Focusing the Digital Brain

Marilee Sprenger

Today's students are experts at skimming and instantly sharing information. But they'll need to do more than skim through the 21st century.

I recently saw a text message that one of my middle school students sent a friend: "First, he left me a voice mail, so I sent him a text on his cell, then he contacted me on Facebook, so I e-mailed him on my Blackberry. Two days later he sent me an instant message, but I wasn't online. How will I meet him?"

This hyperconnectedness that doesn't always lead to connection is a hallmark of what I call the digital brain. It's how many of our students live their lives. This lifestyle has benefits, but it also causes problems. If we want our students to have the life skills the 21st century will demand of them, we must be aware of those problems.

Throughout their long lives, our students will not be passive viewers, but participants in an interactive, digital world. We adults must help all students assimilate technology into their lives in a way that will enhance—not eclipse—skills like sustained thinking and connecting to fellow humans. According to Daniel Pink (2005), two skills will make our students successful in the 21st century: *high concept*—the ability to detect patterns, connect unrelated ideas, and create something new—and *high touch*—the ability to empathize, read faces and gestures, and inspire joy in oneself and others.

So what does the kind of frenetic digital communication that the girl in my opening anecdote engaged in mean for these skills? Let's look at how teenagers typically use digital tools and toys.

Growing Up Connected

Called both the net generation (Medina, 2008) and digital natives, our students have grown up using digital media. Their brains have been conditioned by using computers to play games, send email, exchange instant messages, or videoconference through Skype (Small & Vorgan, 2008). Instead of meeting face-to-face, they "text" one another on cell phones. According to a recent study of 2,000 students between the ages of 8 and 18, on average students spend six hours a day connected to some digital communication device, often to several simultaneously (Tapscott, 2009). They do homework while listening to iPods, sending instant messages, or watching movies on their computers.

By adolescence, today's young people have become experts at skimming and scanning. The average person spends two seconds on each Web site when searching for information (Small & Vorgan, 2008). Two seconds! Is this style of information gathering affecting our students' attention spans? Absolutely.

We often refer to the kind of activity digitally connected people engage in as *multitasking*. But according to many neuroscientists (Medina, 2008), multitasking is not only unproductive, it's impossible. The brain can only attend to one thing at a time. Yes, we can walk and talk simultaneously, but those two processes don't involve the same brain functions. Walking is a procedural motor memory; because we don't have to think about walking, the executive part of our brain can focus on making conversation.

The Digital Brain in Action

Let's look at what happens in the brain of Emily, an average teenager, as she thinks she is focusing on a homework assignment. Emily sits in front of her laptop. Her iPod is playing music by Coldplay. She has three windows open on her computer screen: her Web browser through America Online, MSN Messenger for sending instant messages and e-mail, and her word processing program. Her homework is to write about five causes of the U.S. Civil War.

As Emily is putting her heading on her paper, her cell phone rings. She quickly picks up her phone and a picture of her friend Ivy appears on the screen. "Hi Ivy, what's up?"

"You're not going to believe who texted me," Ivy says. Emily squeals as she hears the name of someone Ivy is interested in dating. Just then Emily's computer flashes, "You've got mail!" The executive part of her brain drops the conversation with Ivy as she reads a new e-mail from another classmate asking for the homework assignment. Emily answers the e-mail as Ivy rambles on, but she realizes she should get back to work. "I'll text you later, Ivy. I have to get some work done."

Emily shifts her attention back to the word processing screen. *Let's see, where was I?* Her brain must let the snippets of social conversation drop out of her working memory. Attending to the assignment causes Emily's brain to retrieve long-term memories of her readings and lectures on the Civil War. As she begins to think about the differences between the North and the South before the Civil War, her mind drifts to picturing Rhett Butler in *Gone with the Wind*.

Refocusing takes several seconds as she remembers what Mr. Montgomery told them in class about slavery. Emily types "causes of the Civil War" into Google. Immediately, 12,900,000 hits come up. She clicks on the first link, realizes it doesn't have any information she is looking for, and tries the next Web site.

Immersed in her search, she is startled by a jangle from her Blackberry. Emily sees Jackson's text message "What r u doing?" Jackson is Emily's new love interest, so her brain floods with pleasurable chemicals as she types her reply—these chemicals make it hard to return to homework.

So it goes among the net generation. Multitasking? Not many tasks are getting done. Later, however, Emily will remember her mission to complete her homework and will stay up late attempting to explain the reasons for the Civil War.

Some researchers believe that young people who operate the way Emily does are putting themselves into a state of partial attention. Linda Stone (2007), a former software executive for Microsoft, has coined the phrase *continuous partial attention*. Digital natives are motivated by a desire to be busy and in demand. They don't want to miss anything, but the main goal behind their multitasking is not so much to be productive as to be connected to someone. Being physically present has become less important; responding instantly is highly prized.

In addition to being inefficient, this method of operating causes other problems. Excessive connectedness can cause stress, which results in the release of cortisol and adrenaline from the adrenal glands. Initially, this cocktail enhances memory. But over time, stress chemicals can lower the effectiveness of the immune system, weaken cognitive functioning, and, in some cases, cause depression. In addition, although quick communication occurs in scenarios like this, people aren't bringing their full attention to their personal interactions. In small doses, this can be useful, but habitually using this kind of attention will put people's ability to problem solve and interact with others at risk.

Providing Balance

If you are 30 or older and fall into the digital immigrant category, you are probably trying to keep up with your students from a technology point of view. Your brain must change too. But you don't have to be tech savvy to guide your students toward a healthy balance between always being connected through technology and connecting with real people. Here are seven strategies to try.

Provide Reflection Time

After students search for information online or learn new material, give them time to reflect on what they've absorbed. To reflect, a person must use different areas of the brain and thereby give some overworked areas of the brain much-needed rest.

One high school teacher whose school switched to a block schedule considered how to use so much time productively. He assigned journal writing as a way for students to think about their thinking. This forced students to slow down and yielded several other benefits. For example, when the teacher asked students to describe how they felt about specific learning experiences, students had to recall the learning, which triggered mental rehearsal of that information. He also asked students to suggest other ways they wanted to study this material, which provided fodder for differentiated instruction.

At first, many students requested learning through strategies like blogs or online lessons. As the teacher balanced the use of digital tools with face-to-face communication and low-tech materials, however, students began to request more face-to-face activities.

Disarm Them

Take away the toys occasionally and encourage students to practice listening to one person at a time. Explain how uncomfortable you—and many people—find it to converse with someone who is reading or sending a text message. Pair students and give each partner three minutes to speak to his or her partner about an assigned topic. Each student must actively listen to the other, make eye contact, and not interrupt. After each partner has both spoken and listened, have students discuss together what each of them said and how the experience felt. Attentive listening usually promotes empathy and connectedness.

Discuss the experience as a whole class. Ask how students felt about talking and listening carefully to a peer while disconnected from any digital media. Did they notice facial expressions and body language? Did being focused change the communication?

Let Them Teach

Our students' digital expertise is an important part of their world. We should respect it. Encouraging students to teach one another about digital skills can help them see how they can use their instant access to information to help them evaluate and synthesize concepts and create something new.

Henry was the Twitter king in his middle school. Sasha's blog was followed by every girl in class. Wikis were Edgar's claim to fame. These three students had a passion and talent for using digital media and jumped at the chance to demonstrate these tools' potential for 21st century learning.

Edgar, for example, took his classmates to the Wikipedia site and searched "causes of earthquakes." He talked with fellow learners about the entries that came up and how to edit each entry. He was very serious about adding information to a wiki with integrity, insisting that this was a chance to add to a body of knowledge, not a license to mislead others. Most of Edgar's classmates had used Wikipedia, but they hadn't realized how interactive this site was or how to add to it. The students discussed how they could set up wikis about content areas they were studying.

Use Interactive White Boards

Digital natives often interact with their world through screens. Interactive white boards allow you to connect a large screen at the front of the class to a computer and to project on that large screen whatever appears on the computer. The tool is interactive; with a finger touch, a user can move around the information that appears on the screen or even call up new information. Students can work in small groups at the white board, or the entire class can participate. Students can move physically and communicate with one another as they interact with technology.

For example, the class might open from a computer file a worksheet they had for math homework and project it on the white board. Students can come up to the white board and demonstrate solutions. They can erase mistakes with their hands and call peers up to the board to help them.

Build Emotional Literacy

Facility with relationships will be essential in this new century. One analysis of more than 100 studies showed that students who had received training in social-emotional learning, compared with those who hadn't, earned higher grades, scored 14 percent higher on achievement tests, and were less impulsive and better at calming themselves (Lantieri, 2008).

Communicating digitally is an efficient way to exchange data, but when dealing with fellow humans, everyone needs to be able to recognize other people's emotions and to use emotional intelligence to help make decisions, cooperate, and even understand themselves. Students who immerse themselves in high-tech activities lose their ability to read facial cues and body language. In their world of instant communication, students seldom take the time to examine how they or others are feeling (Small & Vorgan, 2008).

Teachers can help students by simply taking a few moments each day to check in about how they are feeling. When I taught middle and high school, I checked in with students while taking attendance. As I called names, I asked each student to say "present" followed by any number from 1 to 10, with 1 indicating "I feel terrible" and 10 indicating "I feel great." This reading gave me a good idea of how much learning would take place that day. If a lot of students gave low numbers, I would give students an opportunity to explore negative feelings through journaling or talking together before beginning instruction.

I also had students practice becoming aware of others' feelings. I showed students photographs of faces with different expressions and challenged them to decide how each person pictured was feeling. Students role-played emotions and asked classmates to guess what feeling they were enacting. At times, I guided students on how to handle situations in relationships, through role-playing or discussions. The Collaborative for Academic, Social, and Emotional Learning (www.casel.org) has excellent resources for teaching social and emotional skills.

Teach Mindfulness

Meditation techniques lower students' stress and improve their focus. Such techniques encourage *mindfulness*, a deliberate inner awareness of what one is thinking, feeling, and experiencing. This enables students to focus on themselves and to become aware of their own thinking.

The 2008 book *Building Emotional Intelligence* by Linda Lantieri offers grade-appropriate suggestions for teaching students how to calm themselves and focus their attention. For example, some teachers simply offer students a five-minute calming time. Each student chooses a quiet part of the classroom and sits comfortably, slowly breathing in and out. Each student chooses a mantra, a phrase or a word such as *ohm*, that he or she repeats silently. Students focus on their breathing and the mantra and allow any thoughts that enter their minds to drift away. Students report feeling more energized and attentive after such a meditation.

Encourage Storytelling

Digitally connected young people are experts at finding information, but in this century, they will need to package that information into broader concepts and share it in a way that engages their listeners' interest and emotions. Storytelling enhances people's emotional connectedness and understanding of concepts. It's also what the brain likes best (Roger C. Shank, as cited in Pink, 2005).

As we struggle to keep students' digitally conditioned brains attentive in the classroom, storytelling may be one of our best strategies. Teachers might tell a simple story that relates to lesson content or students' lives. When people tell stories face-to-face, those listening to them use more eye contact and watch the storyteller's gestures. They are guided by the inflection in the speaker's voice. Brain activity increases in the prefrontal cortex, which is a crucial area of the brain in terms of understanding the intent of a speaker's message (Wang, Lee, Sigman, & Dapretto, 2007).

Making Space for the Digital Brain

Students' digitally conditioned brains are 21st century brains, and teachers must encourage these brains to operate fully in our classrooms. We must recognize that relationships and focused attention are key to learning in this century. If we can help students balance the gifts technology brings with these human gifts, they will have everything they need.

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