

Assistive Technology Resources for Children and Adults with Disabilities

Closing The Gap

AUGUST / SEPTEMBER, 2014
VOLUME 33 - NUMBER 3

Solutions

Wyoming's Professional Learning Community Approach to Building Capacity in Assistive Technology

Supporting Students Using Chromebooks

When Writing Seems Like an Impossible Task

From No-Tech to High-Tech Building a Core Vocabulary Classroom

Hidden Potential: Everyday Technology in the Special Education Classroom

Alphabet Soup: DIY Means Do-It-Yourself

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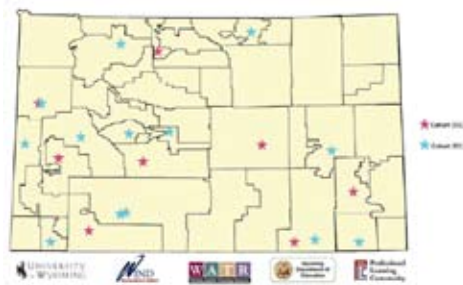
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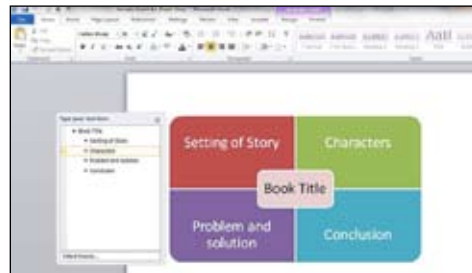
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32nd Annual CONFERENCE

Closing The Gap

Wednesday, Thursday and Friday
OCTOBER 15-17, 2014
 Preconference Workshops
 Monday and Tuesday, October 13-14, 2014
 DoubleTree by Hilton Hotel Bloomington
MINNEAPOLIS, MINNESOTA

Closing The Gap is truly more than a conference, it is a network of invaluable resources – teachers, therapists, clinicians, parents, end users and manufacturers – all emphatically working together to change lives with assistive technology.

The 32nd Annual Closing The Gap Conference promises nothing less than excellence!

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★ OVER 175 PRESENTATION AND HANDS-ON LAB HOURS

Sessions describing and/or demonstrating successful strategies and practical applications of assistive technology for persons of all ages with disabilities. Presentation titles and descriptions will be announced August 1, 2014.

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Extensive exhibition area displaying and demonstrating state-of-the-art assistive technology products and implementation strategies.

★ CEUS AND ACADEMIC CREDIT AVAILABLE!



Conference - Wednesday, Thursday, Friday, October 15-17, 2014 Includes Preview of Exhibits – Tuesday, October 14, 5:30 pm - 8:00 pm

Registration Received	On or Before June 30	July 1 - September 11	September 12 - October 2	October 3 - Onsite
Standard Rate Group Discount - 5 or more Group Discount - 8 or more <i>All group registrations must be received at the same time.</i>	\$440 Groups 5+ Deduct \$30 Groups 8+ Deduct \$50	\$490 Groups 5+ Deduct \$30 Groups 8+ Deduct \$50	\$515 Groups 5+ Deduct \$30 Groups 8+ Deduct \$50	\$540 Groups 5+ Deduct \$30 Groups 8+ Deduct \$50
Parent Rate (A letter describing your child's disability must accompany registration)				\$300
Full-time Student Rate (Proof of full-time student status must accompany registration)				\$300
Presenter Rate		\$350		\$400
Exhibitor Rate		\$350		\$400

Single Day and Exhibit Hall Only Registration	Price
Thursday Only - October 16	\$300
Friday Only - October 17	\$150
Exhibit Hall Only - Tuesday evening through Friday, October 14-17	\$175

Preconference Workshops - Monday and Tuesday, October 13-14, 2014 (Includes Preview of Exhibits – Tuesday, October 14, 5:30 pm - 8:00 pm)	Price
Monday, October 13 (Some preconference workshops carry an additional fee for materials)	\$275
Tuesday, October 14 (Some preconference workshops carry an additional fee for materials)	\$275
BUNDLED PRICING! Monday and Tuesday Bundle (\$60 savings)	\$490

Conference Scholarship - Wednesday, Thursday, Friday, October 15-17, 2014
A limited number of scholarships are available for persons with disabilities or parents/guardians of children with disabilities. To apply, complete a conference registration form, indicating your scholarship request. Submit the form and attach a letter describing your/your child's disability and telling us why you would like to attend the conference. Applicants will receive written notification of acceptance or denial.

Wyoming's Professional Learning Community Approach to Building Capacity in Assistive Technology

In Wyoming, where three quarters of all students with a disability are served in rural communities, assistive technology service delivery is limited. There is minimal expertise and travel by specialists to schools is complicated by rugged, mountainous terrain, vast open prairies, and prolonged periods of harsh, winter weather. In 2012, Wyoming Assistive Technology Resources (WATR) launched a professional learning community to successfully build capacity for assistive technology in education.

Just two percent of Wyoming students with a disability were reported to be receiving assistive technology in 2007 (Wyoming Department of Education Data). As initial steps to build educational capacity for assistive technology, Wyoming Assistive Technology Resources, the state's Assistive Technology Act program, developed training, technical assistance and a team for assessing student needs for assistive technology. Along with device loans and device demonstrations, these services built knowledge through experiential learning. However, their influences were typically limited to one category of devices, one student, one educator or one school at a time. It was clear, that to integrate assistive technology for more students in Wyoming, a new approach was needed.

In a 2004 literature review, Copley and Ziviani discussed barriers to assistive technology use by children with multiple disabilities in educational settings. After funding and access to technology, assistive technology service delivery, in the form of training support, as well as planning for assessment and implementation, were identified as primary barriers to effective assistive technology use (p. 237).

What we have learned about assistive technology, over time, is that it takes more than effective matching of student needs to technology features to ensure that assistive technology is an everyday tool in the classroom. Common reasons given for lack of assistive technology integration into classroom settings include the following explanations:

- Classroom staff doesn't know what to do with the assistive technology
- Assistive technology is too hard to manage
- Students who use assistive technology do not have access to school networks
- Students may not be able to use their assistive technology on state assessments (Bowser, 2010)



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GAYL BOWSER'S work as an independent consultant focuses on the integration of technology into the educational programs of students with disabilities. In the public school setting, she has been a general education teacher, a special education teacher and a school administrator. Today, Ms Bowser provides assistive technology consultation, training and technical assistance throughout the United States and internationally. Gayl has co-authored numerous publications about assistive technology services and is a member of the leadership team of the Quality Indicators for Assistive Technology (QIAT) Consortium. She teaches online classes and webinars. You can learn more about Gayl on her blog at <http://www.integrateat.com>

Several of the Wyoming Professional Learning Community project designers were familiar with assistive technology capacity building projects in other states. Collectively, we had participated in assistive technology team projects in Arizona, Florida, Louisiana, Minnesota, New Mexico and Oregon. A review of these projects revealed a list of common characteristics.

- Participants include multidisciplinary teams of three to eight individuals from a district or region
- Administrative involvement and support with the assistive technology team
- Use of a self-evaluation tool
- Team goals established based on the self-evaluation and district priorities
- Initial face-to-face training provided by expert assistive technology practitioners
- Ongoing support or mentoring after initial training

As we reviewed the work of other states, we realized that an important variable in the projects was the degree to which they focused on specific assistive technology devices. Some projects provided devices to participant teams while others offered awareness-level training and exposure to a range of devices but primarily focused on the agency's model for assistive technology services.

We also looked at state Assistive Technology Act programs and became aware that the unique nature of the geography and population density of Wyoming would have an impact on the project we developed. Wyoming is the least populated state, with 576,626 persons, 5.8 persons per square mile, and the tenth largest in terms of land area. We knew that there was an interest in assistive technology among Wyoming educators, whether they identified as Assistive Technology Specialists or simply hoped to provide technology for their students with disabilities. We assumed they were isolated from each other and lacked resources. Because of

WY Professional Learning Community in Assistive Technology Members by Wyoming School District

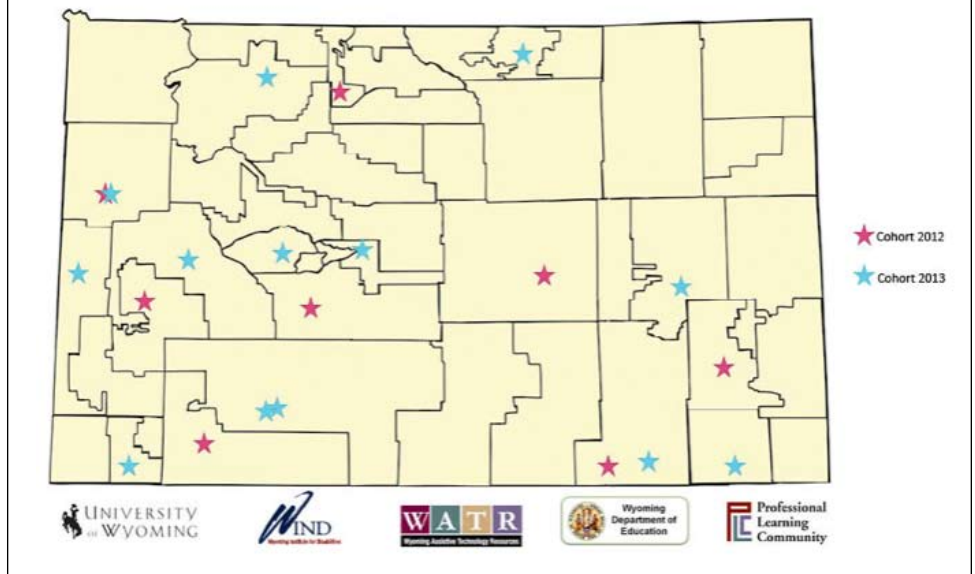
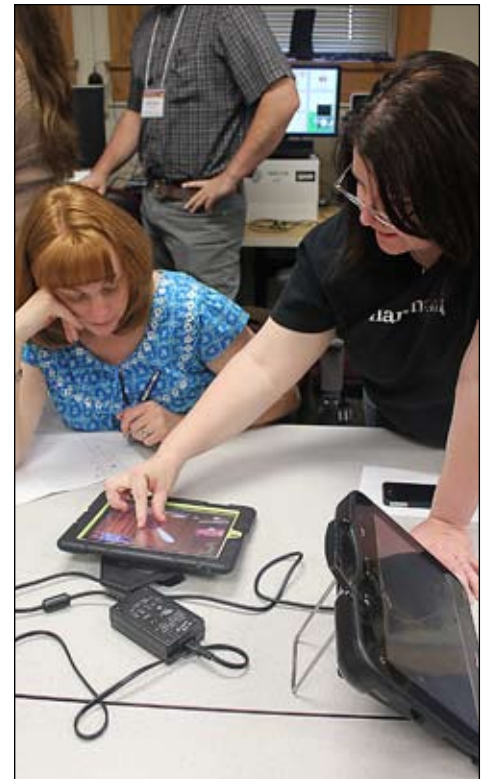


Figure 1: Map of Wyoming School Districts with 2012 and 2013 Professional Learning Community Members.

this, we knew that important aspects of our project would include ongoing opportunities for community building, networking and social interaction that did not require extensive travel. We also determined that, because over half of the 48 school districts in Wyoming have fewer than 1000 students and one fourth have fewer than 500 students, it would be necessary to recruit individual district representatives rather than multidisciplinary teams for the project (Wyoming Department of Education Data).

A state-wide professional learning community approach was identified as an appropriate model to build Wyoming's capacity. The term "professional learning community" refers to a way of operating that emphasizes the importance of nurturing and celebrating the work of each individual member and of supporting the collective engagement of members in such activities as the development of a shared vision of schooling and learning, capacity building, problem identification, learning and problem resolution. It is an environment in which members can learn and continually increase their ability to create the environment they desire.



Professional Learning Communities are exemplified by collaborative work that is grounded in reflective dialogue, in which staff have conversations about students, teaching and learning, identifying related issues and problems and debating strategies that could bring about real change in the organizational culture (Ontario Ministry of Education, 2005). Common elements of a PLC include:

- Shared vision and values
- Solutions actively sought
- Working teams cooperate to achieve common goals
- Encouragement of experimentation as opportunities to learn
- Ongoing quest for improvement and professional learning
- Evaluation of outcomes
- Reflections about the operation and impacts of actions taken (Levine & Shapiro, 2004).

Day	Curriculum Plan
Monday	Project Overview, District Self-Evaluation, Creating a vision for the state
Tuesday	A collaborative model for assistive technology services
Wednesday	Focus on assistive technology devices, accessible instructional materials
Thursday	Providing assistive technology supports, role of school administrators
Friday	Return to shared values and vision, personal and community future planning

Table 1. Wyoming Professional Learning Community in Assistive Technology Curriculum

What we also knew from our research into the nature of professional learning communities was that a foundation for our community required the development of a mission, a vision, shared values and a focus on student success rather than specific technologies (Eaker, Dufour, & Burnette, 2002).

Wyoming's Professional Learning Community in Assistive Technology, funded by the Wyoming Department of Education, was launched in 2012. Our work was guided by a twofold mission: to increase awareness about assistive technology among Wyoming educators and to increase the appropriate implementation of assistive technology for Wyoming students.

We began by sharing information about the professional learning community project with principals, administrators and special educators in Wyoming school districts. We wanted to recruit potential members from their districts who had experience and interest in assistive technology. Applicants were required to submit background information, as well as

a letter of nomination from a colleague and a letter of commitment from a supervisor. We wanted to make sure that the members we selected were not only interested in the training but would have ongoing support for building capacity in their districts. From a pool of 41 completed applications the first year and 32 the second year, an initial eight, then 13 additional members were selected (See Figure 1, Map of Members). Those selected had some experience with assistive technology and demonstrated leadership potential, a history of working well in a team and significant interest in being part of the learning community. Our plan was to provide members with the skills and training to guide their schools and districts along the complex path of continuous assistive technology improvement by forming a hub that offered the members opportunities to share their knowledge with colleagues, families, community members and each other.

Once project participants were selected, we asked them to complete a skills self-assessment regarding assistive technology devices, services and legal requirements (See Figure 2, Self-Assessment). This skills assessment was the first thing we considered in the development of the curriculum for the initial face-to-face meeting.

After a curriculum review of other projects with which we had experience and analysis of the members' self-assessments, we began the process of developing the curriculum. The Quality Indicators for Assistive Technology Services (QIAT, 2009) formed the foundation of our topics. Other frameworks, such as Education Tech Points (Bowser & Reed, 2012) and The SETT Framework (Zabala, 2005), provided guidance on the ways that the QIAT indicators could be

put into action. Based on these national models for assistive technology services and self-assessment data from participants, a 5-day curriculum was developed (see Table 1, Curriculum).

The members spent a week (first year members spent a second week the next year) on the University of Wyoming campus for intensive training, along with leadership skills and community building activities. To earn stipends, members attended the in-person training, community and leadership activities, set personal goals for improving practices in districts, then reported on progress toward their goals and participated in ongoing distance trainings and networking.

While initial funding was available for the project, we also knew that this funding would only be available for a limited time. Because of this, it was important to build a program that could be ongoing and provide supports to be self-sustaining once the community was established. We determined that one important aspect of the project would be the use of Web 2.0 tools, such as conference calls, blogs, webinars, electronic mail lists and video-conferencing as communication strategies. Later, as work groups began to form around specific professional learning community topics, we also included document-sharing resources (e.g. Google Docs, Drop Box) in order to work together at a distance.

The members met and then surpassed our expectations. They have completed their personal action plan goals in assistive technology, most of which correspond with one of six categories: form district teams, implement written policies and procedures, develop a student consideration process, enhance administrators' understand-

ings, provide training and information to parents, and improve data collection and reporting. As the group discussed gaps and promising practices in the state, they compiled, then submitted guidance to the department of education. They recommended that the department provide or support: ongoing training and professional development, availability of information and resources for all stakeholders, recommended policies and procedures, and the implementation of assistive technology for all students in any environment.

After the in-person training was provided in 2013, the larger community formed four work groups to complete a state-specific parent guide to assistive technology, trial device sharing among districts and recommend a process of assistive technology consideration for students that is now available for use by all districts. Recently, the members helped test the translation of a capacity building model that has been remarkably successful in addressing health

care issues throughout the world for use in education for assistive technology. Owing to the pilot's success, members will help expand and enhance this model for use throughout the state and perhaps other states and countries in 2015.

Preliminary results from an external evaluation indicate that members reported increases in knowledge and they demonstrated increases in skills (Data Driven Enterprises, 2014). Wyoming will likely remain a sparsely populated state with harsh winter weather and few roads. The majority of Wyoming school districts are likely to always have fewer than 1000 or 500 students. Yet now, through the ongoing work of the Wyoming Professional Learning Community in Assistive Technology, school districts have an educated and passionate team to help assure that students with disabilities in Wyoming receive the assistive technology they need.

According to several studies that have examined the effects of implementing a

participative management method, such as learning communities, the most notable impact is that participants develop a feeling of empowerment – a feeling that their strengths and skills are allied, that they have natural systems for mutual help and that they engage in proactive behavior when facing changes (Zimmerman & Rappaport, 1988, p. 55). Anne Baures, a 2013 cohort member, wrote that being a member of the community "... has given me the confidence, tools and networking opportunities to be able to implement an assistive technology team, process for our school district and also the resources to be able to carry through with our plans for students. It would've been extremely difficult to initiate our district plan and development without [the] sharing, collaboration with colleagues and trainers, trainings, and the continuous support" (2014).

Assistive Technology Skills Self-Assessment

Name: _____ Date: _____

I. General Assistive Technology Knowledge

Indicator	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1. I know what AT is.	4	3	2	1
2. I understand how AT can benefit students with disabilities.	4	3	2	1
3. I know about the legal requirements to provide AT for students with disabilities.	4	3	2	1
4. I know how AT services are defined.	4	3	2	1
5. I know the implications of local, state, and federal AT rules and regulations.	4	3	2	1
6. During every IEP meeting for my students, the team considers the child's need for AT.	4	3	2	1
7. I can describe student achievements that result from AT use.	4	3	2	1
8. I can identify at least one new AT topic that I would like to know more about.	4	3	2	1
9. I know and use at least three sources of information about AT (websites, blogs, electronic lists, journals, etc.).	4	3	2	1
10. I know where to find in-person and just-in-time training about AT.	4	3	2	1

II. Assistive Technology Process Skills

Indicator	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1. I have the necessary level of understanding of AT to fulfill my role as an IEP team member in the consideration of need for AT.	4	3	2	1
2. I know how to use information about the Student, Environment, Tasks and Tools to implement an AT assessment.	4	3	2	1
3. I know how my agency wants me to respond to a parent's request for AT.	4	3	2	1
4. I know how to implement a trial period if I believe that a student needs AT.	4	3	2	1
5. I know who to contact when I need additional assistance with AT questions.	4	3	2	1
6. I know how to use data in making AT decisions.	4	3	2	1
7. I know how to include AT in IEPs.	4	3	2	1
8. When disagreements or conflicts arise over a student's need for AT, I know what I should do.	4	3	2	1
9. I know how to teach a student to use a new AT device.	4	3	2	1
10. I know how to help a student integrate AT use into his/her daily educational program.	4	3	2	1
11. I know how to assess the effectiveness of a student's AT use.	4	3	2	1
12. I know and observe copyright rules regarding materials developed or adapted for use by children with disabilities.	4	3	2	1

III. Assistive Technology Use Skills

Skill Self-Rating Key:

Rating	Definition
Unfamiliar	Unfamiliar: This is new to me. What is it?
Awareness	Awareness: I have heard about it, but I need basic information.
Knowledge	Knowledge: I know what it is, but I'm not ready to use it. I need training.
Application	Application: I am able to apply this. I can design, and use it in my program.
Mastery	Mastery: I am ready to work with other people to help them learn this. I feel confident enough to demonstrate this to others.

Skill Area	Unfamiliar	Awareness	Knowledge	Application	Mastery
A. Access					
1. Determine a way for students to access toys, games and other materials through enlarging, stabilizing, use of switches, etc.	1	2	3	4	5
2. Determine an effective way for a student to operate/access a computer and/or other AT.	1	2	3	4	5
B. Activities of Daily Living					
1. Select and use a variety of low tech aids to position and stabilize items.	1	2	3	4	5
2. Select and use adaptive utensils and aids for eating, drinking, dressing, hygiene and cooking	1	2	3	4	5

3. Identify a child's need for greater control of his/her environment.	1	2	3	4	5
4. Design opportunities to use aids to daily living and select appropriate AT.	1	2	3	4	5
5. Operate and use a variety of aids to daily living.	1	2	3	4	5
6. Adapt or select and use adapted toys, games and recreational sports equipment.	1	2	3	4	5
7. Select and use a variety of AT, including software, for access and interaction	1	2	3	4	5
C. Augmentative Communication (AC)					
1. Identify important features of AC devices.	1	2	3	4	5
2. Match student needs with features of AC devices.	1	2	3	4	5
3. Operate/utilize a variety of AC devices from simple to complex.	1	2	3	4	5
4. Determine the best form of vocabulary representation (e.g. pictures, symbols, words), select, and organize vocabulary in a usable system.	1	2	3	4	5
5. Train communication partners.	1	2	3	4	5
D. Hearing Technology					
1. Identify when amplification of sound may be necessary for a student in an educational setting.	1	2	3	4	5
2. Operate/use assistive technology for telecommunications, assisted listening and alerting.	1	2	3	4	5
E. Learning/Studying					
1. Develop and use a variety of print and picture schedules.	1	2	3	4	5
2. Select and use a variety of aids, including hand-held and on-line tools to locate, highlight and track information.	1	2	3	4	5
3. Use software to highlight, manipulate and/or organize information.	1	2	3	4	5
F. Math					
1. Identify and use a variety of math aids and low tech AT.	1	2	3	4	5
2. Select and use a variety of voice output aids for math operations, (e.g., counting, measuring, computation).	1	2	3	4	5
3. Select and use software to provide cueing assistance in math operations	1	2	3	4	5
G. Mobility/Seating/Positioning					
1. Recognize and analyze the impact of seating/positioning on the child's attention, energy and ability to access AT devices.	1	2	3	4	5
2. Determine when and why a child may benefit from assisted mobility.	1	2	3	4	5
3. Identify important features of mobility devices.	1	2	3	4	5
4. Select and utilize AT for mobility or stabilization.	1	2	3	4	5
5. Design and implement a sequenced intervention to teach a child to operate/use an assisted mobility device.	1	2	3	4	5
H. Reading					
1. Identify need for and use an array of low tech solutions to assist with reading text (changes in color, size, font, use of guides, etc.).	1	2	3	4	5
2. Create and use pictures with text to support reading.	1	2	3	4	5
3. Use a variety of tools to speak text to accompany the printed words (talking books, software, eReaders, etc.).		1	2	3	4

I. Vision Technology					
1. Use low-tech vision aids to enlarge text.	1	2	3	4	5
2. Operate and use text-to-speech, screen reader and screen enlarger/magnification software.		1	2	3	4
3. Operate and use Braille printers, Braille translation software, refreshable Braille, Braille keyboards and Braille notetakers.	1	2	3	4	5
J. Writing – Composing Written Material					
1. Identify and use a continuum of AT solutions from low to high tech for composing written material.	1	2	3	4	5
2. Complete informal assessment techniques (e.g., environmental inventory, interview, observation) to determine need for AC.	1	2	3	4	5
K. Writing – Motor Aspects of Writing					
1. Identify and use a continuum of AT tools from low to mid tech for difficulties with motor aspects of writing.	1	2	3	4	5
2. Identify and use software to decrease or change the motor demands of writing.	1	2	3	4	5
3. Understand and use tools to augment writing skills, such as word-prediction, macros and electronic word walls.	1	2	3	4	5
L. Additional, Self-Identified Skills					
1.	1	2	3	4	5
2.	1	2	3	4	5
3.	1	2	3	4	5
4.	1	2	3	4	5
5.	1	2	3	4	5

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Supporting Students Using Chromebooks

WHAT IS A CHROMEBOOK?

- looks like a laptop computer
- is lightweight, thin, very portable (protective cases are highly recommended)
- starts up in seconds
- provides for immediate connection to the Internet (actually little can be done on a Chromebook if you do NOT have access to the Internet)
- no apps are installed on the Chromebook
- files are accessed via Google Drive (can also be saved to/accessed in the Downloads folder on the Chromebook)
- uses the Chrome Web Store (<https://chrome.google.com/webstore/category/apps>) to get apps and extensions
- runs on the Google Chrome Operating System
- updates are automatically installed when you shut down the device and restart. It may not always be apparent that changes have been made. During the course of writing this article, several changes in supports were discovered. Therefore, the information you are reading here is only current as of June, 2014.

The Chromebooks may require a little bit of a mental shift when getting started with them.

Here are links to a couple of videos from Google that you may find helpful to begin to learn about Chromebooks:

What is Google Chrome OS? (<http://www.youtube.com/watch?v=OQRO3gKj3qw>)

Chrome OS Guided Tour https://www.youtube.com/watch?v=ntLpCvAyNPE&list=PLuLd6-SdO_G7jsgWFSH-C4IX8AJuSJbAaT

On April 3, 2010, the first iPad was released. As educators returned to school that fall (if not before), the iPad took the education community and the rest of the world by storm. The first Chromebooks started shipping in 2011. By 2012, more Chromebooks were purchased by the education community than any other segment of the population. (source: <http://en.wikipedia.org/wiki/Chromebook>)



Schools looking to move to 1:1 initiatives have been increasingly looking at Chromebooks for a variety of reasons, such as their smooth integration with Google apps and easier ability to manage and provide technical support. Chromebooks are also much more budget friendly. Not factoring in bulk purchases/educational discounts, a Chromebook can be purchased for as little as \$200. The least expensive iPad is \$499. The entry MacBook Pro is \$1,299. While the least expensive price point for a PC laptop seems to be around \$250, I am not seeing PCs as one of the options being considered by most school districts in our area.

Among the factors NOT always being considered as districts go 1:1 is if/whether Chromebooks can support students with special learning needs. The apps and extensions available for Chromebooks are increasing rapidly, in much the same manner that we saw with the explosion of apps on the iPad. This article will provide some general information about Chromebooks and explore the current ability of Chromebooks to support some of the basic tasks that students are typically expected to perform. Don't have a Chromebook? Pretty much anything you can do via the Google Chrome Web Browser (https://www.google.com/intl/en_us/chrome/browser/desktop/index.html) on Macs/PCs, you can do with a Chromebook ... so keep reading!!



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EXTENSIONS, APPS AND NOW ADD-ONS ... OH, MY!

Apps are basically websites. They run within Chrome's browser. Some apps, such as Gmail and Google Drive, are already installed on your Chromebook. Others are available via the Chrome Web Store. Often these Web apps just take you to the website for the tool (e.g., Dropbox, Evernote). Apps are located on the bottom, left side of the Chromebook window (called the Chrome Launcher) (See Image 1). You can customize the display (add, remove, reposition icons) on your Chromebook to support quick access to frequently used apps.

Extensions extend the functionality of your browsing experience. They work across websites. Readability (https://chrome.google.com/webstore/detail/readability/oknpjjbmpnndlp_mnhmekjpoceipnlfdi?hl=en) is an extension that unclutters Web pages and makes the reading and viewing experience easier.

Extensions are located on the right side of the

toolbar (See Image 2). Some may be displayed as icons to the right of the URL box. If you have a lot of them, the rest can be accessed by clicking on the three horizontal lines. You can reposition extensions by clicking and dragging them up and down on the list. You can have more icons displayed by adjusting the size of the URL box.

Add-Ons are a relatively new feature in Chrome. Essentially, add-ons are third-party services that add extra functionality to Google Docs and Sheets. Most of these add-ons already exist as either apps or extensions. The add-ons are a quick way (short cut) to them. Add-ons is a new menu in Google Docs (See Image 3). From here you can get new add-ons and manage the add-ons that you already have.

The Chrome Web Store is your source for getting Chrome apps and extensions. You can access the Chrome Web Store (See Image 4) from the Chrome Launcher. When apps are installed, you may be asked to allow access to Google Drive and/or give other access permissions.

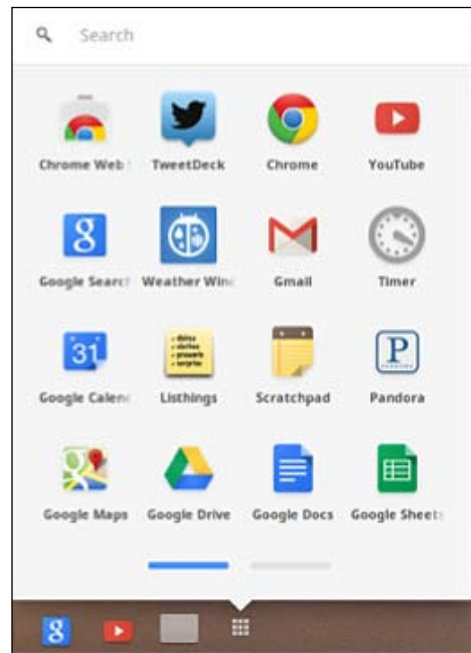


Image 1: Chrome Launcher



Image 2: Chrome Extensions' toolbar

Image 3: Add-ons' toolbar

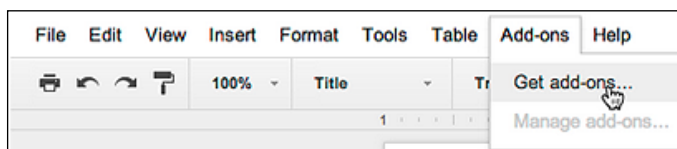
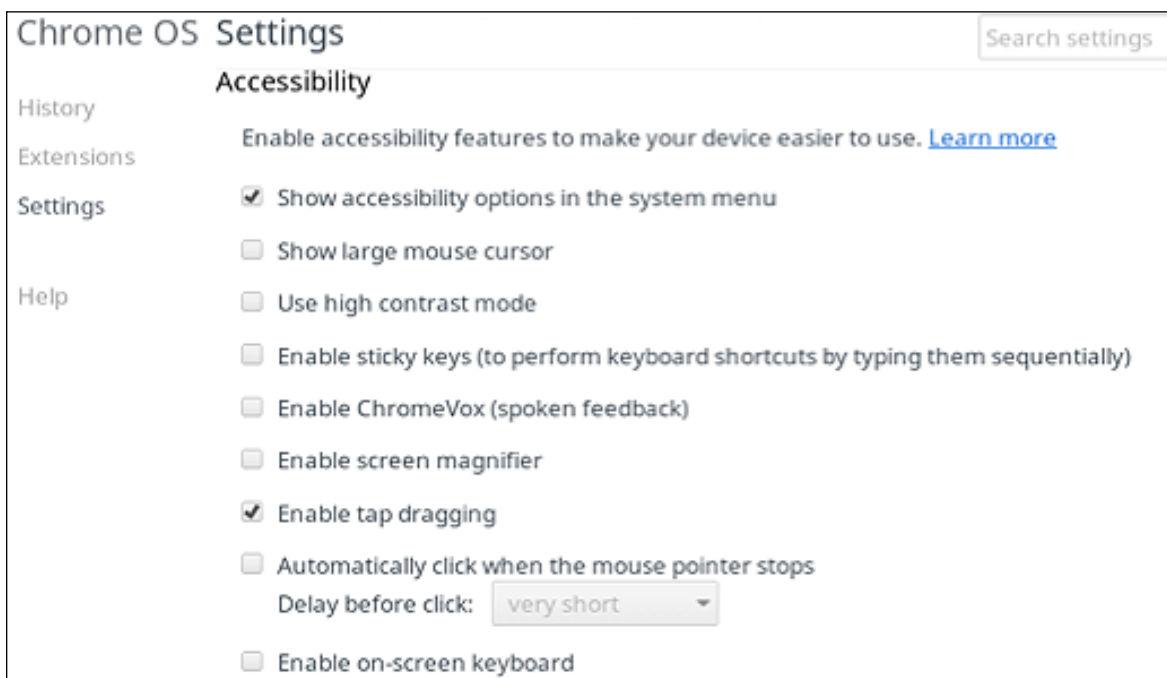


Image 4: Chrome Store icon



Image 5: Chrome Accessibility Settings window



You may also need to manage the connection between an app and something you want to do. For example, you may need to tell Google Drive the app you want to use when opening a PDF. Not all apps can be connected to Drive.

CHROMEBOOK ACCESSIBILITY

There are a number of accessibility features built into the Chrome operating system, with more becoming available. Most are available via Settings - Show Advanced Settings - Accessibility) (See Image 5). From here you can also select to have some of the accessibility options display in the system menu. Below are accessibility features currently available.

Visual Access

- use high contrast mode (white text on a black background)
- spoken feedback (via ChromeVox (<https://chrome.google.com/webstore/detail/chromevox/kgejghlpjiefppelpmljglcjbhoiplfn?hl=en>), the Chrome OS screen reader
- screen magnification (there is also a general zoom function)
- show a large mouse cursor

Physical Access

- tap dragging
 - automatic clicks (click without using your mouse)
 - sticky keys
 - on screen keyboard
- The ability to adjust pointer speed is available via Settings - Device - Touchpad settings.

Switch Access

The ability to use switches with the Chromebook is currently a developing area of accessibility. Many websites offer switch-ready activities and other sites can often be configured to work with standard USB or Bluetooth switches, but the Chromebook itself does not currently support switch access at the level of laptop computers. Familiar customized software used on laptops (think IntelliTools, Don Johnston, etc.) are not currently available for Chromebooks, although many special education software manufacturers are starting to migrate their products online in response to the influx of devices, such as Chromebooks, that cannot have software installed.

SAMPLE WORKFLOWS

Let's take a look at how Google Chrome can help students in performing a couple of typical school tasks.

Task: Reading Digital Content

Students are often expected to read content that is above their instructional reading levels. There are a number of tools in Chrome that can support a student in completing this task independently.

There are number of text-to-speech tools available that allow students to listen to the content on the webpage. Most of these tools allow the user to adjust the reading rate and to pause or stop the reading. Some tools also allow the student to choose a male or female voice. Tool highlighting is sometimes available, but not usually with the free tools.

An example of a free tool is Select and Speak (<https://chrome.google.com/webstore/detail/select-and-speak/gfjopfpjmkcfcgjpogepmdjmcnihfpok?hl=en>) (See Image 6). The Select and Speak extension requires that the user select the content to be read and then activate by clicking the extension icon, using a keyboard shortcut or selecting in the contextual menu. Any text that can be highlighted can be read aloud using these types of tools.

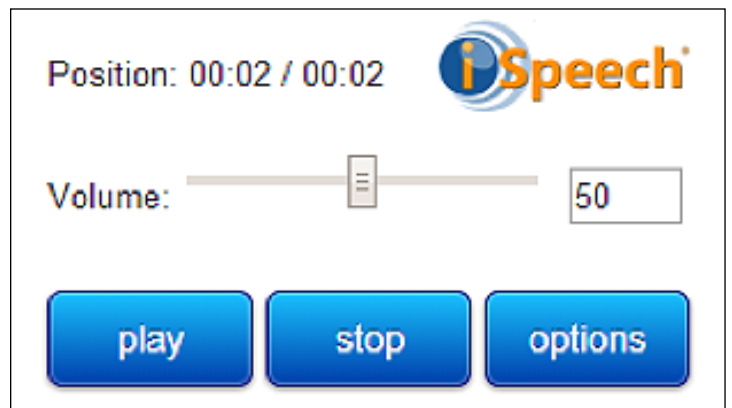


Image 6: Select and Speak window.

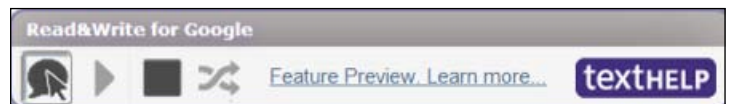


Image 7: Read&Write for GoogleTM Web Reader toolbar.

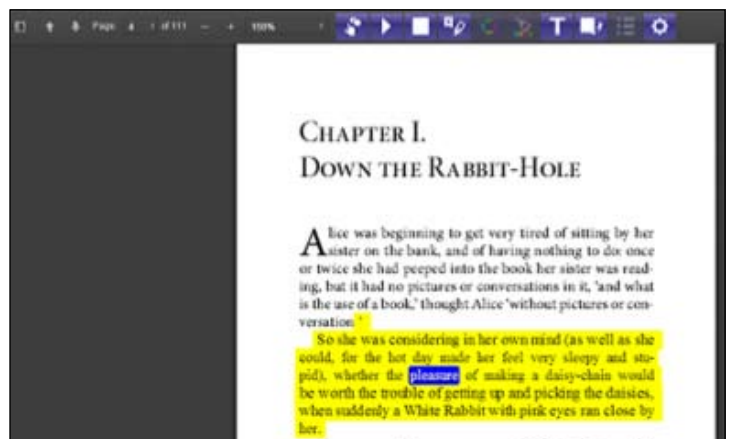


Image 8: Read&Write for Google offers a PDF Reader.

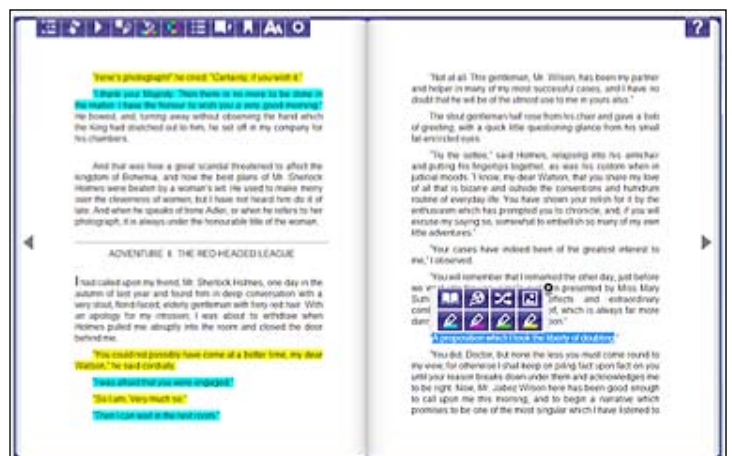


Image 9: Read&Write for Google ePub Reader window.

Read&Write for Google™ (<https://chrome.google.com/webstore/detail/readwrite-for-google/inoeonmfapjbbkmdafoankkfajkcphgd?hl=en-US>) is a suite of tools by TextHELP (<http://www.texthelp.com/North-America>).

This app/extension is subscription based and offers a 30-day free trial. Teachers can now register to download the Premium version for free. Read&Write for Google™ has introduced a Web reader (See Image 7) that allows the user to read content on webpages. In its beta form, the user can either select the content to be read aloud or can use a really cool feature called “Hover Speak,” which lets the user just position the cursor where reading is to begin (no selecting is required). Read&Write for Google™ also offers a PDF Reader (See Image 8) and an ePUB Reader (See Image 9) in its suite of tools. These readers allow the user to adjust rate and visual display and provide a variety of study and annotation tools. It currently does not support easy access to Bookshare files, although it does support the reading of Kurzweil files.

The Bookshare Web Reader (<https://chrome.google.com/webstore/detail/bookshare-web-reader/bkfmjmgnglphchhiemnghidpnddofmq?hl=en-US>) (See Image 10) can be accessed with an individual Bookshare account (<http://www.bookshare.org>). Books are available through the “Read Now” option. The first time you use it, you will be prompted to download the free Chrome extension.

The Bookshare Web Reader lets you adjust font size, background, display, margins and reading rate. You can use arrows to move to previous and next pages. Currently, you don’t seem to be able to pause/read from where you stopped or select where to start reading. Reading starts at the beginning of the chapter/section/page. The extension will remember your last location IF you are using the same computer. There are currently no annotation features.

Task: Writing a Paragraph, Multi-Paragraph Essay, Journaling, Etc.

Another typical school task is for students to generate written content. Let’s look at how Chrome can support students who struggle with these tasks. Pre-writing activities can be completed using one of many of the websites available that allow students to create digitally-based graphic organizers. One of my current favorite tools is the website Popplet (<http://popplet.com>) (See Image 11). Popplet is a very clean and easy tool to use. It has both free and subscription options. Users can type, draw, bring in images, etc. You can change colors and link items. Students can collaboratively work on a single Popplet. Files are saved as PDF or JPEG.

Drafting, of course, can be done with Google Docs, as well as a number of websites that offer students the ability to do writing within their pages. There are a couple of tools cur-

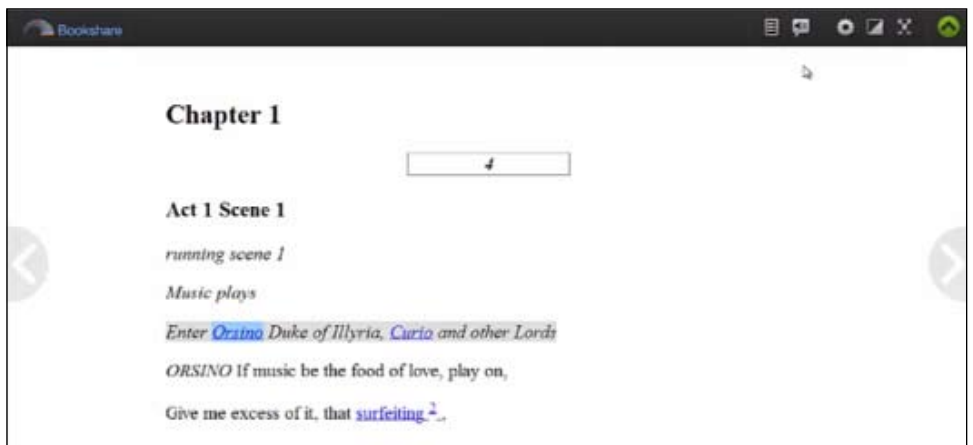


Image 10: Bookshare Web Reader window.

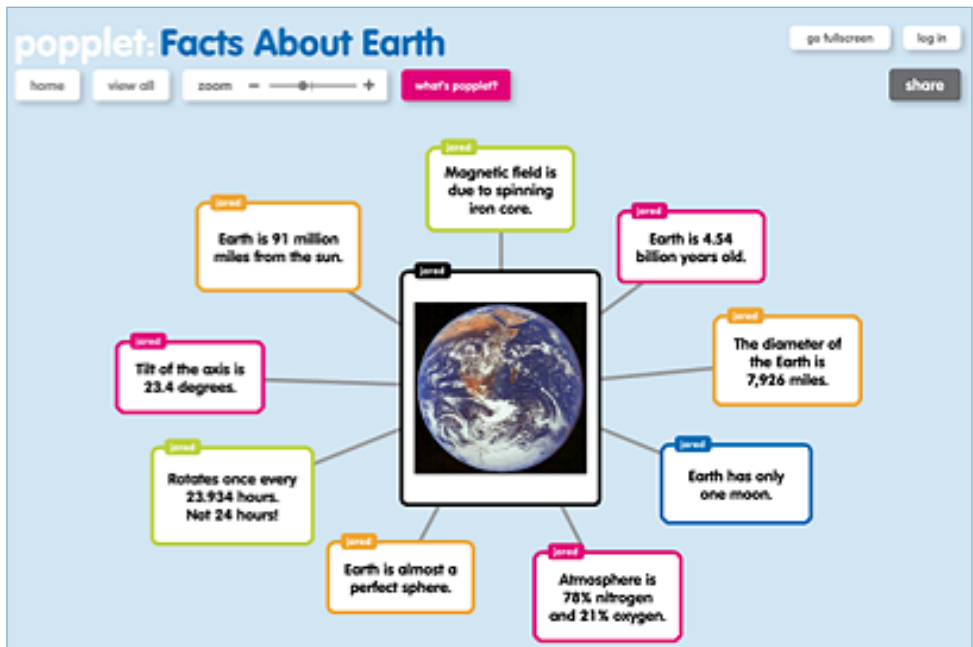


Image 11: Popplet window



Image 12: Read&Write for Google™ word prediction menu

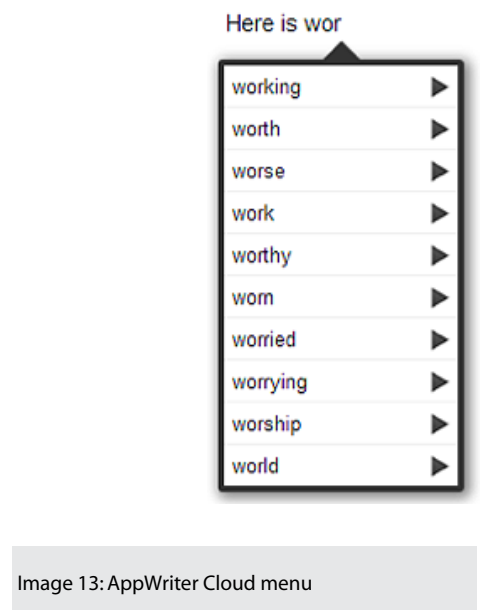


Image 13: AppWriter Cloud menu

rently available that offer word prediction support. The Read&Write for Google™ suite has a word prediction feature (See Image 12) available within Google Docs. AppWriter Cloud (<https://chrome.google.com/webstore/detail/appwriter-cloud/lokadhaghfjbmailhenifjejpkche?hl=en>) (See Image 13) is another word prediction tool available for Chrome. In both tools, users start typing in a Google Doc. A prediction list is displayed. Users select the desired word to insert in the document. Words can be read aloud before selection. The number of words displayed can be adjusted. Neither of these tools currently allows users the ability to create custom topic dictionaries. Currently, Read&Write for Google™ seems to offer the better support for poor spellers.

There are a few tools currently available for speech recognition, but I am not currently really happy with them because of the ease of use and/or the quality of the recognition. These apps generally work by clicking on a microphone icon and clicking to indicate when you are done speaking. Punctuation needs to be dictated. Content can be copy/pasted/exported into a desired location. Some allow editing within the app. An example of a dictation app currently available is Voice Recognition (<https://chrome.google.com/webstore/detail/voice-recognition/ikjmfndklfaonkodbnidahohdfbdhkn?hl=en>). If available in the learning environment, a better option for dictation may be to use an iOS device and dictate directly into a Google Doc using Siri.

Revising and editing can be supported by using the contextual spelling checker built into Google Docs. This checker does a very nice job identifying a variety of spelling and grammar errors. Users can either select words individually or use the “Tools - Spelling” menu item. Students who consistently mistype or misspell words can take advantage of the “Automatic Substitution” feature in Google Docs (via Tools-Preferences) (See Image 14). Custom words can be added to the Google Docs dictionary.

While it currently does not work within Google Docs, the Spell and Grammar Checker by Ginger (https://chrome.google.com/webstore/detail/spell-checker-and-grammar/kdfieneakcfaiglfcgkidlkmlijinh?utm_source=chrome-ntp-icon) (See Image 15) does a really nice job within e-mails, other websites, blogs, etc.

Students can listen to what they have written by using any of the text-to-speech tools. Read&Write for Google™ offers text-to-speech with dual highlighting, as well as a number of

other supports (See Image 16). If users choose not to continue with the subscription version of Read&Write for Google™, the text-to-speech and translation tools will remain active.

SUMMARY

The tools available with Chromebooks and, indeed, the Chromebooks themselves, are changing and developing at a rapid pace. The devices, apps, extensions and add-ons are increasingly offering supports for a diverse population of users. While they will likely never support the full range of students with special needs, the platform is certainly worthy of a first (and even second) look, especially for students who are attending schools using Chromebooks in their classrooms.

RESOURCES/REFERENCES

Here are some resources that I have found helpful in my Chrome journey and to keep abreast with the many changes and developments in the Chrome world.

General Chromebook Information:

<http://www.digitaltrends.com/computing/what-is-a-chromebook-anyway/#!boVPWy>

Google’s Accessibility Site

<http://www.google.com/accessibility/>

This site includes how to use accessibility features, ability to post feedback, etc.

Chromebook EDU - Google+ Community

<https://plus.google.com/u/1/communities/111885171520981887334>

You must be a member of Google+ to access.

Good resource that highlights people all around the globe who are using Chromebooks. Moderator is a former Google specialist.

Chrome AT Toolbox (by Chromebook EDU Google+ Community moderators)

<https://sites.google.com/site/gchromeat/home>

Reviews, including ease of use and functionality

Google Chromes Apps and Extensions

<http://www.pinterest.com/simontechcenter/google-chrome-apps-extensions/>

Pinterest Board by the Pacer Center/Simon Technology Center in Minnesota

AzTap Google App Attack!

<http://www.ataz.weebly.com/>

Symbaloo board by Mary Keeney and Aaron Marsters

Here is the link to the Google Site that I created to help me organize the information I have collected:

<https://sites.google.com/a/nsned.org/supporting-learners-in-chrome/home> ■

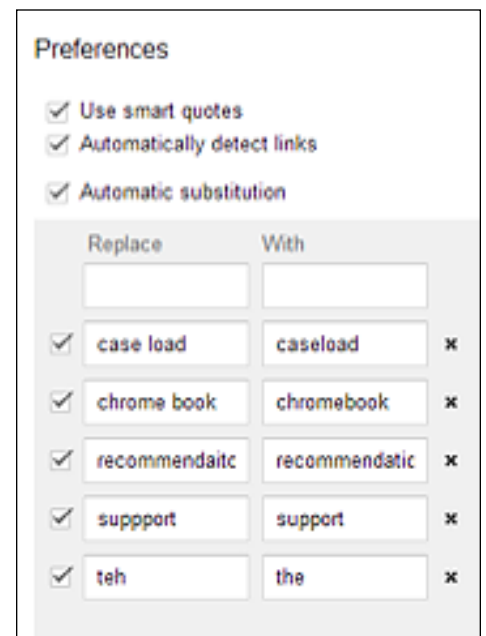


Image 14: Google Docs Preferences window.

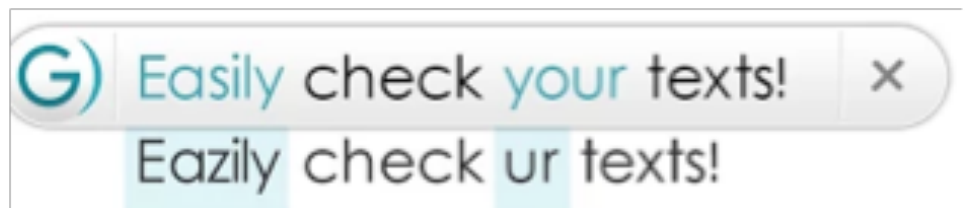


Image 15: Spell and Grammar checker by Ginger.

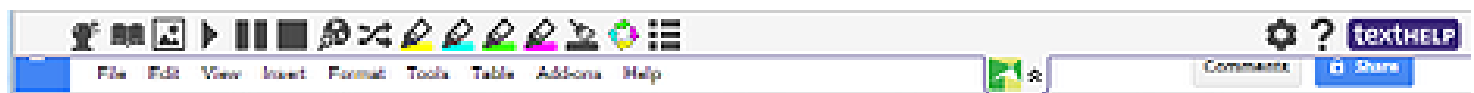


Image 16: Read&Write for Google™ toolbar.

When Writing Seems Like an Impossible Task

Need help supporting students with writing difficulties? Want some strategies to differentiate the curriculum? Sometimes it is not the curriculum that needs to be changed, but the tools that the students use to produce their work.

There are a wide range of assistive technology tools available to help students who struggle with writing. Some of these tools help the students circumvent the actual physical task of writing, while others facilitate proper spelling, punctuation, grammar, word usage and organization. There are numerous tools to assist in the writing process, from organizational to production using a variety of free assistive technology tools, supports, and strategies.

Working in the educational field, you likely work with a diverse population of students with various needs. Writing is a complex process and it is important to know what writing tasks are required of students before you begin implementation of tools and strategies. Will your students benefit from visual supports for writing? Whether your students are writing simple sentences or multi-paragraph essays, knowing the expectations of the assignment will be crucial in determining what supports the student needs to get there. Some of the disabilities that affect writing can include physical, cognitive, organizational, learning disabilities and visual impairments, to name a few. Each student will have unique needs that will require different amounts of support. When it comes to writing strategies, they are not “one size fits all.”

Beginning writers often need visual supports to aid in the writing process. Visuals can assist these writers in construction of sentences, as well as provide pictorial support for comprehension. Writing supports with visuals can be low tech, such as individual cards with pictures to build a sentence, or can utilize technology, such as a computer or interactive whiteboard using programs like Microsoft PowerPoint to compose simple sentences. Additionally, to support students with physical disabilities, a cookie sheet with magnetic pictures/words could be provided, allowing the student to slide the magnets into place to create a sentence. Another tool that can assist beginning writers who need visual support is PixWriter. (Image 1) This software program allows the instructor to set up a visual word bank where students can select pictures to create their own sen-

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KAREN DIETRICH, M.Ed. - Karen has been an educator for more than 20 years. She began her career in California, graduating from UC Davis and then San Francisco State University. She has taught in general education and special education classrooms and is part of the Loudoun County Assistive Technology Team. She earned her Master's degree in Instructional Technology at George Mason University in Virginia. She is passionate about training educators and has presented at several state and national conferences on technology integration. karen.dietrich@lcps.org

tences using the words provided.

Students who are writing will also benefit from text-to-speech support. This is available in Microsoft Word, as the Speak Tool, and is also in commercially available in literacy software programs, such as Read&Write Gold. (Directions to access these tools are on our website. Please visit the link www.bit.ly/CTGwriting.) Utilizing Read&Write Gold's Speak as I Type feature, students can hear each word aloud as they type or choose to have the entire sentence or document read aloud when finished. By accessing these auditory supports, students can self-edit, verifying they have composed what they were trying to say and reducing common errors. Another tool that is extremely helpful for beginning writers is word prediction. Word prediction generates a list of possible word choices that the student is trying to use or may want to use next when writing. (Image 2) This assists beginning writers, as well as those students that struggle with spelling. With certain programs, the prediction list can also be read aloud to assist students in selecting the correct word.

For students that are composing longer written pieces, such as paragraphs or multi-paragraph essays, there are several pre-writing strategies to support these writers. Utilization of graphic organizers can help all students with composition, but are especially important for those students with organizational difficulties. Microsoft Word has SmartArt, which uses a graphic visual representation of information that is easy to generate and customize. (Image 3) Additionally, Microsoft Word has an Outline view, located on the View Tab that may help certain students organize their ideas. Color can play a part in helping students with writing. Research has shown that incorporating color and using color overlays for reading and writing can be beneficial. One simple change is to modify the background color of the page and the text color in a text document. To adjust the background color, select the Page Layout tab in Microsoft Word. The student can select a preferred color and then save as a template for use while composing on a computer. Please note, the page will print white, even though the background is colored on the screen. For the drafting portion of the writing process, students may also benefit from text-to-speech and word prediction, as mentioned for the beginning writer. Another tool useful as a pre-writing activity is the use of audio record-



Image 1: PixWriter is software that combines print, pictures and speech for beginning readers and writers. Teachers can easily create picture-assisted word banks for students to use in their writing.

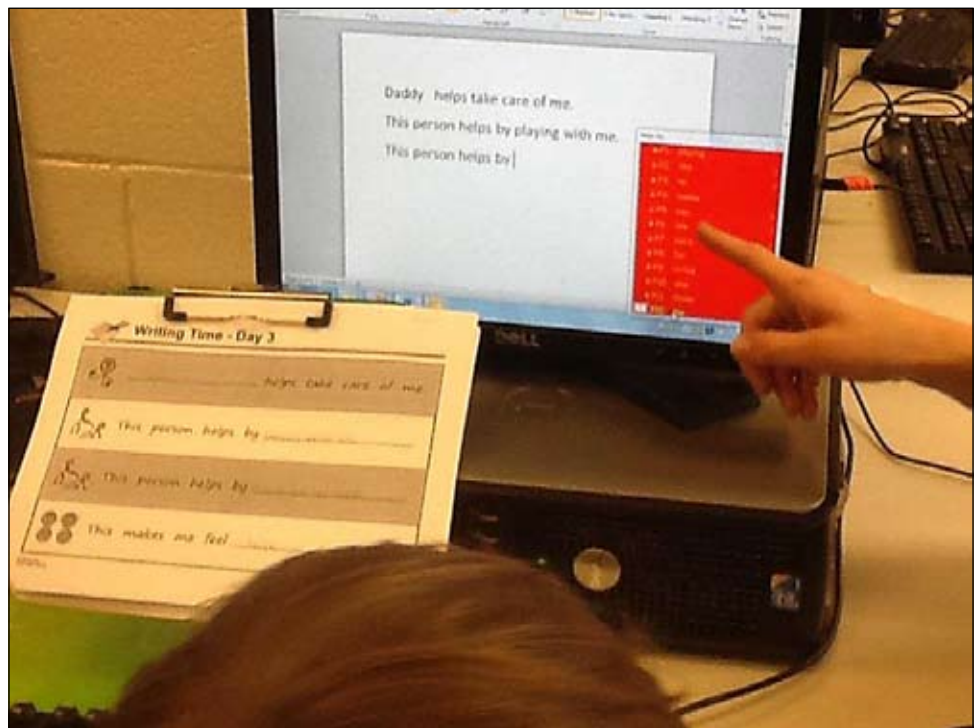


Image 2: Word prediction is a valuable tool, allowing students with spelling difficulties or accessibility needs to generate written work.

ings. Many students can talk much faster than they can write, but struggle to get their thoughts on paper. Students can create an Audio file in Microsoft Word, or use other free tools, like Audacity, to record or brainstorm their thoughts. Students then have the ability to listen to what they have recorded as many times as needed to assist in their composition.

Speech-to-text, which makes the use of

the keyboard and mouse optional, is also a tool to consider for some students. Utilizing speech-to-text, students use their voices to dictate text to the computer. Students with accessibility issues, such as physical limitations, may find speech recognition as a way to become more independent in their writing. Windows 7 and 8 computers have this technology built in. (Image 4) Windows Speech Recogni-

tion works more effectively with increased practice. It is not always accurate and may be frustrating if the software misunderstands what they are saying. Good editing and pre-writing skills are a necessity if using speech-to-text. Speech-to-text software is also commercially available and can be explored to assist writers needing this technology.

The on-screen keyboard, also built into both Windows 7 and Windows 8, can assist students, including those with physical disabilities, in being more independent writers. Located in Ease of Access Center, the on-screen keyboard has three modes of typing. In the clicking mode, the student can use the mouse or joystick to type text. The on-screen keyboard, in scanning mode, continually scans the keyboard and highlights areas by line, group and then by individual letter. (Image 5) Finally, the student can have preferences set in hover mode to use a mouse or joystick to point to a key. The selected character is typed automatically once the letter has been "hovered" over for a predefined period of time. The on-screen keyboard also incorporates word prediction as an option to reduce keystrokes and assist with spelling and composition.

The final portion of the writing process is editing and revising the piece. This can prove to be one of the more difficult tasks in the writing process for students. Text-to-speech is one of the most valuable tools in editing written work. As students listen to what they have written, they are able to catch grammatical and spelling errors exhibited by the pronunciation, as well as hearing if their sentence or passage provides the intended meaning. As noted, Microsoft Word has text-to-speech built in, but there are also free text-to-speech tools that can be explored on our Loudoun County Public Schools Assistive Technology Page <http://bit.ly/ATtexttospeech>. Editing checklists can also assist in the editing and revision process. (Image 6) These checklists can assist students and encourage them to evaluate specific features of their writing, as well as increasing self-awareness. Teachers can create electronic editing checklists, for example, using Voice Notes or Speaking Tool in Microsoft Word and embed reminders to the student. Paper-based checklists can also be customized, depending on the writer. Often included in these lists are reminders to capitalize the beginning of a sentence, check for punctuation and check for spell-

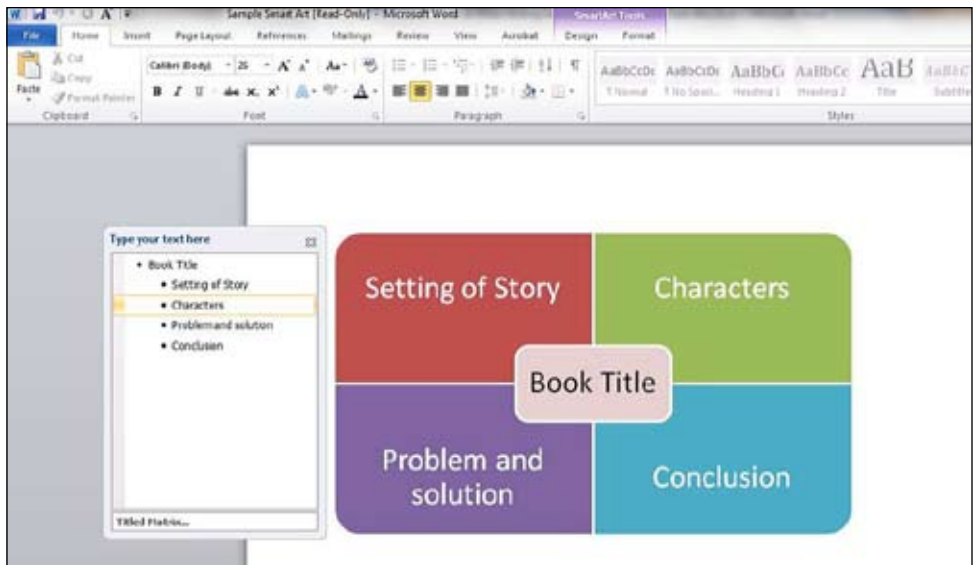


Image 3: Microsoft Office's SmartArt can be used to create a digital, pre-writing organizer.



Image 4: Windows Speech Recognition is a built-in tool for speech-to-text.



Image 5: Microsoft Word offers an on-screen keyboard through the Ease of Access Center. Shown is the scanning feature (by row) to be used for individuals needing alternative keyboard access.

ing errors, just to name a few. They can be as simple or as complex as needed to assist the level of the writer and should always include "Listen to your Work."

Another useful Microsoft Office tool to aid in the final stage of writing is the use of Readability Statistics. (Image 7) This is a proofing tool that provides an analysis after it checks for both spelling and grammar errors in the document. Readability Statistics provides how many words, sentences and words per sentence are included in the analyzed sample. Also provided is the reading level for the document using the Flesch-Kincaid Grade Level. For example, a student in the 7th grade can check the Readability Statistics of the writing assign-

ment. In this case, perhaps the 7th grade student's Readability Statistics reveal the assignment is a Flesch-Kincaid Grade level of 3.0 or 3rd grade reading level. This number can raise their writing grade level by utilizing additional features to enhance their writing. One tool that can easily improve the grade level is the synonym tool. Simply right-clicking on a word in a Microsoft Word document will launch a window of options, one of which is synonyms. By clicking on this, it provides a bank of words to choose from to expand the use of vocabulary in the document. If the student writes "great" many times throughout their writing and then checks for synonyms, they will get words like "prodigious, abun-

dant, excessive," which will then vary their word choice and become more interesting words. If a student utilizes synonyms for even a few words in their composition, the results typically show an increase in the reading level and hence, their writing level.

Many of the supports and strategies discussed here are tools that are embedded in Microsoft Office and Windows 7 and are readily available for students. Others mentioned may charge a fee, but similar free supports may be available. We hope you visit our Web page, <http://bit.ly/CTGwriting> for direction sheets and resources to support the use of the tools we have mentioned here, and more!

PRODUCT INFORMATION

Microsoft
One Microsoft Way
Redmond, WA 98052-6399

Read&Write Gold TextHelp

Texthelp Inc.
600 Unicorn Park Drive
Woburn, MA 01801
Tech Support Phone: 888-248-2479
Website: <http://www.texthelp.com>
Support Inquiries: us-support@texthelp.com
General Inquiries: u.s.info@texthelp.com
Cost is \$645 for PC or Mac,
\$295 for single user copy for IEP/504 students
*Offer a Free 30-day trial

Audacity

Free download
<http://www.audacity.soruceforge.net>
(there is no contact information on their website)

Pixwriter

SunCastle Technology
3574 Bridge Road Suite 8-438
Suffolk, VA 23435
Website: <http://www.suncastletech.com>
info@suncastletech.com
877-306-6968
Fax 757-512-5662
Cost: \$99 for download
\$125 for CD ■

Punctuation	My sentences all have punctuation? (.?!)	<input checked="" type="checkbox"/>
	My sentences all begin with a capital letter	<input checked="" type="checkbox"/>
	All proper nouns begin with a capital letter	<input checked="" type="checkbox"/>
Grammar	My sentences are all complete and have a noun and a verb.	<input checked="" type="checkbox"/>
Spelling	I checked and fixed spelling errors	<input checked="" type="checkbox"/>

Image 6: Self-Editing Checklists can be created from simple to more complex checklists, depending on the writing skills of the student.

Counts	
Words	321
Characters	1483
Paragraphs	15
Sentences	21
Averages	
Sentences per Paragraph	4.2
Words per Sentence	13.6
Characters per Word	4.3
Readability	
Passive Sentences	9%
Flesch Reading Ease	71.1
Flesch-Kincaid Grade Level	6.7

Image 7: Readability Statistics in Microsoft Word can be used to show the reading level of the passage written by the student.

Building a Core Vocabulary Classroom

Do you struggle to get your students to use their augmentative and alternative communication devices (AAC) throughout the day? Do you find yourself spending too much time programming high-tech voice output communication aids (VOCA)s? Are you struggling to move your clients past “I want”? We found that moving to core vocabulary allowed us to build a language-friendly classroom that will grow with clients throughout their life.

When we first started working with children with significant communication disorders, we found it was challenging to get our students to consistently use their communication systems. We spent too much time programming pages for different lessons, searching for missing overlays or lost PECS pictures and not enough time using the device with the student. Plus, other team members did

not want to use the device because they were always searching to find a word or phrase. We were also frustrated because our students used their communication systems primarily to request, but had difficulties using a range of communicative functions, such as commenting, protesting or asking questions. As we looked for ways to encourage language development with AAC, we started to hear about core vocabulary. After introducing core vocabulary to our students, we started to see more language development and increased use of AAC.

WHAT IS CORE VOCABULARY?

Before creating a core vocabulary classroom, we need to understand what we mean by core vocabulary. According to Witkowski and Baker (2012), “Core vocabulary is the relatively small set of words with the highest frequency of use in both conversation and in written text. (C)ore vocabulary consists primarily of pronouns, verbs, auxiliary verbs, prepositions, adjectives, and determiners.” These are words that are used by people across the lifespan, from childhood through-

out adulthood. Research shows that the words used most frequently by young children are core vocabulary (Banajee, DiCarlo, & Buras-Stricklin, 2003; Marvin, Beukelman, & Bilyeu, 1994). For educators in elementary classrooms, the Dolch Word Lists and Fry Word Lists consist of core vocabulary (Dolch, 1948; Fry, Kress, & Fountoukidis, 2002).

What about nouns? We call these words fringe vocabulary. According to Beukelman and Mirenda (2005), “Fringe vocabulary refers to vocabulary words and messages that are specific or unique to the individual.” Fringe vocabulary is specific to who you are and your interests or related to what you are studying.

WHY DID WE DECIDE TO USE CORE VOCABULARY WITH OUR STUDENTS?

As we learned more about core vocabulary, we realized that core vocabulary is a language a person can use throughout their life. If we introduced core vocabulary to students when they were young, this language would grow with them. This



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language would still be relevant when students transition to other classrooms. This language would generalize to other settings, such as home or the community. However, we frequently left core vocabulary off our communication boards, overlays for VOCAs related to curriculum and out of PECS books.

BUILDING CORE VOCABULARY CLASSROOMS

Once the speech language pathologists (SLPs) in our program were familiar with core vocabulary, we became excited about starting the journey toward creating core-friendly classrooms. First, we created an action plan with our administrator. Our program services students with special needs from early childhood through junior high in one building. We decided to start by introducing core vocabulary to the early childhood rooms for the first year. Each subsequent year, the utilization of core vocabulary would trickle up one classroom level.

The first year, we created core vocabulary lists, created a variety of core vocabulary boards based off of the boards from The Pixon Project Kit (Prentke Romich Company - \$149.95) and trained staff via inservices focusing on core vocabulary. The core vocabulary lists contained the words that would be the focus of the grade level each year. For example, during the first year, the early childhood classrooms focused on the first 30 words broken down into two target words every two weeks. The Pixon Project Kit was purchased; this kit gave us a base for the layout of no-tech boards to be utilized throughout the school. No-tech boards were created for virtually every area of the school, including the gym, lunchroom, bathroom and life skills room. Each board had 50 core words as the base, with 10-20 fringe words across the top, specific for that area (Image 1). Standardized overlays were created for all of our lite-tech VOCAs (Image 2). We decided to have standardized layouts for these devices since most students in our school use some type of AAC. Often, there are three or four lite-tech devices in one classroom. By standardizing the boards, the staff learned the location of words and use of aided language stimulation increased, facilitating student learning of the system. All of our staff, including teachers, paraprofessionals and support staff, were trained via in-service on aided language stimulation, the prompt hierarchy, and core vocabulary. These trainings included video samples of individuals using core vocabulary. Videos of our own students were used as



Image 1



Image 2

well as videos taken from YouTube. Most of the teachers have attended Gail VanTatenhove's full day Pixon Project training.

Communication systems were created and customized based on individual student need. The continuum of no-tech to

high-tech is available for our students, and the process for determining a student's individual system is dynamic. No-tech boards may be individualized by adjusting the number of symbols, size of the symbols and masking/revealing of symbols. Currently, we try to start our stu-

dents on a board with at least 50 words to provide them with a robust language, as well as to provide staff with more words when using aided language stimulation. We also add fringe to no-tech and lite-tech AAC systems using comb binders and Flip'n'Talks (Image 3). When we are considering a student for a high-tech trial, we look at systems that support core vocabulary and consistent motor planning and whose features match with the individual student's needs.

This year marks the end of our fourth year of building core vocabulary classrooms in our school, and it marks the first year of core vocabulary being utilized throughout the school. Each year, we build on the resources from the previous year. Through saving all of our previous lesson plans, we now have a library of weekly lesson plans that target two words at a variety of age and ability levels. We also created a variety of supports for classroom teams and families, including "classroom idea sheets" (Image 4), as well as "family idea sheets." These consist of ways to incorporate the two target words in various daily activities. At school, those activities include circle time, art, reading and math. For families, those activities include car ride, reading and bedtime. An example idea given for mealtime/snack using the target words of "big" and "little" would be to have students request a big scoop or little scoop of a desired item.







Other classroom supports given to teachers include Velcro pull-off core vocabulary boards (Image 5) to be used for targeting concepts during an activity or to visualize sequencing of words. Interactive SmartBoard core vocabulary boards were created. Classroom staff model using core throughout various activities with large visuals or on the SmartBoards. Computerized and interactive books and activities incorporating core vocabulary were also created. These activities were shared and made available to all teachers via the school network so that activities can be downloaded and used during lessons. SLPs created a lesson plan template to help teachers create core-friendly lessons, and many lessons were co-planned with the SLP/teacher team.

SUPPORTS FOR FAMILIES

For the past three years, we have provided families with many supports. We offer after-school trainings on core vocabulary for families twice a year. During these trainings, we talk to families about core vocabulary and AAC. Then, we have the

Image 3



Core Word Classroom Ideas	
Date: 2/13 & 2/26	
Target Words: "Different" & "Again"	
Activity	Ideas
Calendar/Circle/ Music 	<ul style="list-style-type: none"> You can have students decide if they want to do a song or activity 'AGAIN' or if they want to do something 'DIFFERENT'. At the end of a song/activity, allow the students to express if they want to do the song/activity 'again' or if it should be 'all done'. If they choose 'again', repeat the same song. "We do it AGAIN."
Snack 	<ul style="list-style-type: none"> If they request a different snack item, you can model, "You want something DIFFERENT." If they request "more", you can elaborate by saying, "You want chips, AGAIN."
Reading 	<ul style="list-style-type: none"> After a story, you can ask the students if they want to read the book 'AGAIN' or do a 'DIFFERENT' book. After a story, you can ask the students if they want to be 'all done' reading or if they want to do it 'AGAIN'. If there is a funny noise in the story that the students are enjoying (e.g., car going "vroom" or snoring) that you make while reading the book, say that you can do it 'AGAIN' and repeat the sound.
Art 	<ul style="list-style-type: none"> If during an activity, you do things multiple times (e.g., glue multiple items), every time you glue a new item, you can say, "Let's do it 'AGAIN'." Students can request a color using "that" and then when finished with coloring with that color, can request a "DIFFERENT" color. When finished doing a step (e.g., finished gluing/coloring), you can say, "Time to do something 'DIFFERENT.'"
Math 	<ul style="list-style-type: none"> If doing a math activity (or any activity on the SmartBoard), have the students request an activity to repeat by saying "AGAIN" or "DIFFERENT"
Rec/Leisure And Gym 	<ul style="list-style-type: none"> If you are doing a gross motor activity, have the student stop and then see if they want to do it 'AGAIN' or do something 'DIFFERENT'. During rec/leisure, you could follow the child's lead. See if they want to do something 'AGAIN' or if they want to do something 'DIFFERENT'

AGAIN - Any time an activity is repeated in the classroom, you can say, "Let's do it AGAIN."
 DIFFERENT - Upon completion of any activity, determine whether you are going to do exactly the same activity or something different. Model and prompt the words 'again' to do the same thing again or 'different' to do something differently.

Image 4

families participate in hands-on activities (e.g., reading a book, making a snack, playing a game) with their child and practice working with their child's communication system. Some of the classrooms also provide parents with a school-to-home communication folder that utilizes core language (Image 6). It consists of a file folder with carrier phrases (e.g., "I liked," "I ate," "I went") with symbol-based options for families to facilitate conversations with their children about their day. Along with the family idea sheets described earlier, core word books were also created. Each book focuses on one target core word and the ways in which that core word may be used. Each simple sentence is paired with the picture symbols to help parents become familiar with the words/symbols. Each page is accompanied by a photographic illustration as well. Materials are sent home in the student's home language.

IMPLEMENTING CORE VOCABULARY IN CLASSROOM ACTIVITIES

Here, there and everywhere! Remember those classrooms that you walk into and everything has a label on it – the chair, desks, clock and even the pencils? In a core vocabulary classroom, instead of the name of the object, there is one or two core words students can use to talk about that object. For example, on the desks, we have the core words "work here." The SmartBoard volume dial is labeled with "turn up" and "turn down." The door has "go in," "go out," "close it," and "open it." These labels tell students more than just what the item is, but what they can do with the item and the language they can use.

Teachers incorporate core vocabulary during all aspects of the school day. Instead of focusing on specific thematic vocabulary, core words are chosen to describe referents in lessons. For example, if a science lesson is focusing on the thematic word hurricane, the teacher may use the core words big, loud, turn and bad to describe this natural disaster. In a lesson on colors, they may focus on the words different and same. During movement breaks, students tell teachers if they want to stop or go and if they want more or are all done. The target vocabulary is modeled by staff on the individual student communication systems. For those students who benefit from less visual stimulation, target words are attached to a separate Velcro board.

Within the past two years, we have also



Image 5



Image 6

incorporated core vocabulary into writing activities. We have created binders of individual 2x2 inch core words. After the child creates an individual work of art, they are asked to tell us about their picture using their core words and then paste the words onto their art (Image 7).

Some students are only using a few words to describe their art project, and some are working on sequencing sentences. Teachers also use wordless picture books and allow students to create a story using core word supports. One teacher has created themed vocabulary pictures for

each month. Students are able to choose their desired picture and use a pull-off core board to write about the item (Image 8). During cooking activities, the students take turns snapping pictures of each other throughout the process with an iPad. After the activity, students pick a photo of themselves and, using the app PicCollage, write about that photo using core vocabulary supports. Through incorporating core vocabulary into these authentic writing opportunities, students' written language has expanded.

CHANGES WE HAVE SEEN WITH CORE VOCABULARY

After implementing core vocabulary, we have noticed a number of changes, both in staff and students. All school staff have begun incorporating core vocabulary into their activities. Thus, students are exposed to core vocabulary throughout their school day in many different contexts. We have seen an increase in staff using aided language stimulation. Consistent language is also used across classrooms and grade levels. Because of these changes in the staff, we have noticed many changes in our students.

Students who are both verbal and nonverbal have shown an increase in language and communication. Their oral and written communication has expanded by incorporating core vocabulary throughout the day, especially in literacy and authentic writing activities. Students are communicating for a variety of functions. They are commenting, protesting and asking questions on top of requesting objects, recurrence and cessation. They are learning new language concepts and generalizing these concepts across environments. Students are taking more ownership of their AAC systems and using these systems in a variety of settings.



Image 7



Image 8

We have seen many positive changes in the past few years after incorporating core vocabulary into our school, and we are looking forward to continuing our journey of creating core-friendly classrooms.

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PRODUCT INFORMATION

Flip'n'Talk Kit

Mayer-Johnson
2100 Wharton Street
Suite 400
Pittsburgh, PA 15203
Phone: (800) 588-4548
Fax: (866) 585-6260
<http://www.mayer-johnson.com>

The Pixon Project Kit

Prentke Romich Company (PRC)
1022 Heyl Road
Wooster, OH 44691
Phone: (800) 262-1984
Fax: (330) 263-4829
<https://store.prentrom.com> ■

Hidden Potential: Everyday Technology in the Special Education Classroom

Assistive Technology! Educational Technology! Instructional Technology! These phrases are tossed around frequently when the worlds of education and technology intersect, and it isn't always easy to know the difference. Most professionals in these three fields have a sense that the terms overlap, but questions remain: where does assistive technology end and instructional technology begin? Can assistive technology be instructional technology? Can instructional technology be assistive technology? Does educational technology encompass both assistive and instructional technology? Who decides?

The Individuals with Disabilities Act provides the accepted, legal definition of assistive technology: "any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (IDEA 2004). When considered with Hap Aziz's 2010 definition of education technology, "the considered implementation of appropriate tools, techniques, or processes that facilitate the application of senses, memory, and cognition to enhance teaching practices and improve learning outcomes." (Aziz, 2010), and the Association for Educational Communications and Technology's definition of instructional technology, "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning," (ACET, 2001) it is clear that assistive technology is both encompassed by and more than

educational and instructional technology. The definitions also suggest a distinct similarity between educational technology and instructional technology, and I will use instructional technology throughout this article to refer to both.

What the definitions do not make clear is what current trends in instructional technology mean for assistive technology. The IDEA definition specifically references technology acquired "commercially off the shelf," which opens the door to consider instructional technology when determining what technology is appropriate for students with disabilities. Typically, students with disabilities are assumed to require more specialized technology than the general public. Specialized technology encompasses everything from simple switches and software to high-tech communication devices, all designed specifically for students with special needs. Over time, it has become generally accepted that the technology utilized in the special education classroom is not the same technology found in general education classrooms.

As the landscape of technology has shifted, particularly since the advent of the iPad in 2010, the technology in general education classrooms has changed dramatically. These changes in instructional technology necessitate a shift in assistive technology as well. Perhaps the most well-known use of instructional technology with students with disabilities is the well-publicized use of iPads as communication devices. In-

creasing functional communication is an area of incredible potential for iPads and tablets and is an excellent example of how changes in technology can be harnessed by special educators. Other uses of popular instructional technology as assistive technology may include use of Interactive Whiteboards (IWBs) as a large touch screen for students who have difficulty seeing or visually attending to a monitor screen or adaptation of commercial software to implement student goals. The question, however, may not be how instructional technology can be used as assistive technology, but rather how instructional technology can be incorporated into special education classrooms to improve student access and task completion.

Arguably, increased usage of instructional technology in the classroom may lessen the need for assistive technology for some students. Many products might be considered instructional technology for some, while others require them to access a program or complete a task. Because features, such as word prediction or autocorrect, double as time-savers, they have been adopted for use by the general public and in general education classrooms. Where these solutions are provided to all students, to the extent that they are provided without an evaluation or documented need for them, they become instructional technology rather than assistive technology. If a student does demonstrate a need for a tool, that need should be well-documented in his or her IEP. If the student changes educational settings or the ac-



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commodation in question is discontinued, a record should exist that, for that student, this was more than simply a handy tool. When classroom tools are sufficient for a student's needs, however, assistive technology may not need to be considered.

Beyond the idea of using instructional technology instead of assistive technology is the concept that, in addition to assistive technology, students with special needs can benefit from instructional technology in the classroom. Tablets have amazing potential for students with disabilities. In addition to use as a communication device, tablets can be used for academics, generalization, vocational skills and more. The strength of the tablet lies in the ability to customize it to create a truly individualized device. The accessibility features allow for customization based on student vision, hearing, motor needs and even impulsivity, all of which are easy to change on the accessibility menu. With just a few taps, the accessibility profile can be modified for multiple students, expanding the potential for classroom use. The key to harnessing the power of tablets for use with students with disabilities is the wealth of apps available, covering all education domains. Both the Android and Apple markets have thousands of educational apps (as of this writing, Apple's website claims over 65,000 and Android over 50,000), and that number grows daily.

App selection and curation could provide enough fodder for an article of its own, but it is worth discussing briefly. There are many special education specific apps – both Apple and Android have a special education app store available to browse – but the sheer number of other educational apps allows teachers to search out apps that address specific skills, either an app that addresses multiple levels or an app that targets an individual student's current ability level. It is important, however, to note that this customization should target the skills or areas of need required by the student. Students often engage more easily with familiar characters or with apps that feature plenty of sound and animation. While those apps may be perfect for student reinforcement, they do not always provide quality instruction. When searching for apps, the priority must be the skills addressed and the quality of the instruction. Reinforcement and instruction do not need to be simultaneous, and it is best to choose quality apps for instruction and utilize favorite characters for reinforcement.

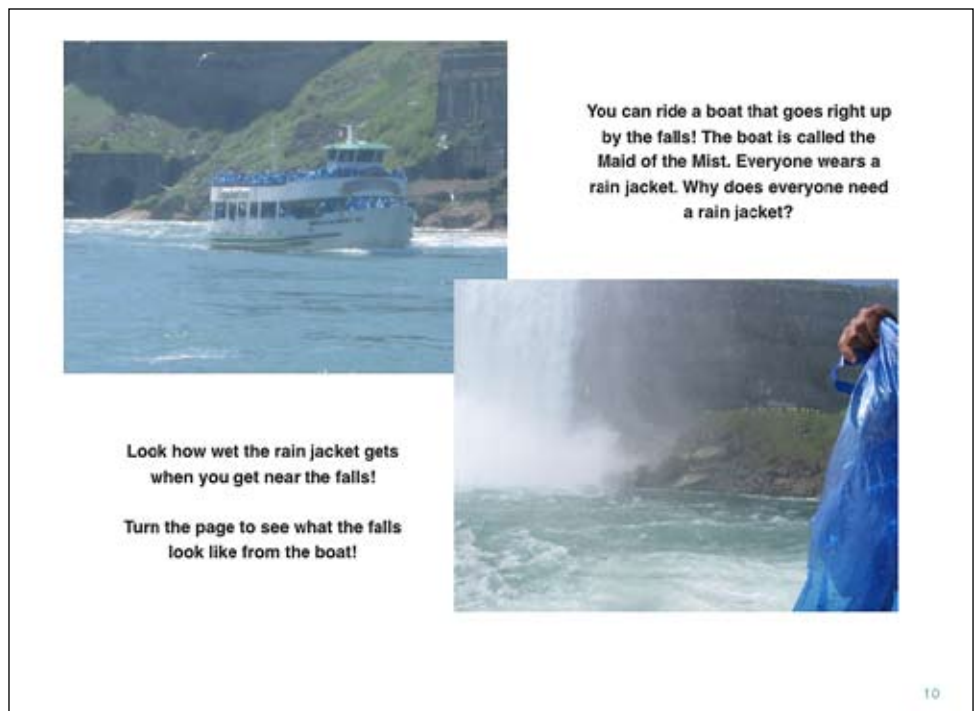


Image 1: Virtual Field Trip to Niagara Falls, created in-house using iBooks Author and displayed in iBooks



Image 2: Middle school-aged students using our Mobile Lab to work on academic games and apps.

The sheer number of apps all but guarantees that you can find an appropriate app, but the real question, of course, is how to find them and how to make sure what you find meets the standards for instructional use. There are a number of well-regarded sites that offer app reviews and sites that allow you to search apps by skill or area

of need addressed. There are also commercially available sites that review apps based on a universal set of criteria. Sites, such as Smart Apps For Kids (<http://www.smartappsforkids.com>), Bridging Apps (<http://www.bridgingapps.org>) and Balefire Labs (<http://www.balefirelabs.com>), are examples of each of these categories

of app review. Additionally, you can check the product descriptions and user reviews in the Android and iTunes stores.

Tablets are not the only technology that can be adapted to use with students with special needs. IWBs are another valuable tool for students. Whether a SMARTboard, a Promethean board, a Mimio board or another brand of IWB is used, the benefits to the students are the same. Many IWBs come with proprietary software (e.g., SMART Notebook, ActiveInspire) that can be used to create lessons and activities for students. These programs offer a blank slate and enable instructors to create lessons individualized to their students. The interactivity of IWBs, coupled with the ability to create lessons specific to the needs and abilities of each student, makes them an effective addition to a special education classroom. The user-friendly nature of the proprietary software gives special education staff the ability to create many custom activities for their students. Educators can create activities that are tailored to student abilities and student goals. Staff can create a file of pages that focus specifically on student IEP goals, complete with the ability to make changes and create new materials quickly in response to student progress on targeted goals.

In addition to hardware, consumer software can be an excellent tool for students with special needs. Commercial early learning software addresses skills, such as the alphabet, numbers and basic math and reading concepts, in an engaging way and is generally appropriate for younger students. These programs are often plug-and-play, and many feature basic data collection and the ability to add multiple users. Other academic software created for general education students is extremely customizable, offering benefits for students with disabilities as well. These programs often include adjustable accessibility features and allow instructors to specify particular lessons or skills for each student. Much of the academic software currently available collects data and allows for multiple users. It is common for school districts to purchase software or online curriculums as a supplement or replacement for their curriculums. The high degree of customization available in these programs allows special educators to create profiles that meet the needs of students with disabilities, allowing students to use the same online curriculum as their peers. Though

they may be working at a different level or on a modified set of lessons, these students can then be more readily included in the classroom than students who are working with an entirely different set of materials.

As instructional technology becomes more individualized, there is less need to turn to the specialized technology that special educators have become accustomed to over the years. Certainly, not every student will be able to benefit from the technology employed by students in general education classes. However, by investigating that technology first, instructors are increasing the likelihood that a student's education will be as similar as possible to that of their same-age peers. Not only is it beneficial for students with special needs to use and participate with the same technology as their same-age peers, but it can also be a significant cost savings to utilize technology that already exists in the school or district. Instructional technology will never fully replace assistive technology for students with special needs, but as our world requires and demands more access to technology, consumer technology does make more considerations for people with disabilities, and special educators must use this to their full advantage. The ability to use consumer technology as assistive technology is an incredible leap in this field. When considering what technology meets students' needs, expanding teachers' repertoire to include instructional technology can only benefit the students.

At Summit Educational Resources, a private non-profit school serving students with developmental disabilities, we have gone beyond the theory embedded in these ideas and are immersed in the practice. Each of our classrooms has an iPad and a SMARTboard dedicated to academics, as well as access to a mobile lab of iPads and laptops. Summit also provides a 500-piece software library, including academic and early learning software, and a number of pre-installed programs on classroom computers. Software purchasing decisions are based on classroom trials and available research. All of our teachers receive training on the hardware and software available, and professional development is provided in-house on all technology, from the SMARTboard to individual apps. Over the last several years, as technology offerings have expanded, Summit has adapted some specialized programs to utilize our

chosen technology platforms. For example, Summit technology staff have created virtual field trips to an ever-expanding list of locations using iBooks Author for the iBooks app. These include trips to local areas of interest and will soon include life-skill locations, such as a grocery store and a restaurant. Summit has been driven to find innovative uses for the technology that surrounds us. As technology staff have worked toward this goal over the last five years, internal surveys show that teachers report higher levels of satisfaction and comfort with technology and a 60 percent increase in usage. That points to another benefit of using consumer technology – the use of ubiquitous technology means that teachers are already comfortable using it on their own and will be better able to translate those skills to the classroom.

Instructional use of consumer technology is a new frontier in special education. Technology has been used in many forms over the years, but it has usually, necessarily, been different technology in special education. Society's current focus on individualized devices and customizable software opens the door for special educators to harness the power of the same technology that the world is using for the very specific needs of their students. Putting technology to work for students with disabilities adds a new and exciting dimension to the use of technology in special education, and it is one that should be embraced and explored.

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Alphabet Soup: DIY Means Do-It-Yourself

JEN MUNDL AND ASHLEY BAILEY

Courage Kenny Rehabilitation Institute.

Assistive technology is not always expensive or come from a manufacturer, but can be created on your own. There are creative ways you can use common items found at a hardware store, fabric store, hobby store, or even Target to create you ingenious and useful products for various related disability needs. It is only limited by imagination.

Courage Kenny Rehabilitation Institute and the Assistive Technology Program have been creating an assortment of assistive technology devices for over 25 years. In the past eight years, the organization has used engineers from a local company to volunteer time in assisting clients with unique needs and develop new and exciting DIY items. You don't have to be an engineer to contribute in this process, but we have found that our volunteers have a unique way of finding solutions for clients with disabilities.

DEVELOPING A DIY PROJECT

The first step is to determine if a project is realistic or possible. Brainstorming and researching solutions is the start of the project. You should first perform a Google search to see what is available on the market. This will give you ideas about costs, designs and possible alternations that are needed. There are many good resources to use during your research, including:

- <http://www.abledata.com>
- <http://www.handihelp.net/index.html>
- <http://www.workshopsolutions.com/>

[COMPLETE/list.htm](#)

- <http://www.youtube.com/watch?v=OcaBaUtk43E>

There will be a team approach to the project as engineers, therapists, volunteers, caregivers and the user all bring their unique prospective and knowledge to the project. Some or all of the people meet at the start of the project so that everyone understands their role and responsibility for completing the work. Volunteers can be experts in their field bringing new abilities to the group. Volunteers of America and local volunteer organizations will have a list of opportunities that you can use to obtain highly talented participants for your project.

ASSISTIVE TECHNOLOGY TOOL KIT

There are many tools you will need with DIY projects and your tool kit should be equipped with a soldering iron, needle-nose plier, hammer, heavy duty Velcro, duct tape, screwdrivers, jewelers kit, tape measure, flashlights, engineers' third hand, needle and thread, safety glasses and other items you find at hardware or craft store. Everyone on the team needs to be given training regarding safety and correct usage of the tools before they begin. Additionally, each project should be evaluated to determine the feasibility of creating the product. There are other key features to consider, including appearance, usability and accessibility. Every person is unique, so their interests and preferences are part of the design process. Kids with disabilities



do not use old, clunky, medical-looking devices, but prefer to use the same items as their siblings and peers.

ADAPTED TOYS

It is important for every child to have the opportunity to explore their environment, through play, as it prepares them for life-long learning. Without this ability, the child will not develop at the same rate as their peers and, therefore, not prepared to enter preschool. There are a multitude of vendors who specialize in creating switch adapted toys and accessible toys. These items are often expensive and are not readily available at toy stores. Children with disabilities want to play with the same toys as their friends and siblings, which then require DIY solutions.

Battery operated toys can be customized for switch access by attaching a switch

port at the junction of the battery compartment. With a switch adapter, there is a metal conductor that needs to be placed on the top of the battery within the battery compartment to provide switch access to the toy or an environmental aid of daily living (EADL). These can be purchased online through AbleNet or created independently. Basically, you will need to purchase a 1/8-inch jack for the switch, cabling and a metal contact. With the use of a soldering iron and needle-nose plier, the adaptation is created for less than \$5.

LAP TRAY

A lap tray is a flat surface tray that is connected to the armrests of a wheelchair so people with disabilities can always have access to a tabletop. It provides easier access to wheelchair users for eating, reading, computer usage and many other activities. They can be made from fiberglass or wood, then attached to the wheelchair frame with Velcro or wooden designs. These can be constructed from extra lumber you have from other projects. It will be important to have protection for elbows by using sheepskin and a secure strap so that it does not disengage while driving.

DRINKING AID

Hydration is necessary to maintain good health, and people with physical limitations may need a drinking bottle that they can easily access at all times. To create this device, you start with a large bottle and purchase Loc-Line to hold the straw in a proper place but yet giving it easy movement. You will need to purchase a bike valve, extender Loc-Line, and an end connector from Loc-Line. Their website is <http://www.loc-line.com/about-contact.html>. The drink aid can be attached to the wheelchair with brackets or with Velcro. A long straw can be purchased by buying plumbing tubing from your local hardware store.

ACCESSIBLE AND PORTABLE RAMPS

New and old homes may need to be accommodated temporarily or long term when physical limitations make it difficult to use stairs. There are specific rules and regulations that need to be followed when building a safe ramp to make a building accessible. There are resources available on the Internet to assist you in building your own ramp. If you visit <http://www.wheelchairramp.org/rampman/manual/rampindx.htm>, you will find a step-by-step guide



Lap tray

to build a ramp of your own.

FISHING POLE HOLDER

There are many fishing pole holders on the market today, which can be expensive, but a trip to the local hardware store will supply you with items to make your own. The supplies you will need include PVC tubing, a wood base to hold the piping, nails and screws to secure the piping. The amount of PVC piping needed depends on the access needs of the individual, as it will be important to consider where it will be used, the length of the fishing rod holder and the abilities of the fisherman. It is a great way to enjoy the outdoors!

MOTORIZED SWITCH-ADAPTED WATER GUN

Every child enjoys a good water fight. Laughs and joy can be seen on their smiling faces. There are a few steps required to make this a reality for an individual with mobility difficulties. This can be created with a switch adapter, but it must be motorized, and it is best to find one that is self-standing.

GARDENING

When summer comes, people always enjoy the beauty of planting their own garden. For individuals with physical disabilities, it can be challenging to get low enough



Drinking aid

to the ground being planted. But with DIY, you can create a garden box that can be raised to any height. This activity can be expanded by making the garden a sensory garden so that a person with any disability can enjoy and benefit from the aroma, peacefulness and healing powers.

Sensory gardens are places where the whole idea is to encourage users to explore, touch, pick, smell and crush plants and interact with objects. This places challenges on the design, particularly to make

things robust and to choose plants and materials that can tolerate the inevitable damage from inquisitive hands. Where resources allow, you could include disposable plants that get regularly replaced, or you can choose plants that are tough and can withstand a lot of handling. Successful design relies on imaginative use of materials and opportunities. Consider ways of concentrating or “stage managing” natural events, such as introducing nest boxes and feeders so that birds can be seen or choosing nectar-rich plants to encourage butterflies and other pollinators. Think of ways to bring in materials that would otherwise require venturing further afield, such as piles of autumn leaves, a load of straw, bark chips, flowers, etc. Plants, especially flowers, are great for triggering memories, and this makes them ideal for reminiscence. This is particularly relevant for older people and those living with dementia and memory loss. If possible, involve people in collecting memories and stories so you know what plants you need, for example by making collages of pictures of flowers and plants. In a garden, it can be as simple as including some containers of annual flowers that are old favorites (e.g., marigolds, forget-me-nots, pansies, snapdragons), letting the grass grow longer between cuts so the daisies can flower, having a tub or two for planting a favorite vegetable (e.g., potatoes, runner beans) or growing some fresh mint for making tea. The design can also include features intended to bring back memories, such as an old garden shed with tools, a border of old-fashioned scented pinks or old clay pots.

Creating a sensory garden is a project that the homeowner and personal care assistant can embrace and work together on to make a wonderful opportunity for the neighborhood to enjoy. If creating your own is not a possibility, enjoy other gardens throughout your state.

SHAREWARE AND FREWARE

There are resources on computers and tablets for free applications and software that can be beneficial to the user. Verbally is a free AAC app for the iPad that provides a voice to the user who is able to use a variety of access methods. There is a professional version for those needing a greater customization of the product, but for many, the free version is sufficient. iTunes can be searched for other free iPad apps, but remember, the free ones are teasers for you to upgrade the app to the professional ver-



Accessible ramp

sion, which will have more features.

Shareware is software that you can use on a trial basis before paying for it. Unlike freeware, shareware often has limited functionality or may only be used for a limited time before requiring payment and registration. Once you pay for a shareware program, the program is fully functional. Today, the most common type of shareware is called “trialware” or “demoware.” Many will work with all functions for two weeks and then request payment to continue using it. For assistive technology, there are specific websites that provide the most options, including:

- <http://www.disabilityresources.org/AT-SHAREWARE.html>
- <http://www.nsnnet.org/atc/shareware.html>
- <http://fritschi.home.mindspring.com/share2.html>

EASE OF ACCESS

Both Macintosh and Windows operating systems provide a handy tool for people with disabilities called “Ease of Access.” Both operating systems have a variety of accommodations that can happen through the Ease of Access center. Some of the accommodations include single key typing, magnification, voice over, mouse keys, repeat delay, debounce timing and show sounds. These features can be set up to run at startup and can be turned on and off, depending on who is using the computer. These items can be combined with other software and hardware for accessibility.



Gardening

CONCLUSION

Do-It-Yourself projects can be rewarding to the user and builder alike. This article touches on only a few examples of what you can make with a little creativity. These projects are all made with universal design principles in place that emphasize the design process so that it is accessible to a large market. Universal design is about creating an attractive, stylish space that everyone, regardless of age, size or ability, can live in or visit. A home with universal design makes it easier for residents to live in and for guests to visit now and in the future, even as everyone’s needs and abilities change. ■

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