



Central Access Reader (CAR) Free Screen Reader for Math

By Andrew Leibs

These days, students with visual impairments or learning disabilities can hear virtually any document, e-book, or web content read aloud. Text-to-speech has evolved from an assistive technology once only found in screen readers to a utility available in most operating systems or as a free app.

One area where text-to-speech has been less effective is mathematics – reading numbers, exponents, and symbols in a way that helps students overcome print disabilities to solve equations.

A recent solution is Central Access Reader (CAR), a free, open source, text-to-speech program designed specifically for students with ADHD, dysgraphia, dyslexia, and visual impairment. CAR deciphers mathematical notations most screen readers do not support.

Spencer Graffe, then a computer science major at Central Washington University (CWU), conceived CAR as his capstone project during his senior year. Central Access, the university office that furnishes accessible educational materials to students with disabilities, hired Graffe to further develop CAR as a product after the project ended.

Graffe, along with fellow computer science major Justin Wilson, refined the program's math-reading capabilities, enabling it to recognize symbols from geometry, trigonometry, linear algebra, calculus, logic, and statistics.

CAR works best for math work or problems that are created as Microsoft Word documents, or those done using MathType or similar software designed for students with dysgraphia. You insert equations into a Word doc using the Insert tab/option, then save it on your desktop. Then you can open CAR, drag the

document in, and test it out; e.g., listen as it's read aloud, and make edits. The program also enables low-vision students to view math in large print and high contrast.

CAR runs on both Mac machines and PCs – though not Windows 32-bit systems. It transforms any Microsoft Word document into a multimodal learning tool by facilitating visual tracking of text as it's read aloud via highlighting, using whatever voices are installed on the machine. Mac and PC users can also customize how the text looks and sounds to make assignments easier to read and understand. Low-vision students, for example, can also enlarge the text and heighten the contrast.

The application works even if Microsoft Word isn't installed on your system as most word processors enable users to save documents as .docx files. In addition to MathType, CAR also supports Word's Equation Editor.

Central Access Reader (CAR) 2.0 Features

Central Access released CAR 2.0 in February 2014 and added the following functions:

- **Tabbed Interface:** You can load multiple documents into CAR and tab through to read each one independently.
- **Click to Read:** Click on any word, image, or math equation to set the start point for reading.
- **Copy and Paste:** Read from your clipboard by clicking Ctrl + V (Command + V for Macs) or on the main menu button on the top right and selecting File > Paste from Clipboard.
- **Save to MP3:** You can save all of your documents to MP3 at the same time and can keep right on working. A progress bar will appear below the current document. Once exported, click "Show Files" to view or open any file.
- **Batch Export:** If you have many files to export to MP3, MP3 by page, or HTML, you can convert them in a batch process by clicking on the main menu button and selecting File > Batch.
- **Themes:** CAR offers four different themes – Crimson, Dark, Light, and Classic – that you can change in "Color Settings" using the sidebar button with the color wheel.

Downloading and Installing Central Access Reader

To download a free copy of CAR, visit the project website. Assistive Technology For Education has produced a brief video overview of how CAR works, presented by assistive technology professional Alyssa Marinaccio.

To install on a Mac, download the Central Access Reader .dmg file, double click to open it, and then drag and drop the CAR icon into your applications folder. Once installed, double-click to open it.

CAR has attracted the attention of schools across the country, including MIT and Harvard. It's been installed throughout the CWU campus and is being used by students and faculty members.

About Central Access

Central Access serves not only the Central Washington University community, but also provides materials to institutions and schools across the country, providing accessible products, including electronic text, braille, and tactile graphics for persons with disabilities. Central Access also provides meaningful professional growth opportunities for student-employees to learn how to produce accessible materials.

CAR-Related Resources

Download Central Access Reader
<http://www.cwu.edu/central-access/reader>

Assistive Technology for Education
<http://assistivetechologyforeducation.com/>

CAR Video Overview featuring ATE's Alyssa Marinaccio
<https://vimeo.com/90354388>

Alyssa Marinaccio discusses her first year as an Assistive Technology Professional
<http://assistivetechology.about.com/od/ATCAT3/a/My-First-Year-As-An-Assistive-Technology-Specialist.htm>

More Assistive Technology for Math

MathTrax Creates Audio Representations of Graphs and Complex Math Equations

<http://assistivetechonology.about.com/od/ATechnologyforMath/qt/Mathtrax-Creates-Audio-Representations-Of-Graphs-And-Complex-Math-Equations.htm>

MathTrax is free PC software that creates audio representations (via text description and sonification) to make graphs and complex math equations accessible to blind and visually impaired students.

MathPad Helps LD Students Build Basic Math Skills

<http://assistivetechonology.about.com/od/ATechnologyforMath/p/Mathpad-Helps-Ld-Students-Build-Basic-Math-Skills.htm>

MathPad is an application that enables students to write and solve math problems on their computer. The program is designed to help students who struggle organizing or writing math problems by hand.

DragonBox Makes Learning Algebra Fun

<http://assistivetechonology.about.com/od/ATechnologyforMath/fl/DragonBox-Makes-Learning-Algebra-Fun.htm>

DragonBox 5+ is a game app for iOS and Android devices designed to give young children a head start in learning mathematics and algebra.