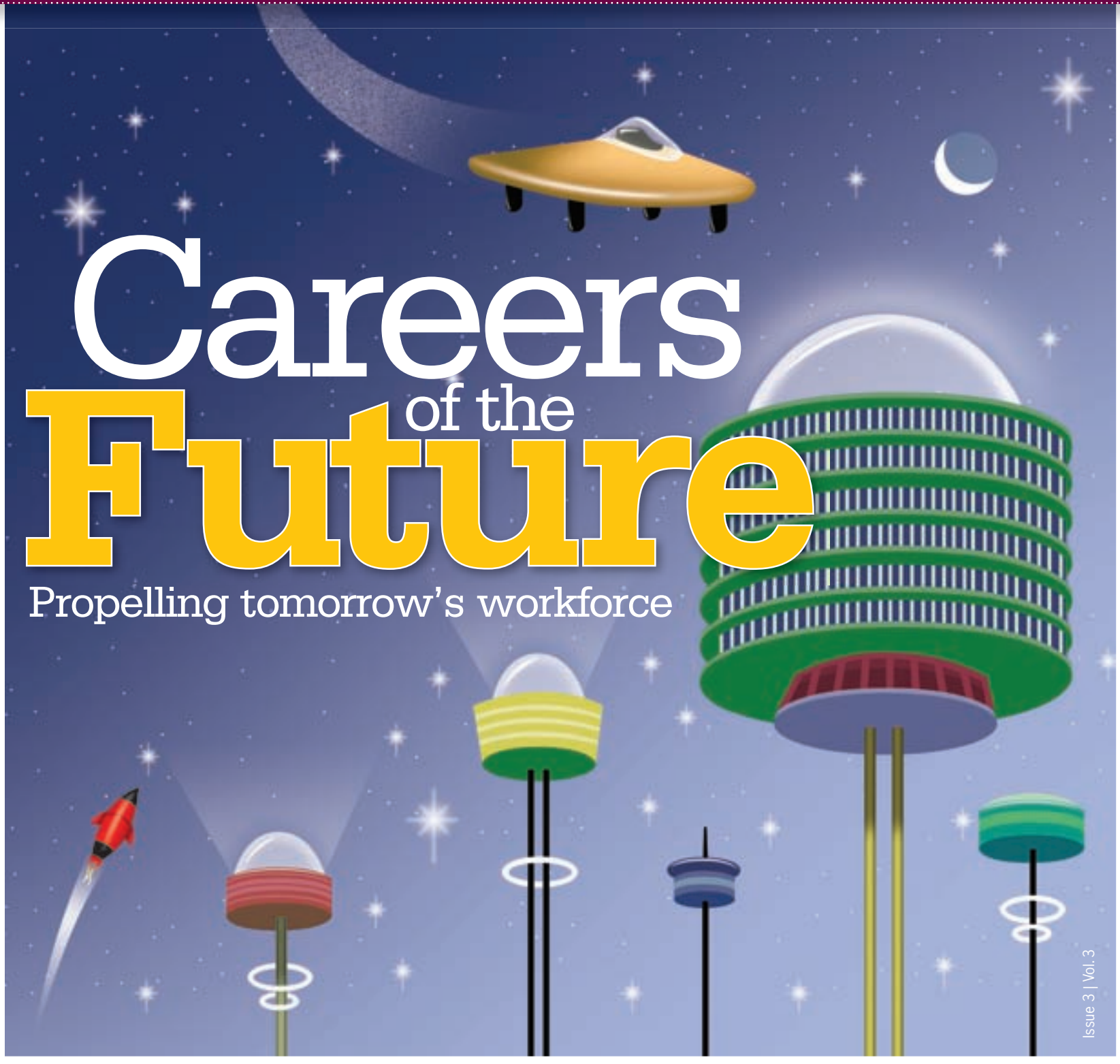
Summer 2008

converge®

» STRATEGY AND LEADERSHIP FOR TECHNOLOGY IN EDUCATION

A publication of e.Republic



Careers of the Future

Propelling tomorrow's workforce

Issue 3 | Vol. 3

Students not quite spellbound in class? A projector from CDW·G can liven up the room a bit.

NEC VT595

- Portable 2000 ANSI lumens projector with 1024x768 native resolution
- Automatic keystone correction SquareShot™ technology instantly projects a square image even when the projector is set up at a steep offset angle to the screen
- Three-year limited parts and labor including InstaCare®, one-year lamp warranty

NEC

$749.99
CDWG 1052834

$999.99
CDWG 1411831

NEC

NEC VT800

- 2700 ANSI lumens XGA projector with 1024x768 native resolution
- Integrated RJ45 connection for quick connection to the LAN (10/100 Base-T capability)
- Two-year limited parts and labor including InstaCare®, one-year lamp warranty

AVerMedia® AVerVision CP300

- Patented presentation features to help keep students focused (visor, box) as well as a split-screen feature
- Robust software allows you to annotate, record video/audio and capture images
- Ability to view camera from multiple computers on the same network

AVerMedia

$723.18
CDWG 1403129

$643.38
CDWG 1313850

AVerMedia

AVerMedia® AVerVision 300af+

- Portable document camera with 3.2 megapixel image sensor for outstanding clarity
- Auto Focus with 16x zoom/pan (8X digital, 2X AVERZOOM™)
- Intuitive control panel and includes remote – excellent for classroom instruction

Promethean Activboard

- Super high quality projection surface minimizes unwanted glare
- "Talks" wirelessly with other Promethean products without requiring additional computer ports, receivers or drivers
- Comes with Activstudio® software for Mac or PC, along with thousands of resources and sample lessons

PROMETHEAN
IGNITING THE FLAME OF LEARNING

$1835.39
CDWG 1144420

$1892.25
CDWG 1305900

PolyVision

PolyVision TS 810

- Control and mark up any projected image using your finger or stylus
- Includes RM Easiteach® educational software with math, science, geography and language arts toolbars
- Available with the patented, calibration-free Lightning™ technology

We're there with the presentation solutions you need.

Updating projectors is a cost-effective way to bring classrooms to life. But sometimes, choosing the right technology can be a daunting task. That's why CDW•G has an experienced account team ready to help you make the right choice. So call CDW•G today, and find out how the latest technology can shed new light on the classroom.

CDW•G®

CDWG.com/k12education | 800.767.4239

The Right Technology. Right Away.®

"I envision a classroom where I walk in and can't find a teacher because they're sitting **next** to the students."

Todd Yarch, page **22**

"Many futurists predict that students of today will have seven or more totally different careers in their lives. Therefore, **lifelong learning will be required, not optional.**"

Ann Beheler, page **47**

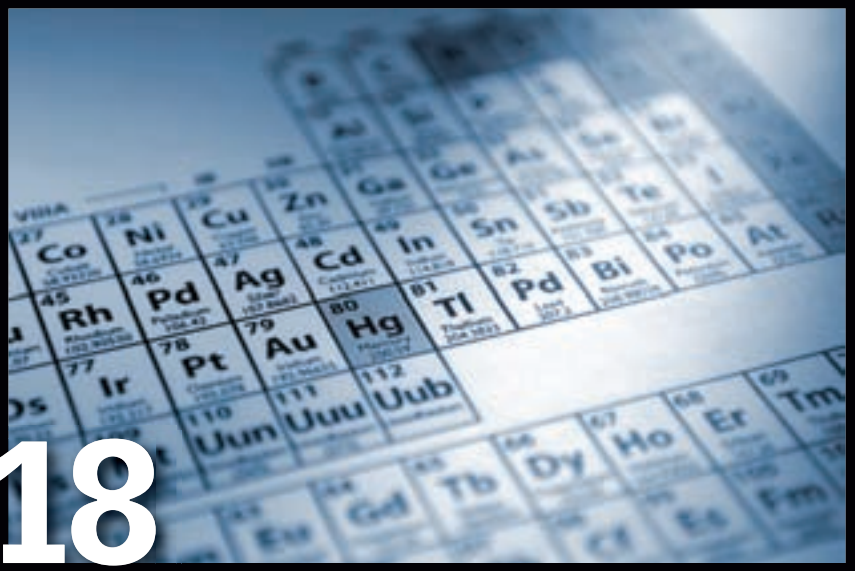
"We wanted to look at **emerging sciences** — things that are changing quickly and be able to respond to those changes quickly in teaching the classes."

Fred Miller, page **36**


"Everything will be **technologically operated**, from ordering food in the cafeteria to working on the final school project."
Michelle Hoang, page **42**
"Unreasonable people are often considered demanding or extreme. Perhaps they are, but they are the **entrepreneurs** — the ones who will make a difference."
Bernard Percy, page **50**

contents

SUMMER | 2008 Issue 3 | Vol. 3



features

online

Visit *Converge Online* for subscription information, news and events.

www.convergemag.com

WELCOME

TO THE FUTURE OF LEARNING

Inspire your students. Empower your teachers.

Houghton Mifflin Learning Technology provides market-leading pre-K to 12 solutions that combine quality instruction, assessment, curriculum management, and professional development. Join the ranks of educators and students who are working with us to invigorate learning and teaching in the 21st century.

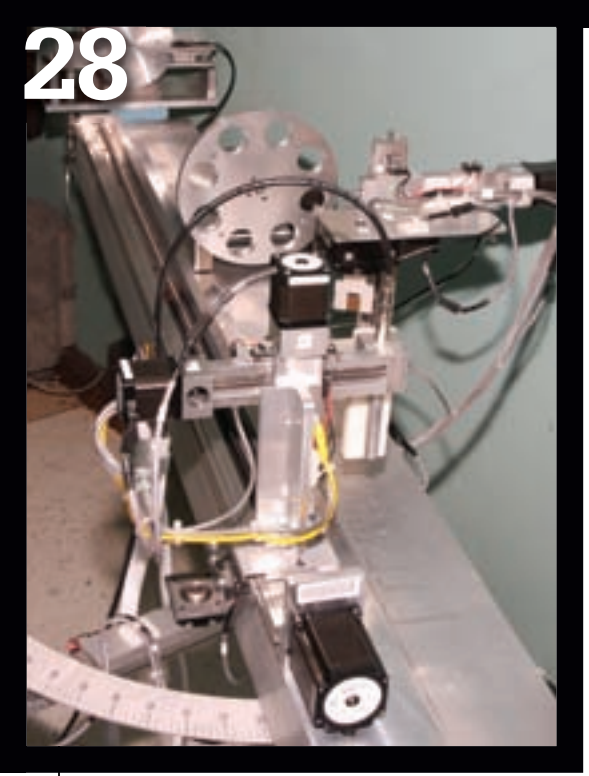
Visit www.hmlt.hmco.com or Call 1-888-242-6747

DESTINATION MATH | LEARNING VILLAGE | DESTINATION READING

earobics® | EDMARK | SkillsTutor

Pre-K – 12 Solutions

HOUGHTON MIFFLIN HARCOURT
Learning Technology



student
futurist

Michelle Hoang, a sophomore at Sheldon High School in Sacramento, Calif., explains the steps that need to be taken for the future of education.

departments

columns

MPC recommends Windows® for everyday computing.

FIELD TESTED. KID APPROVED.

Introducing the **MPC TXTbook**™

The Ultra Low-Cost Mobile Netbook for K-6

Built for small hands and eager minds, this innovative lightweight laptop features a child friendly design, Intel® Atom™ processor, wireless connectivity, and enough memory and storage to run interactive education programs and real world applications. MPC TXTbook opens a big world of learning in a small package.

intel® Atom™ inside™

VISIT **www.mpccorp.com/txtbook** CALL **888.224.4247**

100% U.S.-Based Service & Support

mpc® | PROFESSIONAL COMPUTING

contributors

Michelle Hoang
Michelle Hoang is a 15-year-old sophomore at Sheldon High School in Elk Grove, Calif. Striving to become an anesthesiologist, she loves science and works hard to fulfill her dreams. Her hobbies include playing with computers, hanging out with family, drawing and reading.

John C. Ittelson
Dr. Ittelson serves as director of Instructional Technologies for the K-20 California Educational Technology Collaborative. He is professor emeritus at CSU Monterey Bay, works for Verizon's Thinkfinity California Project, and serves on the board for the California Association of Supervision of Curriculum and Development.

Kahliah A. Laney
Kahliah Laney, a former staff writer and copy editor, holds bachelor's degrees in English and sociology from the University of California, Davis.

Ted Mero
A former daily newspaper reporter for the Lodi (Ca.) News-Sentinel, Mero recently moved to New York. He holds bachelor's degrees in journalism and English from Western Michigan University.

Jessica Renee Napier
A staff writer and copy editor, Napier recently graduated from San Diego State University with a bachelor's degree in journalism. She previously worked in Web production at KPBS Public Broadcasting.

Bernard Percy
Bernard Percy is a noted educator and communicator; from 1998 to 2003 he was co-founder and editor in chief of *Converge* magazine. Percy is the author of several books on education.

Julianne Sturdivant
Julianne Sturdivant is a writer living in Folsom, Calif. She's worked in the education services industry for many years and holds a master's degree in writing from the University of San Francisco.

Isa Kaftal Zimmerman
A senior fellow for the P-16 STEM Initiative in the Office of the President at the University of Massachusetts, Zimmerman has a joint appointment in the UMass Donahue Institute. She works with the UMass campuses and the various STEM stakeholders in the Commonwealth. She chairs the STEM Summit planning committee.

converge

Publisher: **LeiLani Cauthen** lcauthen@convergemag.com

Editorial
Editor in Chief: **Marina Leight** mleight@convergemag.com
Editor: **Jeana Graham** jgraham@convergemag.com
Copy Editor/Writer: **Kahliah Laney** klaney@convergemag.com
Copy Editor/Writer: **Jessica Renee Napier** jnapier@convergemag.com
Contributing Writers: **Michelle Hoang, John C. Ittelson, Ted Mero, Bernard Percy, Julianne Sturdivant, Isa Kaftal Zimmerman**

Design
Creative Director: **Kelly Martinelli** kmartinelli@convergemag.com
Senior Designer: **Crystal Hopson** chopson@convergemag.com
Graphic Designers: **Michelle Hamm** mhamm@convergemag.com
Joe Colombo jcolombo@convergemag.com
Illustrator: **Tom McKeith** tmckeith@convergemag.com
Production Director: **Stephan Widmaier** swidm@convergemag.com
Production Manager: **Joei Heart** jheart@convergemag.com

Publishing
Sr. Vice President, Research Services: **Mary Noel** mnoel@centerdigitalgov.com
Director of Operations: **Jeana Graham** jgraham@convergemag.com
Director of Events: **Diana Wilson** dpwilson@centerdigitaled.com
Circulation Director: **Gosia Ustaszewska** gustaszewska@erepublic.com

Sales
Western Region Manager: **LeiLani Cauthen** lcauthen@convergemag.com
Eastern Region Manager: **Kim Frame** kframe@convergemag.com
Event Sales: **Leesa Kelly** lkelly@convergemag.com

Corporate
CEO: **Dennis McKenna** dmckenna@erepublic.com
Executive VP: **Don Pearson** dpearson@erepublic.com
Executive VP: **Cathilea Robinett** crobinet@erepublic.com
CAO: **Lisa Bernard** lbernard@erepublic.com
CFO: **Paul Harney** pharney@erepublic.com
VP of Events: **Alan Cox** acox@erepublic.com

Converge is published by e.Republic, Inc.

Article submissions should be sent to the attention of the editor. Reprints of all articles in this issue and past issues are available (500 minimum). Please direct inquiries to the YGS Group: Attn. Erik Eberz at (800) 290-5460 ext. 150 or governmenttechnology@theygsgroup.com.

Subscription Information: Requests for subscriptions may be directed to Circulation Director by phone or fax to the numbers below. You can also subscribe online at www.convergemag.com.

100 Blue Ravine Road, Folsom CA 95630
916.932.1300 phone
916.932.1470 fax

A publication of e.Republic INCORPORATED

PRINTED IN THE USA

Does Anonymous Web Surfing Leave You in the Dark?

iPrism Web Filter Stops Anonymizers Cold

SC MAGAZINE ★★★★★ 2008

Anonymizers are emerging as the perfect way for people to avoid Web filters. They are also the perfect portal for dangerous malware, spyware, viruses and other Web-based threats to attack your networks. iPrism Web Filter sheds light on anonymous surfing with the ultimate in anonymizer threat protection:

- Real-time anonymizer updates
- Deep Packet Inspection
- Blocks SSL Spoofing
- Dynamic proxy detection
- Active Domain IP Address Mapping

iPrism h-Series Web Filter

STBERNARD

Sign Up For a Live Demo and Get a Cool T-Shirt

Visit www.stbernard.com/ShedLight or Call 800-782-3762

BY MARINA LEIGHT AND LEILANI CAUTHEN

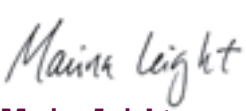
Changing the Rules of the Game

LATE LAST YEAR, our CEO wandered by my office and wanted to talk about STEM (science, technology, engineering and math) and frankly, we have been talking about it ever since. Our conversations have taken us to virtual visits of alternative energy facilities, manufacturing plants, the moon (the hot new real estate investment, in case you didn't know) and to greenhouses on Mars.

Over the past months, we have participated in numerous meetings about STEM and education, and I just don't get tired of the topic. We have been thinking about global sustainability issues and STEM's vital role in solving them. This top 10 list of life-changing breakthroughs is a veritable forecast for the next 20 to 30 years to come (thank you Susan Patrick for assembling it):

- Alternative energy
- Desalination
- Precision farming
- Biometrics
- Quantum computers
- Entertainment on demand
- Global access
- Virtual education or distance learning
- Nanotechnology
- Smart Robots

Here at the Center, we believe the STEM conversation is crucial for our schools and, based on a recent analysis of federal and state money being allocated to STEM projects, we know that leaders nationwide agree. Check out the incredible work of Massachusetts in this issue's STEM policy toolkit. We are thrilled that this was shared with *Converge*, and it is presented in the spirit of facilitating the conversation about how to "engineer" the future.



Marina Leight
Editor in Chief

LIFE IS THE ULTIMATE GAME, and each choice we make – schools, careers, moves – should bring us closer to winning. Everyone deserves a fair chance, and that's precisely what a good education should provide. Today, schools must remember that they are laying the social and intellectual foundations to win in life, and doing so includes preparing students for the myriad jobs they may take on in the future.

We all remember our first job. It wasn't who we were; it was a stop on the way to where we were going. It wasn't a *career*.

A career is a progressive series of achievements linked together by a lifelong calling or a long-term goal. In education, we should be considering both in the training of our youth.

I recently overheard someone from England say he liked America because it seemed that people were not defined by "what they do." He explained that in England, people become a specific profession – often for life – whereas Americans, at any given moment, could be something different.

It's true; we believe the game is not entirely set. We follow career paths that are uniquely our own. We are dentists who become entrepreneurs. We are sudden experts in sustainability. We are former financiers who took up teaching. We are office workers who volunteer in a number of other pursuits.

Here in *Converge*, we are challenging schools to train a workforce that will continue to be bold. We think that technology – and plenty of it – will be a major asset in this game.

Today's call-to-action for schools is a new consideration of the future coupled with what is uniquely American – that bold character that refuses to be completely defined.

LeiLani Cauthen
Publisher

Navigate

your way to success in the technology education market with Digital Education Navigator

INCREASE YOUR MARKET SHARE WITH DIGITAL EDUCATION NAVIGATOR'S FEATURES:

- Qualified Pre-RFPs
- Award Updates
- Qualified Bids
- Decision Making Contacts
- E-rate Opportunities
- Executive Teleconferences

TO LEARN MORE VISIT US AT WWW.CENTERDIGITALED.COM/TRIAL.PHP

See cars come to life! Watch the "Creating Cars" video on The Futures Channel — **www.thefutureschannel.com** — under Innovation.

Careers of the Future

"I want to be a teleport specialist when I grow up."

Doctor, lawyer, firefighter and pilot were hot picks of the past. Get ready for careers of the future. There will be people working in space, the virtual world and in spheres not yet imaginable.

Technology is expanding at a rapid rate, creating a demand for new professions. At the same time, occupations of the past are slowly — disappearing. No need for a check out clerk at the grocery store if a robot can do the job. It won't be necessary to design a home on Earth when architecture is moving to space.

Careers of the future will change how people communicate, learn and live. Some of these jobs are light-years away from creation, but for others, the future is now. Learn where you could be working.

BY JESSICA RENEE NAPIER
ILLUSTRATIONS BY TOM McKEITH

Alternative Vehicle Developer

This is the job that will make the vehicles from the cartoon show "The Jetsons" come to life. Cars will move at the speed of light and there will be highways in the sky.

Ford Motor Company is developing futuristic vehicles — now. The Ford Reflex, released in early 2006, is a car for the future: delivering 65 miles per gallon; made of synthetic and regenerated materials; equipped with safety belts integrated with inflatable bags to deploy during a collision; and using solar panels.

At the University of Northwestern Ohio, students can pursue a career as an alternative vehicle developer. They can study automotive technology, alternative fuels technology and motorsport education. These individuals will be the industry leaders responsible for inventing the latest and most efficient vehicles on the road — or one day, in the sky.

Explore planets! Watch the "Surface of Mars" video on The Futures Channel — www.thefutureschannel.com — under Living and Working in Space.

Biometric Identification Specialist

Think about the film "Minority Report" — Tom Cruise undergoes eye transplant surgery because he lives in a society that practices iris recognition. Since he's framed for murder, he's forced to find a new set of eyes because machines scan his iris, revealing his location to police.

Biometric identification specialists develop the technology to identify people based on an eye, palm or voice scan. This machinery is already used for Israeli border control to identify Palestinians who are issued ID cards that allow them to work in Israel. The ID card stores fingerprints, hand geometry and facial geometry.

West Virginia University offers a Bachelor of Science in biometric systems.

Data Miner

This career is the next step for a statistical analyst. Instead of only providing numbers, a data miner will examine numbers to forecast future events, explain business processes and create predictive models.

Data miners work on tasks such as multifactor dimensionality reduction — examining how independent variables interact to influence a dependent variable. Data miners will look at MDR to detect the correlation with attributes such as DNA-sequence, gender and smoking to the risk of developing certain diseases. Data miners also work for the government to map and target terrorist networks.

As data collection expands, companies and governments will need more people to interpret the statistics.

Experimental Petrologist

If humans should ever move to another planet, it will be thanks to the work of experimental petrologists. These individuals are studying rocks from other planets to learn about their formation and evolution.

Rocks, which come to Earth via meteorites, can show petrologists the age of the material and the type of atmospheric gas the stone was exposed to. Studies thus far have shown the potential for future human life on Mars.

Starting points for a career in experimental petrology include Arizona State University's School of Earth and Space Exploration and the School of Earth & Space Science at the University of California, Los Angeles.

Check out BigDog in action at www.bostondynamics.com

See it for yourself! Watch the space architecture video on The Futures Channel — www.thefutureschannel.com — under Living and Working in Space.

Robotics Engineer

These folks aren't in line to develop the next R2D2. Robotics engineers are creating robots — in some cases more efficient than humans — for medical, military, agricultural and mining purposes.

Careers are found in companies such as Boston Dynamics, specializing in robotic engineering and human simulation. Boston Dynamics has created BigDog, a quadruped robot capable of walking, running and climbing rough terrain. As part of a research project for the Department of Defense, BigDog can run 4 mph, climb 35 degree slopes and carry 340 pounds.

A good starting point for a career in robotics engineering is Carnegie Mellon University Robotics Institute, which researches and develops robot technology for industrial and government use.

Space Architect

Meet the team: 47 architects from 16 countries who design living environments — for space. These individuals came together at the 2002 World Space Congress to develop The Millennium Charter, a space architect's manifesto.

Imagine creating a house with no walls or ceilings in an atmosphere that is free of gravity. Without gravity, there isn't an indication of upside down or right-side up, giving you six floors — or ceilings.

A free-floating environment is just one of the factors that space architects at the Sasakawa International Center for Space Architecture consider. SICSA is part of the University of Houston's space architecture master's program.

Current projects at SICSA include a greenhouse on Mars, lunar outposts and space exploration vehicles. Students are given the opportunity to present such projects to NASA and some will end up working there after graduation.

Sustainability Coordinator

Research continues to reveal the effects of global warming, increasing the demand for sustainability coordinators. It's the jobs of these individuals to help meet the needs of the present generation without compromising the needs of future generations. Tasks would mainly focus on environmental care, but can include social and political needs as well.

Arizona State University offers graduate degrees, Bachelor of Arts and Bachelor of Science in sustainability. Students graduate with an expertise in environmental economics, ethics, earth-systems management and sociological issues.

The demand for sustainability coordinators has increased in the last decade. Such experts will find work at universities, governmental agencies, utilities organizations and consultancy groups.

Teleport Specialist

Weather Modification Police

See it for yourself! Watch the "Wind Business" video on The Futures Channel — www.thefutureschannel.com — under Environment.

Wind Farmer

Still a novel idea for some, careers in teleportation may soon be taking shape — with field specialists required. A teleport specialist will need to know how to work a machine that can analyze billions of atoms in a person's body and recreate the individual in another location.

For students interested in future careers in teleportation, it'll be helpful to have a background in quantum atom optics, the study of nature's interaction with light. Cutting-edge programs are the University of Queensland's Australian Research Center for Quantum Atom Optics and the University of Rochester's Department of Physics.

Research at the universities show that the atoms of a substance called Bose-Einstein condensate can be manipulated to act as one big particle when brought to low temperatures. This is the first step in devising a way to teleport atoms, which brings day one of a teleport specialist's career that much closer.

Arresting cloud bandits and controlling cloud theft will be the duties of weather modification police. The act of stealing clouds to create rain is already happening in some parts of the world, and it's altering weather patterns thousands of miles away.

Weather modification police will need to ensure that people who shoot rockets containing silver iodide into the air — a way to provoke rainfall from passing clouds — are licensed to do so. Villages in rural China have already taken to inducing pregnant rain clouds, resulting in more rain in certain areas than others.

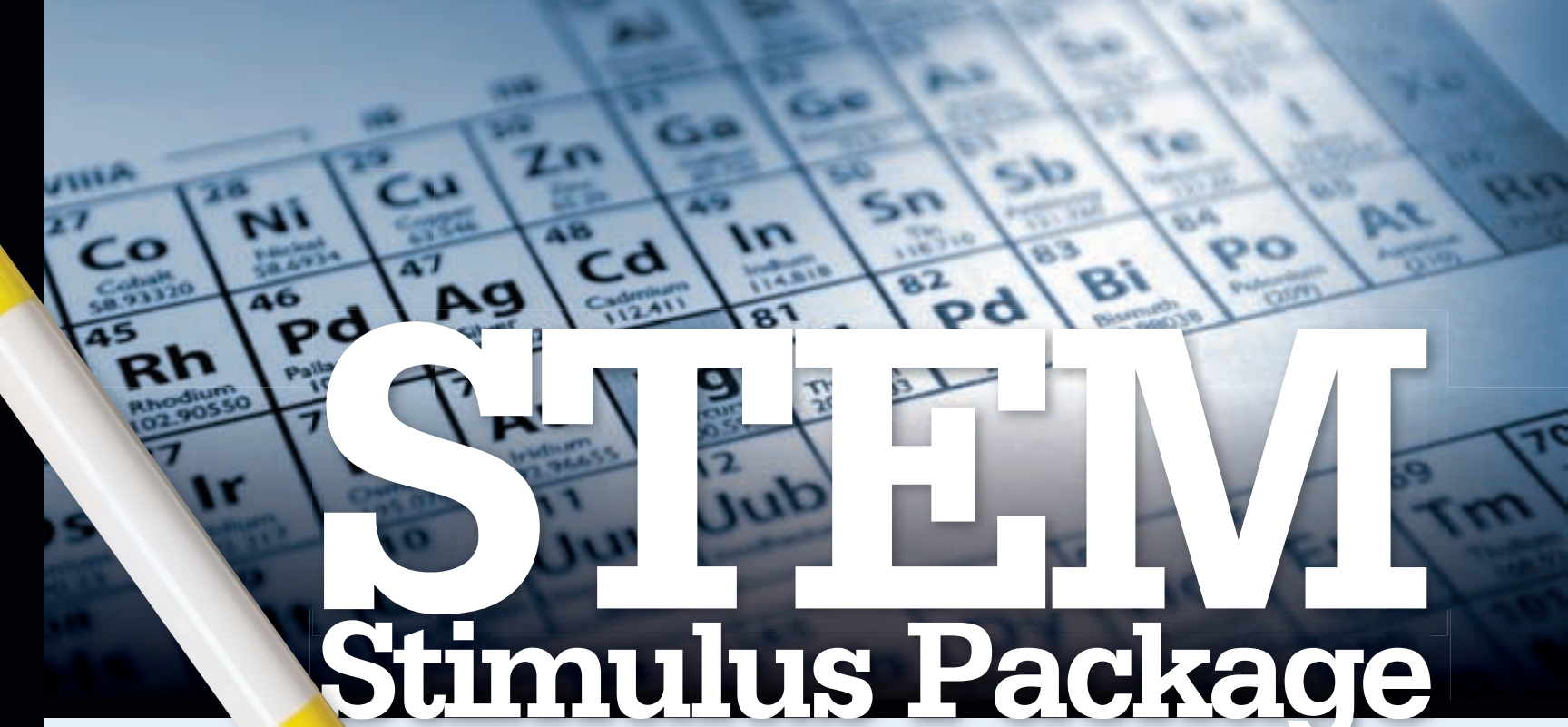
Individuals in this career will measure the level of iodine in the air to ensure that areas with abnormal quantities are abiding by weather modification laws. This career will be necessary to make sure no one monopolizes rainfall.

These are the people who bring you energy. They measure land areas, air speeds, turbine sizes and the pitch of the blades.

The Horizon Wind Energy Center uses nature's wind and turbines that stand 300 feet tall to create electricity. These wind farmers are experts in math and physics, using algebra, trigonometry and geometry at work every day. One wind farm could have 120 turbines, each buried nine feet into the ground at 52 feet in diameter, which will bring electricity to thousands of homes.

Iowa Lakes Community College offers a Wind Energy and Turbine Technology program for students interested in this expanding career field, as alternative energies climb in popularity and affordability.

Special thanks to The Futures Channel for contributing to this article.



STEM Stimulus Package

How to jump-start STEM in your state.

DEVELOPED BY ISA ZIMMERMAN AND MASSACHUSETTS STEM STAKEHOLDERS AND VOLUNTEERS

Along with the first American telegraph, the first basketball game and the first e-mail, Massachusetts was the first state in the union to hold a statewide STEM summit. It was 2004, following the U.S. Department of Education's National Summits on Mathematics and Science, when Massachusetts launched the nation's first summit on science, technology, engineering and math (STEM). The focus was to bring stakeholders together to define and discuss STEM issues in the Commonwealth and to pursue solutions.

The problems were clear: not enough students graduating with STEM backgrounds to fill the open positions in the marketplace; graduates choosing business rather than teaching; and fewer students indicating an interest in STEM careers.

At about the same time, the Massachusetts Legislature began investing in STEM workforce development through the Economic Stimulus Bill. This legislation was intended to improve education and preparation of students for the STEM pipeline and has provided more than $10 million for STEM programs.

While the programs have produced many ideas and engaged students, several people — especially those in the private sector — were frustrated with having to reiterate their needs and interests. Additionally, there was some repetition of initiatives, which meant that scarce resources were not used to their best advantage. Slowly, the notion emerged for a well-constructed, strategic plan. The plan would lay out an inventory and a comparison of actual resources versus needs, which would help focus the efforts of all the stakeholders in the Commonwealth.

In 2006, Jack Wilson, the president of the University of Massachusetts, himself a physicist, created a position to oversee STEM activities and a call went out at the fourth summit for volunteers interested in creating a state plan. Several networks were targeted to secure broad representation of the institutions and groups working on STEM.

Several face-to-face meetings, many e-mails and at least eight drafts resulted in an outline. This volunteer group identified all the elements needed in a state STEM plan.

However, a volunteer group with no affiliation does not have the authority to promulgate the development of a plan. So the next step was to go to the Department of Higher Education, where the Pipeline Fund resides, and which oversees the functioning of the Robert H. Goddard Council, an oversight

Part of the Economic Stimulus legislation was the **Pipeline Fund,** established for the following purposes:

- ✔ to increase the number of Massachusetts students who participate in programs that support careers in fields related to science, technology, engineering and mathematics (STEM);
- ✔ to increase the number of qualified STEM teachers; and
- ✔ to improve the STEM educational offerings available in public and private schools.

The Pipeline Fund allocates money to seven regional networks. The networks bring together key stakeholders — pre-kindergarten through higher education as well as businesses and community organizations — to collaboratively address regional education and workforce needs.

Source: Massachusetts Board of Higher Education www.mass.edu/forinstitutions/prek16/pipeline.asp

group mandated by the Economic Stimulus Bill. The council includes pre-kindergarten through higher education stakeholders, legislators and business representatives. The group proposed the development of a plan for Massachusetts based on the outline created by the volunteers.

The council agreed and approved a contract to hire an overseer for the process.

On Nov. 7, 2007, the Goddard Council approved the development of a state STEM plan with the nonprofit organization Education Development Center, Inc., overseeing the planning process. An advisory committee was convened and a process determined.

In May 2008, the Massachusetts Legislature re-established its STEM Caucus to contribute to the plan. This is an informal group led by a state representative and a senator, which brings together other legislators, educators and the business sector to resolve policy and financial supports for STEM in Massachusetts.

Next steps

The Education Development Center will interview key representatives of all the stakeholder groups while taking into account pre-existing materials and reports in order to avoid duplicating efforts. Then EDC will bring a proposal for the plan to the STEM Summit Planning Committee, which in turn will be discussed at the *MA STEM Summit V: Implementing the Plan* on Oct. 28, 2008.

During the summit, reactions and advice will be sought from stakeholders. This will mark the conclusion of the planning stage and will be step one in implementation.

Resources from the States

Massachusetts looked to the following state plans while developing its own:

Alabama: http://www.amsti.org

Connecticut: http://www.ctacad.org/files/2007KeepingCTCompetitive.pdf

Georgia: http://www.gaprism.org

Hawaii: http://www.hawaii.gov/dbedt/innovation

Kentucky: Kentucky's STEM task force recommended engaging business, industry and civic leaders to improve STEM education and skills in the Commonwealth and create incentives for Kentucky businesses that employ and invest in STEM-educated students. **http://cpe.ky.gov/news/reports/cpe_reports/stem.htm**

Minnesota's STEM Web site lets readers know that STEM is more than just math equations, lab reports and spreadsheets. It's about getting into subjects that can lead to exciting careers. **http://www.mn-stem.com**

Ohio: http://www.ohiostem.org

Rhode Island: Accountability for results in math and science has been assigned to the governor's new Statewide PK-16 Council. Through this structure, responsibility for and commitment to action will be shared among Rhode Island's educational and business leaders to ensure system improvement on each of the recommended strategies. **http://www.governor.ri.gov/documents/TEC_M&S_FA_LR.pdf**

Texas: http://www.tea.state.tx.us/ed_init/sec/thsp/tstem.html

Straight from the Plan Outline

The following is excerpted from the Massachusetts STEM plan outline.

Massachusetts STEM Education Goal and Objectives[1]

The goal of an integrated STEM strategy for Massachusetts is to increase by 35 percent the number of high school students preparing for and entering STEM careers by 2012, as measured by SAT indication of STEM career choices and college applications in STEM disciplines.

To achieve this goal, the following objectives should be met:

- ✔ Increase significantly the **number of students**, including females and culturally and linguistically diverse and underserved students, who are aware of, interested in, and motivated to study STEM from elementary school through higher education graduation.
- ✔ **Raise the level of STEM achievement** of all Massachusetts students, from elementary school through higher education, by 10 percent a year increase in performance as measured by a variety of methodologies and indicators of achievement, including MCAS, NAEP, TIMSS, and college course completion rates within the next five years.
- ✔ Increase, by 10 percent a year, the number of **qualified teachers** of STEM (pre-k – 16) who can provide solid STEM education for all students, through both teacher preparation and professional development, as measured by number of teachers licensed in STEM and hired to teach STEM subjects within the next five years.
- ✔ Increase, by 10 percent a year, the number of students entering as **STEM college majors** who then graduate in these fields.
- ✔ **Improve and provide equitable STEM instruction,** curriculum and programs from elementary school through higher education as indicated from an inventory to be prepared as part of the state plan.

[1]Based on the three goals articulated in the legislation that created the MA STEM Pipeline Fund (2003 Economic Stimulus Bill, c. 141 of the Acts of 2003 and refunded in 2006) and articulated at STEM Summits III and IV. The exact wording of the goal and objectives and the percentages of increase need to be determined.


C

This new Chicago high school is setting the trend for blended learning.

The Best of Both Worlds

BY TED MERO

The brick building at 231 North Pine Ave., on Chicago's West Side, was once a public high school with more than 3,000 students.

Serving a population in which nearly all of the student body was living under the poverty line, the Austin neighborhood school faced challenges – high drop-out rates, low academic performance and the constant threat of violence.

As a result, Austin High School was shut down at the end of the 2006-07 school year with a new vision in mind: smaller class sizes and more specialized learning.

As part of the city's 2010 Renaissance Project, the building was morphed into three separate schools – Austin Business and Entrepreneurship High School on the first floor; Austin Polytechnical Academy on the second; and VOISE (Virtual Opportunities Inside a School Environment) Academy on the third.

The latter program is the only one not yet open, but when it enters its first school year this fall, all eyes in the educational world will be watching. At VOISE, every student will be equipped with a laptop in the classroom and a refurbished desktop computer at home, giving the Austin students – and their families – access to technology most of them have never known. And with an entirely online curriculum, the students' progress can be tracked more easily, allowing them to learn at their own pace.

But the high school students won't spend all their time buried behind a computer, as each school day will be balanced with classroom discussions and group projects, providing the latest and most advanced blueprint for the blended learning – or hybrid – model.

The VOISE slogan touts the program as "the best of both worlds," combining the greatest elements of online and face-to-face learning.

"I think that's where the future of education is going," said Allison Powell, vice president for the North American Council of Online Learning. "This is a pilot to see if it works and how it works."

While computers in the classroom is hardly a new concept, never before has a school offered 24/7 online access to its students, whether it be in a low-income or high-income neighborhood.

Assistant Principal Tiffany Allison

PHOTOS PROVIDED BY TODD YARCH

Role Reversal

The halls may be somewhat empty Wednesday afternoons at VOISE. The students will only attend school for half the day, with the first two hours dedicated to tutoring. The rest of the morning will involve students teaming up in small groups to work on a school-wide project. For teachers, the afternoon will consist of training on the blended learning curriculum.

"It's pretty much one of a kind," said Dr. Sandi Atols, the founder of VOISE. "We feel that our blended model is probably going to take off and be replicated across the country."

In the meantime, the people at VOISE must work their way through the unknowns and inevitable kinks that coincide with first-year programs in order to set the tone for a revolutionary learning experience.

Welcome to VOISE

In some respects, VOISE will be like traditional high schools. There will be sports teams — the three schools in the building will pool their athletes together — and extracurricular activities, such as the refurbishing computers club.

For the students at VOISE, they'll have plenty of opportunities to shape and mold what programs exist. That's presumably part of what made the school so attractive to the parents of the 275 students who applied. (Only 150 to 175 students — all freshman — will be accepted the first year. Administrators plan to expand the student body to 600 within four years.)

"(We'll provide) just about anything the kids would want to do," Atols said. "If there wasn't a team, we'd let the kids start a team. Our 'After School Matters' program is going to provide different activities. We'll survey parents and kids in the community to see what they'd like to do."

During the school day, however, the schedule will be strict. Students will begin the day with the equivalent to homeroom, picking up their wireless-enabled laptops and getting situated for a full slate of block classes. English class, for example, will last 100 minutes, with half the time devoted to individualized work on the computer and the other half centered on class discussions and group work.

Throw out the textbooks

Whenever a new school opens, it receives startup money for everything — furniture to textbooks. In the case of VOISE, that textbook money is all going toward the computers. In fact, the computers are actually cheaper than the books.

"It would cost more to buy textbooks for math and English than it would to put a desktop in every students' home," VOISE principal Todd Yarch said. "Textbooks, which a good chunk of the kids would lose or forget."

Yarch said there will be textbooks in the classroom for reference, but why have the students lug heavy, overpriced books when they could pull an entire book's contents off the Internet?

While VOISE is saving money from not buying textbooks or constructing computer labs, financial resources will likely remain an issue as the school expands. The teachers are still in the early stages of working to get Internet access to every student's home, whether that involves writing grants or striking a deal with cable and Internet giant Comcast.

"This is our teachers' time to be teachers," VOISE principal Todd Yarch said. "To do some things that you would get in a good, traditional classroom. Project-based things, like full class discussions and small group discussions. I envision a classroom where I walk in and can't find a teacher because they're sitting next to the students."

During the block sessions, teachers and students will also be able to take advantage of interactive white boards, on which they can project any student's laptop for the entire class to see. They'll even be able to save and print what is written on the white board.

After lunch, students will be granted a half-hour of free time to check e-mail, meet with teachers or hold a student council meeting. Yarch feels this will help ebb the students' temptation to goof around on their laptops when they are supposed to be doing schoolwork.

> "We feel that our blended model is probably going to take off and be replicated across the country."
>
> **Dr. Sandi Atols**, founder of VOISE

"The reason why kids play around on the computer is because we don't ever give them the time to do things they want to do or because we're always hogging them," Yarch said. "I just think if we give them the time to go to ESPN.com or shop, that they'll be more focused the rest of the day."

HP recommends Windows Vista® Business.

THE BIGGEST IDEA IN 1:1 COMPUTING IS SMALL.

HP 2133 Mini-Note PC
Genuine Windows Vista® Business[1]
$599

Introducing the HP 2133 Mini-Note PC, a new notebook designed just for 1:1 computing programs and the students who use them. It's scaled way down in size and weight, but it's huge in features—including a 92% full-size QWERTY keyboard, a generous 8.9" diagonal screen and wireless capability.[2] It has more of what you need and less of what you don't—like a hefty price tag.

1-800-88-TEACH | hp.com/go/K12mag22 | Visit your local reseller

Skyline of Chicago, Illinois

Chicago Public Schools:

Renaissance 2010 Background and History

In 1997, the Illinois General Assembly approved 45 charter schools for the state of Illinois, including 15 for Chicago.

In 2003, 15 additional charters were approved for Chicago. These innovative schools produced gains in student achievement, increased demand and strong parent satisfaction. This set the stage for Renaissance 2010, an initiative designed to create more high quality educational options across Chicago.

In June 2004, Mayor Richard Daley launched Renaissance 2010, a bold initiative with the goal of increasing the number of high quality educational options in communities across Chicago by 2010. New schools are created through a competitive, community-based selection process that establishes a set of high standards to which every new school will be held accountable.

In 2005, Chicago Public Schools opened the first cohort of Renaissance 2010 schools.

Source: Chicago Public Schools

There will also be a limit to what students can do online, as the Chicago Public Schools firewall is a strong one.

Along with designated computer time, VOISE students will have designated time for project work. In the school's first year, the initial school-wide project, developed in conjunction with Northwestern University, will take a look at the positive and negative effects of hosting an event such as the Olympics or World Fair. Chicago is one of four finalists for the 2016 Summer Olympics.

This project will allow students to take a closer look at their community, while also interacting with peers.

On Wednesday afternoons, when the students have gone home for the day, the teachers will become pupils. With the VOISE model so new and unique, teachers will spend this time in professional development training to further understand the curriculum they are teaching.

Learning, not teaching

With Apex handling a bulk of the teaching load, teachers may feel as if machines are taking over their jobs. And, to some degree, that's true. In the VOISE program, teachers will be more like facilitators than instructors. And while that may not sound appealing to many in the profession, the teachers at VOISE believe it will benefit the students more than, as Atols puts it, "a sage on the stage."

"To just stand up and impart knowledge doesn't work," Atols said. "We want students to be as active in their own learning as possible."

This project will allow students to take a closer look at their community, while also interacting with peers.

That curriculum is primarily drawn from Apex Learning, a Seattle-based organization that specializes in differentiated learning. The digital curriculum addresses different learning styles and provides multiple instructional representations that incorporate audio, video, graphics, images and animations.

This should make the learning process easier on the Austin students, many of whom will enter high school at the third- or fifth-grade reading level. Ultimately, though, VOISE must fall in line with the standards of Chicago Public Schools, gearing students for the ACT, as well as state and college-readiness standards.

That's a big reason why Atols and Yarch looked to hire teachers at VOISE who previously taught special education or worked as coaches.

"You knew they had to build relationships and bond with individual students – not just teaching content," Yarch said. "They have a little bit more invested in kids. You want to have some place where bonds are built. And we have teachers now personalizing with the students not just in their academics, but their social and emotional side as well."

Instead of making the advanced students wait for the others to catch up – or making the struggling students stay after class – the VOISE program will cater to each student's particular needs. And Yarch said that's exactly how it should be.

"Especially in low-income communities, kids don't have time to do a whole lot of extra things," Yarch said. "We should be taking it upon ourselves to help bring them up. I think using the online curriculum is really what's going to allow students to be comfortable with where they're at."

An opportunity for every student

When Atols originally came up with the idea for VOISE, she envisioned a school made up of high-level students. She felt their advanced knowledge and general familiarity with technology would make them a natural fit for the program.

It didn't take long for her to discover that the model would better serve students behind the learning curve.

School Solutions Enhance Performance and Increase Efficiency

It's no secret school administrators are facing increased accountability in ensuring students are meeting federally mandated guidelines in learning. To do this, schools must find ways to efficiently collect and evaluate student data to customize learning for 21st century students. How do schools meet these challenges while overcoming their two biggest obstacles: time and money?

Samsung recognizes this need in education by introducing a new line of educational electronic processes that increase efficiency and decrease spending. From streamlining the paper-heavy process of testing and grading to multi-function devices that can print, scan, fax and copy, Samsung has solutions for the school environment.

Grading Solution:

No longer will schools have to pay for pre-printed tests and scanners, or waste valuable time waiting for test scores. With the Grading Solution, teachers can create a test template and bar-coded answer sheet, and obtain individualized scores and statistics for each student within minutes. Data-driven results can be fed into a Student Information System, allowing schools to identify learning gaps and help students become proficient before end-of-the-year standardized tests.

Special Education Software:

Individual education programs have traditionally been a cumbersome process involving an assortment of supplemental information such as medical documents, counseling reports, court orders and home communications. Samsung's special education software allows all of the required information to be stored in one electronic document that can be updated or modified as needed.

Needs Assessment Program:

Often schools are not correctly equipped with the right products and solutions for efficiency. Through Samsung's Needs Assessment Program, a school may request an evaluation of its document management infrastructure, to provide a roadmap for improvement that can include a reduction in hardware and consolidation to a standardized and more efficient setup. Cost savings for schools that participate in this program may average 20 to 30 percent.

Multi-function Products:

Reducing hardware and offering a consolidated workspace with Samsung's multi-function products saves time, money and space. Now, high-quality color or monochrome copies, scans, faxes and prints can all be made on one machine. These products provide cost savings on office supplies and multiple machine service calls, as well as saving countless trips to print or copy shops.

In a time of shrinking education budgets and growing academic performance demands, Samsung has made it a priority to provide multi-faceted solutions that will help make the business of running a school more efficient and less expensive.

SAMSUNG

A study conducted by the **Educause Center for Applied Research** showed that blended learning reduced institutional costs by **25 to 50 percent**. Additionally, university withdrawal rates were lower for students who **participated in blended learning** than face-to-face and fully online courses.

"We realized it's a perfect model for students who are behind," Atols said. "Instead of a factory model where the students are lock-step with the teacher, we really believe students will be more engaged with this program. We expect there will be better attendance, less dropouts and higher graduation rates."

Not that it wouldn't work for more successful students, too, Atols said. She just believes the VOISE program can provide a greater need for those struggling to stay on track.

And one of the advantages to having a technology-based curriculum is that it better prepares the students for the college level. In more affluent areas, attending college is the norm. In Austin, it's the exception.

But at VOISE, each student will be expected to attend college. One of the school's requirements will be that each senior apply to at least one college.

"They're not leaving without getting accepted to at least one school, but it doesn't fall on them," Yarch said. "That's something that we're going to make sure of. It could be a trade school, it could be a college, but they're going to have somewhere to go in September after they graduate."

While applying to college may be a novel concept for many in the Austin neighborhood, the students at VOISE will have a leg up. With a laptop in every student's hands, the campus will already resemble a college campus in many ways, and that's the environment the staff at VOISE is trying to promote.

And with the fixed goal of advancing to college in sight, Atols believes that will further motivate the students.

"I think that expectation is going to make a big difference," she said.

The future of blended learning

What happens when a laptop breaks? Or when the network goes down? Or when the teachers struggle to adjust to such a dramatically different learning environment?

With a laptop in every student's hands, the campus will already resemble a college campus.

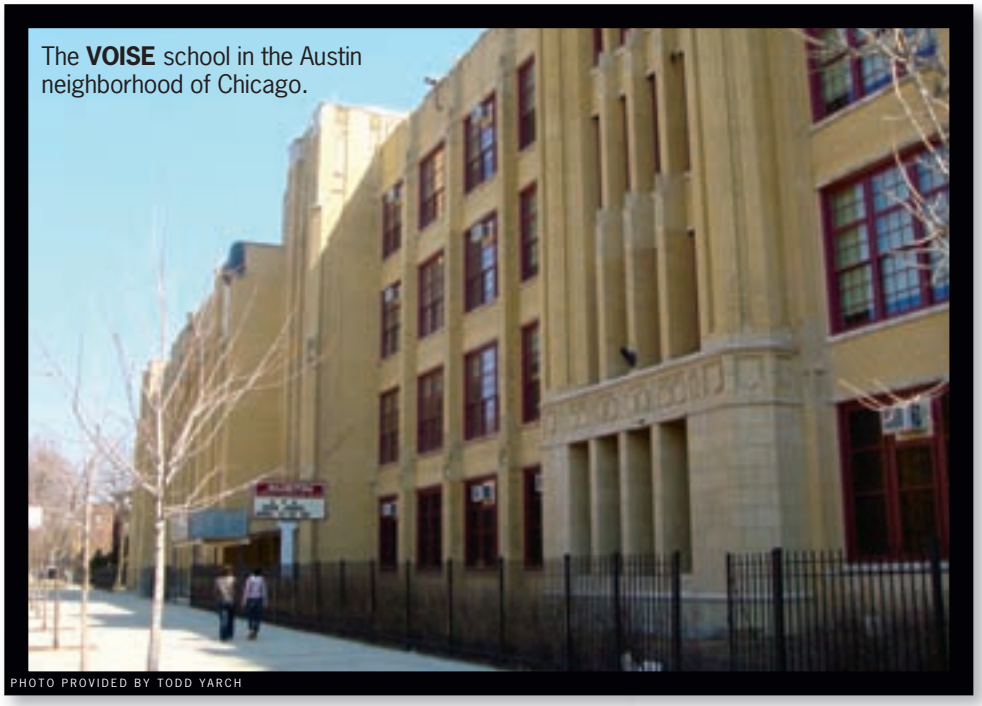
Those are just a few of the concerns of Yarch, who realizes the first year of the school will be a learning process for everyone. He also knows the successes and failures of VOISE may dictate how future schools create similar programs.

According to NACOL, data suggests that 10 percent of high school courses will be taught online within six years, and by 2019, about 50 percent will be delivered online. This trend began with virtual charter schools and distance learning programs – students study via the Internet, but away from the classroom – though neither can offer the human interaction that the blended learning model affords.

And that is why it's so critical for VOISE to set the example for the rest of the learning world.

"We feel it's so important to be part of something that's revolutionary in the way we're teaching," Yarch said. "I don't even think any of us can even think about what it's going to look like when 150 kids have laptops. The kids probably won't even know it's for real until the day that they have them."

It's for real, all right. And it's coming soon.



The **VOISE** school in the Austin neighborhood of Chicago.

PHOTO PROVIDED BY TODD YARCH

Virtual School Symposium 2008
October 26 – 28 in Phoenix, Arizona

"Bridging the Gap through Online Learning"

The Virtual School Symposium (VSS)

brings together representatives from national, state, district, private and other virtual school programs to attend the industry's leading event in K-12 online learning. The VSS conference provides important analysis, interactive sessions and thought-provoking workshops for leaders looking to help shape the future of education.

Online courses increase academic opportunities for students, including:

- Providing Advanced Placement (AP) classes not offered at their schools;
- Offering credit recovery to meet graduation requirements;
- Enabling coursework to be completed virtually for students with illnesses, physical or geographical limitations, or disabilities;
- Teaching technology and literacy skills for the 21st Century.

Conference goals:

Show how online learning closes the gaps for students who need additional or advanced courses not offered at their school, need to retake courses for graduation, or need increased access to high-quality academic opportunities;

Provide professional development in K-12 online learning;

Distribute research, case studies and data about what works in online learning;

Share best practices on plans, policies, standards and evaluation of virtual education;

Facilitate interaction, networking, and collaboration between virtual school practitioners and experts in the field;

Determine strategies for improving mainstream education to ensure every student graduates with a world-class diploma to prepare them for college or beyond.

www.virtualschoolsymposium.org

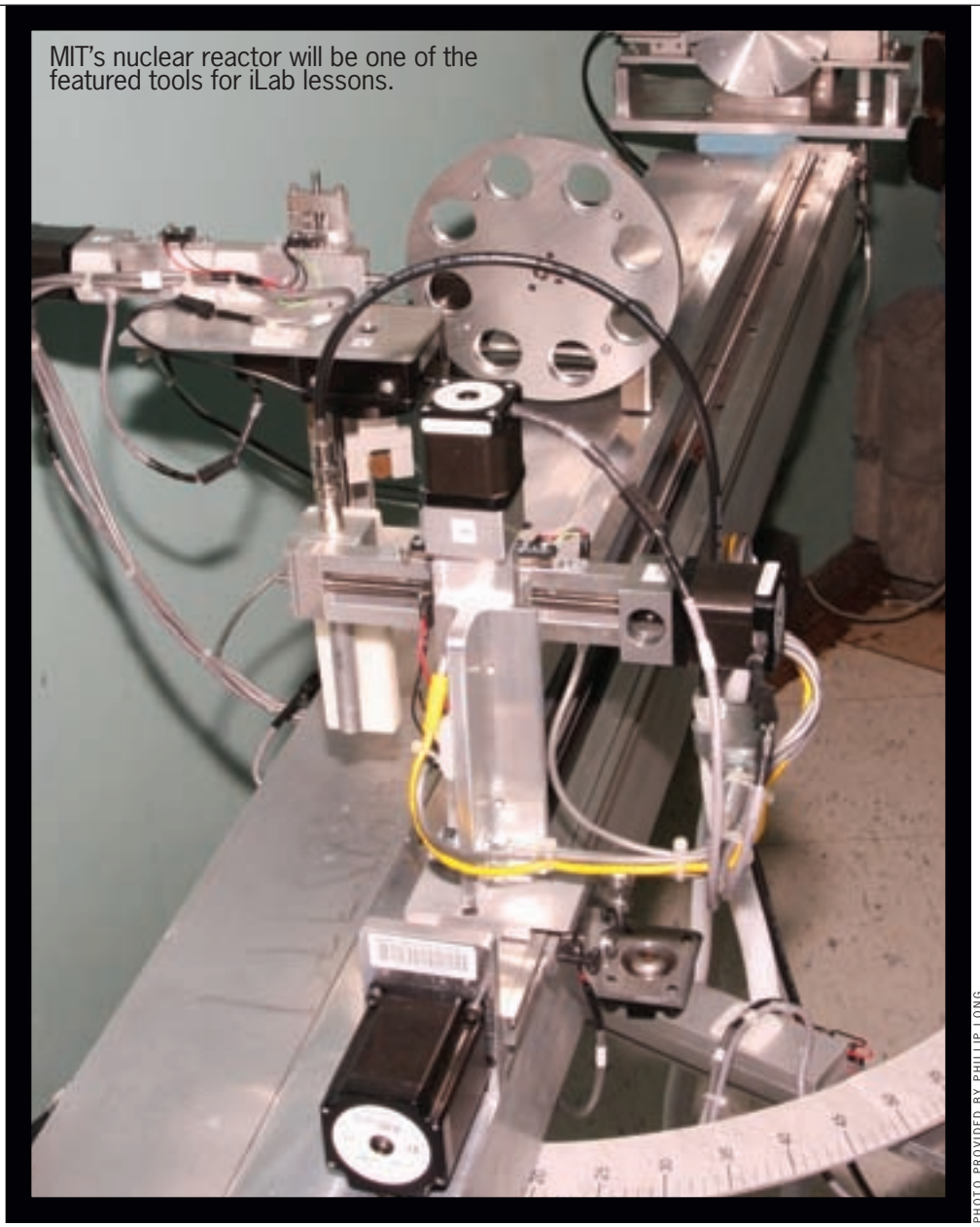
NACOL
North American Council for Online Learning

www.nacol.org

BY KAHLIAH A. LANEY

Science Labs of the Future

Beakers and hot plates and test tubes, oh my! The staples of the high school science lab will soon be available in the library or the café — they're going digital.



MIT's nuclear reactor will be one of the featured tools for iLab lessons.

PHOTO PROVIDED BY PHILLIP LONG

For some MIT undergrads, the science lab is anywhere they want it to be. Through an online science laboratory, or iLab, students can remotely access lab materials and devices via the Web. Pretty soon, select high schools will also have this option.

And options are just what Kemi Jona, a research associate professor of Learning Sciences and Computer Science at Northwestern University, wanted to bring to K-12 science. Jona thought the iLab would give K-12 science teachers lab alternatives. So Northwestern University and MIT developed the iLab Network Project to bring this resource to K-12, starting with high schools.

The iLab connects lab devices, such as microscopes and signal analyzers, to the Web. This allows teachers and students to access equipment remotely. These are not simulations – but actual devices. The tracked data is real, so if sensors aren't calibrated properly, they won't read correctly.

> The project, which kicked off June 9, will receive an estimated $1 million from the National Science Foundation over the course of two years to develop and implement iLabs.

"The idea is to connect actual laboratory equipment to the Web so that you can access it remotely," Jona said. "You don't actually have to be in the room touching the equipment to use it."

This project will give students contact with equipment otherwise inaccessible due to costs, time restraints and safety concerns.

Nuclear reactor lesson

MIT has recently added a neutron beam experiment to the iLab network, using a nuclear reactor to conduct the test.

"There's a beam of neutrons that comes out of a reactor and you can put different materials into the beam and see what happens to the neutrons, how it scatters and absorbs these neutrons," Jona said.

Students can find out how many neutrons are absorbed into materials – such as copper and polyethylene. And to make an already cutting-edge experiment more engaging, a webcam can be attached to the nuclear reactor so students can see the device in motion as they receive data.

Jona added that this experiment is a great way to learn about the properties of different materials, which is already a main component to high school science curriculum.

Science class face-lift

With access to these types of experiments, the entire learning process could change.

"It could be a game changer ... allowing them to do labs and experiments in their classes that they could never dream of doing," Jona said.

However, in order for iLabs to affect any change, it must be classroom friendly and easy for teachers to integrate within existing curriculum requirements.

"We'd like to bring teachers into our project as members of the team ... at least one physics teacher, one chemistry teacher and one biology teacher," Jona said. "Possibly more, but at least one expert in each of those areas to help us do the mapping."

The teachers will aid in identifying how to make the site understandable and accessible to high school students as well as how to integrate iLabs into curriculum.

In regard to integrating the project into the traditional lab environment, Jona posed the question: "How does the way that we conduct labs in high school change for the better because we have this new flexibility?"

Jona said that the iLab team was looking to answer this question and how the project can change the nature of science teaching at the high school level.

"What we want to do with our teachers is begin this sort of re-envisioning process," he said.

As part of this science class face-lift, teachers will have access to tools that give them flexibility in the types of experiments they conduct in class. They will no longer have to stick to experiments bound by the availability of standard equipment. They will be able to shop for labs and equipment as if they're shopping on eBay, which is exactly how Jona envisions the iLab site.

You can get it on iLab

Jona envisions the future of iLab as a portal where "buyers" and "sellers" come together to find and share labs and lab equipment.

"It's like an educational marketplace rather than a commercial marketplace," he said. "That one site where you want to go and find a device to use, a laboratory device, and it will help you find it, no matter what university it is at or where in the world it's at."

This marketplace won't be open for business until spring of 2009 when 20 to 30 schools will participate in the iLab pilot project. The participants will be virtual, specialty and public schools from the Chicago area. The iLab could be particularly beneficial to virtual schools that don't have the same lab access as traditional schools.

"It's a perfect fit for them," Jona said.

In addition to preparing to launch the pilot program, MIT and Northwestern are trying to expand their partnership. In the fall, the universities will host, with the Museum of Science and Industry, a visioning workshop in Chicago – to bring science museums and national labs in on the project.

"They could also potentially be places that purchase expensive equipment and make it available to their community," Jona said. "We really want to engage with them and ask them to think about how this changes the nature of what science museums do and how they think about their role."

Most importantly, the iLab project could change the role of the student to one of a more scientifically motivated and engaged participant in this science lab of the future. ◉

Meet Sparky

Other digital tools that are making an impact on future science labs include the Pasco SPARK Science Learning System.

The SPARK:

- Uses sensors and probes connected to a handheld computer to collect, analyze and assess data
- Creates charts and graphs from experiments as they occur, displaying them on the touch-screen
- Has preloaded, teacher-designed content that integrates data collection, analysis and student response
- Includes real-time visualizations of measurements made inside and outside of the lab

Some of the labs include:

- Measuring the energy change of melting ice
- Measuring the intensity of light
- Tracking wind speed, the temperature and humidity

To learn more about the SPARK Science Learning Lab System visit: http://www.pasco.com/home.cfm

Scoping things out

Another science lab transformation may come in variations of the fragile yet bulky microscopes of old.

One version, the ProScope HR, is a digital, handheld microscope. The ProScope works by a touch view system — meaning students touch the lens to whatever they want to examine and then view the magnified version on a computer. The microscope can be connected to a laptop or desktop by USB port.

For more information on the ProScope HR visit: http://www.proscopehr.com/index.html

Innovate Your Budget

Entrepreneurial Skills for Schools

U.S. SCHOOLS were once able to confidently map the course to technology funds. With federally run programs such as Enhancing Education through Technology and E-Rate, schools were not looking to change course.

But they are now facing more hurdles than ever before. The constant drive toward new technology and the needed sustainability of these systems is coupling with the push back of funding professional development and change.

The once well-worn path toward funding has grown rocky, causing schools to sometimes come up empty-handed. For these schools, the time has come to veer off the beaten path.

School administrators must start thinking like a business — or, more accurately, like entrepreneurs. Entrepreneurs do not wait for money to come to them; they seek it out. The best entrepreneurs are those who creatively find ways to fund their projects.

As most schools are accustomed to applying for government grants, it will be a challenge for school administrators to know where to seek unique sources of funding. For this, they can look to the **Entrepreneurial Compass** (see figure). The compass consists of four overarching ideas, with four additional points, drawing on these themes and supplying more specific suggestions for consideration.

Entrepreneur's checklist:

- ✓ A good **idea**
- ✓ **Validation** of the good idea
- ✓ Business **plan**
- ✓ **Funding**
- ✓ **Measuring** results and managing improvement
- ✓ **Promoting** project's successes
- ✓ Sustainability — **planning** for the future viability of the project

North: Outside of Government Options

Northeast — Reach out to vendors and organizations that have not traditionally been funders

Some great examples are organizations such as the Bill and Melinda Gates Foundation, Web sites such as DonorsChoose.org and online auctions. The Gates Foundation says it looks for programs that produce measurable results, and catalyze increased scale and sustainability of change. In order to successfully receive funding from large organizations, it is most important to stand out in the proposal process.

DonorsChoose.org is a Web site that allows teachers to submit proposals, provided they include four types of information: what the materials are needed for, how much funding is needed, the location of their school and what percentage of their students are from low-income homes. Former Sen. Bill Bradley coined this "citizen philanthropy" because it allows even a $10 donation from a single person to make an impact.

Online auctions allow funds to be collected 24/7 — and online donors are shown to give up to 50 percent more than those who do not give online. Some examples of online auction Web sites are Auctionpay.com and cMarket, Inc. With the latter, the Brooklyn Academy of Music in Brooklyn, N.Y., has raised $165,000.

East: Optimizing Budgets

Southeast — Reallocate existing budgets and shift resources from funds that are no longer required

School administrators can gain access to funds by cutting expenditures that use unnecessary dollars. An example of this is software upgrades. Every computer in a school needs software, and this software requires continuous upgrades. Schools can start looking at solutions to increase efficiency and reduce costs, such as application streaming, which is a way to share software among users.

A major expense for many schools is textbook purchasing. To open the door for new technology, schools can begin to look online for digital textbooks, free lesson plans and professional development tips for teachers.

Schools can also redefine needs by deciding which tools are a necessity for student learning and which are superfluous. A great example is the market explosion of laptops geared toward the youngest generation of learners. These computers provide what is essential for students, thereby reducing the cost — about one-third that of a traditional laptop. The XO laptop, Intel-powered Classmate PC, NOVA and Asus Eee PC cost $250 to $600.

South: Public-Private Partnerships

Southwest – Donations from large corporations

Affinity credit cards — cards where companies donate a percentage of the amount charged by the consumer — can be a good funding

opportunity for schools. Some companies that provide this are Amazon and Target. Target's "Take Charge of Education" program allows card users to choose a K-12 school, and 1 percent of the charges on the card go directly to the school. As of March 2008, Target had donated $229 million to schools through this program.

Donations from corporations are a great way for schools to receive direct funding (i.e., no trickle-down effect). Adobe's Youth Voices program awards $25,000 to $40,000 grants and will donate software up to $10,000. In 2006-2007, Intel Corporation donated $700,000 to Sacramento-area schools and 70,000 employee hours. Matching employee volunteer hours is a new trend for corporations.

What does a venture capitalist look for in a business?

Team: The most important factor is not the business itself; it's the people. The intelligence, trust, track record and cohesiveness of the team can cinch the deal.

How to apply: Administrators should develop relationships with possible investors and make sure they are not just another school name on a piece of paper.

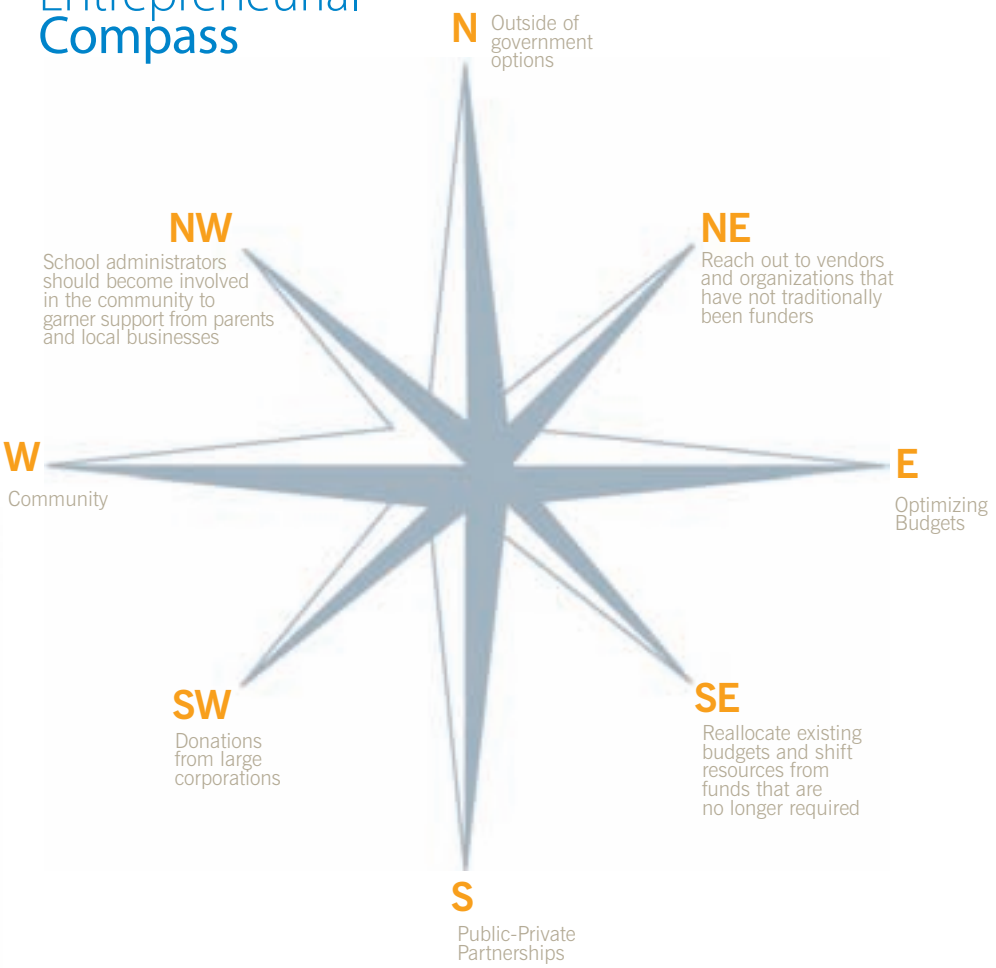
"Unfair advantage": Venture capitalists want startups that propose a unique business approach or technology that will protect it from competitive attack.

How to apply: Schools need programs that go above and beyond. They must be MORE efficient and MORE adaptable to change.

Hot market sector: Venture capitalists look for startups that are in a market poised for explosive growth.

How to apply: Make sure your program is sustainable and can be implemented again and again to benefit the educational system as a whole.

Entrepreneurial Compass



West: Community

Northwest – School administrators should become involved in the community to garner support from parents and local businesses

Money doesn't just come from multimillion dollar corporations. Lots of relatively small sources can make a huge impact. Just ask Barack Obama, who was propelled to a presidential nomination partly because of his ability to raise large amounts of money from small donations made by millions of people. A school's greatest resource can be the community that surrounds it. Parents want their children to receive a quality education as much as school administrators.

In addition, local businesses may not be able to provide hundreds of computers, but they can help in other areas that will free funds for technology. Free construction services or supply donations can go a long way to cut down school costs.

http://www.gatesfoundation.org/ForGrantSeekers/, http://www.donorschoose.org/homepage/main.html, Pew Internet & American Life Project, November, 2005, Converge magazine. Winter 2008. "Bridge Over Technology Water."

SMART Technologies
1-800-42-SMART (1-800-427-7628)
education@smarttech.com

SMART Technologies Inc.

BY JOHN ITTELSON, PH.D.

Know Your ePortfolio

A new wave of ePortfolio interest has educators wondering: What can they do for my school? Experienced in all things ePortfolio, Dr. Ittelson enlightens us.

In the world of Flickr, Twitter, LinkedIn, wikis and blogs, establishing and maintaining your digital identity is daunting. Even more challenging is establishing and maintaining one's educational identity. Luckily, ePortfolio tools, systems and processing are helping individuals establish their formal identities.

The early days

Electronic portfolios, ePortfolios, are not a new phenomenon. But with technological advances and improved functionality, they are having positive impacts on education and have potential for use by a wider group.

Since the middle to late '90s, I have been an ardent follower and supporter of ePortfolio technology and pedagogy, attending and presenting at numerous conferences about ePortfolios across the country. I have also worked closely with educators on the adoption and implementation of ePortfolios inside the California State University system and within the relatively new K-20 California Education Technology Collaborative (K20CETC), comprised of California educators from K-12 and higher education. K20CETC's mission is to support highly effective, innovative, network-enabled teaching and learning opportunities.

In 2005, one of Educause's learning initiatives was ePortfolios. At that time, George Lorenzo, editor of Educational Pathways, and I published a series of reports about ePortfolios. We looked at and interviewed many of the early adopters of ePortfolio systems and wrote some basic perspectives about the various ePortfolio types, features and functions that were prevalent at that time. The conversations about ePortfolios were, and still are in many respects, about how to collect student artifacts, provide a space for both student and teacher reflection, encourage sharing and learning, develop valid rubrics to discover what students are learning and possibly obtain some solid data that could help inform improvements at the individual, course, program and institutional levels.

Phase two of ePortfolios

Historically, the popularity of, and discussions about ePortfolios have always vacillated from warm to hot. Right now, they are blistering. While the majority of ePortfolio implementation has occurred in colleges of education, the change happening today places ePortfolios within a much wider swath of departments, units and institutional missions and goals.

This spring, two ePortfolio conferences sold out to record audiences – one hosted by LaGuardia Community College and another hosted by Eastern Connecticut State

The Grandmother of ePortfolios

Helen C. Barrett, the self-described "grandmother of ePortfolios," has always been a strong advocate of using common software and Web 2.0 tools — such as Microsoft Office, blogs, wikis and Web page editors — for building ePortfolios. In addition to finding Barrett's point of view on software and Web 2.0 tools, her Web site — **www.electronicportfolios.org** — is a great place for valuable information.

The change happening today places ePortfolios within a much wider swath of departments, units and institutional missions and goals.

University. Summer conferences on the topic are the ePortfolio Conference 2008 at St. Jerome's University in Waterloo, Canada. Also, at the Campus Technology 2008 conference there will be a session, The Next Generation ePortfolio — chaired by Trent Batson, with Helen Barrett, Eddie Maloney and myself as panelists.

It is also important to note that since 2003, the Inter/National Coalition for Electronic Portfolio Research has convened 40 cohorts of researchers and practitioners to study the impact of ePortfolios on student learning and educational outcomes. Each year, 10 institutions, selected through an application process, constitute a three-year cohort. Each campus or system works on an individual project that asks: "What learning is taking place as a function of ePortfolios and what evidence supports this conclusion?"

For instance, at George Mason University, educators examined the thinking processes of education graduate students as they created and reflected on building their ePortfolios. They found that while students initially had some technical difficulties and frustrations, they eventually moved to purposeful activities that showed evidence of using higher order critical-thinking skills.

The popularity of ePortfolios is not limited to North America. In Europe, for instance, there's the European Institute for E-Learning, a professional association whose activities and publications focus extensively on ePortfolios.

Additionally, the Joint Information Systems Committee, comprised of senior managers, academics and technology experts in the UK, supports a project called "eReturn" to develop a pilot, demonstrating the use of ePortfolios to support cross-institutional delivery of lifelong learning. The UK's Open University is the lead partner on eReturn.

ePortfolios for assessment, teaching and learning

The conversations about ePortfolios are embedded inside three broad camps: ePortfolios for assessment, accreditation and institutional reporting purposes; ePortfolios for teaching and learning; and ePortfolios for employment and career development. The terminology, features and functions that are growing around these camps can make things seem a bit more complex than what one might expect.

For example, some of the vendors of ePortfolios have changed their business models, adding new products and services and calling themselves providers of assessment management systems or accreditation management systems. That seems to be where the market is at this time. This trend started in 2000 when the National Council for Accreditation of Teacher Education (NCATE) established that teacher education units must have an assessment system that collects and analyzes data on the applicant's qualifications, candidate and graduate performance and unit operations to evaluate and improve the unit and its programs. ePortfolio technology and pedagogy were the natural fit to help meet this NCATE standard, and by 2003 the ePortfolio business experienced significant gains.

The general message today is that these companies have enhanced and further developed their systems, primarily through pilot programs with institutions across the country, to make institutional reporting and accreditation easier.

Along with this growth, additional terms and notions have become more prevalent within the ePortfolio lexicon and its capabilities, including learning outcomes assessment and management, performance-based measures and risk retention, among others. And of course, let's not forget about rubrics. One of the drivers behind the success of an ePortfolio-based assessment system is contingent upon building strong rubrics and getting faculty and students to understand and use them effectively.

On the teaching and learning side, ePortfolio software is touted as being easy for students and faculty to use for a variety of interesting engagements, most recently for the facilitation of Web 2.0-oriented, community-building formal and personal learning environments. The idea is that students and faculty can enhance and modernize learning from more active online interactions, sharing and reflecting through Web 2.0 applications and tools, such as blogs and wikis, all residing within ePortfo-

Lorenzo's Web site

For information about ePortfolios and assessment management systems, see George Lorenzo's latest Web site — **www.edpath.com/ep.htm**. Lorenzo, who has been writing about ePortfolios since 2002, has put together an excellent online resource with an extensive number of links to institutional samples of ePortfolios, vendors, articles, papers and organizations. He has also been writing in-depth case studies about the major players in this field and publishing them inside his online newsletter, Educational Pathways.Check out Lorenzo's site for announcements about upcoming ePortfolio events. In the works are online events that will feature how ePortfolios are being implemented on campuses for the purpose of creating a successful culture of performance-based assessment.

lios. This is the basis of the next generation of ePortfolios, where the latest in digital technologies work interactively with these applications, helping to advance knowledge and individual creativity in interesting and engaging ways.

The decision-making process

In short, when considering the implications of ePortfolios from the two primary sides – assessment and learning – the technology directors and academic decision-makers are faced with more options than they may realize. So, what do they really need to know before buying into anything?

First, an overarching question that is growing louder is: How can you find a middle ground between assessment for course, program and institutional improvement and the practice of effective, creative teaching and learning environments? Also, when considering the implications of Web 2.0, it could be concluded that buying into one ePortfolio application is not enough. Students today use Flickr for sharing photos, Facebook and MySpace for social networking, YouTube for watching and sharing videos, wikis and blogs for publishing what's on their minds – and the list goes on. So far, there is not one ePortfolio system that provides all these things, along with assessment and accreditation management features and functions.

Perhaps the most important rule when considering ePortfolio and assessment system adoption is: Don't buy until you have really done a thorough analysis of what you need. Some institutions, have been forced to step back from their initial investments in ePortfolio software. Why? They were not adequately informed about what they really wanted and needed, nor did they realize how much time and effort it realistically takes to implement an ePortfolio and assessment system.

Putting it to work

Any ePortfolio and assessment system implementation process requires a good deal of planning and organizational management. The discussions have an opportunity to be meaningful and exciting since ePortfolio technology focuses on what students know from the time they start their education up until they receive diplomas.

Some implementation challenges, which mostly are not about the technology, include:

- how to train faculty and students to use ePortfolio software;
- how you want to utilize the ePortfolio, such as for assessing learning outcomes and gathering data for analysis and reporting, for career-oriented repositories or for communicating, sharing and reflecting within a teaching and learning environment;
- coming up with clear steps and recording mechanisms for ultimately getting an across-campus adoption rate;
- developing authentic and valid assessments;
- developing effective rubrics;
- establishing clear and consistent terminology and rating systems for assessments and rubrics;
- figuring out what kind of data-gathering mechanisms will inform teaching and learning as well as meet accreditation standards and institutional reporting requests;
- keeping faculty on board for the long term; and
- maintaining an overall systematic approach for the utilization of ePortfolio and assessment tools.

ePortfolio technology focuses on what students know from the time they start their education up until they receive diplomas.

The early adopters of ePortfolio and assessment systems who overcame such challenges and successfully brought about positive change to students, courses, programs or across institutions did not achieve results overnight or in six months. In fact, it typically takes two to three years – at minimum – to fully implement a successful ePortfolio and assessment system in a college.

A Californian strategy

Many of these success stories can be found in California. The statewide CalStateTEACH – a teacher preparation program through the California State University system – has successfully implemented an ePortfolio system, dating back to early 2000, as part of its teacher credentialing process, using

TaskStream's Learning Achievement and Accountability Manager System tools.

At San Francisco State University (SFSU), project managers Ruth Cox and Kevin Kelly have built a program geared toward improving ePortfolio development processes by building campus-wide knowledge of ePortfolio use within SFSU and its broader CSU community through research, collaboration, experimentation and sharing.

In recognition of their work on ePortfolios and assessment, SFSU and the College of San Mateo are identified as leadership campuses in the Valid Assessment of Learning in Undergraduate Education project with the American Association of Colleges and Universities.

Also, one of the earliest developers of ePortfolios, California Lutheran University, has successfully been using a homegrown, Web-based ePortfolio and assessment system, called Webfolio, since 2003 inside its School of Education.

At K20CETC we are working on a promising ePortfolio pilot that we hope will lead to a larger statewide plan. As part of the pilot phase, K20CETC is partnering with eFolio Minnesota to build and deploy eFolio California.

The eFolio Minnesota effort is a multimedia ePortfolio system that is available for free to all Minnesota students and residents. eFolio Minnesota is a product of the Minnesota State Colleges and Universities system and a visible commitment to support lifelong learning throughout the state.

The effort currently boasts more than 80,000 users who typically utilize the service to build an online showcase of their education, career and personal achievements. A joint effort between MnSCU and the CSU system – the largest public higher education system in the U.S. – could easily result in a statewide adoption rate that could exceed Minnesota's 80,000 users and could generate interesting data, given California's diversity.

In addition to this statewide initiative, K20CETC plans to work with the Epsilen Environment, a social-networking oriented ePortfolio system that came out of the Purdue School of Engineering and Technology at Indiana University-Purdue University, Indianapolis. The New York Times recently became an equity and strategic partner in Epsilen, launching the *New York Times* Knowledge Network. We are planning to work with Epsilen for California institutions that might want to choose that resource.

We will also look at how to leverage the work of those companies that have successfully implemented ePortfolio and assessment systems at a wide variety of institutions within the state. Those companies include Chalk & Wire, Digication, LiveText, TaskStream and course management system providers who have built-in ePortfolio systems, such as Angel Learning, Blackboard, eCollege and Desire2Learn. Essentially, we are looking at whatever trends can be considered the next phase of ePortfolio development.

Fulfilling a purpose

Overall, we see ePortfolios as fulfilling a greater need for individuals to be able to document and share their professional accomplishments in ways that are richer than an educational transcript.

The potential is great. An ePortfolio and assessment system applied across large segments of institutions, such as the CSU system or the California Community College system, can positively affect the lives of students, teachers and future employers.

I look forward to the day where an individual's ePortfolio becomes the credit bureau for his or her academic and professional achievements. The current trends bode well for making this a reality.

ePortfolio Resources

Educause Learning Initiative Resources, **"White Papers: E-Portfolio Series."** http://www.educause.edu/ELIResources/10220

K-20 California Education Technology Collaborative http://www.k20cetc.org

"ePortfolio Conference 2008," St. Jerome University in the University of Waterloo, http://www.sju.ca/eportfolio.html

The International Coalition for Electronic Portfolio Research, http://ncepr.org/index.html

To see abstracts, reports and presentations from the cohorts, visit http://ncepr.org/members.html

The European Institute for E-Learning, http://www.eife-l.org

San Francisco State University, **"ePortfolio: Academic Technology SF State,"** http://eportfolio.sfsu.edu/index.php

eFolio Minnesota, http://www.efoliominnesota.com/

Epsilen Environment, www.epsilen.com

***The New York Times* Knowledge Network**, http://www.nytimes.whsites.net/knowledgenetwork/index.html

MERLOT ePOrtfolio Portal, http://eportfolio.merlot.org/

John Ittelson, Ph.D.: *Dr. Ittelson serves as the director of Instructional Technologies for the K-20 California Educational Technology Collaborative (K20CETC). The mission of K20CETC is to support highly effective, innovative, network-enabled teaching and learning opportunities.*

Cutting-Edge Science

BY JESSICA RENEE NAPIER

STUDENTS HAVE ALWAYS had the opportunity to take science classes such as biology, physics and chemistry. Some of these courses are required for graduation at certain high schools. However, how do students prepare for careers in specialized sciences such as forensics and epidemiology?

These occupations are expected to grow 36 percent and 34 percent, respectively, by 2014. Without the tools for such labs in traditional high schools, an alternative is necessary. One company is raising the learning curve by introducing an online science module with niche topics for students interested in specialized scientific material.

The National Network of Digital Schools (NNDS) distributes Cutting Edge Science courses, a product of Lincoln Interactive curriculum. These science courses include biotechnology, epidemiology, forensics, emerging genetics, sports medicine and stem cell research.

A demand for science

Since technology advancements are occurring on a daily basis, NNDS has incorporated the latest science innovations into online courses through Lincoln Interactive. In addition to Cutting Edge Science and general science classes, Lincoln Interactive provides online education to more than 50 schools across the country.

"We wanted to look at emerging sciences – things that are changing quickly and be able to respond to those changes quickly in teaching the classes," said Fred Miller, communications coordinator at NNDS. "They picked out some of the things that I like to think of as 'ripped from the headlines.' We have all of the standard stuff, but we also have these exciting new things."

NNDS is hoping to grab the attention of students who think they may want a career in a niche field such as sports medicine, said Bryan Bown, director of educational services for NNDS. Since most traditional schools are unable to provide such curriculum, Lincoln Interactive can give students the options to learn such material.

"They'll be able to see if they actually enjoy the course or that's something they do want to move forward to once they do get to college," Bown said.

This fall is the first semester that Cutting Edge Science classes will be offered in high schools.

Online education

When NNDS began providing online curriculum in 2005, it was originally with one school, Pennsylvania Cyber Charter School. Today, Lincoln Interactive courses – including the Cutting Edge Science classes – are available internationally to public school districts, charter schools, parochial schools and cyber schools.

"Because we are providing curriculum to a lot of students, we can justify the expense of developing this curriculum for a large market," Miller said. "Whereas a single school district, how many kids would they have who want to take stem cell research? One or two kids. But in a cyber school with 7,500 students, we're going to have a fair number of students in a class like that. The way that the cyber school works makes it perfect for this small niche kind of class that a traditional school cannot afford to offer."

Traditional high schools may offer Cutting Edge Science classes for credit as a supplemental course since most schools don't have the resources for a stem cell research or biotechnology course. Cyber charter schools supply these courses as elective material.

"We have other school districts that use Lincoln Interactive classes because they realize it's an advantage for their students to be able to take these other classes that they don't offer," Miller said.

Although the online tools are not the same as brick-and-mortar science labs, Bown said that students are receiving a rigorous education. While taking a Cutting Edge Science course, students utilize homemade videos, discussion forums, PowerPoint presentations and Micromedia Flash experiments.

"They can see what they did right and what they did wrong, but they can't actually touch and feel," Bown said. "We're not here to take over – we're here to enhance the curriculum for any school."

Students who want to take a Cutting Edge Science course for high school credit must attend a school that offers the material to students. Otherwise, students can pay to take a course for leisure.

"Many schools don't have these specific courses out there, so it draws that student in — that highly motivated student who may be interested in moving on in a career."

Bryan Bown, director of educational services for the National Network of Digital Schools

Cutting Edge Science

Lincoln Interactive is rolling out six new classes this fall, all subjects on the forefront of science. Courses in biotechnology, epidemiology, forensics, emerging genetics, sports medicine and stem cell research expose students to scientific advancements that are happening in the real world. These lessons are for high school students who have already completed one year of biology.

Cutting Edge Science classes consist of 20 lessons over nine weeks of learning modules. A typical semester course is worth .5 credits for the duration of 18 weeks. But the new science courses are shorter, giving students the option not to take a full semester of science if it's not the appropriate subject for them.

"Those students who are really interested in these top-notch cutting-edge sciences that are in the news today, they can take a nine-week course, and if they feel, 'Oh, it's not for me to take,' then they haven't wasted a whole year in taking a specific course," Bown said.

The biotechnology course shows students how technology and biology are used in agriculture, food science and medicine. The epidemiology module touches on subjects such as biological sampling, survey research and geographic information systems. In the forensics course, students will learn to do research that most people only ever watch on CSI. The emerging genetics module exposes students to genetics concepts and cloning. As a part of the sports medicine class, students will learn how to diagnose, treat and prevent sports injuries. And the stem cell research module will teach students about the development of the human body.

The six Cutting Edge Science courses include: biotechnology, epidemiology, forensics, emerging genetics, sports medicine and stem cell research.

"We're hoping to get these courses out to all students who are interested," Bown said. "Many schools don't have these specific courses out there, so it draws that student in – that highly motivated student who may be interested in moving on in a career."

Keeping it cutting edge

Not only are students given the resources that meet the latest technology standards,

they're also using consumable text books. These are books that the students get to keep, so they can write in them, make notes and refer back to the information after completing the course.

"We've gone through a textbook company called Quantum to write our books," Bown said. "And they've gone out to the specific areas across the country to gain people who are really in-depth with the research to actually write the books."

Additionally, Lincoln Interactive curriculum is audited by The University of Pittsburgh's Tri-State Area School Study Council in order to ensure the rigor and quality of course content. Bown said that the courses go through a three-tiered endorsement process: the Council makes suggestions for improvement; the courses are launched after alterations are made according to suggestions; and parents, students and teachers provide feedback and courses are revamped again.

Not only are the courses tested in three tiers, but Lincoln Interactive courses are designed to teach in three tiers. Each lesson will encompass key concepts, reinforcement and enrichment. The key concepts will cover the main components of the lesson, using PowerPoint presentations, the textbook and animated Web sites. The reinforcement part is additional activities and curriculum to help students memorize the key concepts. And the enrichment component is additional information that reaches beyond the course for students who want to learn supplemental, non-required material.

"The people who have seen this curriculum are just blown away by it because this is great stuff," Miller said.

North Hills High School

Until the Cutting Edge Science courses are rolled out this fall, only seven students have had the chance to take advantage of Lincoln Interactive's newest offerings. North Hills High School, a traditional high school in Pittsburgh, Pa., conducted a pilot program last spring, recruiting a few students to take the stem cell research course.

Jerry White, science department curriculum leader and gifted education specialist at the high school, said that the students were given the option to include the class on their transcript since these individuals were already enrolled in a full schedule.

> "Because we are providing curriculum to a lot of students, we can justify the expense of developing this curriculum for a large market."
>
> **Fred Miller**, communications coordinator at the National Network of Digital Schools

The dollar signs

NNDS was set up as a charitable foundation to provide management services and curriculum in an online forum. However, sustaining academic excellence comes with a price tag.

"Nobody wanted to make a profit on this," Miller said. "We wanted to put a profit back in the community, back into the organizations and the people. The way that the funding works in Pennsylvania is the money follows the kid from the school district."

There isn't a standard cost for online education, and the payment system isn't simple. It varies from state to state and within school districts. For the Cutting Edge Science example, NNDS charges $225 plus materials per student for one semester course. Cutting Edge Science classes cost $150 since they are nine-week courses. But, individuals typically don't pay NNDS – schools do. So, if a traditional school wanted to provide one Lincoln Interactive class to five students, the school district would pay $1,125 to NNDS.

"They liked the fact that there are no specific due dates," White said. "The only condition is that they finish the course within one year of when they're enrolled in it. They can do the course when they have time for it and there aren't any hard and fast due dates."

NHHS chose to participate in the pilot program because a former student-teacher at the school is the online stem cell research teacher. Principal Patrick Mannarino said the school will offer all six Cutting Edge Science classes this fall because of the success with the stem cell research course.

"We're trying to create as many opportunities for our students as we can," he said. "I think the program is successful because we have people like Jerry who are going to work with our kids. He's going to guide them and that's what makes the kids be successful because they have a mentor in the school."

However, no matter the amount of students given the opportunity to take – and pass – these courses, White said that without the laboratory component, the online classes are the "second best option." The problem is enrolling more students and finding a teacher to implement a new class. Until a greater interest for these science classes exists, White said the curriculum is comparable.

"It is a nice supplement for those areas where we do have some students who are interested but not a critical mass," he said. "It's a nice opportunity for students to explore their interest when we don't have a comparable offering. I think a hybrid is really nice."

As occupations in fields such as forensics and epidemiology continue to grow, more opportunities for learners must be brought from cutting edge to center stage.

This year, for the first time ever, DELC will host a workshop to create a TECHNOLOGY BILL OF RIGHTS. This document will advocate for technology equality and access for our youth as part of our nation's education system.

Be part of this revolution!

Digital Education Leadership Convention

DELC

THE CONVENTION

EDUCATION | TECHNOLOGY | LEADERSHIP

December 11-12

Renaissance Hollywood, Hollywood, CA

For more information please contact:
Anthony Yanez, Registration Coordinator
800.940.6039 ext. 1348
lyanez@centerdigitaled.com

CENTER FOR DIGITAL EDUCATION

Coming soon!
edIT, a handbook on infrastructure in a K-12 learning environment, brought to you by **Intel.**

Building an Education Infrastructure

"Through technology in schools, a new approach of 'networked education' must be implemented to 'go beyond bandwidth,' addressing fundamental issues such as equitable access and closing the achievement gap."

– Education Commission of the States Report

Infrastructure: Imperative

A new class is entering school systems across America and the message is clear: Educators must be ready.

True digital natives, students entering U.S. classrooms have never known life without computers and cell phones and the mobility that goes with them. Their experience – along with growing competition in a global world and increasing standards for student achievement – requires overhauls of aging education systems that take into consideration wireless connections, podcasting, virtual fieldtrips, social networking and more bandwidth, just to name a few. With changes of this magnitude, it's imperative for educators to understand the steps to implementation – the first being infrastructure.

It's Time to Change the Story

A resource for educators wanting to move forward, edIT explains both the tools students need to enhance 21st-century skills and the applications the administration needs to effectively measure and increase student achievement while managing their schools and districts. Accompanying this first-of-its-kind handbook is a companion book, which demystifies technology through pictures, diagrams and a glossary of terms. School leaders now have a toolkit to explain the complicated but necessary backend systems, giving administrators a complete picture of what will become the new educational process.

Sharing in Success

The edIT guide gives specific examples at the end of each chapter of technologically pioneering districts with names of CIOs, technology coordinators and teachers to contact, opening up an opportunity for a dialogue on how others can learn from their successes. These case stories can provide answers to those questions sure to arise: "How did you do it?" "What results have you seen?" And, of course, "How much did it cost and how did you get the money?"

To reserve your copy of edIT,

contact Jeana Graham at jgraham@centerdigitaled.com or call 916-932-1406.

Intel believes that education is the key to a productive future. That's why Intel has invested over one billion dollars and Intel employees have invested over two million hours to improve education in over 50 countries.

www.k12blueprint.com
www.intel.com/education

BY MICHELLE HOANG

Student Info
Name: Michelle Hoang
School: Sheldon High School, Sacramento, Calif.
Grade: Sophomore
Age: 15

Making Society a Success

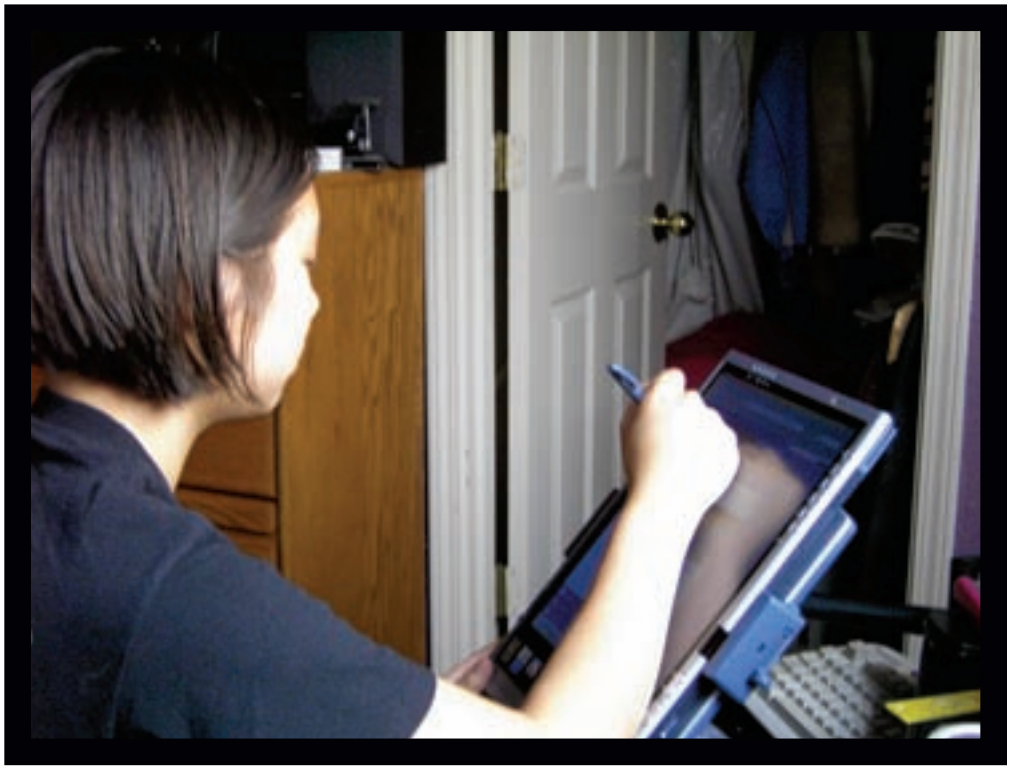
Education today, in traditional schools, may very well be outdated. Not that I doubt the ability of my teachers, nor the ability of the school system, but I find that most of what we learn, outside of English and language arts classes, isn't used in real life. My school, like most other public schools, is adequately funded, provides decent classrooms, gives teachers decent pay and graduates students that simply turn out decent.

That is the bane of our society. Too many students are unmotivated to work further, and in this society, where education may very well be one of the only keys to success, this can be a deadly situation. As long as the teachers find the work decent, and as long as the student "succeeds," everything is hunky-dory, right?

No, that's not right. Why should everything be "good" when it has the potential to be "great"? Too many students are unmotivated to work, believing that they have time to get their act together in a few years or during college. They don't realize their folly until they drop out of college, bumming the streets, looking for quick cash.

Although I love my school, it is a prime example. There are few students motivated to work hard and earn good grades. I hope that somewhere, sometime soon, those who aren't trying will suddenly turn themselves around and go the right direction because life doesn't wait. They don't know how little time they have until there's none left.

Looking at my peers, I see many that have great potential, but they waste it away for lack of interest.



PHOTOS PROVIDED BY MICHELLE HOANG

The future of education

In 50 years, maybe even in 30 years, at the rate our technological advances are progressing, I'd like to believe public schools are funded for students to become more than decent – to be excellent, over-achieving and most of all, motivated. Education has become one of the most important components to success, and no doubt, it will continue to have a very high priority as the world advances, changing according to the available technology.

Students will be issued a personal laptop notebook, programmed with a global positioning system, in case it is lost or stolen, for use throughout their high school career.

What is needed most is universal education, so that even children in the poorest countries can receive formal education. Everyone has aspirations and dreams, but not everyone has the means to get there, which is exactly why we need to spread education worldwide, to aid these dreamers in their hopeful endeavors. Even if improving the quality of education takes years, it will still help the scholars in developing countries flourish and bloom.

Once the worldwide education standard has been established, schools may branch off in structure and organization, but every system will be more or less similar to a base system. Everything will be technologically operated, from ordering food in the cafeteria to working on the final school project. As it is with the traditional school system, students will still go to a classroom and learn from a teacher, but many differences will be made.

Students will be issued a personal laptop notebook, programmed with a global positioning system, in case it is lost or stolen, for use throughout their high school career. The laptop will be networked to a main server, which holds information about the school, the student and the student's assignments. The main server will hold digital copies of textbooks, assignments, school events and other information that the student needs to know.

Everyone has aspirations and dreams, but not everyone has the means to get there, which is exactly why we need to spread education worldwide.

In order to notify students about assignments and projects, e-mail and other methods of contact will be extremely important. It will be crucial for students to check their e-mail constantly in order to stay informed. With this method, even if students are absent, they can complete their assignments and submit them to the server for credit.

Although technology will be important, course material will have a higher priority. Unlike the current curriculum, in which students learn relatively useless information in relation to real life, assignments and projects will be geared toward modern society in order for students to connect lessons in a way that will help them survive life after school.

Information must be taught in alignment with how students learn. Too many students can't solve problems simply because of the way the teacher presents them. In the future, if a student is struggling with their work, if assignments are confusing, and if their scores are low on a quiz, then automatically, their laptop notebooks will present the information in a different format, and it will continue to do so until the student understands the material. Collective understanding must be achieved in order for education to reach equilibrium.

Even though it is possible for students to do schoolwork at home, it is not the optimal situation. After all, where will students learn to build healthy relationships with other people? Without contact with other people, where will social connections be created? How will students connect with each other and work together if they never meet? Attending physical school, though tedious and seemingly unnecessary, is an important aspect for the social health of the community. If an entire generation is created without face-to-face interaction, society will suffer.

Students will be separated in the classrooms according to their abilities, dreams and personalities, so they will mingle with similar students, creating a more efficient and friendly method of learning. Of course, during classroom breaks, all students are able to interact, but inside the classroom, those with similar abilities help each other grow toward their common goals — similar to a real-world work environment. Students who wish to follow the same field of work will cooperate with each other and finish projects more efficiently because they are aspiring toward similar goals.

These steps, no matter how simple they may sound, will ensure greatness in classrooms. Schools will no longer be associated with a distasteful groan, but instead with delight and eagerness. They will be pristine buildings, well respected within the communities and among the students — making society a success.

Steps for Educational Success

- Implementing universal education to assist scholars in developing countries.
- Standardizing personal laptops for each student.
- Creating servers that hold digital textbooks, assignments and school schedules.
- Designing a communication policy with the ability for teachers, students and parents to stay connected.
- Choosing curriculum that mirrors real-life circumstances.
- Giving students multiple formats to learn material.
- Grouping students into niche classes to encourage educational stimulation.

legislative landscape: STEM Programs

COMPILED BY KAHLIAH LANEY

There is no shortage of jobs in the fields of science, technology, engineering and math (STEM). In fact, while overall U.S. unemployment is rising, STEM industries are looking for qualified applicants. A 2008 study by the Interagency Aerospace Revitalization Task Force concluded that lack of U.S. students with strong skills in STEM subjects — added to a retiring aerospace workforce — could equal a catastrophic shortage of skilled workers.

To combat this dilemma, legislatures are drafting initiatives to stimulate STEM. Read on to see how governments plan to link STEM with the workforce of tomorrow.

State	The Legislation
Nationwide	**Bill:** House Resolution 6104, Enhancing Science, Technology, Engineering and Mathematics Education Act of 2008 **Summary:** Introduced by Sen. Barack Obama and Rep. Michael Honda, this bill aims to coordinate state and federal STEM initiatives while increasing the number of students entering the STEM workforce as well as the quality of education for these students. This bill also addresses the need to diversify the STEM field by increasing the presence of women and underrepresented groups. Through the State Consortium on STEM Education, this legislation would develop STEM Career Awareness programs with high school counselors, featuring mentoring programs and professional outreach. Under the Consortium, STEM vocational programs may also be developed to meet STEM industry workforce demands. **Source:** *http://www.govtrack.us/congress/billtext.xpd?bill=h110-6104*
Nationwide	**Bill:** House Resolution 2272, America COMPETES Act **Summary:** H.R. 2272 is sponsored by Rep. Barton Gordon. One provision of the bill seeks to have the director of the National Science Foundation award up to 200 grants to universities promoting master's degrees in STEM subjects. The bill also aims to develop strategies for attracting more women and underrepresented minority groups into the STEM industry. Another issue addressed is NASA's aging workforce. It requires that NASA be a "full participant in any interagency effort" to promote STEM education, with an annual report of activities the agency conducted or took part in. **Source:** *http://www.govtrack.us/congress/bill.xpd?bill=h110-2272&tab=summary*
Nationwide	**Bill:** House Resolution 3634, Strategic Technology/Engineering Program (STEP) Act **Summary:** Sponsored by Rep. Emanuel Cleaver, the STEP act provides incentive for students to pursue STEM-related degrees in the form of scholarships and loan forgiveness. The loan forgiveness program is for currently employed engineers and students in science, technology and engineering undergraduate and graduate programs. Eligible borrowers, under the Federal Family Education Loan and Direct Loan Programs, must remain employed as an engineer for eight years and become licensed as a professional engineer within eight years of completing their degree. This act is an amendment to the Higher Education Act of 1965, which authorized the Secretary of Education to award STEP scholarships to students pursuing secondary or post-secondary degrees in STEM subjects. **Source:** *http://www.govtrack.us/congress/bill.xpd?tab=summary&bill=h110-3634*

State	The Legislation
Hawaii	**Initiative:** Hawaii Innovation Initiative, Act 111 **Summary:** Signed into legislation by Gov. Linda Lingle, Act 111 is a move to promote the Hawaii Innovation Initiative. A goal of this initiative is to develop analytical and problem-solving skills in Hawaii's students through promoting STEM education. "The programs established under this bill are part of a long-term effort to develop the innovation capacity of Hawaii's workforce," said Lingle in a press release. The bill establishes programs in fields such as engineering, computing and robotics, offered through the University of Hawaii, various Hawaii community colleges, the Department of Education and other private businesses. The bill allocates $5 million toward these programs for fiscal years '08 and '09. **Source:** *http://hawaii.gov/gov/news/releases/Folder.2007-01-31.1527/governor-lingle-signs-legislation-to-promote*
Iowa	**Grant Award:** U.S. Department of Labor **Summary:** Iowa Sen. Chuck Grassley announced that the U.S. Department of Labor awarded a grant to two Iowa workforce development projects. The grant, allocated from National Emergency Grant funds through the Workforce Investment Act, is meant to stimulate STEM workforce development. One of the two Iowa programs receiving the $500,000 grant is Iowa Workforce Development out of Des Moines. The grant will help the program establish a Workforce Innovation Strategy and Planning Office, which will facilitate a feasibility study on establishing a STEM Workforce Academy/Center of Excellence. This project will span across Cherokee, Crawford, Ida, Monona, Plymouth and Woodbury counties. **Source:** *http://grassley.senate.gov/public/index.cfm?FuseAction=PressReleases.Detail&PressRelease_id=c58823a9-f8a1-f442-609b-9fcc94043a34&Month=5&Year=2008*
Florida	**Initiative:** Florida STEM Opportunities in Workforce System Initiative **Summary:** Workforceflorida.com published a U.S. Department of Labor, Employment and Training Administration STEM funding opportunity announcement. Five awards totaling up to $10 million will be awarded with a $2 million cap on single awards. Eligible applicants are workforce investment boards, or WIBs, representing regional workforce consortiums. Grant applications will be considered in two parts through a competitive process. Grants will be awarded to programs fostering the expansion of "STEM workforce education and training strategies, activities and resources in One Stop Career Centers." Qualifying proposals must include STEM coaches and mentors to connect participants to employers — acting as workforce guidance counselors. These STEM coaches will also create "career blueprints," charting a career path for each program participant. Funds will be awarded fall 2008. **Source:** *http://www.workforceflorida.com/rfp/grants/grants_080125.htm*

State	The Legislation
Nationwide	**Bill:** House Resolution 4137, College Opportunity and Affordability Act of 2008 **Summary:** Sponsored by Rep. George Miller, this act would amend the Higher Education Act of 1965, effectively revising and reauthorizing HEA programs. Section 309 of this amendment addresses STEM by establishing the YES Partnerships grant program to foster projects promoting the pursuit of STEM-related careers among underrepresented K-12 students. **Source:** *http://www.govtrack.us/congress/bill.xpd?tab=summary&bill=h110-4137*
Nationwide	**Bill:** House Resolution 362, 10,000 Teachers, 10 Million Minds Science and Math Scholarship Act **Summary:** This bill was sponsored by Rep. Barton Gordon, authorizing the allocation of $1.5 billion to fund existing and new programs supporting the training and professional expansion of school teachers in STEM subjects. Programs receiving funds are housed within the National Science Foundation and the Department of Energy, and are subject to the bill's stipulations — including increasing the number of STEM certified teachers by 10,000 per year and improving overall teacher quality. Funds are to be appropriated for fiscal years 2008 through 2011. **Source:** *http://www.govtrack.us/congress/bill.xpd?tab=summary&bill=h110-362*

40% **Florida, California, Texas, New York, Virginia and Illinois**
According to the Bureau of Labor Statistics (BLS) Occupational Employment Statistics survey, these six states accounted for **40 percent** of nationwide STEM related occupations in 2005.

Source: U.S. Department of Labor, Bureau of Labor Statistics
http://www.bls.gov/opub/ooq/2007/spring/art04.pdf, http://www.bls.gov/opub/ted/2007/jun/wk4/art04.htm

55% The expected growth rate between 2004 and 2014 for network systems and data communications analysts — a budding STEM occupation. This group includes the people who design and install computer networks.

Source: https://www.cpst.org/STEM/STEM7_Report.pdf

20% **Colorado**
Colorado expects to see a **20%** growth rate in STEM occupations from 2005-2015

Source: Colorado Workforce Development Council
http://www.dola.state.co.us/wdc/publications/CO%20State%20of%20Talent%20Development.pdf

Q&A

David G. Sevier, Ed.D.
Policy Adviser
State of Tennessee
Board of Education
Nashville, Tenn.

Robert C. D. Barclay,
Government and Education Industry Marketing
Xerox Corporation
Rochester, N.Y.

Q: What type of career fields will see the most expansion in the next 20 years? Why?

A: Creating ultra-efficient workplaces will be necessary to allow people to have meaningful lives outside the workplace. Jobs that focus on knowledge management and efficiency will be crucial to support this goal. Those who can take the lessons learned from streamlining traditional business markets and apply these concepts to government, education and other areas will be in high demand.

A: Math, science and engineering will see increases as product development and manufacturing are becoming increasingly more technology and science based. Technology innovation is on a rapid continuum and companies will continue to seek people who understand what is there today and those who can be constant learners of what comes tomorrow.

Q: What types of technology will be the biggest influencers on the future U.S. job market?

A: The increasing demand for business decisions to be data-driven requires that emerging technologies follow along. Technologies that gather, filter and analyze information will be absolutely necessary to the health of any business. Those who can leverage these types of technologies will be critical players in the job market.

A: Information management, global communication and virtual computing will all have great impact. While some are in their infancies today, new uses and more widespread use will soon be a fact of life. We tend to be data rich, but information poor. Those who can manage the data — both structured and unstructured — and make informed decisions based upon it will succeed.

Q: In the future, will teaching entrepreneurial skills become more important in high school and college? Why?

A: Entrepreneurial skills are vital because they can be put into practice no matter what job path a person chooses. We know that today's students will, most likely, have many jobs over the span of their careers. It is imperative that students learn the types of skills that allow them to take advantage of emerging technologies and trends.

A: Entrepreneurialism is the American dream. Internet technology and telecommunications have allowed any individual to reach customers worldwide. With further advances in virtual reality technology and software as a service (SaaS) models, even the smallest company can appear to be big. If kids in the future are creative, the world will be their oyster.

Q: How will collaborative trends — citizen journalism, wiki environments — effect how business is conducted?

A: Business solutions that utilize social media and other high-contact technologies will continue to tear into the fabric of traditional business organizational structures. Phrases such as "work from home" or "telecommute" will become obsolete and work will morph into something that occurs without regard to time or place.

A: Collaboration is king. No one can compete as an individual and tomorrow's youth are already living it. They will demand that their business environment take advantage of the tools that they grew up with.

Q: No one knows where technology could take careers of the future, but we want your far-out ideas! If anything was possible, what could a career of the future look like?

A: I see an eventual return to an appreciation for the work of artisans. Someone soon will incorporate nanotechnologies into one-of-a-kind art pieces at a cost that makes them affordable for the average person. These may be beautifully crafted bowls that keep fruit fresher, garden statues that self-illuminate at night or necklaces that change color to coordinate with clothing.

A: It would be a virtual surgeon. Using a small robotic device that can be easily shipped to the patient, a virtual surgeon could sit across the world at a computing device, give a diagnosis and conduct a complex medical procedure. This would be particularly helpful in providing cost-effective care to the elderly and those in remote areas.

Ann Beheler,
Dean of Business, Computing and Career Services
Orange Coast College
Costa Mesa, Calif.

Elise Volpe,
Management Information Systems (MIS) Coordinator
West Orange Public Schools
West Orange, N.J.

Jalynn Gilworth,
Student, 15
Putnam County R-1 High School
Unionville, Mo.

A: Any careers associated with the green initiative will be in the forefront. Everything from the traditional environmental careers to areas like convergence technology will expand. The convergence technician supports the combined network that supports voice, data, video and image in a wired or wireless setting with emphasis on security.

A: Engineers who specialize in developing alternate types of fuel.

A: I think the field of computer programmers will expand in the next 20 years because people are coming up with new computer technology every day and computer programmers will become more important in installing these programs.

A: New careers will follow developing technologies. Present Web technologies will become even more pervasive, with wireless access becoming more ubiquitous and citizens in developed companies never being away from voice, video and written access. Convergence technologies will continue to advance; any technologies that minimize energy usage will be important.

A: Designing machines that use alternate fuel.

A: Advanced cell phones, such as iPhones or Blackberrys will influence business. People will be able to set up meetings, e-mail and stay in contact with their colleagues all around the world.

A: The workplace of the future will rely on a greater and greater number of independent contractors. The success of these contractors will depend on the individual's mastery of interpersonal, written and verbal communication, critical thinking and problem-framing and problem-solving skills.

A: Yes, I believe that entrepreneurial skills are what can make a person truly successful. Some of our most successful people right now (i.e. Bill Gates) exemplifies this. If we are to compete with other countries, we will have to improve these skills through education.

A: Yes. It will become more important because technology in business will keep advancing so people will need as much training for their future as they can get.

A: With the Internet supporting self-publishing of materials, every citizen can be a published author. Political campaigns are already conducted via the Internet; businesses of all sorts have to be aware of their Internet presence and need to address citizen comments as part of brand management.

A: These types of environments could lead to more collaborative projects with people from different backgrounds and areas of expertise. Therefore, I think more business will be conducted via the computer. No longer will distance be a barrier for collaboration.

A: Business may be conducted strictly over the Internet. In the future you may be able to find business partners from all over the world using an Internet site like Facebook.

A: Many futurists predict that students of today will have seven or more totally different careers in their lives. Therefore, lifelong learning will be required, not optional. Technologies that support anytime, anyplace education, decision-making and connectedness will continue to mature.

A: I think that careers of the future will require more hands-on training and internships. A college education may consist of mostly working experiences with classes that correspond.

A: A career in the future could possibly be to program robots or to even to create robots.

REVIEWED BY JULIANNE STURDIVANT

Technically Speaking

Why All Americans Need to Know More about Technology

What's the first thing that comes to mind at the mention of technology? For most, it's computers. Mention "technology in education" and you might imagine rows of students in the computer lab or a group clustered around a computer station.

But technology is more than just computers. Although computers are certainly one aspect of technology, too often that narrow definition is broadly applied and accepted.

The Committee on Technological Literacy – overseen by the National Academy of Engineering (NAE) and the National Research Council – seeks to provide a more accurate definition of technology. The committee's book *Technically Speaking: Why All Americans Need to Know More About Technology*, gives an expansive, compelling report for why individuals and the United States need greater technological literacy.

Technological literacy – "a broad understanding of the human-designed world and our place in it" – helps people become better informed, participate more in policy decisions, maintain a sense of social equity, strengthen the workforce and much more.

The Committee on Technological Literacy charges that the best place to develop technological literacy is in the K-12 setting.

An early, important distinction made in *Technically Speaking* is technological competency versus technological literacy. Technological competency is the "how-to" – the ability to work with technology directly.

For example, most people know how to send an e-mail (competency), but understanding the impact of the technology requires literacy. Or, it's likely consumers don't know how to genetically engineer food (competency), but if they're literate on its technology, they can participate in a meaningful discussion on its advantages and disadvantages.

Becoming technologically literate is an exciting and powerful idea. With it, people can see clearly how technology affects them and its social, political, economic and civic impact.

Technological literacy can enhance social well-being by closing the generation gap. Exposed to media and the marketplace, people can become overwhelmed by new technologies and feel they are a generation beyond learning anything new. But by being comfortable and adaptable to new technologies, people will be able to see the relevance of innovations. And that sense of empowered social equity is well worth the time investment.

The Committee on Technological Literacy charges that the best place to develop technological literacy is in the K-12 setting. But with so much emphasis on computers in schools, many wrongly believe technology is being taught. Using technology (computers) isn't the same as *teaching* technology, which the Committee recommends. Its additional recommendations include formal and informal education, research, decision-making and educational innovation.

For learners outside the K-12 setting, they can still develop technological literacy via community-based research groups, media, museums and science centers, just to name a few. Resources and links to organizations and Web sites are available online at the NAE's *Technically Speaking* Web site at www.nae.edu/techlit. The site encourages visitors to submit useful links and information.

It's a great service to understand how technology is created, how it shapes the world and how to make choices about it. While *Technically Speaking* can be a go-to resource for leadership in education – those who effect change in curriculum standards – it can also help the general public. Readers will become informed, stay current, ask relevant questions, understand risks and responsibly engage in thoughtful discussion about technology. ◉

details:

By The Committee on Technological Literacy, National Academy of Engineering, National Research Council, and Greg Pearson and A. Thomas Young (Editors)

Publisher: National Academy Press, 2002

Price: $19.95 Paperback

AASHE2008

2ND BIENNIAL CONFERENCE & EXPO
NOVEMBER 9-11
RALEIGH, NORTH CAROLINA

Working Together for Sustainability: On Campus and Beyond

Register today to reserve your place:
www.aashe.org/conference
Early bird discount ends August 31!

AASHE's biennial conference is the largest North American campus sustainability conference. Over 1,200 participants are expected from every sector of the higher education community, including sustainability officers, administrators (from both academics and operations), facilities officers, design consultants, purchasers, planners, faculty and students.

In addition, more than 300 participants of the co-located Sustainable North Carolina Conference and over 500 business and government leaders are expected to attend the **Sustainable Solutions Expo**, a first-of-its kind tradeshow. With this mix, the diversity of institutions and sustainability interests represented will be impressive.

Keynote Speakers

Lester R. Brown
Founder, Earth Policy Institute
Author, *Eco-Economy, Plan B, and Plan B 3.0: Mobilizing to Save Civilization*

Van Jones
Founding director, Ella Baker Center for Human Rights
Founding president, Green for All

Peter Senge
Senior lecturer, MIT
Chair, Society for Organizational Learning (SoL)

Vandana Shiva
Physicist and environmental activist
Author, *Stolen Harvest*, and *Earth Democracy*
Winner of the 1993 Right Livelihood Award

PLUS!!
An exciting line-up of local and national public officials and experts addressing the post-election legislative landscape, and opportunities to promote policies that advance sustainability in higher education.

Who Should Attend? Administrators, Faculty, Staff, Students, Business Partners, Government Partners, NGO Partners, All Higher Ed Stakeholders!

- Dozens of sessions on sustainability in three tracks: Education & Research, Campus Operations and Administration & Finance
- **"Sustainable Solutions Expo: Green Solutions for Campuses, Businesses, and Institutions,"** in partnership with Sustainable North Carolina
- Events highlighting the American College & University Presidents' Climate Commitment
- Sustainability Career Fair
- Pre-Conference Student Summit
- Pre-conference workshops for faculty, sustainability officers and others
- Sustainability tours of local campuses
- Awards banquet featuring AASHE leadership awards and other honors

Gold Sponsor

CREE LED Light

Silver Sponsors

Duke Energy

PortionPac Sustainable Solutions

VHB Vanasse Hangen Brustlin, Inc.

www.aashe.org/conference
conference@aashe.org
859-258-2551

AASHE

Reserve your spot at the largest campus sustainability conference in North America!
www.aashe.org/conference

BY BERNARD PERCY

Fostering the Unreasonable Spirit

AN EXECUTIVE for a major corporation recently said, "One thing we are finding is that people who are applying for work at our companies are not able to think."

I was expecting him to say, not able to read, do math or communicate as well as is needed. When he said *think* I began to reflect on that. I looked up the definition of *think* and found 27 definitions, but the two that seemed to best fit are: "to employ one's mind rationally and objectively in evaluating or dealing with a given situation" and "to invent or conceive of something."

> Unreasonable people are the entrepreneurs — the ones who will make a difference.

There is so much emphasis today on testing for reading, math and achievement in various subjects – providing evidence our students have become educated.

Not that I am minimizing the need to be skilled in reading and math, nor ignoring the importance of helping students achieve a better reality of the world they live in. I am concerned that we are ignoring the need – the essential need – to help our students learn how to think and to provide the opportunities for them to demonstrate that skill.

George Bernard Shaw wrote, "Reasonable people adapt themselves to the world. Unreasonable people attempt to adapt the world to themselves. All progress, therefore, depends on unreasonable people."

Unreasonable people are often considered demanding or extreme. Perhaps they are, but they are the entrepreneurs – the ones who will make a difference, create new edges, start new enterprises and to quote from "Star Trek," "boldly go where no man has gone before."

We must foster the entrepreneurial spirit within our students and educators. Our future depends on nurturing that spirit, for the entrepreneur is the person who will organize and manage an enterprise, even though it may involve considerable initiative and risk.

This is not just in reference to entrepreneurs as individuals who start a business activity; rather individuals who are willing to find new and better ways of doing things in their areas of talent, interest and purpose. Following are some educators who I consider to be entrepreneurial in this larger sense of the word.

Larry Wolfe, who taught two of my daughters, created a truly magical space in his third grade classroom, building a loft where students can go to read and study, as well as doing other wondrous things, including morning sing-a-longs, making his classroom so inviting and special.

Alan Zwirn, a music teacher in a Brooklyn, N.Y., middle school, who created shows that were so innovative, powerful and impacting because of his "unreasonable" attitude about his students meeting professional standards in their performance.

Tim Lefens, founder of Artistic Realization Technologies (A.R.T.), developed tools and techniques that allow quadriplegics to creatively express themselves using laser-guided painting. This ability opens doors, often for the first time, to communicate through art.

Let's recognize the educators who are entrepreneurs of the classroom, who value and instill the entrepreneurial spirit in their students through their example, creations, contributions and unreasonableness. Let's help them inspire our next generation of entrepreneurs who will wonder and set out to make their dreams become reality.

Help Us Prepare America's Students for the Future:

Support 21st Century Learning with Technology

Dear Next President:

On July 20, 1969, Astronauts Buzz Aldrin and Neil Armstrong planted the U.S. flag on the moon, helping America win the coveted space race. Our great nation realized this seemingly impossible dream by making sound investments in education.

Today, nearly 40 years after this historic accomplishment, we're facing new challenges—including a flattening global economy and climate change. Now, more than ever, we must engage and train the next generation of scientists and innovators to address these 21st century problems and opportunities. Student access to school technology, robust teacher technology preparation, and a renewed focus on 21st Century skills are critical to today's missions.

Help us ensure America's students are prepared for tomorrow's missions.

Thank you,

Consortium for School Networking,
International Society for Technology in Education,
The National Education Association, **and the**
State Educational Technology Association

Sign the Petition to Support Education Technology at:

http://www.onegiantleapforkids.org

Lenovo® recommends
Windows Vista® Business.

GO BEYOND CUTTING COSTS. GO GREEN.
BUDGET-FRIENDLY IDEAS FOR A GREEN FUTURE.

Lenovo leads the industry in the "Green" movement. Lenovo® PCs, powered by Intel® Centrino® 2 with vPro™ technology, come with an EPEAT† Silver or Gold rating—the highest environmental standard in the industry. In fact, our entire line of ThinkVision® monitors is Gold rated. Lenovo is committed to environmentally friendly products and processes: our packaging is composed of 90% recyclable material. We also offer Asset Recovery Services which provide an eco-friendly disposal option for your used technology. Through Lenovo's proprietary ThinkVantage® Technologies, you can consume less energy while maximizing performance.

ThinkPad.

Lenovo T61 ThinkPad Notebook

Intel® Core™2 Duo Processor T7100 (1.8GHz)[1]
Intel® Active Management Technology 2.5
Intel Wireless WiFi Link 4965AGN
Energy Star 4.0
EPEAT Silver Rating

$999*
P/N: 765912U

Warranty Upgrades

3-year Accidental Damage Protection
P/N: 41C9340 $135

Upgrade from 3-year depot to 3-year onsite
P/N: 41C9342 $199

90W Slim AC/DC Adapter

Includes a standard AC adapter for the wall outlet as well as an adapter for airplane and automobile DC outlets.

P/N: 41N8460
$95

ThinkPad Port Replicator

ThinkPad Essential Port Replicator offers one-step, pass through connection to the devices you use every day. Ideal for notebook users who need access to a network, monitor and multiple USB-attached peripherals.

P/N: 250510W
$159

Targus Grove Messenger Case

The EcoSmart alternative. PVC-free and features recyclable plastic accents and nickel-free metal to reduce the amount of toxins released into the environment.

P/N: 45J5787
$40

Microsoft® Office OneNote® 2007

lenovo.

For more information visit lenovo.com/environment