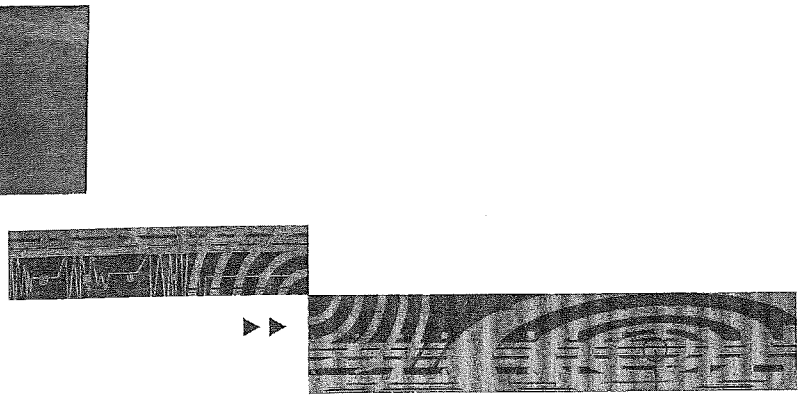


2

students and learning

While using the Web has changed the world and the workplace of the 21st century, nowhere has it had a greater effect than on the lives of young people. They play video games, communicate using text messaging and instant messaging, conduct Internet searches, download music and share files (legally, we hope), and use the Web for homework. These technologies have always been available to them. Their parents and teachers and the rest of us who weren't born into a technologically interactive world have to struggle to keep up.

Marc Prensky is a speaker, writer, consultant, and educational software game designer whose theory about the differences between today's teens and the adults in their lives defines the generation gap. He calls students digital natives, people who live in a world where technology is omnipresent. He calls their parents and teachers (and us) digital immigrants, well-meaning adults who have to work at being comfortable with technology.

According to Prensky (2001), today's students:

- Are no longer the people our educational system was designed to teach
- Have not just changed incrementally from those of the past ... our students have changed radically
- Represent the first generations to grow up with this new technology
- Think and process information fundamentally differently from their predecessors
- Are all "native speakers" of the digital language of computers, video games, and the Internet (p. 1)

Of course, many adults (including tech coordinators and many teachers) are just as comfortable with technology as the most advanced teen. And, unfortunately, many students cannot afford 24/7 access to technology and thus cannot be facile. However, the definitions are useful for understanding that today's students are likely to be a wired generation and that today's teachers and parents are likely to need a little help from their young friends.

21st-century students

How wired are students? Of American households, 71% have Web access, and Americans age 13–24 now spend more time online than they do in front of the TV (Sloan & Kaihla, 2006). Seventy percent of YouTube's registered users are American; roughly 50% are under 20 (Gomes, 2006). They communicate with friends through instant messaging, download music to their iPods and MP3 players, hang out on MySpace, surf the Web, and meet friends online.

According to the NetDay Speak Up Survey (Project Tomorrow, 2006) of American students, 65% of students in Grades 6–12 use e-mail and/or an instant messenger every day, and personal Web site use (MySpace.com, for example) jumped at a rate of 300% from 2004 to 2005. By Grade 12, almost 50% of students reported personal Web site use on a weekly basis and 79% play video games. In Grades 6–12, 54% of students go online for news, sports, weather, and entertainment updates; 51% use graphic, design, photo, video editing, or music editing software; 47% conduct personal research; and 43% shop.

What does this tell us about students? NetDay's findings indicate that:

- Students are setting trends with their use of technology both in school and out of school. They are innovative users of technology, adopting new technologies to support their learning and their lifestyles.
- Communication is a key motivator for students and drives their use of technology for learning and for personal use. The result is an explosion of communications tool use and the desire to transcend communications obstacles.
- Students are strong believers in the power of technology to enrich their learning experiences. They have ideas about their futures that include using technology tools for learning and preparing themselves for a competitive job market. (Project Tomorrow, 2006, p. 6)

Technology affects how students live and communicate and when, where, and how they learn. They assume technology is there to help them. More and more students have access to technology from home. Data from the Corporation for Public Broadcasting (CPB; 2003) indicate that by 2002, 83% of family households in America reported computer ownership, a growth of 30% from 2000. By 2006, another study found that almost 70% of households in America subscribed to an online service and 60% of them had high-speed access (Leichtman Research Group, 2006).

Having digital technology at their fingertips all the time means that students think, work, and play differently from previous generations. Young people are ahead of the curve in using new Web tools and services, and social networking is causing concern. The upside is that the Internet helps people to connect with others who have similar interests whom they might not encounter in traditional ways. They can reach across vast distances to communicate and share.

MySpace, for example, is popular with teens. Youngsters post their biographies, exploits, photos, and more and link to a network of "friends." It's the place to be for teenagers to meet friends, brag, and just hang out. It has replaced the mall as the after-school haven for teens. It didn't exist three years before, but it celebrated its 100 millionth registered user on August 8, 2006. It is the most trafficked site and was acquired in 2006 by NewsCorp.

Of course there's a real downside. While social networking allows users to create an online persona, some people are eager to embellish the truth. The more hip the page, the more attention the page's author receives. Other young people accept what is written at face value. Teenagers often think that they can post outrageous information and photos about themselves without any consequences. Lately that has backfired with colleges and even prospective employers sifting through postings to determine a candidate's character. This out-of-control behavior has also raised the hackles of parents and educators. Schools block access and parents are starting to do so too.

Businesses are aware of the change in young people's habits and now spend substantial dollars in advertising online. "With children spending much of their time online, marketers are experimenting with new techniques," says Brian Steinberg (2006, n.p.), writing for *The Wall Street Journal Online*. OfficeMax, for example, produced a reality-show–type video that includes plugs for products. "Kids in middle school and high school tend to buy things differently," says Bob Thacker, OfficeMax's senior vice president of marketing. "These kids are online. They live online" (Steinberg, 2006, n.p.).

Today's students become technology-savvy early as toymakers target younger and younger children. VTech Holdings, a consumer-focused technology company, has adapted its V.Smile educational video games to reach children as young as nine months. The console was configured so that toddlers can learn vocabulary, motor skills, and even baby sign language. MGA Entertainment offers a virtual-reality gadget with animated digital characters that chat with kids on a BlackBerry-size handheld device and a Web site (Binkley, 2006; Palmeri, 2006).

According to the Corporation for Public Broadcasting (2003), "Preschool children are one of the fastest growing groups to be online. Only 6 percent of children ages 2–5 used the Internet from any location in 2000; two years later, parents reported that 35 percent of the same age group now went online from some location—the largest increase of any age or demographic group" (n.p.).

It is clear that youngsters and adults spend time in different places and use different tools. One result of the NetDay Speak Up Survey (Project Tomorrow, 2006) was an analysis of the differences in product use among different age groups and between students and educators (Table 2.1). For example, sixth grade is the tipping point when students begin to show their enthusiasm for using technology for communication. In middle schools, 50% of sixth graders say they use e-mail or instant messaging on a daily basis. It is interesting to note that only for desktop and laptop computer use do teachers employ a technology product more than students do; on all other items, students are using the technology more than teachers.

Table 2.1 | TECHNOLOGY USE AMONG STUDENTS AND EDUCATORS

Technology products used on a weekly basis	K–3	3–6	6–12	Teacher
Desktop computer	63%	60%	82%	93%
Laptop computer	21%	28%	35%	39%
Cell phone	39%	49%	75%	60%
Handheld device (PDA)	n/a	14%	16%	11%
Digital camera	21%	25%	43%	36%
Video camera	14%	16%	22%	9%
DVD or CD burner	24%	31%	59%	32%
MP3 player or iPod	12%	22%	46%	6%
Video game player	53%	55%	61%	3%

▶ Adapted from Project Tomorrow, 2006, p. 7.

how children get information

Students have always been social. (Watch the interaction among groups of seventh-grade girls to understand.) Older technologies such as television weren't social; individuals watched passively even if they would talk about what they had seen. Today's technologies are interactive. Students go online to meet friends, seek information, and find out what they need to know. These are social activities and involve instant messaging, e-mails, blogs, and social-networking Web sites.

Young people's personal networks of friends are always available. Youngsters are part of a group even when alone in their bedrooms. They interact, get advice, form opinions, plan events, and gather with friends. As their interests vary, their groups vary, and so they may be part of several networks at one time.

School-age youngsters use the Web to do homework and school projects—from home. According to a study commissioned by the Pew Internet & American Life Project (Levin & Arafeh, 2002), "For the most part, students' educational use of the Web occurs outside of the school day." Unfortunately, "Many schools and teachers have not yet recognized—much less responded to—the new ways students communicate and access information over the Internet" (p. iii).

> Students come to school knowledgeable about the Web and its potential, are comfortable using it, and expect learning in school to be more like learning on their own.

The Corporation for Public Broadcasting (2003) found that "In households with broadband connections, children ages 6–17 reported that high-speed access affected both their online and offline activities, including schoolwork. According to these children, since getting broadband, 66 percent spend more time online; 36 percent watch less television, and 23 percent get better grades" (n.p.). Many parents report grade increases as well.

Students do not even have to scramble to find information; now it comes to them. Using aggregators (software that checks for new content at user-determined locations and retrieves updates) and syndication (which makes part of a Web site available to other sites or to subscribers) they can receive automated updates about any information they want. Even if they don't subscribe to syndicated feeds, everything they look at has links to other things. For example, if they start a

research project by looking up the topic at Wikipedia, they'll find dozens of links to other sites with more information on that topic that they can follow—and when they get there, they'll find even more links.

Today, advice is always available online. Adults make decisions about purchases by going to the Web and researching not only traditional reviewers' opinions but also by visiting sites that contain users' reviews. Online companies are themselves presenting suggestions about their own products based on what others have bought. Web sites such as Amazon.com use sophisticated software to figure out purchasing patterns and then use that information to make suggestions for additional purchases.

For example, by using word pattern analyses, Amazon can suggest additional books a reader might like, informing you that "People who bought this book also bought..." or offer a related book as a set with the one you want—at a slight discount for purchasing both. In addition, Amazon displays the opinions of other readers as reviews and as lists of related books.

This means that students come to school knowledgeable about the Web and its potential, are comfortable using it, and expect learning in school to be more like learning on their own. "Large numbers of students say they are changing because of their out-of-school use of the Internet—and their reliance on it. Internet-savvy students are coming to school with different expectations, different skills, and access to different resources" (Levin & Arafeh, 2002, p. v).

With E-Rate funding and local support, more students are going online from school as well as from home. By 2002, key findings from a U.S. Department of Education survey showed that 99% of U.S. public schools already had access to the Internet, 88–96% had classroom access, and 94% of schools had broadband connections (National Center for Education Statistics [NCES], 2003).

what students want from their schools

Today's students know that they are tech-savvy and report that their schools are not. Schools are still more text-dominated and do not integrate technology into student learning effectively. A 2005 report, "Listening to Student Voices on Technology: Today's Tech-Savvy Students Are Stuck in Text-Dominated Schools", reviews articles and papers on student attitudes, perceptions, and

behaviors about using digital technology, particularly for learning. The summary also highlights what students want adults who influence education policy decisions to know about how they use technology and how schools could better meet their needs (Farris-Berg, 2005). The report's findings are:

- Computer and Internet use is growing
- Students are sophisticated users
- Technology is important to students' education
- Technology is not an "extra"
- In-school access to technology is limited
- Home use dominates
- In-school use is not integrated
- Computers and the Internet are communications tools, first
- Metaphors describe how students use the Internet for school
  - *The Internet as virtual guidance counselor*
  - *The Internet as virtual textbook and reference library*
  - *The Internet as virtual tutor, study short-cut, study group*
  - *The Internet as virtual locker, backpack, and notebook*
- Technology has caused students to approach life differently, but adults act as though nothing has changed
- Students desire increased in-school access
- Students want to use technology to learn, and in a variety of ways
- Students want challenging, technologically oriented instructional activities
- Students want adults to move beyond using the "Internet for Internet's sake"
- Students want to learn the basics, too

the customization generation

According to middle-school teacher Jeff Utecht (2006) at his Web site The Thinking Stick, "What I am starting to see is that if students cannot customize a technology device to their way, their style, then it does not interest them" (n.p.). He gives an example:

> Derek walked into technology class like he does every "A" day on his schedule. A quick "Hello Mr. U" and off to his computer. By the time I greet the other students and we begin class, Derek has done the following to his class computer:
>
> 1. Change the desktop background to another picture in the sample picture folder. Why? Because the one that was there was not his.
> 2. Change the settings of the Windows menus to reflect his colors, font, style. Why? He didn't pick those colors.
> 3. Quickly go into the control panel and change the cursor to a twirling dinosaur. Why? He likes it that way.
> 4. Get the height of his chair just right, move the mouse and mouse pad where it is comfortable for him. (n.p.)

Utecht (2006) is asking the right questions:

> How do we take this customization generation and apply that customization in the classroom? Allow students to choose their method of presentation, choose where they go to find their information, and choose to learn in a way that meets their needs. Can we have customized classrooms? Where each student has access and uses the tools they need to learn. Where the teacher is customizable giving each student just what he or she needs to succeed. How would our students react if we gave them the control to customize their education? (n.p.)

Outside of school, students are using the Web for homework as well as for fun, and to a great extent they do customize what and how to learn. The desire to do this is not new, however; only the tools are. With these tools, students have much more power to do as they wish. Schools may have a ways to go to match the experience students have elsewhere, but the goal is to help students use and enjoy technology in order to learn.

access to online tools and services

In any discussion of new tools, it is clear that access to them must come first. In the first national educational technology plan, issued in 1996 and titled *Getting America's Students Ready for the 21st Century,* access was defined as five students per computer (U.S. Department of Education, 1996).

If, as we saw in the previous chapter, access to online tools and services has changed the way the world operates, then students' needs have changed. If businesses have harnessed blogs and wikis, for example, then students will be expected to use these tools. For schools, this means implementing one-to-one computing programs so that each student has access where and when he or she needs it.

A 2006 American Digital Schools survey of the top 2,500 U.S. school districts found that 19.4% of all student devices today are mobile and that 52.1% will be mobile in 2011. This is not a frill. Where results were tracked, 87% of schools offering one-to-one computing reported substantial academic improvement, and the districts and states that have one-to-one programs reported higher attendance rates, fewer discipline problems, and improved student writing skills.

In 10 years of research into laptop programs, Saul Rockman, an evaluator of educational technology projects, found that one of the most important benefits of a laptop program is an increase in 21st-century skills. Students learned independently, collaborated with peers to accomplish work, and communicated the conclusions. Teachers were more likely to encourage student-led inquiry and collaborative work. Test score results improved. "These accomplishments are seen in many laptop programs, especially those that permit students to take their computer home in the evening" (Rockman, 2003, p. 27).

The kind of learning students do with these laptops will define how well they will perform the rest of their lives. Thomas Friedman points out the importance of teaching greater collaboration skills, creating a sustainable community of learning, cultivating the entrepreneurial spirit in all, and encouraging synthesis skills. "The ability to memorize is quickly fading in our information rich society where a Google search can return millions of references. Society needs more synthesizers capable of filtering divergent sources into a coherent, relevant whole" (Friedman, 2006, n.p.).

School leaders have to think differently and promote teaching methods such as those we discuss later in this chapter. According to Daniel Pink (2006), today's students will need "a new set of aptitudes. They'll need to do what workers abroad

cannot do equally well for much less money: Forging relationships rather than executing transactions, tackling novel challenges instead of solving routine problems, and synthesizing the big picture rather than analyzing a single component" (p. 40).

To help students acquire these skills takes time and training as well as practice. The first step is to understand how learning works.

understanding learning

Bloom's Taxonomy (Bloom, 1956) described learning in six cognitive process dimensions: remembering, understanding, applying, analyzing, evaluating, and creating. His taxonomy, however, was one-dimensional. A team of cognitive psychologists updated the taxonomy in 2001 by developing a two-dimensional version to reflect relevance to 21st-century work (Anderson & Krathwohl, 2001).

In this adaptation, the knowledge dimension represents the kind of knowledge to be learned, and the cognitive process dimension identifies the process used to learn. The knowledge dimension is composed of the following four levels:

1. Factual knowledge includes an elementary knowledge students must know to be acquainted with a discipline or to be able to solve problems in it; for example, knowledge of terminology and knowledge of details and elements.

2. Conceptual (declarative) knowledge refers to an understanding of the interrelationships among the basic elements within a larger structure that enable them to function together; for example, knowledge of classifications and categories, principles and generalizations, or theories, models, and structures.

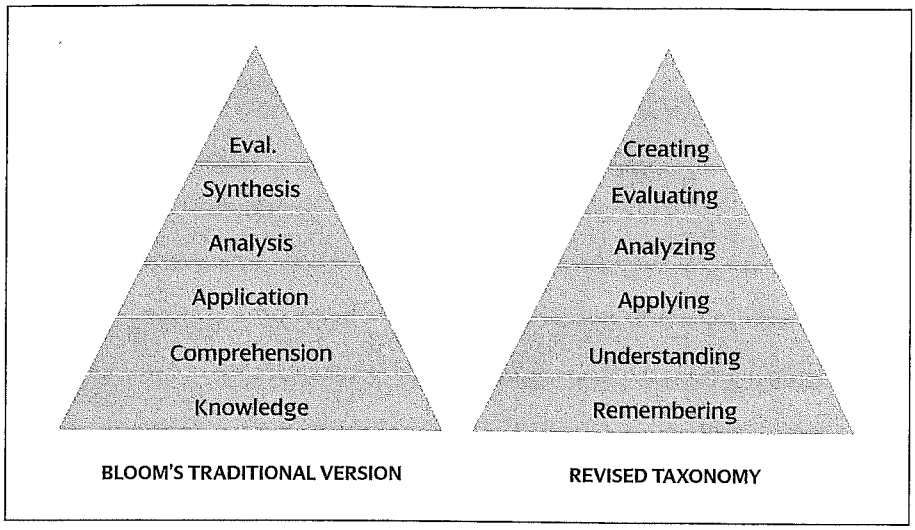
3. Procedural knowledge is an understanding of how to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods.

4. Meta-cognitive knowledge is the knowledge of cognition in general as well as awareness and knowledge of one's own cognition.

The differences between the traditional and newer versions of Bloom's Taxonomy are displayed in Figure 2.1. The distinctions indicate that new technology tools

have the capacity to support higher order thinking and more engaged learning. The revised taxonomy addresses the needs of today's students (Krathwohl, 2002).

Figure 2.1 | Comparison of the revised taxonomy with Bloom's traditional version



▶ Source: http://web.odu.edu/educ/llschult/blooms_taxonomy.htm

In Figure 2.1, note the change from nouns to verbs (e.g., Application to Applying) to describe the different levels of the taxonomy (Schultz, 2005). Anderson and Krathwohl (2001) explain these terms as follows:

> **Remembering.** Retrieving, recognizing, and recalling relevant knowledge from long-term memory.
>
> **Understanding.** Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
>
> **Applying.** Carrying out or using a procedure through executing, or implementing.
>
> **Analyzing.** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.

Evaluating. Making judgments based on criteria and standards through checking and critiquing.

Creating. Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing. (pp. 67–68)

To help students acquire these skills and become synthesizers means not just providing access to technological tools but also employing the pedagogical tools that are more powerful when combined with technology. When pedagogies and technologies are grounded in how students learn, schools provide the best strategies.

To begin with, students learn in a variety of ways. They have different learning styles that are based on how they understand and process information. For example, there are visual learners, auditory learners, and tactile/kinesthetic learners. Technology makes it possible to target the right approaches for each student in order to provide individualized and differentiated instruction.

We turn to cognitive science to understand how the brain functions and how people learn. These scientific approaches have indicated that everyone learns, but schools do not always understand how best to approach each student. According to Renate and Geoffrey Caine (On Purpose Associates, 2001), the following are the core principles of brain-based learning:

1. The brain is a parallel processor, meaning it can perform several activities at once, like tasting and smelling.
2. Learning engages the whole physiology.
3. The search for meaning is innate.
4. The search for meaning comes through patterning.
5. Emotions are critical to patterning.
6. The brain processes wholes and parts simultaneously.
7. Learning involves both focused attention and peripheral perception.
8. Learning involves both conscious and unconscious processes.
9. We have two types of memory: spatial and rote.

10. We understand best when facts are embedded in natural, spatial memory.
11. Learning is enhanced by challenge and inhibited by threat.
12. Each brain is unique. (n.p.)

Renate and Geoffrey Caine (On Purpose Associates, 2001) also indicate that three interactive elements are essential to this process:

- Teachers must immerse learners in complex, interactive experiences that are both rich and real. One excellent example is immersing students in a foreign culture to teach them a second language. Educators must take advantage of the brain's ability to parallel process.
- Students must have a personally meaningful challenge. Such challenges stimulate a student's mind to the desired state of alertness.
- In order for a student to gain insight about a problem, there must be intensive analysis of the different ways to approach it, and about learning in general. This is what's known as the "active processing of experience." (n.p.)

When we understand how students learn, we can use targeted teaching methods to help them analyze, synthesize, and communicate information. Combined with appropriate uses of technology, these methods will help students prepare for the future. Examples of approaches that are customizable are constructivism, project-based learning, and a relatively new concept, connectivism.

constructivism

Constructivism views learning as a process in which the learner actively constructs or generates new ideas or concepts based upon current and past knowledge. With a constructivist approach to learning, students build on what they already know and what they learn. Rather than providing didactic instruction and expecting students to repeat facts on a test, teachers encourage students to think about what they already know about a topic, search for new information, and collaborate with others to solve realistic problems and derive new understanding.

Using Web tools helps the process along. Students are able to do more research, find information they would never encounter without Web access, and collaborate to create a product that shows how both a priori and new information are combined to become knowledge. Using Web 2.0 tools such as wikis allows students to collaborate on creating a document that displays what they have learned. They can illustrate with photos and videos, use an interesting presentation format, and engage the audience to think about what they've seen.

project-based learning

Project-based learning is a constructivist approach that encourages learning in depth by allowing students to use inquiry-based methods to engage with issues and questions that are rich, real, and relevant to their lives. It emphasizes learning activities that are long-term, interdisciplinary, and student-centered. Students form a learning community that focuses on critical thinking.

Students are expected to use technology in meaningful ways, for example, to help them investigate or present their learning. Teachers offer resources so that students can explore and develop content purposefully and creatively. Students engage in activities that are valued in the real world, manage their own tasks and time, work as part of a team, and communicate with adults and experts. They drive the accumulation of content knowledge and thus remember what they learn.

Project-based learning allows for alternative approaches that address students' individual differences, variations in learning styles, intelligences, and abilities and disabilities. Despite the current emphasis on learning and testing basic skills, many schools continue to encourage students to do higher order thinking as preparation for self-directed lifelong learning and as a way to develop workplace skills.

Web-based tools add the ability to communicate and collaborate with the world outside the classroom easily and at no cost beyond the technology. Thus, Web 2.0 tools are part of a paradigm shift in learning. Rather than delivering information from textbooks and teachers' resources, the new approach harnesses the technologies that students use outside of school to engage them in finding and analyzing resources themselves.

Because the Web has almost limitless information, students need strategies to find what they are looking for. Web 2.0 services allow them to create social networks of those with similar interests in order to interact, share information, and learn collaboratively. Achieving the goal of having students learn deeply rather than broadly can happen. They can pursue a topic thoroughly, discern the truth about it, and eventually know more than some of the experts and thus become experts themselves. They can create an authentic audience for their work by creating tags for linking, by inviting comment, or by syndicating it with RSS (Really Simple Syndication). Because they have the tools at their fingertips to publish their work online, they become resources for other students' research.

connectivism

George Siemens' (2004) theory of connectivism is an approach to learning that also considers technology as a key factor. "Including technology and connection making as learning activities begins to move learning theories into a digital age" (n.p.).

Siemens (2004) believes that:

> Learning and knowledge rests in diversity of opinions; learning is a process of connecting specialized nodes or information sources; the capacity to know more is more critical than what is currently known; nurturing and maintaining connections is needed to facilitate continual learning; the ability to see connections between fields, ideas, and concepts is a core skill; and decision-making is itself a learning process. (n.p.)

Siemens points out that using technology and making connections are linked. Combining connectivism with constructivist methods in the classroom offers students an opportunity to gain 21st-century skills. Siemens (2004) sees the trends:

- Many learners will move into a variety of different, possibly unrelated fields over the course of their lifetime.
- Informal learning is a significant aspect of our learning experience. Formal education no longer comprises the majority of our learning. Learning now occurs in a variety of ways—through

communities of practice, personal networks, and through completion of work-related tasks.

- Learning is a continual process, lasting for a lifetime. Learning and work-related activities are no longer separate. In many situations, they are the same.
- Technology is altering (rewiring) our brains. The tools we use define and shape our thinking.
- The organization and the individual are both learning organisms. Increased attention to knowledge management highlights the need for a theory that attempts to explain the link between individual and organizational learning.
- Many of the processes previously handled by learning theories (especially in cognitive information processing) can now be off-loaded to, or supported by, technology.
- Know-how and know-what are being supplemented with know-where (the understanding of where to find knowledge needed). (n.p.)

the challenge

For a while the education pendulum had swung toward the types of learning that constructivism, project-based learning, and connectivism typify. The goals were to prepare students for the 21st century—to use higher order thinking skills, apply technology, adapt to change, acquire workplace skills, and more.

Today's educational goals are seemingly the opposite. We focus more on standards, standardized tests, and accountability, which lend themselves to traditional, teacher-directed instruction. Because "the test" is the ultimate determinant of success, many think the process is easy—teach what will be tested. However, two dangers exist: one is in not measuring what really matters even if it will matter more in the future. The other is in narrowing instruction to the exclusion of anything more than test materials.

The challenge is to find ways to support in-depth learning and increased student achievement while also employing a variety of measures, including standardized

tests. If new methods engage students so they are eager to learn, allow them to acquire the ability to do serious, in-depth, "real world" activities, and support them in retaining what they've learned, can the new methods also result in their doing well not only on performance-based measures but also on high-stakes tests? If these new Web-based tools offer students the tools of production and engage them, can we harness these tools for learning? The goal is to provide an education that prepares students to have 21st-century skills and also to ace the test without breaking stride (Solomon, 2003).

When they are adults, today's students will change jobs more often than their parents did and each new job may be unrelated to the last. This means that the skills they will need will be less job-specific; rather, they will be skills that enable people to think, adapt, and continue learning. Students will acquire some of these skills informally—by communicating with a wide range of people and developing personal networks. With the kind of guidance that schools can provide, they can add the other skills they'll need. The tools students use may change where and how they get information, but only educators can make sure that students learn how to process and use that information wisely.

harnessing new technologies

How do we take advantage of students' interests and the ways they learn to create new models for learning? David Jakes (2003) had this to say in a conference presentation:

> Various types of virtual learning environments, when supported by pedagogically sound instructional models, and when combined with the content of the Web, can provide the following:
>
> - A structured approach to an investigation that provides direction and guidance for students in a large, complex, and dynamic system such as the Web.
> - An opportunity to integrate multiple types of truly unique Web resources into the learning experience, including such media as simulations and animations that can promote the development of highly interactive and multisensory learning environments.
> - An increased level of student engagement.

- An opportunity to build information literacy and 21st-century skills in students.
- Learning experiences that are pliable and scalable, and provide opportunities for differentiation.
- Learning experiences that are inquiry-based, and focus upon the resolution of an essential question that requires the acquisition, processing and synthesis of information. (p. 1)

One of the new technologies that could be harnessed is digital storytelling. The goals are traditional; the tools are new. David Jakes explains in the Web 2.0 Wisdom sidebar, Digital Storytelling.

web 2.0 wisdom

Digital Storytelling

David Jakes

NEW TOOLS SUCH AS BLOGS, wikis, and podcasts allow everyone, including students, to contribute to a global conversation. They enable voice. The process of digital storytelling provides a voice rich in multimedia that has the potential to resonate deeply with an audience. As a result, digital storytelling has become one of the most powerful 21st-century learning processes available to teachers and students.

So what exactly is a digital story? A digital story in its truest form is a personal experience represented in narrative format. A script, or the essence of the story, is extracted from the narrative and then amplified by including video, music, still-frame imagery, and the author's voice. A digital story typically lasts between two and three minutes. The inclusion of multimedia makes the story come alive and takes the story to a place that could not be achieved by writing alone.

▶▶▶

▶▶

The process is rich in learning. Digital storytelling makes students better writers through the multiple drafts, rewrites, and script preparation that is required and helps them build essential visual literacy skills through the selection of the imagery required to construct the story. Using storytelling software such as Photo Story 3 and iMovie further advances their skill set.

The final component in the digital storytelling process is sharing the creation. The video-sharing sites now available online make this possible. The result demonstrates to students that what they have to say is important and how they say it is critical. They discover that they can be lifelong contributors to the new global conversation.

David Jakes is the instructional technology coordinator for Community High School District 99 in Downers Grove, Illinois.

One could argue that there is even yet another component beyond sharing the story. In the world of Web 2.0, the final piece involves the audience—to choose to watch or not, to choose to modify or not, to choose to re-create or collaborate or not. And then to offer it back to the original author—or not—and so on, in the ultimate peer-learning experience.

Now that we've seen what the world is like and what today's students are like, let's take a closer look at the Web tools that have such an impact.