



Questions and Answers About Technology and Dyslexia

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Overview

I am a successful dyslexic adult and part of the reason for my success is the fact that I use computers and other tools to organize my life and express my ideas. I am extremely opinionated. My strong feelings come from personal experience and the experience of thousands of people who I have helped get started with computers. The fact that I recommend certain computers, software, and other tools does not mean that they are endorsed by The International Dyslexia Society.

Question

We are interested in investing in computer equipment for our ten year old dyslexic child. We are looking at a scanner to enlarge print, and also to be able to have the material read back to him. We are also trying to make a decision on what choices of computer hardware and software would be available. It would be both user friendly and have software to aid dyslexic skill building and/or for regular academic reinforcement. Where can I get information on these specific concerns?

The Computer

When you're making a decision about what kind of personal computer to buy these days there are really two choices: DOS or Windows machines (IBMs or compatibles) or Macintoshes. People who use Windows will disagree with this, but, in my opinion and in the opinion of thousands of other dyslexic computer users, the Macintosh is the easiest, most consistent, best integrated, and most enjoyable machine to use. In my experience, more dyslexic people (kids and adults) use the Macintosh than any other kind of machine. With a Macintosh, the machine falls into the background faster than with a Windows-based machine. This is important because you don't want to spend your time learning about the computer; you want to spend your time using the computer as a tool for exploring content or making your own content.

Once you decide between Windows and Macintosh then you have to decide between desktop machine and portable/notebook. For doing the things a ten year old is going to do with computers, a desktop machine will be better. In the Macintosh world all desktop machines are now color machines and many models can be bought with CD ROM drives built in (CD ROMs are a medium for distributing software, usually with lots of images and sound).

For a high school or college student I might recommend a portable computer (in the Macintosh world these are called PowerBooks) so that he might carry the computer to the library to avoid

having to transcribe from a notebook into the computer.

Follow School?

Another variable for parents is the question of buying the kind of computer a child uses at school. My simple answer is, it doesn't matter whether you have the same machine the school uses or not because you probably won't be running the same kind of software the school uses anyway. And, the kinds of things your child or you will do with a computer at school will be different from the kinds of things he or you will do with it at home. Why be stuck with whatever the school has decided is best? The bottom line is that kids, even dyslexic kids, can adapt to various kinds of computers much more easily than adults (so stop projecting your uneasiness about computers onto your kids!).

Large Print

Any Macintosh computer that has ever been, and probably ever will be, can display text in a variety of typefaces, sizes, and styles. The size of type is only one of many variables that can effect readability. The typeface used is also an important consideration. Macintoshes come with many built-in typefaces and you can purchase hundreds more. Any Macintosh typeface can be displayed on screen and on paper in a wide range of sizes to make reading easier.

Possibly a more important consideration in readability is not the physical medium, but the quality of the writing itself; the quality of the author's thinking and his or her ability to illustrate that thinking with words. That's another story (and column).

Getting Text Into The Machine

Before a computer can read text aloud the text has to be in the machine. Either the user has to write the text or have written the text, or somebody else has to write the text, or have written the text.

Keyboarding

Even considering what will eventually happen with speech (see below), learning the keyboard is an important part of the writing process. It is not, however, an important part of using a computer, just the writing process. For this reason, there is little reason to learn to touch type until one wants to write faster. Yes, I know how to touch type and I'm glad I know. But, I learned only after being motivated by wanting to write faster, not because I was told that it was an essential ingredient for computer literacy, which it is not.

The positive part of keyboarding as many dyslexics already know is that it does not tap our weaknesses; it is purely the memory of kinesthetic sequences which have little to do with auditory or visual memory. For that reason and the fact that I can look at the screen while I type, learning to keyboard has improved my spelling and my writing as well.

In the end, my advice is to let the need to learn to keyboard invent itself and when it does, be ready with one of the many excellent electronic keyboarding programs.

Speech

There is another option and that is speech. The original question didn't mention speech and I'm not going to go into it now except to say that there is technology available, both on the Macintosh and in the Windows world for doing speech-to-text (you talk into a microphone and the computer displays your speech as text). The Windows product is called Dragon Dictate and the Macintosh product is called Power Secretary. There are limitations to both products and they are both extremely expensive. But what was expensive in the past is inexpensive now so it's important to track this technology because eventually it will compete with, if not replace, the standard keyboard.

Optical Character Recognition

One way to get text into a computer is to take a page of written text, say a textbook page, lay it on a scanner, and make a digital picture of the page in the computer. This is referred to as scanning. The problem with scanning alone is that the image the computer has is just a picture of text, it isn't the real text that can be edited and read aloud. In order to turn the picture of text into text that can be read aloud, a special piece of software called optical character recognition software (OCR) must be used. This software looks at a scanned image of text and translates the image into text characters. Just to be clear, OCR software does the scanning too. All a user does is place a book on a scanner and run the software, it does the rest.

There are a number of ways of doing OCR. One way is with a hand-held scanner that the user drags over a page. Another way is with a flatbed scanner (looks like a photocopy machine) that the user places a book on face down.

Also note that many OCR packages have certain scanner and computer requirements. If you know that OCR is going to be an important use of your machine, make your shopping list accordingly.

A final note: I do not own OCR software, although I have a scanner which I use to scan artwork rather than text. I can read. I read slowly, but fast enough so that this technology would get in my way. I'm assuming that most dyslexics might have limited use for this kind of technology in the early parts of their reading careers, but after a while their reading will improve to the point that going through this process will seem more cumbersome than just sitting down and reading the material.

Electronic Books

There are also other options for getting text into your computer. Books that are out of copyright can be legally scanned or keyboarded into computers. This includes much of the literature that is studied in many high school curriculums. For instance, the short stories of Edgar Allen Poe are available on many online services for users to take, for free. And, there are hundreds, maybe thousands of other electronic texts available, as well as electronic versions of Barron's Book Notes and other study aids. Of course, once you have the electronic text on your machine, you can enlarge its type or have the machine read it to you.

Online Services

The easiest way to have access to this wealth of electronic information is to join a commercial online service. And, the easiest-to-use and cheapest online service is America Online (AOL). AOL is available on both Windows machines and Macintoshes and provides numerous resources for both kids and adults with dyslexia: electronic mail, a learning disabilities forum for questions, answers, talk with other people with learning problems, access to hundreds of electronic books and other useful software, and more.

A modem is required for access to any online services.

The Ability to Read Text Aloud

There are two ways of storing and retrieving audible text on a computer. You can read some text into a microphone and record it such that the computer will play it back like a tape recorder. This is called digitized sound. Just like an audio compact disc (CD), the content sounds very good. Most multi-media products that have fixed content use digitized sound.

The problem with digitized sound is that it is not interactive: it can't read (play) what you type on the screen because that content wasn't fixed ahead of time. Theoretically, I could digitize every word I might type, but what would happen when I made a spelling mistake? Would the computer read back the word spelled correctly? How could it?

To have text read aloud interactively: what you type is what you hear, a speech synthesizer is used. This technology is sometimes called "text-to-speech." Text-to-speech technology is software that you install on your computer. The quality of the sound this technology makes is inferior to the quality of digitized sound, but the fact that it is completely interactive makes up for the drop in sound quality. With this technology you can have any text read back to you, text that you write or text that someone else has written.

You should note that for teaching basic vowel sounds to dyslexics with weak auditory discrimination, text-to-speech technology leave much to be desired, but you probably would use a program with digitized speech for this purpose anyway and leave the synthesized speech for use when kids are doing more writing and need more interaction.

Any current Macintosh computer is capable of doing text to speech synthesis and this capability is built into many products.

Question

How do computers change the writing process and what effect might this have on a dyslexic writer?

Answer

Using a computer and various pieces of software for writing makes the writing process easier, and so allows more writing to take place. Word processing software doesn't necessarily teach people how to write; it simply allows more writing to take place (by making the process easier) and so, allows people to learn from their own writing experience. Here it is again: the way to learn how to write is to do a lot of writing, and using a computer and software for writing can make the process of doing a lot of writing easier.

Why Write?

How do you get someone who hates writing to use a tool - even one as potentially interesting as a computer - to do something that is hard, unpleasant, or may have no personal meaning beyond getting through school? Just having access to a computer doesn't automatically solve a writing problem; the computer has to be used regularly as a writing tool to produce a variety of writing.

One solution is to find a motivating force to get a person started with writing and keep them writing long enough to get hooked on the process. An external motivating force (an assignment or a reward) may work in the short term, but it's not portable and may not work with every writing task a person has to do in life. What happens when the external motivation isn't there? Better to learn how to produce an internal motivating force, for instance, sharing a piece of knowledge, an idea, an opinion, anger, or joy.

Separating the Tool from the Writing

It's also important to help dyslexic writers keep certain ideas clear in their minds: the difference between their disability and their intelligence, and the difference between the tools they are using for writing and the content that they want to produce with those tools. The end goal is to use the tool to share the depth and complexity of one's thinking in a form that others can understand, not to prove mastery of the tool.

With this in mind choose simple, easy-to-use writing software that will fall into the background quickly, letting the writer get to the writing without wading through layers of user interface that may confuse and undermine self-confidence.

How Computers Change the Writing Process

When you write with a pen and paper, the composition process (forming, organizing, and encoding

ideas) and the printing process (getting ink on paper) are wed. Unless one has an incredible memory and can hold complex trains of thought in sequence long enough to get them written by hand, the pen and paper method isn't very useful for anything more than short pieces of writing. When you fold dysgraphia into the mix, the pen and paper method isn't very useful for anything more than writing checks. A typewriter solves the dysgraphia problem, but it does not solve the memory problem or the problem of needing to edit the writing later.

Computers change the writing process by holding all of the writing in memory (instead of on paper), freeing the memory of the person doing the writing, and because all of the writing is being stored electronically, it can be changed at any time with all sorts of electronic editing tools. Even the simplest computer printer will produce easier-to-read print than a dysgraphic person can produce by hand, making the print easier to proof-read, edit, and eventually share.

Electronic editing allows:

- Expanded vocabulary: The person doing the writing is freer to take chances with words that they use but don't know how to spell because they can fix the spellings later
- De-emphasis of spelling: Dealing with spelling can be left until the content is set; then a spelling checker can be used
- Easy cut and paste organization: Easy reorganization frees a person from having to hold the entire organization of the piece of writing in their heads before starting to write
- Easier proofreading: Allows a person to finally get a sense of their own writing style and makes revision possible and bearable
- No more rewrites: Takes a huge weight off the dysgraphic person's back.

Conversational Writing

I learned how to write by writing hundreds of letters. I was motivated by loneliness and anger. I had just moved to a new city and didn't know many people and had left a lot of good friends behind, and I was in the process of coming out as a dyslexic adult. I had a lot to share and didn't have close friends to talk things over with, so I turned to my manual typewriter. I started conversations through letters with many of my friends who then lived too far away to talk with regularly. It wasn't an appropriate form for all of them, but a few of them kept up the conversation through correspondence. I was not a very experienced letter writer, but I tried to write the way I spoke. I thought about conversation, at times even speaking whole trains of ideas aloud before I typed them. I photocopied all of my letters and kept them though I didn't know why at the time. What I started to see as I read through old letters was the complexity of my thinking. Seeing this hooked me, and I wrote more.

The lesson I learned here was simple: had you assigned me a paper on any one of the ideas I was writing about, I'd have been blocked, but in conversation, through correspondence, I was able to give form to the ideas.

What's so special about conversational writing?

- The motivation of conversation with another person
- Shared language and ideas
- Informality (spelling and mechanics de-emphasized)
- Purpose
- Relatively fast feedback.

Conversational writing can take many forms: writing and sending letters through the mail; sharing a keyboard on a single computer and conversing through writing, writing and sending electronic mail or taking part in an online chat with a modem. The important part is the conversation - experiencing a less formal form of writing as a vehicle for sharing ideas.

To this day I spend a considerable amount of time on mail. Some of my best ideas germinate and develop in this kind of conversation. It's also nice to stay in touch with people; they appreciate it

and they usually write back.

List Making

Another simple but powerful technique to help a person get started with writing is list making. Rather than struggle with making complete sentences, punctuating them correctly, worrying about grammar and other technical language patterns, why not start by making a simple list of everything you know (or can remember at the moment) about the subject at hand?

For example, below I'll list some of the things I know about rock climbing (I used to do quite a bit of rock climbing):

- Rock Climbing
- places
- equipment
- weather
- clothing
- Yosemite
- rope
- carabiner
- piton
- nut
- instruction
- falling
- yelling
- wind
- big walls
- El Capitan
- shoes
- signals
- ratings
- kind of rock
- technique
- schools

The object here is to list everything that comes to mind, in no particular order, without regard to spelling or even if its appropriate for this list. You can always prune and edit later. Many people have a hard time separating the editing process from the idea-generation process and as a result of this, they get in a bind each time a new item is added to the list. Computers allow easy editing later, so why worry? That kind of worry is a vestige of an old process, using pen and paper, where change was hard. Just making the list and exhausting the things you know about a particular subject is actually a self-contained exercise and stands alone nicely as a great way to build confidence. Many times before I write an article (like this one) I'll make a list of all of the important points I can think of on the subject at hand, just to get them in writing before I struggle to make them make sense.

It can also be very impressive and confidence-building for a student who has never done much writing to see a long list of words and short phrases that represent his knowledge on a particular subject.

Logistically, this list generation can be something a student does on his own, with a teacher, with a partner, or something a teacher does with the whole class using a computer with a projection device so everyone can see and participate. The latter is a wonderful class activity and the teacher can act as talk-show host, asking questions to generate more items in the list. These questions are the kinds of questions a student needs to learn how to ask him or herself when writing independently.

Categorizing Lists

After a list is generated, but before any of the items in the list are eliminated, items should be categorized. This is where a specialized program like an electronic outliner comes in handy. Any word processor can facilitate list making, but moving the items of a list around by dragging (rather than cutting and pasting) requires an outlining program. With an outliner, one can literally grab an item and drag it next to another item until there are groups of like items close together.

If you're using a color computer and a program like ClarisWorks, you can color-code the items in a list so that items of a particular category are all a single color. This makes it easier to visually group items by color matching.

Outliners also make it possible to take groups of like items in a list and make them sub-headings of another item. This kind of hierarchy building is the final step in categorizing a list. Once items have been grouped in a hierarchy the outline can be collapsed so that only the major category headings are showing; all the detail is hidden (temporarily). Being able to collapse and expand an outline is another technique that makes this kind of writing tool far superior to anything possible with pen and paper. Writers can work with one general idea at a time without the distractions of unrelated ideas showing on the screen or the need to scroll through many lines of text looking for things. What they are seeing is just the major categories with the detail hidden.

In the End

The way to learn how to write is to do a lot of writing, and using a computer and software for writing can make the process of doing a lot of writing easier. Correspondence and list-making are two techniques that have worked for me and are a natural for anyone who has access to a computer.

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