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Rapid Determination of Assistive Technology Needs for Reading Disabilities  
in High School Seniors Seeking to Attend College

*by Ira Socol*

Certified Assistive Technology Specialist - Michigan Rehabilitation Services

In an ideal world students with reading disabilities would reach their senior year in high school with an integrated plan for accommodating their learning skill weaknesses in their current education, their future education, and lifespan employment situations. Their plan would seek to strengthen all likely skill development while providing workable accommodations allowing them to maximize intellectual and income potential. It would be based in recent and detailed testing indicating causes of decoding and comprehension problems and would involve technologies and strategies field tested in the high school environment, if not also within actual employment experiences.

I do not work in an ideal world however, nor have the two or three hundred students I have worked with since 2002 received their education in an ideal world. I work in the Holland office of Michigan Rehabilitation Services and the students I meet primarily attend high schools across Ottawa, Kent, Muskegon, and Allegan Counties. Though the range of Special Education services provided in these dozens of districts varies dramatically, not one district has a staff member certified in Assistive Technology, nor do any of the four Intermediate School Districts involved. No high school routinely considers AT solutions in Individual Education Plan Conferences, and this is almost never considered when the primary disability is other than POHI. No school district has reading support technology routinely available to LD students. None of the schools' computer labs in the region meet federal accessibility standards under Section 504 of the Rehabilitation Act. Generally, the Educational Psychology reports prepared for students show nothing more in-depth than a reading comprehension grade level. The area faculty is hampered in serving students with reading disabilities due to a very minimal curricular commitment to Special Education issues in the dominant teacher education programs serving western Michigan.

When I meet students they are in the third to sixth month of their senior year. Though over 90% will graduate with regular high school diplomas over one third of students referred to Rehabilitation Services display almost complete failure in effective reading, being unable to correctly decode words such as "fog," "brown," and "which." These students cannot access printed information at a functional level that would allow success in college or in any post-secondary career training. In many cases they cannot successfully complete a job application.

Because of the structure of Michigan Rehabilitation Services and the agency's relationship with schools I am asked to evaluate students and recommend solutions within a very minimal time frame. To meet this challenge I have created a two-hour analysis that allows me to rapidly assess reading strengths and weaknesses and the causes

of reading failure, in a way that allows me to choose probable effective assistive technology accommodations, creates access to information, and which may possibly strengthen reading and writing skills.

### *Testing*

I begin by asking the student to read the following, or a similar passage, chosen for a ninth-grade reading level on the Flesch-Kincaid scale<sup>1</sup> and the likelihood of unfamiliar words:

"The cold passed reluctantly from the earth, and the retiring fogs revealed an army stretched out on the hills, resting. As the landscape changed from brown to green, the army awakened, and began to tremble with eagerness at the noise of rumors. It cast its eyes upon the roads, which were growing from long troughs of liquid mud to proper thoroughfares. A river, amber-tinted in the shadow of its banks, purred at the army's feet; and at night, when the stream had become of a sorrowful blackness, one could see across it the red, eyelike gleam of hostile camp-fires set in the low brows of distant hills." (from the first chapter of Stephen Crane's *The Red Badge of Courage*)

When a student is asked to read this passage I am not looking for comprehension or even handling of sentence structure. I need the presence of likely unfamiliar words in order to view the student's strategies in sounding out, or otherwise seeking to acquire new vocabulary. This is based in the International Dyslexia Association's view that reading disability is essentially characterized by issues with single word decoding.<sup>2</sup> Even without this definition there is an essential need to be able to acquire words before students can learn to "read," that is, to conceptually assemble coherent sentences, paragraphs and stories. In this reading I am looking for word attack systems: Does the reader attempt a phonological solution? Does he or she instead go on pure word-shape recognition? Is there some combination method? Is it simple guesswork? Or does the reader just shut down when faced with an unfamiliar word.

As I watch method I also time the process: How long does the word recognition process take? Is the process so laborious that the reader cannot remember the first words in the sentence before he or she has come to the end?

If this passage proves impossible I scale down to a story that falls in the fifth to sixth grade reading level, as in this segment rated 5.5 on the Flesch-Kincaid scale:

"Somerset PA (AP) -- A. Wolf took the stand today in his own defense. This shocked and stunned the media who predicted that he would not testify in the brutal double murder trial. A. Wolf is accused of killing (and eating) The First Little Pig, and The Second Little Pig. This criminal trial is expected to be followed by a civil trial to be brought by the surviving Third Little Pig. The case has been characterized as a media circus.

"His testimony is transcribed below:

"Everybody knows the story of the Three Little Pigs. Or at least they think they do. But I'll let you in on a little secret. Nobody knows the real story, because nobody has ever heard my side of the story. I'm Alexander T. Wolf. You can call me Al. I don't know how this whole Big Bad Wolf thing got started, but it's all wrong. Maybe it's because of our diet. Hey, it's not my fault wolves eat cute little animals like bunnies and sheep and pigs. That's just the way we are. If cheeseburgers were cute, folks would probably think you were Big and Bad too. But like I was saying, the whole big bad wolf thing is all wrong. The real story is about a sneeze and a cup of sugar." (*The True Story of the Three Little Pigs!* As told to Jon Scieszka, Illustrated by Lane Smith, Published by: Viking, New York, 1989)

This quick test provides a glimpse into the phonological vs. word shape strategy question, and can reveal essential strengths and weaknesses.

|                                | Student A<br>age 17<br>Male | Student B<br>age 18<br>Male | Student C<br>age 17<br>Female | Student D<br>age 17<br>Male | Student E<br>age 18<br>Male |
|--------------------------------|-----------------------------|-----------------------------|-------------------------------|-----------------------------|-----------------------------|
| first attempt<br>"reluctantly" | real...                     | reloaded                    | relocated                     | re...                       | relative                    |
| final version<br>"reluctantly" | relative                    | reloadedly                  | relocated                     | repeat                      | resolutely                  |
| time                           | 6 seconds                   | 3 seconds                   | 2 seconds                     | 7 seconds                   | 3 seconds                   |

All of these students knew the first segment of the word, but none were successful at sounding the word out. Some attempted, during the time period they focused on this single word, to determine it phonetically. Student A got to "relih" before obviously giving up and picking the first known word with that beginning - "relative." Student E who began with "relative," got to "reluck" before shifting strategies. Others went straight to shape: Students B and C chose the most familiar word that "looked right" ("C's" term) though C was more sure and B sought to correct his choice when he realized "that the word had a Y."

Student E's shift from phonics to shape is actually quite common in my experience. These students have usually been aggressively taught to attempt phonics, but once frustration mounts readers often return to the reading structure – word shape recognition – or what is most productive for them.

If a student primarily sticks to phonological solutions I move on. If they are solidly shape dependent I ask them to read further paragraphs in a variety of typefaces to check their ability to work with shape changes. In my studies so far I cannot determine a "best typeface," though the majority of students read more easily in Times New Roman and similar fonts than sans serif fonts like Arial. Some are stunningly frustrated by italics, others do best in 'hand-printing' fonts like Comic Sans. This process is less diagnostic than prescriptive. In the world of personal computers and digital text a reader can select any font that makes them comfortable, and they should know what works for them and use it consistently.

After these trials I attempt to define the pattern of reading strength and weakness. A simple version of a phonological awareness test,<sup>3</sup> using the removal of letter sounds from words, can show in more detail phonics capabilities:

|       |                |
|-------|----------------|
| broom | Remove the "b" |
| Flake | Remove the "l" |
| brake | Remove the "b" |
| can   | Remove the "c" |
| road  | Remove the "d" |
| timer | Remove the "m" |

In this test I find a clear divide. Certain readers find this easy even if they read poorly, others find it completely impossible; they show no ability to comprehend that letters can be removed from (or added to) words. If the reader shows no phonological awareness here I often test alphabetical awareness by showing them a random mix of letters, both upper and lower case, and asking for them to be read "as quickly as you can."

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| D | g | H | m | V | X | i | B |
| S | h | R | J | q | e | T | E |
| n | O | f | r | c | G | K | L |
| l | y | b | M | u | P | Q | p |
| W | d | h | a | Z | N | Y | w |
| k | A | C | t | s | j | d | z |

This checks not just for an understanding of the alphabet but also may start to reveal those with "p-d-q-b" confusion. If I suspect this I may ask them to read another version of the same type of chart as I watch for inconsistencies.

The next step for those who seem dominantly "word shape readers"<sup>4</sup> is a quick test of that skill, using sheets with four choices for a word that I will say. In this I look for accuracy, speed, and confidence levels, but if the answer is wrong, which selection the reader chooses can be significant.

|         |        |            |         |
|---------|--------|------------|---------|
| "trade" |        | "radio"    |         |
| tribe   | traed  | rialto     | rabio   |
| trade   | tread  | radio      | ridao   |
| "punch" |        | "believed" |         |
| phone   | punch  | believed   | beveled |
| paunch  | pounce | bedeviled  | belied  |

For example, there is no shape difference between "radio" and "rabio," so, while choosing "rabio" indicates "p-d-q-b" confusion, it also shows a knowledge of that word's shape.

When a reader shows phonological awareness I usually move to spelling tests, looking especially at pseudoword spelling to see the confidence level in assembling sounds from letters.<sup>5</sup>

feg, scup, stram, shrup, squam, doil, toud, sarb, moy, mert, dit , mub, gof, pid, skub, frek, klom, regot, poos, wrin, dwin, scrup, filk, drilt, lisila, berifa, massorel, perplisteronk

The spelling tests, including a test of actual words, also indicate manual writing ability. Students are often asked to complete part of these tests using a computer to determine if there is a difference in competencies between the two writing systems.

The testing process ends with the student creating a writing sample that includes both free writing and copying both by hand and via keyboard.

### *Analysis*

The professional transition staff of our Michigan Rehabilitation Services office pre-screens students before referring them to my testing, looking for markers of intent to pursue college or other post-secondary training along with general capabilities. Our experience shows us that one important marker is a reading comprehension level above the reading decoding level. We also look for grades that seem to exceed those that the reading grade level might logically predict, and for students whose auditory comprehension exceeds their reading comprehension.

The goal of this testing is to determine first if the application of assistive technology will make a substantial difference in the likelihood of success in post-secondary education, and then to determine which technology solutions will be most effective.

The students are thus ranked on:

- (a) Phonological awareness: Was the reader successful with first letter removals? Last letter? Second consonant (the "r" from "broom")? Center consonants ("m" from "timer")?
- (b) Word shape recognition: Correct answers? Right shape but wrong words?
- (c) Word attack strategy: How does the reader choose to attempt new vocabulary?
- (d) Decoding speed of unfamiliar words: Whichever strategy is used - is the speed a block to comprehension?
- (e) Pseudoword spelling: Can the student manipulate letters to successfully represent sounds?
- (f) Alphabetical awareness: Does the reader know the letters?
- (g) Manual writing skill: Is the handwriting legible? Is it fast enough to take notes in a classroom? Can the student read his or her own writing? Does the act of forming letters occupy so much attention that information processing becomes impossible?
- (h) Typing skill: How many fingers are used? What speed is achieved? Is that speed functional for notetaking? Do they understand the keyboard? Can they accurately

copy? Does finding the letters and typing occupy so much attention that information processing becomes impossible?

The scaled answers to these questions allow me to fit the students into categories. The first division relates to an ability to significantly benefit from technology. Those students who use phonics successfully in reading may be best served by minimal approaches, such as screen readers for difficult passages for example, the scaffolded<sup>6</sup> structure of writing support programs, combined with tutorial and "pre-freshman" level support courses. The subsequent categorical divisions detail specific needs: What level of support is required for successful college-level reading, writing, notetaking, and studying?

These categories are then linked to logical hardware and software packages. A student whose only word attack strategy is word shape recognition definitely requires computer reading software that allows him or her access to new vocabulary through the 'hear and see' combination. If that is joined with a complete lack of workable phonological awareness the reader may need voice-to-text software that allows him or her to see what letter combinations appear when they speak.

A student whose handwriting is illegible or too attention-consuming in letter formation will need to utilize a notebook computer for classroom notetaking. If typing is also an issue a different (more 'logically' designed) keyboard would be the first response before seeking classroom notetaking support.

In seeking to bring support to the apparent skill deficits the first choice is always to create student independence. Students should be able to read books on their own, in classrooms and while studying. Students should be able to write their own papers. Students should be able to take tests without human readers and scribes whenever possible.

### *Technology and Strategy Selection*

For word shape recognition readers the most important accommodation is to provide scan-and-read computer reading software that uses multiple sensory inputs to aid the acquisition of new vocabulary. For some this will be pure accommodation – they will need to rely on this type of technology for all reading, or all advanced reading, throughout their life<sup>7</sup> - but for most that constant repetition of seeing *and* hearing the word will build the skill and improve reading on paper. For this purpose I usually recommend Freedom Scientific's WYNN 3.5<sup>8</sup> which has proven in my experience to have the best combination of features, ease of learning curve, and price. Certain colleges have committed to the far more expensive Kurzweil 3000 package. In those cases we utilize that software though state policy typically prevents us from fully funding this for students because there is a "less expensive alternative."

There are simpler computer readers, including software built into Apple Computers, ReadPlease for PCs,<sup>9</sup> OpenBook, and various screen readers. None of these perform the range of tasks or have the level of adjustments of WYNN although they have their usefulness when students need lower levels of support and will not need testing support.

These programs can also aid weak phonological readers by providing scaffolding in new vocabulary acquisition.

As noted above, voice-to-text dictation systems can provide an additional boost to students with very low phonological awareness by allowing them to literally see properly spelled words formed as they speak. Voice-to-text software is also obviously utilized where typing skills cannot be improved with keyboard variation. The preferred package here is IBM's ViaVoice (Pro USB 10). In working with users of voice dictation systems I have only found 3 of 39 students who have attempted to use a Dragon Naturally Speaking product use it successfully. Of those who have tried ViaVoice, 48 of 56 have been successful. In addition, ViaVoice is much simpler<sup>10</sup> for weak readers to train to their voices, although with very weak readers I utilize a tape of the training with pauses built in so the student can listen and repeat the voice training sentences.

The Dvorak keyboard,<sup>11</sup> or less often, the 'ABC' arrangement,<sup>12</sup> often makes far more sense to those who struggle with reading than the QWERTY-norm. For those students who have not yet learned the keyboard, this switch is easy and a logical strategy. For writers whose spelling is extremely weak word prediction software can be of substantial assistance. If WYNN is already part of the recommended package the word prediction word processor included is easy to learn and use, otherwise third-party packages, such as Co:Writer, Soothsayer, or WordQ<sup>13</sup> may be added.

An additional support may be the use of Inspiration,<sup>14</sup> with built-in templates, to scaffold the creation of academic papers, which many of these students have never written on their own. Changes in the settings for Microsoft Word may also be made to provide struggling writers with better spelling and grammar support. A template for classroom notetaking which forces notes into outline form is also often recommended.

All of these technical solutions are usually installed on notebook computers which allow the student to carry their 'toolbox' with them to all classes and study situations. The software described above will generally run on any Pentium III or better, 500 megahertz or faster, computer with a 15 gigabyte or larger hard drive. If scan-and-read software is included, portable scanners, such as the very lightweight USB-powered models now made by Canon, are joined to the systems.

Students with less intensive support needs, those requiring scaffolding for phonological skills for example, are provided with less expensive solutions. These range from the use of ReadPlease on a desktop computer, to properly configuring word processing support, to the utilization of Pocket PCs (Personal Digital Assistants)<sup>15</sup> with add-on keyboards for notetaking support and e-book reading. Other solutions that may be appropriate in non-collegiate post-secondary training situations include the Wizcom Reading Pen<sup>16</sup> and the Franklin Speller.<sup>17</sup>

Except when the student has shown extensive experience and success with books-on-tape that system is rarely recommended due to the inability to mark up or search for specific terms in that reading format, both essential study strategies.

## *Conclusion*

Students with reading disabilities should reach their senior year in high school with detailed skill and ability testing having informed multiple years of rehearsal with appropriate assistive technology. This, however, is simply not the case in the school districts with which I work. Transition services should link students to available services early in high school, but neither school districts nor state policies facilitate that. Students should be prepared through transition support for the academic requirements of college education, but neither is that provided by the structure of most high school classes nor, in my experience, are transition services for students with disabilities focused on anything but minimum wage employment opportunities, if those services are offered at all.

In this vacuum, Michigan Rehabilitation Services is forced to fill a wide variety of roles with limited personnel, financial resources, and time. Within these limits, the Holland office, and to a lesser extent the offices in Grand Rapids, Muskegon, and Big Rapids, have asked me to develop a system that improves the chances of success for our high school-to-college transition students. The assessment strategies described here have been created over the past two years to meet this need.

Obviously, there is not yet the kind of detailed results that can prove or disprove the effectiveness of this system, but student reports suggest that this is a workable, if limited, program of analysis. The students for whom expensive technological solutions have been purchased are often performing better in college than they did in high school. This indicates that we are both identifying appropriate students and providing effective support structures. This has been true at a wide range of colleges, including Michigan State University, Grand Valley State University, Grand Rapids Community College, Muskegon Community College, Central Michigan University, Western Michigan University, Calvin College, and a variety of vocational/technical academies.

When failures have occurred, the dominant issues appear to be student non-use of the technology and/or non-cooperation by campus disability offices with the recommended support systems. This most often involves either a lack of commitment by the student to scanning reading materials, or in the consistent use of writing support accommodations, or in a lack of the college's assistance to the student in converting reading material to digital form.

Other issues do develop. Though I clearly ask every student to train extensively with the software at least during the summer before the start of the freshman year, and ask them to stay in constant communication regarding their use of the technologies provided, this system obviously works better with highly self-motivated students and with the students comfortable with computer technology than with students who lack those assets, due in large part to the minimal time which can be devoted to one-on-one training. Additionally, with a fast-track analysis and accommodation systems put in place without the opportunity for trial in an academic environment, there will inevitably be mismatches. This appears most in notetaking choices and writing support choices. Only one of 31

students equipped with WYNN over the past two years has reported major issues with that software.

With the ever-increasing number of students with learning disabilities completing high school and seeking post-secondary educations, the need for high-level reading support grows every year. When students have limited k-12 reading experience due to a disability they also often require significant reading strategy and writing strategy support, along with strong grammar and spelling support if they are to succeed in colleges and universities. Until k-12 school districts fully realize their legal and moral responsibilities to these students with disabilities the essential transition functions will remain with campus disability offices and state agencies like Michigan Rehabilitation Services.

As long as this remains true the need for rapid determination of effective accommodations will be required. I offer my experience not as a proven solution but as a possible starting point as those of us involved in Special Education services seek to provide our customers with the best possible chance for college and lifetime success.

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<sup>1</sup> *Readability Formulas*: The Center for Cognitive Science and Educational Practice, The University of Memphis <http://csep.psyc.memphis.edu/cohmetrix/readabilityresearch.htm>

<sup>2</sup> Jack M. Fletcher, Ph.D. *Classification, Cognitive and Neurobiological Correlates and Intervention* University of Texas Center for Academic and Reading Skills 2004 [http://cars.uth.tmc.edu/projects/dyslexia/definition\\_and\\_classification.shtml](http://cars.uth.tmc.edu/projects/dyslexia/definition_and_classification.shtml)

<sup>3</sup> David J. Chard and Shirley V. Dickson, *Phonological Awareness: Instructional and Assessment Guidelines, Intervention in School and Clinic*, Volume 34, Number 5, pp 261-270, 1999 [http://www.ldonline.org/ld\\_indepth/reading/chard\\_phono\\_awareness.html](http://www.ldonline.org/ld_indepth/reading/chard_phono_awareness.html)

<sup>4</sup> While I am aware that the entire concept of Word Shape Recognition is controversial I am choosing not to debate that issue here. (A good article discussing the arguments is available at <http://www.microsoft.com/typography/ctfonts/WordRecognition.aspx>, Kevin Larson, *The Science of Word Recognition or how I learned to stop worrying and love the bouma*, 2004) My experience has so far convinced me that many of those labeled with reading disabilities do not successfully distinguish individual letters within word forms and that these students routinely mistake similarly shaped words for each other.

<sup>5</sup> Dr. Patrick Groff, *The Usefulness of Pseudowords*, The National Right to Read Foundation, 2003 [http://www.nrrf.org/essay\\_pseudowords.htm](http://www.nrrf.org/essay_pseudowords.htm)

<sup>6</sup> Martha Larkin, *Using Scaffolded Instruction To Optimize Learning*, ERIC Digest: ED474301, 2002 <http://www.ericdigests.org/2003-5/optimize.htm>

<sup>7</sup> In 1999 I began work with the first high school student I was involved with in this type of project. The student was a 16-year-old junior who could not, in initial testing, even read his own address. He is now a junior at Grand Valley State University with a 3.8

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grade point average reading with WYNN exclusively, writing almost exclusively with ViaVoice. Over these years, despite his academic success, his decoding has not improved in any significant way. To see the initial write up of this case: Ira Socol, "*Disability Peer*" *Educational Assistance for Students with Learning Disabilities: an undergraduate research project in new support systems*, 2000 at <http://www.forequalaccess.org/downloads/PeertoPeer.doc>

<sup>8</sup> WYNN was originally created by the National Aeronautics and Space Administration and was the first reading support software created specifically for those with learning disabilities (as opposed to programs such as Kurzweil 3000 which are spin-offs of blind accommodation technology). A quick guide to features is located at [http://www.freedomscientific.com/LSG/products/wynn\\_features.asp](http://www.freedomscientific.com/LSG/products/wynn_features.asp).

<sup>9</sup> ReadPlease2003 remains a free download and provides the simplest of text reading. (paste any digital text in and it can be read with text size and speed control) <http://www.readplease.com/english/readplease.php> Upgrades can be purchased including multiple voice choices and a new document reader called ReadWords for Microsoft Word. <http://www.readplease.com/english/readwords.php>

<sup>10</sup> The choice between these two software packages creates significant controversy but two primary issues have directed me to favor ViaVoice in most situations: First, the simpler language and more forgiving nature of the voice training process make the entry into the use of the software much easier for students with learning disabilities. Second, the price point difference. The equivalent packages sell for approximately \$200.00 for ViaVoice Pro USB 10 and \$695.00 for Dragon Naturally Speaking Professional 8.0.

What I have found is that most reviewers and professionals who recommend Dragon are accomplished readers and speakers who understand the format of dictation before starting. In these situations Dragon will most likely prove superior in word accuracy (up to 98%). For those who lack those polished skills Dragon's unforgiving nature produces nothing but frustration. Though ViaVoice will most likely never exceed 95% to 96% accuracy, when combined with properly set spelling and grammar checks in Microsoft Word, it produces completely satisfactory results.

In "head-to-head" competition, asking people to train both Dragon and ViaVoice, I have found that the same person can be accurately writing in ViaVoice within one to two hours of intensive training. The equivalent for Dragon requires five to six hours, when successful.

<sup>11</sup> The Dvorak keyboard arrangement - <http://www.mwbrooks.com/dvorak/layout.html> with all the vowels grouped on the left-hand "home row" and over 70% of total keystrokes on the home row - seems to make learning effective typing easier. Both Apple and PC computers can be easily switched to the Dvorak layout within the keyboard control panel (key labels are the n used). Hardwired and switchable (dual format) add-on keyboards are also available.

<sup>12</sup> ABC keyboard arrangements, a good match for students with basic alphabetical awareness who have shown an inability to comprehend other keyboard arrangements. It is available with BigKeys keyboards - [http://www.bigkeys.com/html/bigkeys\\_1level.html](http://www.bigkeys.com/html/bigkeys_1level.html) - in other hardwired forms - <http://www.abckeyboard.com/> - can easily be built with most on-screen keyboard software. It is possible to reprogram notebook computer keyboards this way, but requires software professionals.

<sup>13</sup> For a discussion of Word Prediction, though on an elementary-level: Charles A. MacArthur, *From Illegible to Understandable: How Word Prediction and Speech Synthesis Can Help*, *Teaching Exceptional Children*, July/Aug 1998 [http://www.ldonline.org/ld\\_indepth/technology/word\\_prediction.html](http://www.ldonline.org/ld_indepth/technology/word_prediction.html) WordQ: <http://www.wordq.com/> Soothsayer: <http://www.ahf-net.com/sooth.htm> Co:Writer: <http://www.donjohnston.com/catalog/cow4000d.htm>

<sup>14</sup> Inspiration supports writing development through visual concept mapping that quickly converts to outlining. It also has templates for many types of academic papers allowing students new to academic writing the opportunity to focus on ideas rather than structure. <http://www.inspiration.com/productinfo/inspiration/features/index.cfm>

<sup>15</sup> Pocket PCs, the PDAs that run Microsoft Windows software, run full versions of Microsoft Word and offer full Microsoft e-reader functionality making them far more appropriate as academic solutions than the types of stand-alone portable keyboards such as AlphaSmart boards often used in k-12 environments. The University of Virginia Libraries have led the way in offering digital books in e-reader form. <http://etext.lib.virginia.edu/ebooks/ebooklist.html> E-reader is a free download from Microsoft. <http://www.microsoft.com/reader/>

<sup>16</sup> Due to its limitation of single-line scanning the Reading Pen is not an appropriate academic accommodation except when used as a support for those who only struggle with new vocabulary acquisition; in which case it can support phonological skills and offer definitions. It is, however, a remarkable workplace and lifeskill support, offering a great way to read everything from addresses to part numbers to production tags to job applications. <http://www.wizcomtech.com/Wizcom/products/products.asp?fid=78>

<sup>17</sup> Franklin Spellers can add a speaking dictionary to a student's backpack for under \$100.00 <http://www.franklin.com/estore/details.aspx?ID=MWS-1840>