turned "ON" and "OFF" by pressing the "Speech" button or F10. This section outlines how WordQ reads as you type and predicts words, assists with reading, and is specifically designed for proofreading.

WordQ can read while a writer is typing. After a word is typed, pressing the 'spacebar' will make WordQ say the word aloud. Writers will know immediately if a word is spelled incorrectly because it will sound wrong. When a writer finishes a sentence, pressing period " . " and then spacebar will make WordQ read that sentence aloud. Instantaneous audio feedback allows the writer to consider if their sentence has the grammar, punctuation, and clarity that they intended. Many writers find that hearing their sentences lets them reconsider and improve upon their writing independently.

It can be distracting to hear every word you type read aloud, and many would rather hear only the completed sentence. Generally the faster you type the more obtrusive it can be. This can be modified: Options/Speech Feedback/Feedback "off" speak words. The benefit of hearing each word read aloud is that the writer gets immediate feedback. Obviously, a good speller will find this redundant, and an inexperienced writer will appreciate the feedback more.

When "Speech" (F10) is "ON", WordQ will also read words and usage examples from the prediction box. See the section on selection methods, and how speech feedback can vary.

WordQ's proofreading support enables writers to improve the quality of their own work, by themselves. Nearly all writers relate to the feeling of finding a preventable error in their own work after it has been submitted, e-mailed, or published. Using WordQ to proofread often means better grades for students, and for adults it means less embarrassment and a higher degree of professionalism in their writing. It is the least known function of WordQ, yet those that know about it say it has the most substantial effect on the quality of their writing.

WordQ has been specifically designed for proofreading inside Microsoft Word, Outlook and many other programs. When the cursor is flashing in a sentence, click "Read" (F10) and this will automatically select/highlight the sentence. This turns "ON" proofreading mode. Pressing the spacebar will now start and pause the reading function. Navigating between sentences and specific words is easy. Pressing the up and down cursor keys will shift the reading to the previous sentence and following sentence. Pressing the left and right cursor keys will make WordQ read word by word. Finally, clicking with the mouse on any part of the document, or pressing escape (ESC) will turn off Proofreading mode.

When writers listen to their work, they know how it should sound. WordQ reads everything exactly as it is written. Generally, words that are misspelled are mispronounced accordingly or are caught by spell check. Written grammar errors are read exactly as they are, and the sentence doesn't sound as intended. Punctuation errors disrupt the intended rhythm of the sentence. A run on sentence even makes the computer sound like it is running out of breath.

Most writers can hear nearly every kind of writing error, except for two: homophone (words that sound the same but have different spellings such as to, two and too), and capital letter misuse. It is simply impossible to hear these mistakes. Fortunately, most writers use WordQ in combination with Microsoft Word spelling and grammar, which helps in finding these particular errors. WordQ's usage examples provide extra support for determining the correct spelling. See the previous section on homonyms and homophones.

WordQ is primarily a writing tool but it can also assist with reading. In any program where text can be selected, writers can have text read aloud. This is helpful for researching online, reading emails before responding, interacting on Facebook and instant-messaging and anywhere they need to read. Follow these simple steps: 1) with the speech "ON" select what you want read, and 2) then press the "Read" button. The reading speed can be changed using the slider found under options/speech feedback.

Writers, particularly those needing assistive reading, find it helpful to raise and lower the reading speed of the computer. Setting a faster speed is useful when the writer wants to skim a document, alternately, a slower speed is appropriate when something needs to be read closely.

WordQ does not have a dictionary. Dictionary preferences can vary by age, subject, academic discipline, technical specificity, political and religious preference and more. Nearly any kind of dictionary imaginable is quickly and easily available online for free, and WordQ can be used to search and read from them.

Writers are sometimes confused between assisted reading and proofreading mode. In assisted reading: the text is highlighted and then "Read" is pressed. Where as in proofreading mode: "Read" is pressed first to turn it on (which automatically highlights/selects the sentence), and then "spacebar" is pressed to make it read aloud. The confusion happens when writers combine the first step of assisted reading (selecting the text) and the second step of using proofreading mode (pressing spacebar) of course this results in erasing the selected text, because the selected text was replaced with a space from the spacebar. If this happens you can 'undo' by clicking on edit/undo in the word processor, or pressing 'ctrl+z', or on a Mac 'command+z'.