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interactive educator

The Digital Face of 21st-Century Curriculum

Savvy Tech Shopping

Tools to succeed in technology purchasing

Information Overload

Deciding what to use (and what not) is important

Is It Worth It?

Is technology worth the time, effort and money?

PLUS —



David Weinberger

Knowledge is changing – are you?



DIGITAL REVIEWS • PD • RESEARCH • WE

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So much is going on right now with regard to integrating technology, pedagogy and digital content that it's difficult to pinpoint any one trend or idea that truly represents a beachhead. The areas of inquiry span a range so broad that in a matter of moments you can jump from examining the shifting nature of knowledge to filling out a grant application on why you want iPods for every student.

At SMART – even with a tight focus on the integration of interactive whiteboards – we have our sights on multiple horizons. Everywhere we turn we see the profound impact such areas of inquiry are having. Classrooms are becoming collaborative, technology-based learning hubs, with products like interactive whiteboards boosting student engagement and promoting inquiry-driven learning.

The issues concerning the integration of technology, pedagogy and digital content are complex for many reasons. One part of the debate concerns the media and hardware. The Internet, handheld computers, laptops and even MP3 players are being used in unique and creative ways to support teaching and learning. The other side concerns

content. Blogging, podcasting, educational MUVES and MMOGs, digital learning objects – all relative newcomers to education, but all insinuating themselves into the discussion at a rate difficult to keep up with sometimes. Bring the two sides into the same discussion and ... well ... to quote an old friend of mine, "It's just really complicated."

In this issue of *i.e.*, we examine the interplay of technology, pedagogy and digital content. We discuss practical issues like how to integrate handheld computers into classrooms (All the Rage for a Reason, p. 38) and how to measure whether technology is worth it (Is It Worth It?, p. 35). We also delve into larger questions like how the nature of literacy is changing in the 21st century (Information Overload, p. 30) and how digital content is affecting pedagogy (The Digital Face of 21st-Century Curriculum, p. 24). Guest columnist David Weinberger also weighs in on how technology is changing the very nature of knowledge (Knowledge in Transition, p. 20).

We may raise many questions, but that is, after all, the nature of inquiry-based learning, and it seemed apt that we should examine them in the same manner that students face their own learning.

Thank you for the overwhelmingly positive response to the last issue of *i.e.*, which was our inaugural issue. We hope you find the information in this issue useful and insightful, too. Please send us your feedback, stories, experiences and suggestions so we can continue our discussion.

Sincerely,

Carolyn Dearden
Editor-in-Chief

CONTRIBUTING WRITERS

Judi Harris is a professor and the Pavey Family Chair in Educational Technology in the School of Education at the College of William & Mary, where she coordinates the Curriculum and Educational Technology doctoral program. She is the author of the forthcoming new edition of *Virtual Architecture: Designing and Directing Curriculum-Based Telecomputing*. Her nonprofit Electronic Emissary telementoring service and research effort is the longest-running K–12 effort of its kind, and has served students and teachers worldwide.



David Weinberger, an NECC 2005 keynote speaker, is a Fellow at Harvard's Berkman Center, and author of the international bestseller *The Cluetrain Manifesto*, and, most recently, *Small Pieces Loosely Joined*. He has written for numerous publications, including *Harvard Business Review*, *NY Times*, *Smithsonian*, *InfoWeek* and *Wired*.



David Warlick has been an innovator and leader in educational technology. He created and maintains the second oldest continuing online project, Global Grocery List, and writes for *Technology & Learning*, ALA's *Knowledge Quest*, *Education World* and *CUE Online*. He has also written three books: *Raw Materials for the Mind*, *Redefining Literacy for the 21st Century* and *Classroom Blogging: A Teacher's Guide to the Blogosphere*.



Wesley Fryer is an educator, author, digital storyteller, technology integration pioneer, husband and father. He is an international and national presenter and speaker, addressing a range of topics related to education, technology integration, distance learning and 21st-century literacy.



THE Digital Face OF 21ST-CENTURY Curriculum

How digital content is changing teaching and learning

Angus King, former governor of Maine and principal architect of the Maine Technology Learning Initiative (www.mainelearns.org), enjoys telling a story about Wayne Gretzky, the greatest hockey player of all time. Gretzky was once asked how he was able to score so many goals. He answered that he always skated to where the puck was going to be, instead of skating, like everyone else, to where the puck actually was.

In the education arena, stakeholders at all levels need to consider the applicability of this metaphor for teaching and learning in the 21st century. The availability of digital content and communication tools is revolutionizing curriculum and education activities for learners of all ages. Recognition of these opportunities and actual adaptation to them varies widely. Despite common reticence to change, the face of education curriculum is undergoing a fundamental transformation. Educators at all levels who wish to remain relevant and effective in the 21st century need to pay attention.





Students today must be engaged in the creation of authentic knowledge products, collaborating with students in their local area as well as across the world, in a modern classroom that prepares them for their future.

Flattening the world

Digital content and communication tools are “flattening the world” and removing communication barriers that have existed since the beginning of recorded history. *New York Times* columnist Thomas Friedman identifies in his book, *The World Is Flat: A Brief History of the Twenty-First Century*, 10 “flatteners” that have made outsourcing and offshoring to other countries a relatively easy and cost-effective business practice. Companies today can and do locate their call centers in Bangalore, India, instead of North America or Europe and save millions of dollars as a result.

teach students to sort through the information available, understand it and process it. But since the information is unfiltered by editors and publishers, it is all the more important that students learn to rein in all that information. That includes teaching them to effectively gather, evaluate, verify, comprehend and create information from a huge array of sources in myriad forms.

As educator David Warlick has noted, accessing and using information available online is just the starting point for digital literacy in the 21st century. Students must be engaged in the creation of authentic knowledge products, collaborating with students in their local area as

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Many of the same “flatteners” that have transformed the face of international business are also changing curriculum in basic ways. We have entered an age where, in order to be globally relevant, content must be digital. Increasing numbers of students with access to the Internet at home go to online sources first when investigating a research question. They consult analog, text-based resources (the school library) second, if at all.

Educators and librarians may wring their hands at this trend, but despite their objections, it is likely to continue. Access to information via the World Wide Web is flattening the educational playing field. Google (www.google.com) places an unimaginably diverse world of content literally at the fingertips of every Internet user, and this ubiquitous availability of content represents a fundamental shift in educational curriculum and the corresponding role of schools as well as teachers.

Managing information on the loose

One reason contemporary schools were originally created was to attempt to manage and control the flow of information in society. Writing in *Technopoly* in 1992, educator Neil Postman observed that the most obvious reason for the rapid growth of schools was that it was a necessary response to the rise of the printed book and the resulting anxieties and confusion surrounding information on the loose.

With information now wildly and extensively on the loose via the Internet and other digital resources, a major role of schools is still the same as Postman suggested – to

well as across the world, in a modern classroom that seeks to prepare them for their future.

Removing barriers with technology for collaboration

Geography and financial resources used to be enormous barriers to communication in educational contexts. If you wanted to collaborate with someone living on the other side of a nation or the world, you had to travel to see them, write and mail letters, pay them to travel or pay phone charges to talk for a limited amount of time.

The digital face of curriculum and communication tools has changed this. Free instant messaging software and services (www.aim.com, <http://messenger.msn.com>, <http://messenger.yahoo.com>) permit free and profuse text-based communication on a wide range of devices, including cell phones and computers. Free Internet-based telephony software and services (www.skype.com and www.talk.google.com) extend collaboration to voice chat, ignoring national and international boundary lines normally critical in calculating POTS (plain old telephone service) fee-based charges. Websites like ePals (www.epals.com) enable educators from around the world to connect and collaborate on projects of shared interest.

Desktop videoconferencing is quickly becoming a viable technology for any Internet user. Peer-to-peer connections using software like Apple’s iChat (www.apple.com/macosx/features/ichat/) or server-based tools like MacroMedia Breeze (www.macromedia.com/software/breeze/) and Codian’s MCU and IPVCR (www.codian.com) permit

people with standard desktop and laptop computers to engage in rich-media collaboration over any high-speed Internet connection.

Although many school IT departments block network ports to try to prevent teachers and students from using these collaborative communication tools, these are the very tools that should be embraced and creatively used in our “flat world” to develop multimedia and critical literacy skills. Traditional and nontraditional students inside and outside classrooms can and should now collaborate with peers on the other side of the planet as easily as people living in their same city. Technology has broken down communication barriers, connecting teachers and students around the world and supporting collaboration in ways that would have seemed impossible even a decade ago.

The Web as a platform

Traditional education has been described as the passive transmission of content from the mouth of the teacher to the brain of the learner, and the subsequent recitation of content by the student at the cue of the instructor. Learning in a collaborative education environment where access to information is ubiquitous, however, involves the active engagement of the student in both the process of comprehending information and reconstructing it into knowledge. Information does not become knowledge until it has passed through the mind of a learner. This fundamentally active process requires resources and tools that are nontraditional. The digital face of curriculum and educational software tools is providing these resources and many of them are free.

Traditional education technology purchases have included computer hardware, operating system licenses, productivity software and computer-aided instruction or learning management system software that provides exercises and drills for students on specific curriculum content. The majority of North American schools in 2005 continue to purchase education technology using this paradigm.

In the digital world of the early 21st century, however, this purchasing pattern is both fiscally naïve as well as pedagogically counterproductive. Open source software tools offer functionally comparable options for both teachers and students in the areas of productivity and communications tools (<http://del.icio.us/wfryer/OpenSource>). Any school or district technology coordinator not planning or already implementing a transition plan for many of the organization’s desktop computers to an open source operating system (www.linux.org) and free productivity software tools (www.OpenOffice.org) should



In the 21st-century classroom, students must be actively engaged in the comprehension of information and the creation of knowledge.

get the process started.

Students in the 21st century need to be actively engaged in the collaborative creation of authentic knowledge products using technology tools, rather than sitting in front of drill-and-practice software helping them answer multiple-choice questions for an end-of-year standardized test.

Operating systems are not yet irrelevant, since they can be extremely important for people wanting to easily create content like digital movies and interactive DVDs (www.apple.com/ilife). Increasingly, however, the Web is becoming a platform itself for both content creation as well as distribution and access. The emergence of the “read/write web,” or “Web 2.0,” has been documented and explained fairly recently in the blogosphere. “Web 2.0 is a term often applied to a perceived ongoing transition of the World Wide Web from a collection of websites to a full-fledged computing platform serving Web applications to end users,” notes the English Wikipedia. “The proponents of this thinking expect that ultimately Web 2.0 services will replace desktop computing applications for many purposes.”

Examples of free read/write Web tools include online blogging services (www.blogger.com), feed aggregators (www.bloglines.com), wikis (<http://wikipedia.sourceforge.net/>), social bookmarks (<http://del.icio.us>) and online rubric tools (<http://rubistar.4teachers.org>). A more detailed description of these and other read/write Web tools available for educational uses is available in the article, "Teaching & Learning with the Read/Write Web" (http://www.wtvi.com/teks/04_05_articles/read-write-web.html). A more exhaustive list is available on <http://del.icio.us/wfryer/ReadWriteWebTools>.



Free read/write Web tools are ideal for one-to-one educational settings or for one-to-many settings, such as this one.

Students and teachers need more than hardware and software tools to become literate in the 21st century, however. Learners still need high quality curriculum, but that curriculum is increasingly available in digital formats. Many textbook companies have attempted to maintain their near monopolistic control over classroom content (via the printed textbook) by creating digital supplements to print materials, including CD-ROMs and websites. However, these offerings attempt to buttress the primacy of the textbook in the classroom rather than replace it with a superior digital alternative.

Subscription-based, online curriculum alternatives falling into this preferable latter category include Nettekker (www.nettekker.com), MyAccess! Writing (www.vantagelearning.com), BeyondBooks (www.beyondbooks.com), ExploreLearning (www.explorelearning.com), KidBiz3000 and TeenBiz3000 (www.achieve3000.com),

and UnitedStreaming (www.unitedstreaming.com). These flexible software tools are ideal for one-to-one educational settings where every student has a wireless, mobile computing device as well as for one-to-many settings in which classrooms are equipped with interactive whiteboards. They offer levels of interactivity and differentiated instruction impossible in a traditional classroom even for the most advanced master teacher.

As an example, MyAccess! Writing provides immediate feedback for students on their writing drafts, not only offering assistance with spelling and grammar concerns like a modern word processor, but also providing more sophisticated feedback involving sentence construction, voice and other writing aspects. IntelliMetric, the Web-based essay scoring engine developed by Vantage Learning, uses artificial intelligence (AI) technology. According to the company's website, the application emulates the process carried out by expert human scorers and achieves levels of scoring accuracy that equal or exceed expert graders.

Technologies like these do not replace teachers. Rather, they free them from having to be the only source of experienced and trained feedback for student writers. These software tools empower both teachers and students, enabling them to go farther in their journeys of learning than they could without technology tools.

What next?

In the absence of a global energy and communication crisis like that predicted by some for Y2K, digital curriculum is here to stay. Our educational as well as economic situation in the early 21st century has changed dramatically. The world is flattening and the implications of this trend are enormous for education as well as business. Educators at all levels need to consider not simply where the metaphorical "puck" of teaching and learning is today, but where it will be moving in the next year and the next decade. Its destination may be subject to debate, but its nature is not.

Curricula will continue to have an increasingly digital face. The sooner educators adapt to this new reality and engage students on terms suitable for the flat, 21-st century world, the better prepared the graduates of our school systems will be for a future we can barely begin to imagine.

In the early 20th century, John Dewey wrote, "If we teach today's students as we taught yesterday's, we rob them of tomorrow." Let's give our students keys that will open the doors to their future. It's a journey we have to go on together because the puck of teaching and learning is moving faster than ever. Fortunately, this is a game where everyone can win, but we need team captains with the vision, courage and stamina to lead us on to victory.