

Materials from March 31ST



EDCO Collaborative

Education Collaborative for Greater Boston, Inc.

LEGISLATIVE FORUM
Wednesday, March 31, 2010

*21st Century Classrooms:
Where Are We Headed and How Do We Get There?*

EDCO
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Biographies of the Presenters

Cheryl Lemke is President and CEO of the Metiri Group, a consulting firm dedicated to advancing effective uses of technology in schools, and serves as the Practice Leader for Metiri Group Policy Consulting. Prior to launching the firm, she was the executive director of the Milken Exchange on Education Technology for the Milken Family Foundation.

Ms. Lemke specializes in public policy for K-12 learning technology, working at many levels with governors, legislators, superintendents, business leaders, and teachers. She currently works with both the public and private sectors in states across the country, as well as at the national level. Last year, Lemke facilitated public hearings in Silicon Valley, CA and Atlanta, GA for the Web-based Education Congressional Committee. This year, she is working with several states on leadership in technology initiatives, and most recently authored the definitive work on 21st century skills that was published by the North Central Regional Educational Laboratory and the CEO Forum. Her twenty-five year career in the public sector and her work with Metiri Group have included projects related to assessing the impact of technology on learning; gauging the progress of states, districts, and schools in bringing technology to the learning process; conducting surveys and focus groups; convening national experts in discussions on policy issues; and designing and prototyping educational technology frameworks. Her recent article published in *Education Leadership* in Sept. 2009 is included in this packet.

As an Associate Superintendent for the Illinois State Board of Education, Ms. Lemke managed a center for learning technology with over 100 staff members, translating the \$50 million annual budget into: a new State backbone, professional development centers, community-based technology planning processes for Illinois schools, and online curriculum projects designed to help students learn. She also oversaw the development of state learning technology plans in both Illinois and Washington.

Recognized nationally as a proactive leader in learning technology, and sought after as a consultant, speaker, and writer, Cheryl Lemke has designed policy in the State house that translates into sound educational practice in the schoolhouse.

Shelley Chamberlain is the Director of Instructional Technology for the Newton Public Schools. Ms. Chamberlain started her career in Cambridge Public Schools as a special needs resource teacher and moved to a staff development position, working with regular and special education teachers on ways to use adaptive technology to keep students in the least restrictive environment. She worked in Lexington, MA as the Coordinator of Educational Technology and joined the Newton Public Schools in 2006. In Newton she is part of the Central Administrative Team and has been instrumental in the development of Newton's long-range strategic plan, Vision 2020.

Her most recent work is focused on how technology can support students as they develop the 21st century skills of creativity, critical thinking, collaboration, and communication. She has partnered with the Newton Schools Foundation to develop a prototype for the 21st century classroom. This digital classroom includes a variety of tools (1-1 learning using net books with cloud computing, a full suite of interactive tools, and online courses) to foster 21st century skills and extend the home-school connection. Student performance is being measured through a comprehensive evaluation designed by researchers from the Technology and Assessment Study Collaborative at Boston College's Lynch School of Education.

Ann Koufman-Frederick is the Superintendent of the Watertown Public Schools. She began her career as a school psychologist, and has been a middle school teacher and instructional technology specialist in the Brookline Public Schools, an Education Curriculum Specialist at BBN Learning Systems & Technologies in Cambridge, the Director of Technology Initiatives at the Massachusetts Association of School Superintendents, and Director of Curriculum and Instruction at the Carroll School, a special education school in Lincoln, MA. Most recently, she was the Assistant Superintendent in Watertown. She has worked on a variety of state and national grant funded STEM and Technology-in-Education projects. She also teaches in the Harvard Extension School Masters in Technologies of Education program. She received her Ph.D. in School Leadership from Boston College. Her dissertation is entitled "Electronic Collaboration: A Form of Teacher Professional Development". In addition, she is the co-editor of the book *Mission Possible: Reaching All Learners With Technology*.

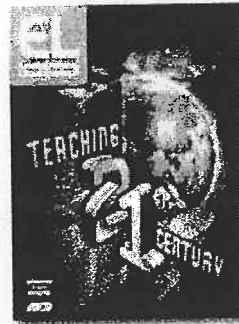


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The Change Agents

Cheryl Lemke and Ed Coughlin

Technology is empowering 21st century students in four key ways.



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The timing is right. Just as the funding for education in the American Recovery and Reinvestment Act has opened a window of opportunity for the K–12 community to reinvent itself, Web 2.0 tools are offering strikingly different, more participatory and interactive ways for people to learn.

To date, U.S. elementary and secondary schools have marginalized technology. Many school districts still restrict their students' use of such Web 2.0 tools as social networking sites, chat rooms, blogs, wikis, visual media, instant messaging and texting, virtual worlds, and interactive games (Lemke, Coughlin, Garcia, Reifsneider, & Baas, 2009).

Instead of requiring our students to check their Web 2.0 technologies at the schoolhouse door, we should teach them how to use these tools for learning. Our students need such guidance. Although we often picture them as technology experts—engaging in multiple texting or instant messaging conversations while listening to music on iTunes and browsing the Web—most children and youth don't know how to use technology as informed consumers, intelligent learners, creative producers, and effective communicators (Kaiser Family Foundation, 2006).

As educators, we should be using technology as a critical design factor, in combination with research on how people best learn, to establish new and different environments for student-centered learning. Here are four key ways that technology is changing the nature of learning in the 21st century.

Change Agent 1: Democratization of Knowledge

The Internet has become a treasure trove for content related to the academic curriculum, providing learners with free access to thousands of valuable courses, information sources, and experts. Elementary and secondary students are accessing these resources every day. Many a teacher has explained something in class only to have a student who recently Googled the topic speak up and add more current or detailed information to the discussion. For some teachers, being challenged in this way is problematic; but for others it is a teachable moment, an opportunity to expand the conversation in response to students' interests and explorations.

Tapping into a student's prior knowledge is a highly effective teaching strategy. But the easy access to online information means that the kinds of prior knowledge students bring to the classroom vary now more than ever before. A high school teacher introducing Newton's laws of motion may have some students who know nothing about this topic, others who have explored the physics of skateboarding online, and even one or two who have taken an introductory online physics course from MIT. As students increasingly access such resources, educators need to assess students' prior knowledge and design instruction that

provides more individualized learning paths and builds students' self-directed learning skills.

The democratization of knowledge requires that schools include digital content, filtered appropriately, within the school curriculum. The excellent online resources that now make information accessible to anyone (for just a small sample, see Resources for Learning Online, p. 57) mean that integrating this content into the curriculum is limited only by the teacher's imagination. For example,

- Biology students can access the animated video of how a cell works on the Biovisions Web site (<http://multimedia.mcb.harvard.edu>) and then run interactive, online simulations at the University of Colorado's Interactive Simulations Web site (<http://phet.colorado.edu/simulations/index.php?cat=Biology>). After developing a series of questions sparked by these activities, the students might hold an online conversation with a professional scientist at the Ask an Expert site maintained by the Center for Innovation in Engineering and Science Education (www.ciese.org/askanexpert.html).
- An elementary teacher could use the Learn Bird Songs! site (www.learnbirdsongs.com) to assess her students' knowledge of birds and then collaborate with a local nature center to take students on a bird walk. Such nature walks can be augmented through the National Geographic's Handheld Birds, a bird guide that can be used on an iPhone, iPod, and other handheld devices. The guide enables the student teams to quickly search for bird types on the basis of characteristics they observe in the field, to access sounds and characteristics of specific birds, and even to record sights and sounds from the field to add to their database (see www.handheldbirds.com).

Afterward, the students could create their own multimedia site to share their knowledge of birds that they see and hear in the schoolyard, their neighborhoods, and the local community. These activities could lead to online investigations of birds that are on the endangered species list.

Change Agent 2: Participatory Learning

The advent of low-cost global communications has led to mass collaboration in the social, economic, and political sectors. Young people are no exception; they expect to interact with and have a voice in everything they do—and that includes learning.

More than 30 years of research on collaboration indicates that it contributes significantly to academic learning and is more powerful than competitive learning or learning individually (Darling-Hammond et al., 2008; Johnson & Johnson, 1989; Williams, Lemke, & Slipac, in press). One key indicator of collaboration is sustained, on-task discussion among students. Unfortunately, according to Kamil and colleagues (2008), this kind of discussion currently accounts for an average of only 1.7 minutes per 60 minutes of classroom instruction. The Internet makes it possible to extend such discussions beyond the walls of the classroom. By creating collaborative blogs and wikis, students can interact with their peers in other communities and even other countries.

For example, a geography class could read and compare interpretations of current events in newspapers in Beijing, London, New York, and New Delhi to gain insights into cultural, political, and social perspectives on such events. Then, by creating a wiki together with sister schools in one or more of these cities, U.S. students can participate in ongoing, in-depth discussions of how culture and geography influence the reporting of these events.

Blogs and wikis offer many opportunities to engage students in such discussions. For an example, see the blog maintained by an advanced placement U.S. government class in Colorado during the 2008 presidential elections (<http://meyerapgovt.blogspot.com>). The teacher asked crucial questions, and his students responded in sustained, online discussions. Sample questions included the following:

Here is your chance to define the label you place on yourself. Why are you a

conservative? A liberal? A moderate? A Democrat? A Republican? An Independent? What do you believe in politically, philosophically, and ideologically? Enjoy . . . and remain civil.

Change Agent 3: Authentic Learning

Today's society is fraught with economic, environmental, social, and political challenges. Students are eager to learn in the context of these realworld issues. And research suggests that such authentic learning increases their engagement and the depth of their learning (Newmann, Bryk, & Nagaoka, 2001).

The work of Newmann and colleagues suggests that three factors are crucial to the achievement of increased learning. First, the student work must have meaning or value that transcends the student-teacher relationship. Such value is created when the student shares his or her work in a meaningful way with an audience outside the classroom, when the student is personally interested in the topic and product, or when the student perceives a clear connection between the academic task and the kind of work done in the real world. Second, the work must embody serious, in-depth learning in the subject area. The student must begin to build a schema of expertise and understanding on the topic and to express that understanding through complex communications. Third, the student must use what he or she learns to produce something. This product might be simply a new idea or an understanding that synthesizes the concepts learned, or it might be an actual product for real-world use.

As we have worked with schools and teachers around the United States to develop rich, authentic learning units and activities for 21st century learning, we have had success with a backwards design process similar to that developed by Wiggins and McTighe (2006). We encourage educators to do the following:

1. Start with the academic standards. Know specifically what students should know and be able to do and what sort of performance might demonstrate that knowledge or skill.
2. Ask the question, Who cares about this content? Try to identify some professional who, in the course of his or her daily work, might apply this knowledge or skill. Think creatively. For example, a medical researcher might use math standards related to probability to analyze the results of testing on the effectiveness of a new drug.
3. Once you select a professional role, identify a task for which this professional might use the targeted skill or knowledge. Try to select a task that would be appropriate and motivating for students.
4. Identify content from other disciplines that might be integrated to make the learning more efficient.
5. Identify 21st century skills—information literacy, visual communications, and so on—that might be developed and assessed in the context of the learning.
6. Think about the tools and technologies of the 21st century that might contribute to the final product.

For example, one school in California looked at the state's six social studies standards on ancient Greece through the lens of travel professionals. Students developed a Web site that featured themed tours based on those standards. The students incorporated their knowledge of ancient Greek culture. They used persuasive-writing skills to make the information engaging for potential users and incorporated math knowledge to calculate currency conversions. The students honed their information literacy skills as they gathered and evaluated information from other travel locations, and they practiced their visual-communications skills in designing an attractive and useable Web site.

Change Agent 4: Multimodal Learning

Communication in today's world is complex, fast-paced, and conveyed through sophisticated media.

People are bombarded with multimedia messages that they need to be able to interpret to gain a deeper understanding of the information. For instance, the *New York Times* online often includes interactive graphics to help its readers understand events. Recent graphics have illustrated such phenomena as changes in carbon emissions across the United States, the retreat of sea ice in the Arctic from 2003 to 2006, the differences in the language of presidential inaugural addresses from Washington through Obama, the spread of the swine flu, and the depth of past recessions compared with today's economic picture.

Neuroscience research supports the power of learning through a combination of text and visuals. The dual-channel modality of the human brain suggests that the limited working memory (where people do their thinking) treats text/sound and visuals differently. Emergent research suggests that certain combinations of the two can significantly increase levels of learning (Mayer, 2003; Moreno & Mayer, 2007).

Students need to be prepared not only to interpret and analyze such media, but also to compose and produce communication using such media. Teachers should provide opportunities for students to produce graphics and charts to convey their ideas.

One of the most powerful ways in which schools are beginning to use multimodal learning is in digital storytelling, a type of composition in which the student tells a first-person narrative in his or her own voice using sound, oral language, music, and visuals. When engaging students in digital storytelling, teachers need to ensure that students not only are motivated and interested by the use of media, but also meet literacy standards.

The Center for Digital Storytelling (www.storycenter.org) has links to many resources and articles about this medium. You can find examples of digital stories posted by students and teachers in Niles Township High School District 219 in Skokie, Illinois, at www.digitalstories.org.

Two Choices

In our list of Resources for Learning Online (p. 57), we referred to the online physics class of Walter Lewin, a physics professor at MIT whose online lectures have made him something of a Web rock star. Although Lewin's classes are interesting and even entertaining, a story that appeared recently in the *New York Times* (Rimer, 2009) may serve as a guidepost for thinking about the 21st century classroom.

Despite the entertaining lectures of such professors as Lewin, MIT was struggling with relatively high failure rates and low attendance in its lecture-style introduction to physics courses. Ten to 15 percent of MIT students, arguably one of the most select student populations in the world, were failing physics courses, and in many classes, attendance had fallen to around 50 percent. MIT decided to move from lectures to smaller high-tech classrooms in which students work in teams on real-world problems, collaborating with teachers and students alike. Students are involved in inquiry rather than note taking: They are now conducting experiments and collaborating on knowledge products—authentic learning in action. As a result of these changes, attendance soared, and the failure rate dropped to below 5 percent.

This story suggests the changes schools need to make to leverage the opportunities offered by Web 2.0 technologies. Educators must

- Become familiar with new technologies and knowledge resources, even those that at first blush do not seem at all related to their teaching.
- Incorporate new knowledge resources into the learning program of each student. Leverage these rich online tools to differentiate learning and engage reticent learners.
- Promote self-directed learning for all students.
- Seek out real-world applications of content and integrate those applications in student learning.
- Give students opportunities to communicate their understanding through a variety of

media—print, video, Web 2.0, and more.

- Promote active collaboration over individualized competition.

At this juncture in history, we have two choices: We can either leverage the democratization of knowledge and the power of participatory, authentic, and multimodal learning in the service of our students, or we can continue with current practice and careen down a path to irrelevancy.

Resources for Learning Online

Online Content

Technology Entertainment Design (TED), www.ted.com

This site contains videos from the annual TED conference, which brings together "the world's most fascinating thinkers and doers." More than 400 of the conference's best talks and performances are available free on the Web site, with more added each week. Teachers can use these videos to spark student interest and discussion in many subject areas. History students can view historian Doris Kearns Goodwin talking about what we can learn from U.S. presidents, including Abraham Lincoln and Lyndon Johnson. Math students can view "ethno-mathematician" Ron Eglash exploring the fractal patterns underpinning architecture, art, and design in many parts of Africa.

Biovisions, <http://multimedia.mcb.harvard.edu>

This site, created by a collaborative community of Harvard scientists, teaching faculty, students, and multimedia professionals, contains video clips and animations related to biology, including the eight-minute animation "The Inner Life of a Cell."

Learn Bird Songs! www.learnbirdsongs.com

Created by a nature photographer and writer, this site contains recordings of bird songs as well as information about habitats and bird species.

Online Courses and Learning Units

MIT OpenCourseWare, <http://ocw.mit.edu>

The Massachusetts Institute of Technology offers a free publication of course materials reflecting almost all the undergraduate and graduate subjects taught at MIT, a total of 1,900 courses. Materials include course syllabi, lecture notes, assignments, exams, and audio and video lectures. Teachers can incorporate parts of these courses into the curriculum to spark learning and engage students. (For example, at <http://ocw.mit.edu/OcwWeb/web/courses/instructors/lewin/lewin.htm>, you can access the 36 entertaining demonstrations by 71-year-old physics professor Walter Lewin. In a typical presentation, he teaches the laws of motion by swinging back and forth on the stage of the lecture hall seated on the ball of a pendulum.)

Connexions, <http://cnx.org>

Facilitated through Rice University, this site is "a place to view and share educational material made of small knowledge chunks called modules that can be organized as courses, books, reports," and so on. Anyone may view or contribute, and there are currently more than 12,000 learning modules on the site. For example, a unit on African message drums for early primary students is "suitable for inclusion in a unit on music,

percussion, communication, history, or world cultures."

Web-Based Inquiry Science Environment (WISE), www.wise.berkeley.edu

This online learning environment sponsored by the University of California, Berkeley, enables students in grades 5–12 to examine real-world evidence and analyze current scientific controversies by designing and debating solutions. The learning modules, designed to take about one week, cover such areas as global climate change, hybrid cars, genetics, and recycling. All modules are free.

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EDCO Collaborative

Education Collaborative for Greater Boston, Inc.

EDCO is a voluntary collaborative of 22 urban and suburban school districts serving the Greater Boston metropolitan area. EDCO has been in existence since 1969, with a continuous mission to improve education through inter-district and interagency collaboration; provide high quality education and related services to students at risk; and enhance equity, intercultural understanding and equal opportunity in education. EDCO is a public non-profit educational agency with a private non-profit affiliate, and is governed by a Board of Directors comprised of school superintendents and school committee members representing each of its member school districts. For more information, visit www.edcollab.org or call at 617-738-5600.

EDCO MEMBER DISTRICTS

Acton	Boxborough	Lincoln	Waltham
Acton-Boxborough	Brookline	Lincoln-Sudbury	Watertown
Arlington	Carlisle	Manchester-Essex	Wellesley
Bedford	Concord	Newton	Weston
Belmont	Concord-Carlisle	Sudbury	Winchester
	Lexington	Archdiocese of Boston	

PROFFESIONAL DEVELOPMENT PROGRAMS

EDCO Seefurth Education Center: The Seefurth Center offers a full array of workshops, courses and online courses in all disciplines focused on improving the practice of teachers and administrators. In addition, the Seefurth Center staff facilitates standing Professional Learning Groups for administrators and teachers in positions of curriculum leadership within their districts.

Empowering Multicultural Initiatives: EMI specializes in providing professional development courses and workshops that focus on cultural proficiency and antiracist educational practices.

Educator Leadership Institute: ELI is a field based licensure program for teachers pursuing principal, assistant principal, and supervisor/director licenses.

School Committee Leadership Programs: EDCO sponsors two professional development activities for School Committee Members from our member communities – a monthly Leadership Roundtable and a New School Committee Member Orientation – as well as the annual Legislative Forum.

Recruitment and Human Relations Services: EDCO provides recruitment and job fairs to member communities. In addition, EDCO provides support to candidates seeking licensure through individually tailored experiences, and consultation regarding various aspects of personnel management and human relations services, including coaching and mentoring services.

SPECIAL EDUCATION TUITION PROGRAMS

EDCO Program for the Deaf and Hard of Hearing provides comprehensive inclusive educational programming for deaf and hard of hearing students grades 6-12 with support services to provide access to the general curriculum and direct instruction in separate classes when appropriate.

The North Crossing School Program is a therapeutic alternative program designed to meet the needs of students grades 6 through 12 whose clinical mental health diagnoses impact their day to day performance.

The Interim Alternative Education and Assessment Program supports students with special needs who have been temporarily excluded from their public school placements and students who need short-term diagnostic placements in order to better plan for longer term educational placements.

The EDCO Manville Partners Program serves students with Asperger's Syndrome who require specialized programming in order to maximize their academic and social potential. The program provides an intensive focus on social and pragmatic skills, offers a grade level high school curriculum, and provides a fifth year transition program when appropriate.

COLLABORATIVE BUSINESS AND PURCHASING SERVICES

Utilities Purchasing: EDCO supports the collaborative purchasing of electricity and natural gas for participating member districts.

Technology and Curriculum Materials Purchasing: EDCO coordinates the collaborative purchasing of hardware, software and other curriculum materials among member districts based on shared need.

Special Education Transportation: EDCO collaborates with the LABBB Collaborative in a program to offer cooperative special education transportation services across six participating towns.

EDCO MANAGED CONTRACT PROGRAMS

EDCO Youth Alternative is an alternative high school program located in a community-based site in Kenmore Square, Boston. This program provides a full academic program, counseling and support services to students who have dropped out of school, leading to a Boston Public Schools diploma.

Massachusetts Migrant Education Program provides supplemental educational opportunities to the children of migratory workers and out of school youth. The program includes regional Family Support Projects that provide migrant students with extended learning opportunities; parent support and family literacy programs; student and family advocacy; outreach and recruitment services; and a summer program that provide language development and enrichment instruction.

Special Education Surrogate Parent Program recruits and trains volunteers to participate in the decision making process regarding special education services for students in the care or custody of the Department of Children and Families (DCF) and for students whose parents are unknown or unable to participate.

Archdiocese of Boston Administration of Titles I – V Funding

EDCO staff manages the administration of Title I funding and funding from other federal Titles that are made available to the Archdiocese of Boston schools as an entitlement from the Boston Public Schools.

Habilitative Services Program provides comprehensive therapeutic services in occupational and physical therapy, adapted physical education, and orientation and mobility to residents at the Wrentham Developmental Center. The Program supports the improved quality of life and care for residents, maximizing their level of skill development, maintaining their functional ability in varied environmental settings, and promoting wellness.