

THE FUTURE OF EDUCATION*

“Rip Van Winkle,” a familiar tale by the American author Washington Irving, tells about an idle man who lived in the Catskill Mountains with his wife, young children, and loyal dog. One afternoon he fell asleep in a remote grassy knoll, and awoke twenty years later, complete with long, grizzled beard. When he returned to his town, he was confused by its many changes.

Now imagine a more recent Rip, a college lad who dozes off in 1932 and wakes up seventy years later. We escort him on a tour of his modern surrounds, wanting to impress our aged traveler with his new world. Our first stop is to observe a NASA shuttle launch. Not surprisingly, Rip is frightened and stunned by the size and power of the spacecraft. His last memory of air travel was Charles Lindbergh’s 1927 trans-Atlantic flight. Next we take Rip to a cardiac surgical unit at City Hospital. He’s curious and puzzled by the electronic gadgetry, the instruments used, and the procedures performed. His prior medical recollection was of a physician making house calls.

And finally we accompany our sleepy friend to a modern-day university. It’s only here that Rip proudly proclaims, “Ah, a school!” At last Rip is relaxed as he strolls through this familiar setting of lecture halls and classrooms.



Technology impacts nearly every aspect of our lives, yet its effect on learning continues to be modest. That isn’t to say there is neither investment in technology nor innovative uses. Indeed, we know that schools and corporations have spent billions of dollars building a complex digital network to provide “any time, any place” access to the Internet. Nonetheless, if you walk the halls of schools or corporate America, you’ll quickly see that the way we taught and learned before the “information revolution” is not significantly different from the way we teach and learn today. It seems that we’ve optimized our computer- and Web-based systems to reflect a model of schooling consistent with a bygone era, complete with central control, standardization, and top-down administration of courses, tests, and degrees. However, this is about to change.

In our post-9/11, post-Enron/WorldCom culture, a collective threshold has been crossed, awakening us to an unpredictable and impermanent world. While globalization has brought us the opportunities of genomic discovery, a

* This essay will appear in Zolli, Andrew, Ed. *TechTV's Catalog of Tomorrow: Trends Shaping Your Future*. Published on September 16, 2002 by Que.

worldwide technological infrastructure, and the democratic transformation of nations, it has also brought us the challenges of a global AIDS epidemic, computer viruses, and terrorism. Even though English has become the de facto language of trade and communication, increasingly we feel vulnerable because of our unfamiliarity with non-Western languages, cultures, and traditions. As pundits declare that a return to basics is what's needed in our schools, many teenagers have migrated from the linear tradition of the book to a nonlinear, synchronous mix of Instant Messaging, hypersurfing through Google hits, and tracking their last bid on e-Bay. Each of these factors contributes to a climate of change, a sense that the industrial view of schooling must give way to a view consistent with the challenges and opportunities of our time. At its core, the change will redefine the role of teacher, learner, and content.

No longer will the teacher disseminate information in the form of lectures and textbooks. Rather, the teacher will adopt the role of facilitator, tutor, and learner. Similarly, the student's role will change from a memorizer of facts and principles to that of a researcher, problem-solver, and strategist. The "keep your eyes on your own paper" value of independent scholarship will be augmented with learning communities and cooperative workgroups. Skilled collaboration, interpersonal communications and project management will define successful learner teams.

Content will change as well. Traditionally we organize content into disciplines—the "arts and sciences." We further divide these disciplines into smaller content silos, each to be mastered by the learner in a prescribed curriculum of courses and topics. Increasingly, however, this strategy will fail, given the exponential growth of information. Instead, students will be encouraged to examine the connectedness of information. Digital learning tools will promote multidisciplinary thinking and an appreciation for multiple perspectives while solving authentic, real-world problems. Overcoming the "tyranny of the disciplines," scholars will regroup themselves into new academic units with names such as "Informatics," and students will develop new specialties with titles such as "genetics software engineer" and "interaction designer."

To overcome a growing sense of "information anxiety" — the uneasy feeling of understanding less about what we want to know more — cognitive tools will help us visualize concepts as variations of larger themes. Big-concept thinking, systemic analysis, and model building will replace the less useful memorization of disconnected facts. Sophisticated online search engines will lead learners to specific details, discarded after their use and resurrected when necessary. Unlike the end-of-chapter problems students solve in today's textbooks, future learners will engage in problems that are context-dependent, complicated, messy, and reappear in diverse guises.

Lest you think this new Digital Learning Environment lacks the rigor of today's best curriculum designs, consider this: Intelligent software tutors will insure that students acquire basic skills – not through the textbook-imitative exercises of today's e-learning, but through sophisticated algorithms of concept presentation, simulation, correction, and review. These skills will be mastered when they're needed. For example, most of us learned how to add two fractions with unlike denominators because it was the next topic in the teacher's curriculum plan. Our major motivation for paying attention and learning the procedure was to achieve a high score on the Friday afternoon quiz. Now imagine the same concepts introduced in the context of a problem-centered environment. A student team may be constructing a 3-D model, including measuring and adding components of varying lengths. In this case, the students are motivated to access instruction on fractions because it will help them produce their model. And it's not only motivation that will change. Rates of comprehension and retention will increase as well.

Insuring that “no child is left behind,” management systems will track learner proficiencies. Teachers will provide support and guidance to individuals, probing here, questioning there, and emphasizing learning *how* rather than learning *what*. In time, software-generated, personal learning assistants will “accompany” each student through a lifetime of learning. Like an alter ego or “über-me,” these intelligent agents, accessing a personalized, life-cumulative profile, will provide options for the learner: “On Friday, you'll be in Chicago. You have three hours between appointments. Given your interest in Mies Van Der Rohe, shall I reserve tickets for the East Pier Architectural Boat Tour? (East Pier docents score 22% higher approval ratings than docents from competing tour companies.) The weather agent predicts a sunny day and low humidity. By the way, I've prepared a videography of Chicago architects. I know you like to impress others with little known facts.”

As we look forward, might there be other trends signaling the Digital Learning Environment? Look for new tools, databases, and settings. There will be less use of productivity tools and more use of cognitive tools for conversation, analysis, prototype construction, scenarios, simulation, reflection, and insight. These new tools will lead to ethical debates, the development of personal standards and evaluation criteria, and the contribution to team norms.

The Web-as-learning-tool will be used less as a global database and more as a global “learningbase,” indexed with generations of recursive commentary, a kind of “Global Talmud.” Learners will explore interpretations, rules, and cases. Scenario building and computer imaginative forms of interactive narrative will lead to the integration of academic skills and “practical intelligence” or tacit

knowledge. Learning spaces, whether formal or informal, virtual or real, will become safe environments for experimentation and failure. Throughout a lifetime of learning, each person will function as both a learner and a coach.



When Rip went to school, his reading comprehension task was simple: a paragraph or two with a multiple-choice question. He knew that the answer could always be found in the paragraphs above. Tomorrow's students will consider the appropriateness of the question, whether it is part of a larger problem, the likelihood that an answer exists, and the trustworthiness of the sources found. Students will examine their findings from multiple perspectives, and they will develop criteria by which to judge their conclusions. One might argue that the best teachers have always guided their students with these considerations. Yet the new digital tools will allow learners and teachers to access information in ways, quantities, and speeds never imagined by Rip's most prominent professors.

If you want Rip Van Winkle to recognize *your* school, you had better wake him up now, because in another thirty years he'll have no idea what he's looking at—let's hope!

— Martin A. Siegel

Director, Human-Computer Interaction Program
School of Informatics, Indiana University
Professor, Instructional Systems Technology
School of Education, Indiana University
Founder and Chief Learning Officer,
WisdomTools

Contact information:
marty@wisdomtools.com

