

# The **Blended & Virtual** **Learning Frontier** Special Report

A RESEARCH REPORT FROM **THE CENTER  
FOR DIGITAL EDUCATION AND CONVERGE**

CENTER FOR  
**DIGITAL**  
EDUCATION

**converge**



**JEB BUSH,**  
FORMER FLORIDA  
GOVERNOR AND  
FOUNDER OF THE  
FOUNDATION FOR  
EXCELLENCE IN  
EDUCATION

“What distinguishes a technological world is that the terms of nature are obscured; one need not live quite in the present or the local.”

— REBECCA SOLNIT, *RIVER OF SHADOWS: EADWEARD MUYBRIDGE AND THE TECHNOLOGICAL WILD WEST*

**THESE ARE INTERESTING TIMES** in the education field, and a bit hectic for education leaders at all levels. The digital revolution has hit full force and a whole new education frontier is emerging.

It is important to remember, however, that the revolution in banking took under a decade. The ATM greatly improved convenience for users and significantly lowered costs for banks. I can't even remember the last time I went to a field branch. Similarly, the peak of evolution in education with blended and online learning has been the fundamental restructuring of the delivery mechanism. It will continue to evolve into the future, like in other fields. Banking, for instance, is now personalized online in so many ways and there is even micro-banking and micro-lending.

The Center for Digital Education sees that schools everywhere are grappling with the rather vast new frontier of blended and virtual learning. As such, we wanted to start defining the territory. This Special Report describes the various terms in blended and virtual learning, and gives education leaders more than a few ideas of what their peers are already doing in this new frontier.



**LEILANI CAUTHEN**

*Publisher, Converge Special Reports*

*Vice President, Center for Digital Education*

**IN THE LAST SPECIAL REPORT** we looked at how educational institutions were addressing the digital revolution. We talked about how digital textbooks and other forms of digital content are changing the way learning is conducted. In this Special Report we take a close look at one aspect of this digital outgrowth — the movement to online and blended learning.

This investigation was enlightening for us. We learned not only that there were multiple sources for online and blended learning curriculum and content, but that there are multiple delivery systems for

that content. Because there are so many options for educational institutions to investigate, campuses must perform proper due diligence to ensure they maximize opportunities and achieve the best results for their students and staff. But this is not a one-time investigation. As the education industry continues to evolve new tools, courseware and content, educators and administrators (including schools of education) must adopt methodologies, delivery systems and best practices to keep pace for optimum student performance and institutional efficiency.

Online and blended learning are yet two more ways we can achieve the goal of personalized learning. When curriculum is online, when it can be delivered 24/7, when it can be easily customized, when student achievement can be instantly measured, when we can blend face-to-face and online benefits, we enable greater personalization. We know this will not come easily. Instruction must be altered, curriculum must be adapted, administrators must adjust practices and students must become more responsible for their learning. Everyone in the system must adjust. But the effort will be worthwhile when we see the results.

**JOHN HALPIN**

*Vice President, Strategic Programs*

*Center for Digital Education*

CENTER FOR  
**DIGITAL**  
EDUCATION

# CONTENTS

2012 | ISSUE 3

## INTRODUCTION

**4** New Frontier, Big Impact:  
The Promise of Virtual and  
Blended Learning

## GLOSSARY

**6** Bringing Clarity to the Confusion

**8** Every Revolution  
Meets Resistance:

A Look at the Drivers and Roadblocks

**14** The Support Ecosystem:

What's Needed to Make it Work

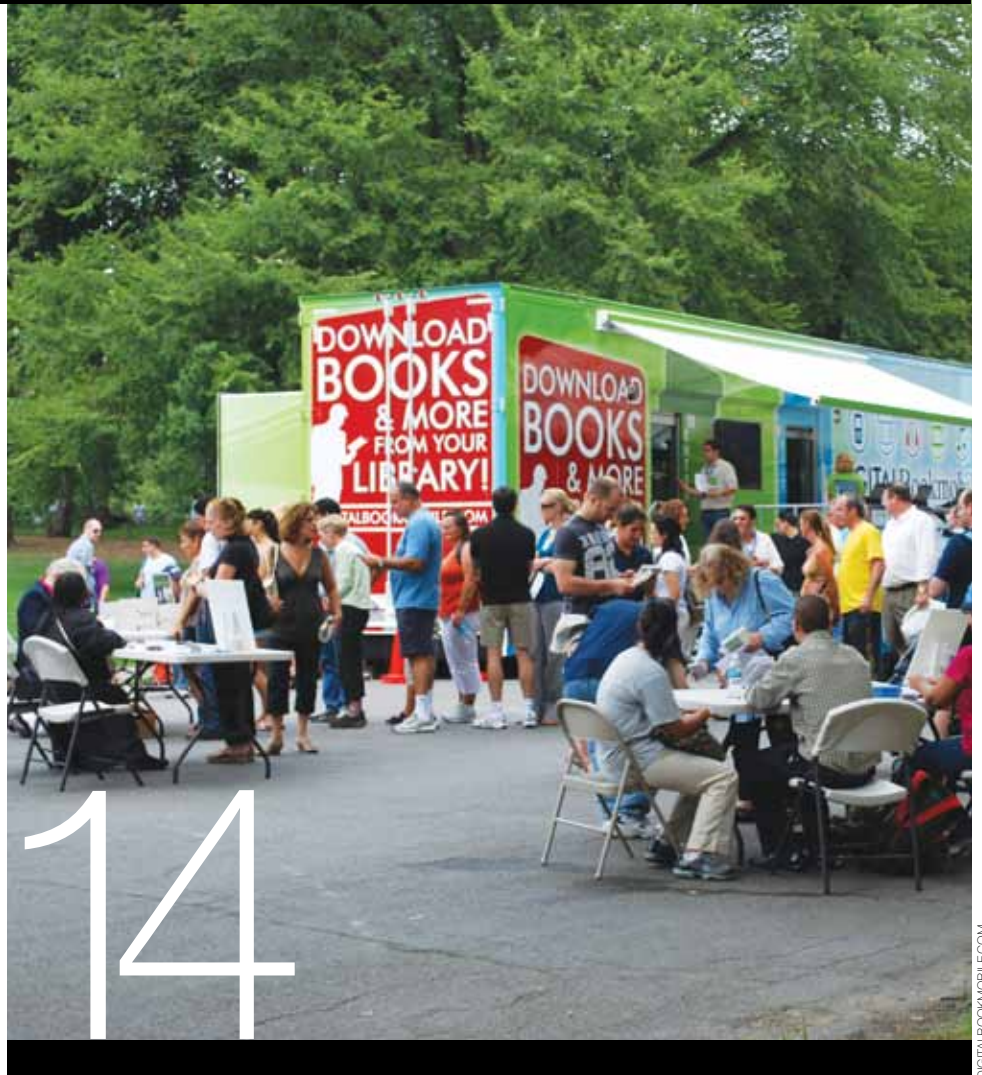
**20** The Enhanced, Evolving  
Role of Educators



FLICKR/MACSD



CONNECTIONSACADEMY



DIGITALBOOKMOBILE.COM

**26** Effective Leadership  
Goes a Long Way:

Administrators Inspire Change  
from the Top Down

**32** Best Practices  
from the Field

**28** Making Virtual and  
Blended Learning a Reality

**34** What Will Become of  
Campuses in the Future?

## CONCLUSION

**36** Moving Forward  
Toward a New Frontier

e.Republic

SMART MEDIA FOR PUBLIC SECTOR INNOVATION

© 2012 e.Republic. All Rights Reserved  
100 Blue Ravine Road, Folsom, CA 95630  
916.932.1300 phone | 916.932.1470 fax



A fourth-grade student works on an estimation lesson on MIND Research Institute's ST Math Software with his class at Overton Elementary School in Chicago, Ill.

# New Frontier, Big Impact

## The Promise of Virtual and Blended Learning

**D**ental students at the University of Maryland can skip class if they want, because the professor's lecture is recorded and available online almost as soon as she is finished, complete with the slides she presented and notes she included. Students can rewind, fast-forward and freeze-frame her talk as well as zoom in on the slides. The convenience of having the lectures captured and stored — along with a lecture library going back several years — has many students listing this as a reason to pick UM's program over others.<sup>1</sup>

At Evansville Vanderburgh School Corporation (EVSC) Virtual Academy in Indiana, a high school senior wants to boost her GPA, so she enrolls in an online version of a course she already took in class. She earns a higher grade, which her school allows her to replace. Not only does she improve her GPA, she hones her concentration and study skills, leading to a higher SAT score and college acceptance.<sup>2</sup>

After just one year of blended learning, the graduation rate at Great Mills High School in Maryland increased about 7 percent. Approximately 75 of the 2012

graduates had participated in the new online curriculum; according to St. Mary's County Public Schools Superintendent Mike Martirano, some of these students would not have graduated without the blended option.<sup>3</sup>

Vignettes like these give a small picture of the big transformation occurring in education as a result of blended and virtual learning, which are becoming more common in U.S. schools at every level. These types of learning have created a new frontier, where the roles of instructors, administrators, students and the entire campus ecosystem are evolving. These changes are leading to a rethinking of the structure of educational institutions, new funding models, new forms of curriculum and new, more personalized approaches to pedagogy.



## The Growth of Blended and Virtual Learning

OVER  
**6.1**  
MILLION

**COLLEGE STUDENTS** TOOK AN ONLINE COURSE IN FALL 2010 (UP 560,000 FROM 2009, REPRESENTING A 10 PERCENT GROWTH RATE).<sup>4</sup>

AT THE  
**K-12 LEVEL,**

**1.8**  
MILLION

STUDENTS WERE ENROLLED IN DISTANCE EDUCATION COURSES IN THE 2009-2010 SCHOOL YEAR, WHILE

**40**

STATES HAVE VIRTUAL SCHOOLS OR ONLINE LEARNING INITIATIVES.<sup>5</sup>

**12**  
PERCENT

OF HIGH SCHOOL STUDENTS HAVE TAKEN AN ONLINE CLASS ON THEIR OWN, OUTSIDE OF THE CLASSROOM, TO LEARN ABOUT A TOPIC THAT INTERESTED THEM.<sup>6</sup>

IF  
CURRENT  
TRENDS  
CONTINUE, BY

**2018**

THERE WILL BE MORE **FULL-TIME ONLINE POST-SECONDARY** STUDENTS THAN STUDENTS WHO TAKE ALL THEIR CLASSES IN A PHYSICAL LOCATION.<sup>7</sup>

As more students choose online or hybrid models of learning, challenges are rising as well. Too many instructors remain untrained in the use of online pedagogy. Administrators similarly lack training in the unique complexities of managing online courses, programs and institutions. Public policy sometimes works against successful online learning, such as government seat-time restrictions that limit reimbursement to the hours a student sits in a classroom rather than what a student learns. Entrenched bureaucracies, regulations and attitudes all stand in the way of needed reform.

This Special Report examines the new blended and virtual learning frontier, taking an in-depth look at its challenges and its promise. ■

# Bringing Clarity to the Confusion

There remains much confusion in the field of blended and virtual learning over what these terms actually mean. School officials will sometimes say their campuses are incorporating blended learning, but what they mean is their classrooms use technology to enrich learning. A student may use the Internet for research, but this alone does not constitute blended learning. The following definition of blended learning is widely accepted and was developed by the Innosight Institute in 2012 with input from more than 100 education experts and 80 organizations.

**“Blended learning is a formal education program** in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace and at least in part at a supervised brick-and-mortar location away from home.”<sup>8</sup>

Innosight further breaks down blended learning into four models:

## 1) Rotation:

Students' time is split between different modalities: sometimes in the classroom, sometimes in the lab. In class, students rotate on a scheduled basis between stations, such as group projects, individual tutoring or independent online learning.

## 2) Flex:

Students move on an individually customized, fluid schedule among different learning modalities, with teachers providing help as needed. Such models often employ differentiated staffing.

## 3) Self-blend:

Students attend traditional school but take one or more classes online.

## 4) Enriched virtual:

Students learn at a physical school but teachers are brought in remotely, or divide time between campus and home online learning; this model began as full-time virtual schools developed blended programs to give students more face-to-face time.

**Flipped classroom models** are another form of blended learning where material that traditionally would have been covered in class, such as an instructor's lecture, is provided for students

to study outside of class (a video recording of the lecture, for example). The material normally considered as homework — activities related to the content, plus discussion — is then done in class.

**Hybrid learning** is another term often used: Is it different from blended? No, says Vicky Phillips, CEO of GetEducated, a consumer and research group focused on online learning.

**Online learning, virtual learning and distance learning** are also terms that are often used interchangeably, yet they can carry different meanings.

**Distance learning** is any type of learning that takes place with the student and instructor geographically distant from each other.

**Online learning** is the most recent delivery method used for distance learning instruction.

**Virtual learning** is any learning that occurs where either the instructor or student are present for an educational event in virtual rather than physical form.<sup>9</sup>

Mike Lawrence, executive director of Computer-Using Educators, suggests “e-learning strategies” as a more easily understood and accepted term, covering both blended and online instruction. ■





GETTY IMAGES/DIANE COLLINS/JORDAN HOLLENDER



22%  
In jobs not requiring  
a college degree

22.4%  
Not working

55.6%

In job  
a col

Daphne Koller is a co-founder of Coursera, a massive open online course (MOOC) that offers free online courses from a host of top universities.

College Degree, but Not a College Job." New York

portunity



# Every Revolution Meets Resistance

A Look at the Drivers and Roadblocks

**S**tudents in a Florida public school classroom work side by side at computers, but each child studies something different: Spanish, algebra, biology, English. A facilitator — not a certified teacher — manages the class, walking the room to maintain order and make sure equipment functions properly.

Florida Virtual Learning Labs — offered to public schools as part of Florida Virtual High School — are becoming popular because they allow school districts to meet Florida's strict class-size guidelines without having to hire more teachers. They also help schools comply with a state mandate that students attend an online course. In 2012, 273 online courses existed — a number set to double in 2013.

The School of One in New York is another ambitious blended program. Middle-school walls were knocked down, creating a large open space filled with centers that students move through in a rotational model. At the end of each day, teachers run an algorithm showing what each student has mastered, which determines the next day's assignment for that particular student.

At the University of Connecticut, a new graduate business class is being held simultaneously at two campus locations, Hartford and Stamford, using videoconferencing with an auto-tracking camera to connect the instructor and students in one classroom with a teaching assistant and students in another. The instructor uses a wireless graphics tablet to make annotations on material displayed on the

FLICKR/TECH CONFERENCE



interactive whiteboard and to control his PowerPoint presentation. The interactive whiteboard is visible at both locations, observed in real time as well as recorded for students to view later.

These outposts on the frontier show some of the chief characteristics of e-learning today: it is personalized, flexible and convenient. It is also a key element in the educational change that's urgently needed to restore America to economic health.

"Most jobs today — 60 percent — require post-secondary education, yet we are turning out a workforce with only about 40 percent holding a post-secondary degree," says Bob Wise, former governor of West Virginia and head of the Alliance for Excellent Education.<sup>10</sup>

Wise calls for a host of changes to spur greater educational attainment at the K-12 level, including the use of blended learning.

Within higher education, there has also been an increase in online and blended options at a range of different types of institutions: for-profit, online-only schools (the University of Phoenix being perhaps the most

well-known); nonprofit, online-only public schools (such as the Western Governors University, formed in 1997 as the result of a cooperative effort among the governors of 19 states); nonprofit, online private schools; and both private and public brick-and-mortar schools, which offer either online-only or blended programs.

The newest wrinkle: MOOCs, or massive open online courses. Examples include Coursera, a company co-founded by Stanford professors Andrew Ng and Daphne Koller to offer free online classes in more than three dozen subjects from a host of top universities, including Stanford, Princeton, the University of Pennsylvania and others. The company was started after Ng's first class drew more than 100,000 students.

Other MOOCs include Google Vice President Sebastian Thrun's Udacity, which he started after his free online class in artificial intelligence at Stanford attracted 160,000 students.

With MOOCs, students are given more than just the free lectures that have long been part of the open

courseware movement. Students can take part in discussion sessions, answer quizzes, receive grades and earn a certificate of completion, all at no charge.

Udemy is offering another new option for students to learn by empowering experts around the world to teach and share what they know online. It is a community platform where it is easy for anyone with an expertise to build an online course by using video, PowerPoint, PDFs, audio, zip files and live classes.<sup>11</sup>

Even when college courses aren't fully online, many are likely to have some kind of an online element, such as virtual office hours, downloadable content or videotaped lectures, says GetEducated's Vicky Phillips. "There isn't any 'either/or' — it's flexing together."

One reason: students today — raised with online technology — demand it.

"This generation of students is all about convenience," says Phillips. "If they don't want to go to a class, why should they? If they don't want to wait until 3 p.m. for office hours, why can't the instructor have virtual office hours? It's the whole mentality

of anytime/anywhere — it's very much a part of our culture and especially this generation."

Indeed, today's mobile devices, digital content (including instructional games), availability of video (conferencing, streaming, capture) and access to WiFi have helped fuel the movement to personalized, blended and virtual learning.

Other drivers include:

- the need to improve high school graduation rates, which has led to the use of more credit-recovery programs, many of which are online;
- demand by students for the freedom to "self-blend" and take whichever type of course best suits their needs;
- demand by state legislatures that students take at least one online course before they graduate (Florida and Idaho have this mandate);
- budgetary pressures; as funding drops, districts look for more economical ways to provide services (online learning can be less expensive — Florida Virtual High School's per-student costs in 2010-11 were \$4,840, compared with \$6,999 statewide and \$10,000 nationally);<sup>12</sup>
- competition; at both higher education and K-12 levels, there is student demand for blended and/or online services; in some districts, K-12 students have multiple choices for online learning (including charter and state schools), while colleges find themselves competing for enrollments with schools offering more flexible learning options;

"We are incentivizing the wrong things. We need to put our money where our priorities are. If our priority is to keep kids in chairs while their parents are away, I'm pretty sure we don't need to have people paid \$90,000 a year to do that work."

— David Haglund, Principal,  
Riverside Virtual School, Calif.

- changes in pedagogy that value student-centered, flexible, data-informed instruction, which pairs well with personalized digital content available online; and
- Common Core implementation (and the ability to run online assessments) must be accomplished in the next two years for the 45 states that are adoptees (plus the District of Columbia); even states that aren't Common Core adoptees have upgraded standards, which means a national imperative to change curriculum and upgrade teacher skills.

Despite these and other drivers, a variety of roadblocks and challenges remain on the road to broad implementation of blended and virtual learning.

### **Educator, Administrator and Community Acceptance**

Prevailing attitudes among some educators, administrators and communities that online and blended learning are not as rigorous as traditional learning are slowing adoption. Less than one-third of chief academic officers say their faculty accept the value and legitimacy of online education, a percentage that has changed little over the last eight years.<sup>13</sup>

GETTY IMAGES/MAOEL NOSKOWSKI





Students enjoy some technology time at the School Age Center computer lab in Fort Sill, Okla.

FLOK/FORT SILL CANNONEER

Zoe Renfro, principal of the new Bradley County Virtual School in Cleveland, Tenn., says winning administrative, school board and community support for their grades 3-12 school was a challenge. “They went to brick and mortar schools,” and weren’t convinced students could get a quality education online, says Renfro. “It’s taken some time to show them there are curriculum providers out there who are writing and providing a good, rigorous curriculum.”<sup>14</sup>

### Seat-Time Funding

Funding based on Carnegie seat-time reimburses school districts for the amount of time students are physically present (typically 180 days a year). Such rules were put in place in the early 1900s as a reform measure ensuring all American children had access to education. Today, though, such rules are counterproductive.

“The seat-time policies didn’t foresee online courses and learning,” says Susan Patrick, CEO of the International Association for K-12 Online Learning (iNACOL). “They are clunky and limit what a district can do in terms of online and blended learning.”<sup>15</sup>

In recent years, states have started moving away from seat-time policies. Thirty-six states have adopted policies that allow for credit-for-performance rather than time spent physically in class. In 2009, New Hampshire did away with seat-time policies entirely, requiring high schools to comply with a competency-based model.<sup>16</sup>

“Kids should be allowed to move on when they’ve mastered the content,” says David Haglund, principal of Riverside Virtual School in California. “If we’re going to focus on learning, we’re going to have to let go of arbitrary constrictions relating to time and place. From my perspective, the only way to do that is to engage learning 24/7 and focus on competency.”

Haglund says it makes more sense for schools to be paid based on student outcomes, not seat time. “We are

incentivizing the wrong things. We need to put our money where our priorities are. If our priority is to keep kids in chairs while their parents are away, I’m pretty sure we don’t need to have people paid \$90,000 a year to do that work. If we paid schools based on their outcomes, maybe we would see a shift in focus in the work and a subsequent improvement in learning. As my dad always warned me, you get what you pay for.”

Riverside has introduced language in the California legislature that would reimburse the district based on demonstration of competency in online courses. “Don’t pay us until our kids demonstrate proficiency,” he says.<sup>17</sup>

The 15-year-old Florida Virtual School already follows this principle; it is reimbursed only after students master their courses.

### Disparate Learning Systems; Lack of Standardization

Instructors using digital curriculum products from different vendors may find themselves faced with learning several different interfaces — not something busy instructors want to take the time to do. Disparate learning systems may also not offer interoperability with learning management systems. Middleware that allows for easier, more cost-effective integration of content and platforms is one solution.

Organizations such as the IMS Group and the Association of Educational Publishers (AEP) are working to develop and foster the use of common standards for digital materials. This would allow digital content from publishers, third-party providers and others to be more easily integrated into a school or college’s learning environment, making these products more likely to be adopted by instructors. The AEP, for example, supports the Learning Resource Metadata Initiative, which would create a standard framework for the online tagging of educational content.<sup>18</sup>

Another issue with digital content at both the K-12 and higher education levels has been a tendency for institutions to adopt standardized software solutions that may not be adaptable or customizable for various disciplines — leading educators to reject using these products and instead build their own. In recognition of this problem, future learning content models may shift to a less structured, hierarchical approach in favor of more organic dissemination and collaboration.

Additional challenges when moving to blended and virtual environments include:

- **A lack of formal training or certification in technology integration in most teacher preparatory programs.** Many new teachers arrive in classrooms not knowing how to use online and blended learning technologies and must learn on the job.
- **Intellectual property concerns.** Which material found online (and how much of it) can be used legally by instructors? While fair use and TEACH Act provisions provide guidance, there still remains gray areas for instructors planning lessons, especially those that include digital content excerpts.<sup>19</sup> Another issue: Do instructors maintain any rights to their lesson materials, videocasts or audiocasts? University policies can differ quite significantly.<sup>20</sup>
- **A potential confusing new dynamic for administrators, teachers and students.** Shifting to a blended learning environment can be especially tricky because the existing on-site structure is still largely maintained, yet with new roles for teachers, administrators and students. Proper training and understanding of the new learning dynamic is essential to the transition.
- **Network access and security concerns.** These must be addressed to support the shift to vastly increased student access. ■

**Despite these challenges,** research continues to show that blended and virtual learning are equal to or better than face-to-face learning.

- ✓ **Eighth-grade algebra students in a blended learning class outperformed counterparts in a traditional classroom setting,** according to a recent study by researchers from the American Institutes for Research and Education Development Center. The study compared 218 students who studied online at school with 222 students who received classroom instruction. The online students were proctored by a math teacher and also had an online math instructor assigned to them. At the end of an academic year, the online students scored slightly higher than the control group and were twice as likely to take advanced math classes.<sup>21</sup>
- ✓ **Nonprofit researcher Ithaka recently studied blended learning,** comparing students at six public universities to test efficacy. The students were divided into two groups, with one taking a course in hybrid fashion and the other taking a traditional course. Result: The hybrid group got the same scores as traditional learners, but took less time to complete their courses.<sup>22</sup>
- ✓ **In a 2009 meta-analysis of online and blended learning,** the U.S. Department of Education found these types of learning were just as effective as face-to-face learning, with blended learning offering the best results.<sup>23</sup>



FLICKR/AUGUST JENNIFER/COURTESY UMSEL



All aspects of campuses need to evolve to support the transition to blended and virtual learning. School district libraries are now hosting Digital Bookmobiles (an alternative to the traditional bookmobile) to engage students with e-books, audiobooks, music and video.

# THE SUPPORT ECOSYSTEM:

## WHAT'S NEEDED TO MAKE IT WORK

Moving into the blended and virtual learning frontier requires a strong support system that includes both human and technology resources, and updated policies and strategies. This support ecosystem expands outside of the traditional classroom and reaches across all departments and areas of a campus.





Teachers at the virtual public school, Connections Academy, interact with students on the phone, over the Web, and at in-person field trips and social activities.

FLICKR/CONNECTIONS ACADEMY



**For some additional resources** about instructional design degree and certificate programs, visit the following sites:

- ▶ [www.learningsolutionsmag.com/articles/670/](http://www.learningsolutionsmag.com/articles/670/)
- ▶ [www.bls.gov/ooh/Education-Training-and-Library/Instructional-coordinators.htm](http://www.bls.gov/ooh/Education-Training-and-Library/Instructional-coordinators.htm)
- ▶ [www.instructionaldesigncentral.com](http://www.instructionaldesigncentral.com)

## The Learning Staff

To transition to blended and virtual learning, a host of support staff is needed, both inside and outside the classroom, covering everything from aides and IT workers to special education paraprofessionals and counselors to library specialists. Often, these roles are changing and evolving with the move to online learning.

When students are studying online coursework in classrooms or computer labs, it may make sense for lesser-trained (and paid) paraprofessionals, facilitators or others to be on hand for support, leaving certified educators for higher-level interactions.

Proctors assigned to watch students taking tests may be able to do this virtually, allowing students to take tests from home rather than having to travel to an in-person, proctored test site. Services exist that let proctors monitor students through their computers' webcams. The proctors also monitor the students' computers to make sure no unauthorized programs are being accessed. Students can't take screenshots or look up answers if forbidden by examiners.

In foreign language classes, a district might employ a limited number of teachers certified in specific languages, being unable to afford to have this teaching repertoire in every school every day. But a language lab

can tap the teachers remotely for a certain number of hours per week (including different teachers from different schools, depending on language specialty), with

a facilitator or paraprofessional on hand to supervise and prevent problems, thus allowing more students to receive varied language instruction while still containing costs.

Librarians, too, have a changing role: Today's librarians, whether in higher education or K-12, "have to be much more IT-sophisticated," and have become digital curators and archivists, says Vicky Phillips, CEO of GetEducated. "Still there are very few library science programs even online that have an emphasis on digital."<sup>24</sup>

The role of the IT professional in education is also shifting, as more maintenance and traditional IT duties are being outsourced to cloud-based services. For some, this may mean a move to instructional development and design. Master teachers with tech skills also may move into these positions.

"The trend I see is for technology departments to become less of a technical department and more of an instructional department," says Aaron Slutsky, director of technology for McDowell County Public Schools in North Carolina. "I would like to grow our instructional side and have a group of facilitators who are in the classroom helping teachers integrate the technology into the curriculum."<sup>25</sup>

Although this trend is not widespread as of yet, districts are acknowledging the need to get better

at supporting the technical educational needs to facilitate these new learning opportunities. Also, a variety of degree and certificate programs — many online — have surfaced in the last decade in the field of instructional design. Districts and colleges also may use the services of online curriculum developers, subject matter experts, content writers and others.

## Collaborative Technologies

Beyond personnel, another key to making e-learning initiatives successful is collaborative technology. Having a flexible, user-friendly LMS can help instructors and students maintain the communication needed for successful online learning.

Another collaborative tool that is increasingly critical: video capture, where educators record lectures, lessons and other material for students to watch later, either as a download or streamed material.

Lecture capture is growing rapidly in higher education. More than two-thirds of online courses at the community college level use some type of online collaboration tools, according to the Center for Digital Education's 2011 Community Colleges Survey.<sup>26</sup> Additionally, in another recent university study, recorded lectures and other content were found to increase student comprehension and test prep, and helped some students score more highly on tests.<sup>27</sup>

At North Arkansas College, 90 courses are recording lectures and 84 percent of students say they'd like to see more use of this technology in future courses.<sup>28</sup> Pace University in New York views lecture capture as a way to serve

Students interact with each other and digital content at the Colorado Springs School District 11 Internet Cafe.



DEREK SWANSON

students located in other countries (and time zones). “We know that recorded lectures are an important part of distance learning courses that can attract students from around the world, who will add to the rich cultural experience of the university,” says Shikha Bajracharya, director of user services.<sup>29</sup>

University of Maryland College of Dentistry students report on end-of-year surveys that they find recorded lectures to be extremely valuable, says James Craig, educational consultant for the school. “Students will say if it wasn’t for lecture capture, they wouldn’t have graduated,” says Craig. “Many students select us because of that.”<sup>30</sup>

Within K-12 schools, video capture is still a small segment, though growing. The primary use in K-12 is professional training. Sometimes rural schools will use it to offer AP courses they can’t provide on location, rather than having students travel.

Videoconferencing is another rising element. It is becoming more affordable, allowing teachers to connect students with other students, experts and outside-the-classroom virtual field trips. Students can collaborate with another classroom within their district, in another state or another country. They can use mobile devices to join lecture discussions that they can’t attend in person.

Lecture capture and videoconferencing work most smoothly when there are dedicated room systems, letting teachers focus on teaching rather than lights and cameras. Such room systems might have touch-panel control systems in the instructor’s podium to view students connecting on mobile devices or computers.

In one such configuration, students call into a bridge mechanism that allows the professor to see their faces in a Hollywood Squares-like display, with each student’s face in a small box on the screen. The instructor controls what is displayed; students are usually shown only during discussions or question-and-answer periods.

These specialty rooms are outfitted with multiple cameras (including ones that can sense and respond to whomever is speaking) and special sound and lighting equipment. If rooms aren’t available, cart-based systems can be wheeled from classroom to classroom. Desktop capture is another alternative — using a classroom computer to do the recording.

Instructors now have the ability to annotate over presentations, such as on interactive whiteboards; these annotations can be captured as part of the lecture so students don’t see just the instructor’s face, but also the material being presented and annotated. The whiteboarded material can be saved as a PDF file or other format and made available online or via email after class. Teachers can present other content, websites and so forth. Document cameras can show 3D objects on these screens.

Medical simulation capture can involve three or four different angles captured simultaneously, as at a nursing lab at Douglas College in British Columbia. The college was experiencing a shortage of nurses and nursing instructors, so recorded several angles simultaneously

of nursing students working with medical simulation mannequins.

Some classrooms of the future can cost \$100,000-plus and be fully tricked out with video and audio tools to capture the classroom experience. A more typical classroom capture setting with video costs \$15,000 to \$30,000, including projection technology, controls for lights and audio, and fixed cameras. Some universities are tiering their video capture classrooms, so that some rooms have higher-level capture tools than others, with courses scheduled accordingly. Universities may fully outfit 10 percent of their rooms, and then work in coming years to add equipment to others as funds become available.

Some believe for-profit institutions can afford to adopt these technologies faster than public institutions, where budgets are tight. Yet this technology can be a cost-saver for institutions: rather than build or expand classroom facilities and large lecture halls, they can offer classes online (maybe with a smaller number of students showing up for in-person lectures).

### Digital Learning Content that is Interactive, Adaptive and Guided

Digital content today is not just a repurposed textbook, but rather material that can include video and audio elements, games, puzzles, quizzes and tests. Schools and colleges can pick from prepackaged courses, individual learning objects that are available a la carte and open source



The University of Alberta in Canada accommodated the IP address needs of 38,000 students and 14,000 faculty and staff by using an automated management software solution.

Flickr/JASONWOODHEAD23

students. Students can join Web-based social communities to interact with other students, including those who are natives in the language they are studying. Lessons could include activities such as sending a text message in a foreign language or performing a mock job interview in another language (recorded for the teacher to see).

Online curriculum increasingly is mirroring what's being taught in the brick-and-mortar classroom. "We're shifting away from a high level of difference," says Greg

Ottinger, director of online learning for the San Diego County Office of Education.<sup>32</sup> The classroom and home learning experiences are becoming more similar today, letting students move back and forth between them (such as during an illness). The remote student can participate and have the same opportunities at home with the same learning tools and resources as those in the classroom.

School districts in most states will want digital content to be Common Core compliant. As these standards are being implemented, it is key for K-12 teachers to have material available that has been aligned to the standards they need to teach. Or, for the handful of states that have not adopted CCSS, it is important for teachers to have state standards-compliant material.

States getting ready for Common Core implementation and assessment can look to Michigan and South Dakota for an example of how to use resources to help schools prepare. The two states are paying teachers to locate open access, Common Core-aligned resources, such as digital learning objects, and post them to Michigan's open source digital resource portal, MORE (Michigan Online Resources for Educators). Michigan is welcoming other states to join the effort.<sup>33</sup>

Alabama is also providing Common Core materials through its online Alabama Learning Exchange (ALEX).<sup>34</sup>

### Updated Procurement Policies

Procurement policies for online digital materials are often overly complicated and inflexible. "Up until 15 years ago, we focused on only one type of content delivery: textbooks," says Wise. "But buying a textbook with a lifespan of four to six years versus buying digital content that is updated daily is a far different situation. Those procurement rules need to be revisited and in many cases completely changed."<sup>35</sup>

Using purchase orders to buy content pieces, such as online textbooks, remains an area of difficulty for campuses. Administrators might see deals on consumer sites, such as Amazon.com, and want to simply buy items in bulk this way, but districts work with purchase orders and can't buy downloads. In addition, state contract vehicles that would speed up the purchasing process are not readily available in every state for all potential digital curriculum providers. It is also more common for state departments of education to allow digital content add-ons to existing textbook contracts, rather than allowing the purchase of a full digital curriculum replacement.

Colleges shifting from print to digital textbooks can take months to negotiate the change with publishers and prepare for e-books that students can read on mobile devices. Even once purchased, publishers can impose restrictions — such as limiting content access to one device per student or restricting the number of pages a student can print.

One new initiative brings together 28 schools in a joint effort to receive deeply discounted e-textbooks, viewable via Internet2's NET+ cloud-based collaborative purchasing system. The effort should help students save money (the average student spends about \$1,000 per year on books).<sup>36</sup>

Some states (including Florida, West Virginia, Utah and Idaho) are unbundling content, enabling schools

(free) content, or they can create their own content. Some learning courses are customizable, allowing instructors to rearrange units, add their own projects or even film themselves on Web cameras to incorporate into lessons. With a few clicks, teachers can include video of themselves, including news on the fly in a daily lesson or activity.

"Technology means teachers don't have to keep repeating the same lecture but can find content materials and authorities across the globe that will best move their students forward," says former West Virginia Gov. Bob Wise.<sup>31</sup>

Instructional programs can be used in or outside the classroom, with students working on personalized lessons, at their own pace. Continuous formative assessment built into content adjusts the material instantly to a student's performance.

With foreign language content, studio coaches can work online with students to practice conversations with native speakers (students can see them via video presence). Students can record video and/or audio of themselves practicing lessons for a teacher to hear and assess; they can also see a graphic display of their audio waves and match this pattern to that produced by a native speaker. Teachers can record replies to

to obtain content from a variety of sources. Content can be broken down into individual parts and purchased a la carte, so that digital learning objects, chapters and other bits of material can be purchased separately.

### Tailored IT Security and Solutions

The virtual and blended learning frontier has a variety of security needs. Integrity of online assignments and tests is one concern. Districts and colleges need to prevent cheating and take steps to ensure, as much as they are able, that the online student turning in the homework or taking the test is the student receiving credit.

One strategy is requiring “two-factor authentication” or “multi-factor identification” — such as having university credentials and a PIN to log in. Virtual proctors are another solution, making use of cameras in classrooms to watch for cheating during tests.

FERPA (the Family Educational Rights and Privacy Act) is another concern: to receive funding, administrators must ensure confidentiality and integrity of information. Administrators need to make sure the right person has the right level of access and that Web servers are secure, so data is protected. Managing back-end infrastructure is also important. Many institutions are now using hosted applications but with access control to ensure confidential information isn’t leaked.

On the other hand, having to re-authenticate repeatedly during the course of a school day is frustrating for students, faculty and staff. An instructor might need to know multiple passwords and usernames in order to sign in for various classes, databases, vendor sites, student accounts and so on. Single sign-on is preferred, though not always possible. Still, programs and services exist to provide authentication and password management assistance.

Additionally, mobile devices can represent a challenge for institutional networks. In the past two years, Indian River School District in Delaware has gone from almost no mobile devices

to more than a third of devices being mobile, says Patches Hill, technology systems manager. The district recently installed a mobile device management solution to help push configurations and control settings while improving security. “We will now be able to make a change on devices without students and teachers bringing them into a central location,” says Hill.<sup>37</sup>

Multiple devices coming onto networks mean IP address management is needed. The University of Alberta in Edmonton, Canada, needed to accommodate IP address needs of more than 38,000 students and 14,000 faculty and staff. A software solution allowed the university to reduce the complexity of managing IP addresses across multiple platforms. Putting in automated management allowed the university to reduce administrative costs, while enhancing reliability, manageability, scalability and security.<sup>38</sup>

### New Branding and Marketing Strategies

Branding is important for recruitment, especially in a crowded, competitive field. How do campuses set themselves apart?

More students are starting to look at return on investment for their education dollars. Will an educational institution provide them with the 21<sup>st</sup>-century skills they will need in the marketplace (which could include video capture/conferencing as well as a general environment of technological innovation)?

Ivy League schools are jumping into the online world. Yale, Harvard, Stanford and Columbia all have begun offering online courses for credit in recent years. The \$25-million funded Minerva Project aims to begin offering an Ivy-League level education in a fully online mode, cutting costs to about \$20,000 per year, starting in 2014.<sup>39</sup>

Marketing is relevant not only in higher education but also in K-12 education, where parents are being asked to decide between public and private schools or between charter and traditional schools.

Achieve K12 is a four-year-old, fully online K-12 school in Colorado Springs, Colo., serving about 200 students (and growing: the prior year’s enrollment was 60). Students take courses online but can come to school for tutoring sessions with their teachers. Achieve K12 also offers on-site art and physical education programs.

About 30 of the students in the most recent year were elementary students from grades 2 through 5, says Assistant Superintendent Robert Curran. “We see a lot of parents who would generally home school their children, but they decide on this because we provide the curriculum. They have the ability to be home with the student.”

Achieve K12 competes with “a ton of online providers within the state,” says Curran, plus programs at neighboring school districts and a state online program. “It’s gotten to be a very competitive environment.”<sup>40</sup> ■

### Best Practices for Online Pedagogy Services

- ✓ Build a community (example: have students embed photos and videos of themselves, their hobbies and interests)
- ✓ Use appropriate formative and summative assessments
- ✓ Foster collaboration
- ✓ Instill the “4 Cs” of 21<sup>st</sup>-Century learning (creativity, critical thinking, collaboration, communication)
- ✓ Remember that tech tools are subordinate to educational objectives: map out first what standards you want to achieve, then find the tool to help students get there



# THE ENHANCED, EVOLVING ROLE OF EDUCATORS

**E**ducators are key to successful learning, whether online or not. Yet it's not always easy for them to transition from one field to the next, or to juggle the demands of a blended classroom, especially since many are not trained in online skillsets.

Former Gov. Bob Wise says the shift to a blended, technology-infused environment is good for educators. "I think it's a positive shift and it enhances the role of the educator; it doesn't diminish it," he says. Beyond being a guide on the side, today's instructors are more like educational designers, he says, using technology tools that allow them to work on an individual basis with students, knowing their strengths and weaknesses, and helping design their most successful learning path.

Parents' biggest concern about their children using technology in school, says Wise, is that it will depersonalize the process. Yet, he argues, despite constrained budgets, "layoffs for laptops" and political rhetoric that negatively portrays the profession, "The educator is still the most critical element in school. The educator has a much greater ability to bring about successful outcomes."<sup>41</sup>





FLOPPYMACSD

Online learning systems can do much to help students learn, but they can't replace the human connection students make with instructors, nor the influence they have, especially in a blended model where there remains some element of face-to-face contact.

"I spent 10 years teaching in an inner-city school," says Greg Ottinger, director of online learning for the San Diego County Office of Education. "There is a huge difference between a curriculum saying 'click here and here and do it again' versus a teacher

looking at a student and realizing 'this student hasn't had breakfast in three consecutive days; this is a problem.'"<sup>42</sup>

Teachers may worry that they are going to be replaced by technology. When they see such programs in action and discover their continuing role, such fears may ease. They also may appreciate the support technology can provide them in helping plan individualized lessons and track student analytics.

In a blended or virtual system, teachers are still teaching; they are still providing support,

encouragement and empowerment. Even more importantly, technology allows them to get to know their students on a much deeper level; they're not trying to teach to a large class, all learning the same subject at the same time.

Many learning programs provide student data through a learning management system, such as formative assessments and other analytics. New frontier teachers need to be able to interpret this data in order to best provide differentiated instruction.

## The Roles of Educators in Online and Blended Learning Environments

The roles of educators are constantly evolving, especially when it comes to blended and virtual learning. These images represent four of the common roles found in blended and virtual learning environments. The ideal blended and virtual educator would most likely incorporate aspects from all four roles.



### SUPERVISING SELF-GUIDED INSTRUCTION

In blended learning environments it is common for students to self-guide themselves through the curriculum. In this case, lesser-trained (but still paid) paraprofessionals or facilitators can supervise certain classes to make sure students stay on task.



### LECTURING WITH THE SUPPORT OF TECHNOLOGY

Although increasingly less common in blended and online learning environments, educators are still required in certain situations to feed information to students — similar to a lecture in a traditional classroom structure. Online and blended educators, however, have the advantage of using technology to supplement lectures.

### Differences Between Online Teaching in K-12 and Higher Education

As Metropolitan Nashville Public Schools began adding virtual and blended learning last year, administrators initially chose part-time online college instructors as teachers — but realized there are differences between how courses are taught online in college and in K-12.

“What they are required to do at the K-12 level is significantly different from what they do at college,” says Kecia Ray, executive director of learning technology. Courses are paced differently, while

students need reminders to log in and to do assignments. “In college, the attitude is that the students are in college so they should know how to do this by now. In K-12, that can’t be the case. You really have to pull them along, encourage them, and help them adapt to this environment.”<sup>143</sup>

While online educators at colleges and universities may expect independence from their students, they still need to keep lines of communication open and be responsive for online learning to be effective.

“The educator is still the most critical element in school. The educator has a much greater ability to bring about successful outcomes.”

— Bob Wise, Former Governor of West Virginia and Head of the Alliance for Excellent Education



#### MAKING REAL-WORLD CONNECTIONS

A highly trained online and blended learning educator achieves a proper balance of teaching students and guiding students in their own learning. They also make real-world connections with their lessons, with the aid of technology.



#### TEACHING IN A PURELY VIRTUAL ENVIRONMENT

In a purely virtual/online learning environment, students drive their own learning and advancement through the curriculum, while educators are available via online chat or video presence to answer questions and intervene when necessary.

## Key Instructor Traits for Blended and Virtual Teaching

Successful online teachers need to be able to:

- Use student-centered instructional strategies to encourage active learning and interaction
- Identify tech tools and strategies to move project-based learning into the online environment
- Collaborate with colleagues through the use of Web-based tools
- Use asynchronous discussion tools and social media tools
- Understand accessibility; know the relevant laws and regulations related to Section 508 and the Americans with Disabilities Act (ADA)
- Know how to develop and deliver assessments, projects and assignments that meet standards-based learning goals
- Understand the changing role of the online teacher to online coach

*Courtesy of Greg Ottinger, Director of Online Learning, San Diego County Office of Education*

GetEducated.com collected data from about 1,000 online college students to find leading causes for dissatisfaction with their schools. The chief complaint, says GetEducated CEO Vicky Phillips, is related to inadequate instructor interaction.

“The number one complaint by far is: ‘Where is my professor?’” she says. “They’ll say, ‘I could have learned as much by buying a book.’ They feel they are not getting any mentoring, guidance or feedback.”<sup>44</sup>

### Professional Development: Training Needed in Online Teaching Skills

“Teachers are not often trained in online and/or blended instruction,” says Susan Patrick, iNACOL CEO. “In the 21<sup>st</sup>-century, there’s a huge need for teachers to be coming out of teacher prep programs with a wider range of skills.”<sup>45</sup>

K-12 teachers are not the only ones lacking training in online teaching. Only about half of 183 two- and four-year colleges had formal training in place for faculty to teach online, according to the 2010 Managing Online Education survey by WCET and the Campus Computing Project.<sup>46</sup>

One way to gain training in online skills is from content providers, which typically provide professional

development to help teachers become acclimated to the product and create their own tasks or lessons within the framework of the software.

Professional learning communities also exist online, supported by learning software providers, education associations and educational institutions. These allow teachers to compare notes on online teaching practices and can be a source of ongoing coaching, mentoring and support.

A new national program offering certification for e-learning teachers is Leading Edge Certification, run by a nonprofit alliance of educators, universities and educational agencies. Leading Edge began certifying online and blended learning teachers in 2011 and administrators in 2012.

“The vast majority of the teaching force out there and administrators as well have limited experience in an online and blended environment,” says Mike Lawrence, Leading Edge founder. “I see a massive chasm in the skillset of teaching online.”<sup>47</sup>

One aspect of online teaching that instructors need to prepare for is the increased time-shifting by students of their lectures. At the University of Maryland College of Dentistry, all lectures are recorded; some classes give students the option to attend in-person, remotely or not at all.



However, implementing lecture capture is not without its difficulties. When the system was first put into practice, some faculty members were uncomfortable with the idea of attendance not being mandatory. Faculty and students have been able to compromise on the issue, and some classes at the school have mandatory attendance, while others do not.<sup>48</sup>

### Transitioning to Online

Julie Young, CEO of Florida Virtual School (FLVS), says full-time teachers



SHUTTERSTOCK.COM

should spend a day in a kindergarten or first-grade classroom as part of an orientation to blended learning, because they can get an appreciation for what it's like to have multiple students pursuing multiple paths simultaneously.

"You could have a phenomenal classroom teacher who comes to Florida Virtual School and is miserable," says Young. "They may be phenomenal because they are great entertainers and very engaging in class, but when you come to any virtual school and see how to have these same

traits in an online environment, it's not always easy."<sup>49</sup>

Other teachers may struggle in a traditional environment, but find it easier to teach and excel online because everything is not done in real time; teachers have time to plan for their next student interactions.

Mentors can be helpful for teachers new to online and blended learning. At FLVS, "star teachers" are paired with new teachers to "shepherd them through their first year," says Young. Mentors are available 7 a.m. to midnight for teacher calls. ■

**"Full-time teachers should spend a day in a kindergarten or first-grade classroom as part of an orientation to blended learning, because they can get an appreciation for what it's like to have multiple students pursuing multiple paths simultaneously."**

— Julie Young, CEO,  
Florida Virtual School



# Effective Leadership Goes a Long Way

Administrators Inspire Change from the Top Down

It's important for administrators to ensure that stakeholders understand "that online and blended learning is not replacing good instructional practice," says San Diego County Office of Education's Director of Online Learning Greg Ottinger. "Online learning equals learning — period."<sup>50</sup> It just uses a different technique to get there.


Nonetheless, it can be challenging for administrators to dismantle

long-term structures to put today's new, student-centered, personalized learning models in place. Administrators may not know where to start. Pilots are helpful to show effectiveness and try out different models before attempting large-scale change.

Administrators also need to ensure blended and virtual schools are appropriately prepared with digital assets (multimedia, engaging content), content mapped to

standards and an LMS (including a way for data to be managed).

When Metro Nashville Public Schools decided to make the transition to online and blended learning, administrators first located a "lead innovator" at each school who would be specially trained and rewarded. Administrators found their innovators by going into schools and asking principals for recommendations — not for the most tech-savvy



Principal Terry Dade, from Graham Road — Focus School for Language and Fine Arts in Virginia, responds to a teacher's comment during a collaborative team meeting before school where he and the school's teachers meet to discuss and share new teaching methods and skills.

can't describe how amazingly motivating it is for an educator to see kids that engaged and excited about learning, especially in a district like ours."

Effective administrators also help staff avoid frustration and "getting buried in the minutia of it all," says Ray. "Our director of schools has provided focus with plans for improvement. ... He's empowered us as executive directors, and assistant and associate superintendents to make it happen. Leadership is key, especially at the top."<sup>51</sup>

Riverside Virtual School started first as a supplemental course provider in Riverside, Calif., during the 2005-2006 school year. Administrators traveled extensively around the country to see other online schools firsthand and learn best practices. "We looked at other programs and asked them about missteps they made in the process and what they did well," says founding Principal David Haglund.

Now, Riverside's success has led to it becoming the destination for education departments and school districts worldwide that are considering virtual and blended learning programs. In the past 18 months, says Haglund, more than 300 districts have visited from around the U.S., Korea, China, Japan and Australia.<sup>52</sup>

Mike Martirano is superintendent of St. Mary's County Public Schools in Maryland, which saw graduation rates improve within the first year of its new blended learning program. Martirano shepherded the transition despite facing a \$13 million district budget cut.

One key factor in the program's success, he says, was enlisting the support of others within the district and not trying to force changes in isolation. Guidance counselors helped identify students who could

## Questions to Ask when Planning a Blended or Virtual Transition

- What, and when, is the ROI?
- If you outfit a room to connect virtually, is it going to work reliably?
- Will you buy devices for students or allow them to use their own?
- If students connect with their own devices, what security and infrastructure measures are in place? Are there restrictions on device type?
- If you plan to use a flipped classroom model, what measures have you taken to ensure equity of access, so that students who don't have home computers, Internet connections, or other resources aren't at a disadvantage?
- Have you investigated content solutions? Have you been given a try-out so you and your teachers can examine firsthand the program you are considering?
- Have you investigated open source options or considered having staff create curriculum?
- What do you plan to do to foster student engagement and socialization?

benefit, IT provided technical support, teachers provided the digital content in a blended learning environment and tracked data, and SMCPS put a principal on special assignment to coordinate the implementation at the school level. "We did not leave it to chance; we didn't just throw it out there," Martirano says.<sup>53</sup>

This type of collaboration helps ensure better buy-in from the outset, leading to easier implementation. Also key: assuring staff the implementation of blended learning is not aimed at replacing their jobs, rather another way to reach all students. ■

teachers, but rather for the teachers who have the most engaged students. Administrators then would watch these teachers in action.

"You just need one person in that school that believes it can be done," says Kecia Ray, executive director of learning technology at Metropolitan Nashville Public Schools, which serves about 81,000 students.

The shift to blended learning at Metro has helped the urban district — seven years ago a state take-over — improve its graduation rate and attendance, and see discipline problems fall.

"It is so uplifting to see kids in these environments," says Ray. "Words



Students from Connections Academy learn from home and parents act as “learning coaches.”

# Making Virtual and Blended Learning a Reality

**O**nline and blended learning programs are, on average, less costly than traditional programs, at least at the K-12 level. The current U.S. average per pupil expenditures for a fully online model is \$6,400 and for a blended learning model is \$8,900, according to the Fordham Institute. This compares to a traditional, brick-and-mortar average per-pupil cost of \$10,000.<sup>54</sup>

However, the main motivation to transition to blended or virtual learning shouldn't be to save money. “I get concerned when I hear anybody saying online learning should be less expensive,” says Greg Ottinger, director of online learning for the San Diego

County Office of Education. “It can be, but if you go into it to save money, you will probably put together a program that is doing a disservice to students.”<sup>55</sup>

However, in order to bring the benefits of blended and virtual learning to instructors and students in this economic climate, it is important to understand the online models, as well as technological and managerial strategies that are affordable and could help bring down costs.

## Curriculum Purchasing and Creation

There is a plethora of organizations that provide fully outsourced

solutions or complimentary virtual courses whether for specific subjects by grade level or for remedial work. These include K12 Inc., Apex Learning, ODYSSEYWARE, Compass Learning, Advanced Academics, Education 2020, Connections Learning, Brainpop, Discovery, Learning.com, Plato Learning, Cambium Learning, Adaptive Curriculum, American Virtual School, Renaissance Learning, Pearson, Follett, Houghton Mifflin Harcourt and many others.

Florida Virtual School creates its own content, which it sells not only nationally but also globally (57 other countries to date). The virtual school program also provides teacher and leadership training, all for a fee.

Riverside Virtual School in California also creates curriculum, but shares it with members of the California Open Campus consortia — it too charges for

training and other “wrap-around” services, says principal David Haglund.<sup>56</sup>

The University of Maryland’s dental school uses advanced video capture to record all professor lectures, including visual elements such as slide presentations. The school has begun selling its curriculum, including these lectures. A school in Saudi Arabia was a recent purchaser. Other institutions around the U.S., Jamaica and Africa have also contacted the University of Maryland School of Dentistry.

Districts and colleges also can save money by using free, open source content, of which there is a plethora, including customizable video (TED-ed), lectures and assessments (LearnZillion is just one of many examples).

For high-value digital elements that work for lesson or course building or with hardware solutions directly, there are a large number of companies to consider such as Echo360, Knovation, eInstruction, Promethean, Sonic Foundry, Rosetta Stone, Vernier, Qwizdom, Gaggle, Amazon, SMART Technology, Disney, Global Scholar and many others.

## Virtual Desktops

Both higher education and K-12 institutions can use virtual desktops to give students access to the applications and data they need from any device, anywhere and at any time — a boon to online learning as well as a potential cost saver.

Virtual desktops make maintenance much easier; IT can change applications at the server level, which then can be seen instantly by any machine accessing the virtual desktop (as opposed to going around to each machine and manually updating software or making other changes). Districts can make do with less expensive thin clients to access programs. Or, students can use their own devices, whether they are PCs, tablets, laptops or other mobile tools.

Virtual desktops also represent the wave of the future in supporting collaboration, allowing teachers and students to log in to a virtual workspace

to find whatever is needed and to communicate with others — no matter what operating system or equipment any participant is using.

The University of Connecticut (UConn), School of Business uses virtual desktop infrastructure (VDI) with its online and blended degree programs. Students can use any device to log in to their virtual desktop, where they can get access to a variety of high-level, business-oriented software programs provided by the school. Prior to VDI, the school leased laptops to students and, if software was changed or updated, had to send students disks for installation. With VDI, such changes can be made at the server level, once, which instantly updates the virtual desktop for all devices and saves IT maintenance costs.

The UConn initiative gives graduate business students a “persistent”

virtual desktop for two years, meaning student data is saved on secure servers so that students can log in from any number of machines and see the same information, software, tools and so forth. A “non-persistent” lab computer, by contrast, would offer the same software and interface, but would not keep data from one log-in to the next.

From a return on investment (ROI) perspective, VDI is “breaking even when it comes to capital expenditures,” says Jeremy Pollack, director of IT for the School of Business. However, “the added benefits in the higher education environment are absolutely priceless.” For example, VDI helps the online education experience run more smoothly, says Pollack. “This takes stress away from the faculty and students. Here’s your platform; it’s reliable; you can use it from anywhere. And there’s equitable access.”<sup>57</sup>



The University of Connecticut, School of Business uses VDI with its online and blended degree programs. Students can use any device to log in to their virtual desktop, where they can get access to a variety of high-level, business-oriented software programs provided by the school.

The university plans to use virtual desktops in other degree programs, supported by a new student fee. About two dozen other universities have talked to UConn to find out more about its use of virtual desktops, says Pollack. For now, VDI is a market differentiator for the program.

Institutions saving money by using virtual desktops include:

- Lake Land College in Mattoon, Ill., which saves \$80,000 annually in energy costs thanks to the virtualization of 1,800 desktops.
- Tyler Independent School District in Tyler, Texas, expects to save \$3 million over five years by swapping aging desktops for thin clients (2,300 in all).<sup>58</sup>

### Consolidating for Purchasing Power

To help trim costs, institutions are employing consortia to pool buying power. At Dallas County Schools in Texas, for example, 10 schools bought a county-wide block of virtualized desktops (representing 10,000 “seats”); they aren’t sharing the data centers but buying across consortium levels to save money.

The California Open Campus Initiative lets districts with online learning programs join together for purchasing power. “When I negotiate a contract

with a vendor,” says David Haglund, principal of Riverside Virtual School, “I am leveraging potential enrollments in over 30 districts, representing approximately 450,000 students.” This guarantees a better price than a district representing, say, 4,500 students would be able to achieve on its own.

In addition to access to group pricing, districts can share expertise, such as online teacher training from a district specializing in this service. (Riverside, for instance, sells professional development services to districts outside its consortium, even when the districts buy content from others.)

Riverside develops curriculum and passes this on for free to other districts. Its blended course enrollments have soared from 3,600 in 2010-11 to more than 22,000 this year. “That’s been enabled because content is freely developed and distributed,” says Haglund.<sup>59</sup>

School districts can see licensing costs drop significantly if they join with a larger group, saving as much as half on the cost of materials. Vendors may develop ad hoc groups that pair existing clients.

Another cost districts struggle to manage is infrastructure — increasing bandwidth to create the type of high-speed, reliable wireless connectivity necessary for blended learning. One school district found a way to achieve fast WiFi at low cost by leveraging Internet2 resources, made available to local school districts that could connect to university services.

Internet2 is the backbone that connects research universities globally. The K20 Initiative allows primary and secondary schools, libraries, museums and others to connect to Internet2 through a university member or state education network.

Barrow County School District in Winder, Ga., found it could join the University System of Georgia’s state-wide communications network, PeachNet, and

immediately receive bandwidth five times faster than their existing system.

Barrow, which had committed to STEM courses, now has the Internet connectivity to launch science education programs that previously would have been impossible — such as videoconferencing with science experts working in research labs or conducting interactive classes with marine biologists (in SCUBA gear and underwater) at the Georgia Aquarium. The district joined with Georgia Tech University to form a program, Direct to Discovery, aimed at helping other school districts bring students virtually into the research labs of working-class scientists.

### Enhanced Recruitment

Districts can gain funds for students who come into the system through state reimbursement. Students who have dropped out may come back if they can complete their missing credits through an online, at-home program; at age 19 or 20, many if not most would not be willing to do an in-class program.

Home-schooling families may be willing to put their children into a public school system if the learning occurs at home, where they can supervise and have input. Plus, their children can have the benefit of access to public school activities and groups (they can join band or the football team, even if enrolled in a virtual program).

### Staffing and Facility Usage


Online learning may mean ending night school or summer classes, since students can take these from home. This saves on facility costs.

Population bubbles can be tough to accommodate in brick-and-mortar institutions. How do you scale up buildings to serve a baby boomlet that then vanishes in 10 years? Online learning is more flexible and scalable at less cost.

Virtual and blended learning in general provide facility savings, since students do not need to use classes and lecture halls to the same extent when they are doing at least part of their learning from remote locations. ■

**For more information**  
about UConn’s VDI initiative,  
visit <http://vpc.uconn.edu/>.





## Steps to Deploying a Blended Learning Environment

1. **Establish a definition of what blended learning is going to look like** for you. (Will it be oriented around timeframe expectations or specific subject areas? Will it be designed for specific student needs such as remedial or advanced?)
2. **Develop a realistic plan**, with clear, measurable goals.
3. **Determine technology needs** and an implementation timeline.
4. **Train all key players** — administrators, teachers, IT staff, students and parents.
5. **Set up periodic reviews** and analysis — feedback will be essential, including feedback from students.
6. **Compare actual results** and implementation to earlier projections.

# Best Practices From the Field

The Center for Digital Education interviewed a number of education leaders from K-12 and higher education institutions with virtual and blended learning programs. They had a lot to say about what does and doesn't work. Here are some of the tips they shared.

## Make sure parents and students considering an online program understand at the outset what is involved.

**David Haglund**, principal at Riverside Virtual School in California says the word “virtual” in the school’s title can be misleading. “It communicates the image of what you see in commercials for online colleges — ‘you get to learn in your pajamas,’ which is far removed from what we do. Students interact routinely through the day with the curriculum and the program.” Parents and students need to grasp how much engagement and work is required and make an informed decision about whether the student should enroll.<sup>60</sup>

## Recognize that online and blended learning isn’t for everyone.

“Virtual courses are not appropriate for all students,” says **Brad Hellickson**, project coordinator for the Corona-Norco Unified School District in California, which is entering its sixth year of blended learning. “Establishing the correct set of filters for selecting students and applying them universally is very important.”<sup>62</sup>

## Try out services like lecture capture systems and learning programs before buying.

**James Craig**, educational consultant at the University of Maryland College of Dentistry, says the school was able to give its lecture capture system a trial run, which helps staffers see the need for such a system, and encourages buy-in. “Any opportunity to get a hands-on experience is key to having a successful program.”<sup>61</sup>

## Go slow to go fast.

This is a motto used at St. Mary’s County Public Schools in Maryland, says Superintendent **Mike Martirano**. In order to be most impactful, online and blended programs often need to be phased in over time. St. Mary’s began with a credit recovery program aimed at improving the graduation rate. In the coming year, original credit and AP courses will be added, and the program is set to expand into other high schools and, in subsequent years, to middle and elementary schools as well. Ensuring each step is successful makes the overall impact more significant than trying to do too much too soon and then failing.<sup>63</sup>

## Communication between student and instructor — whether at K-12 or higher education — needs to be regular and constant, to help ensure students stay on task.

Some learning programs, for example, won't let students advance if they can't score above a certain proficiency level. If students fall below this, teacher contact is needed. "We are in constant communication with our students," says **Janet Leistner**, director of the Evansville Vanderburgh School Corporation (EVSC) Virtual Academy in Indiana.<sup>64</sup>

## Students in K-12 virtual classes need to set specific daily or weekly times when they will do their school work.

**EVSC's Leistner** says, "We find if kids are not held accountable for when the work gets done, then it doesn't. We started out saying, 'Sure, log on when you can.' Well, they didn't. Now we have them plan something in writing: say, work from 7 to 8 p.m. three nights a week." If students don't log on as planned, teachers contact them right away to keep them on track.<sup>65</sup>

## Staff development needs to be emphasized.

**Corona-Norco's Hellickson** says, "The key to success of online instruction requires high-quality curriculum and teachers who understand the differences between teaching in a brick-and-mortar and a virtual environment. Much of our limited budget goes to conducting staff workshops to align curriculum to our district pacing guides, collaboration among our online staff and training in how to use the LMS."<sup>66</sup>

## Teachers need to build relationships with students and create an emotional connection, which can be difficult in an online environment.

**Matt Federoff**, chief information officer at Vail Public Schools in Arizona (which has both virtual and blended programs) explains that ways to do this include teachers responding in a timely way to student email with "authentic responses" (not canned messages), instant messaging, text messaging and videoconferencing. "Training teachers how to effectively communicate emotional cues and supports is almost as important as other pieces," says Federoff.<sup>67</sup>

**P**urely online learning at the K-12 level may not expand to a large population, says former Governor and Head of the Alliance for Excellent Education Bob Wise, because it serves a niche population — students who don't do well in traditional school, students with medical problems, students who need to travel for careers. However, as more experience is gained in online learning, it is likely that a broader spectrum of students will be taking more of their courses online and opting in to a blended learning model. We already see many states following Idaho and Florida's lead in requiring online courses before graduating from high school.

## What Will Become of Campuses in the Future?

The Alliance for Excellent Education also focuses on blended learning, believing it will have a much greater impact in coming years.

"We believe the technology used in virtual learning is now ready to be introduced in a massive way to blended learning. Instead of affecting just 5 to 10 percent of students, now we have the opportunity to affect 90 percent of students in a blended environment for at least the foreseeable future," says Wise.<sup>68</sup>

Over the next 5 to 10 years, the majority of high schools will look like blended learning environments, says Susan Patrick of iNACOL. "However, there still will be a need for individual online classes to fill in gaps, allowing students access and opportunity."<sup>69</sup> (Example: taking courses required by universities that aren't offered in their particular high school.)

Socialization is still an important aspect of education and is likely to remain so. Students need to learn to behave and

Northern Arizona University is developing three competency-based online degree programs that will rely heavily on online course materials. Students will work at their own pace, take exams when they feel they have mastered content and pay a flat \$2,500 every six months.

learn how to interact. Some, depending on their environment, will need to have a safe place to go where they can be supported and their talents guided.

Blended learning, taking the best from both online and face to face, is an easier transition for traditional schools than switching to entirely virtual, and is likely to be most characteristic of the new education frontier.

Students, then, will continue to use school facilities at least part of the time — and that means these need rethinking. Libraries, for instance, may be used more for students working on individualized learning programs on personal mobile devices than for students seeking books. Books on the walls may be of less interest to e-book reading students who would prefer the space be used for study or collaboration space.

Collaboration between students is important, especially at the K-12 level, so to allow this to happen, meeting spaces may need to be built or enlarged. At Metro Nashville's virtual high school, the district put in a physical space to support blended learning — an open space with tables and chairs that wheel together, TVs on stands where students share a projector and tables with built-in whiteboards that students can write on.

"We've not only adjusted the instructional side, not only introduced online learning to the traditional classroom, but we've shaken up the traditional classroom," says Kecia Ray. "It's like 3D blended. We're not just looking at how you flip the classroom. It's rethinking what does student engagement look like when you're seeking the highest level."<sup>70</sup>

Metro Nashville's hybrid students — who take both traditional and online courses — can use workspaces at the school (perhaps between traditional courses), where there are kiosks, recharging stations and study nooks.

Blended learning also may mean the end to agrarian school calendars, with long summers off. As students work at individual paces, taking a two-month break because children in agricultural communities 50 years ago

needed summers for harvesting seems increasingly illogical.

As more states drop seat-time requirements in favor of competency-based funding models, there will also be less reason for students to be in school five days a week, 7:30 a.m. to 3 p.m.

Wise expects in the next decade, students may go to "traditional school," but maybe not five days a week; they may do afterschool learning away from school.

Students may even go to school virtually, using augmented reality platforms such as Second Life, which already offers college courses and resources. For example, nursing students at the University of Texas at Arlington can practice disaster simulations in Second Life, as well as meet with other students and instructors for classes and conferences. The Horizon Report predicts increased use of augmented reality in the next four to five years.<sup>71</sup>

In the future we likely will see more institutions pairing up with others to share content, best practices and ways to improve teaching and access. An institution might pair up with another to share content in a subject area, or a community college might share resources with a local university or the local university might share content through the lecture capture medium with advanced students in K-12.

At the college level, a move to competency-based online learning is starting to be adopted by traditional brick-and-mortar schools, and likely will progress — especially as MOOCs and other innovations change the structure (and value) of traditional degree programs.

The University of Wisconsin recently announced plans to start a flexible online degree program in fall 2013 that will allow undergraduates to receive credit for concepts they have already mastered. Courses will be broken down into units and students can take tests to show they have already learned these particular units, saving their time to study just those parts of the course that they don't know.

"We're trying to find ways to reduce the cost of education," Robert Cross, chancellor of the UW Colleges and UW-Extension, told the Chronicle of Higher

"Instead of affecting just 5 to 10 percent of students, now we have the opportunity to **affect 90 percent of students** in a blended environment for at least the foreseeable future."

— Bob Wise, Former West Virginia Governor and Head of the Alliance for Excellent Education

Education. "Implicit in the model is the idea that you can take lectures online from free sources — like Khan Academy and MITx — and prepare yourself for the competency test. Then take the remaining courses online at UW."<sup>72</sup>

Northern Arizona University is partnering with education publisher Pearson to develop three competency-based online degree programs, relying heavily on online course materials and less on faculty support (instructors will be available on demand). Students will work at their own pace, take exams when they feel they have mastered content and pay a flat \$2,500 every six months.<sup>73</sup>

Online-only institutions, such as Western Governors University, have offered competency-based (over seat-time) credit for years.

Meanwhile, in another twist on the performance-based model, digital content publisher McGraw-Hill is taking accountability for student performance. In a deal with Western Governors University, McGraw-Hill says it will only get paid for its learning software if students earn a B or better.<sup>74</sup>

College students can also gain credit by taking free online courses, then taking exams and receiving credit through the American Council on Education (ACE).<sup>75</sup>

Alternative ways to recognize learning are being developed. For instance, digital badges that represent achievement, for instance, may be a replacement or adjunct to degrees and diplomas. The MacArthur Foundation is working with Mozilla to develop an open source platform that will offer a "digital badge backpack" in which lifelong learners can collect and display badges.<sup>76</sup> ■

Former Florida Gov. Jeb Bush reads to kindergartners during a visit to Tangelo Park Elementary School in Orlando, Fla.



## Moving Forward Toward a New Frontier

GETTY IMAGES/ORLANDO SENTINEL

**F**ormer Florida Gov. Jeb Bush, who also began the Foundation for Excellence in Education, called for further implementation of virtual education in an editorial in June 2012:

“When kids can learn in their style and at their own pace — not just that of the average student — all children will achieve. Those who are struggling receive the time and support they need to master the material. High achieving students will stay engaged and accelerate their learning. All students win.”<sup>77</sup>

College students also win with online learning; they, too, benefit from being able to access instruction they might not otherwise have been able to receive. Think, for instance, of the single mother in rural Texas whose circumstances

make it impossible for her to attend a traditional four-year college; she now can go online instead, studying from home to earn a degree and a better job. Another example: the soldier stationed in the Middle East, who is able to connect online and work toward a new post-service career.

Thanks to the new frontier, these types of college students and many others can take accelerated courses from wherever they happen to be; if they attend blended programs, they can often view lectures in ways that past generations were never able to — seeing their instructors via recorded video, which they can pause and rewind as often as they like, along with magnifiable slides, graphs and charts.

“Have an open mind, embrace it and move forward with a level of urgency.”

— Mike Martirano, Superintendent, St. Mary's County Schools, Md.

As the move to value competency over time spent physically sitting in classrooms continues to spread through K-12 education, students of all levels can work to their potential without being fettered by archaic, assembly-line systems that seek to keep them within the walls of classrooms for 180 days a year, learning pre-cut cookie-cutter curricula in equally prescribed doses. Instead, they can work at their own paces, from their own places, making new connections using today's tools and taking advantage of the wealth of opportunities this new freedom affords. Students may be able to benefit from more targeted instruction, gaining higher levels of achievement in the process. Institutions will need to adapt to this changing frontier, or find themselves overtaken by others that are more ready and willing to evolve.

There certainly are challenges for schools and colleges making the shift to virtual and blended learning. But the rewards are high. Customized, personalized learning is likely to lead to more student engagement. Students who are more engaged are more likely to be successful in school and to stay in school. With more careers requiring a post-high-school education (as former West Virginia Gov. Bob Wise pointed out, 60 percent of jobs today require college), more college graduates are needed. Providing virtual and blended options enables more people to attend college and find programs that meet their needs.

As Mike Martirano, superintendent of St. Mary's County Schools in Maryland, says about online and blended learning: “This is the future of education. A number of students require a different delivery model and we need to recognize that. Have an open mind, embrace it and move forward with a level of urgency.”<sup>78</sup> ■

“Academic video and lecture capture is going to have a dramatic impact. It already has. Today’s **students are very visual — they want everything video-based and time-shifted.** My recommendation for institutions considering video capture is to simply start recording. Don’t wait until you have perfect lighting or all the stars are aligned — it’s not broadcasting. The goal and opportunity is to capture and transfer knowledge as it takes place — immediacy of knowledge is invaluable.”

ROB LIPPS, EXECUTIVE VP, SONIC FOUNDRY

“The need for sequenced curriculum design is not going away. What changes when you go from print to digital is the potential for creative sequencing, but now it’s a flexible element and has more currency in the virtual environment. The innovation is around that sequencing which **allows teachers to adapt learning for an individual student.**”

CANDACE PETERSEN, PRESIDENT, LEARNING.COM

“Getting the best technology in the hands of our students and teachers is critical to improving educational outcomes and making sure students are prepared for college and career. With schools’ ever-tightening budgets, **Office 365 for education enables them to deliver new and innovative technology in the cloud** that will modernize teaching and learning practices, at no cost.”

ANTHONY SALCITO, VICE PRESIDENT,  
WORLDWIDE EDUCATION, MICROSOFT

“It’s undeniable that virtual and blended learning can improve student outcomes. Applied successfully, these approaches can personalize learning, expand institutional reach and stretch resources. One of the powerful things about technology is that it’s not a one-size-fits-all solution. **It allows educators to pick a solution along a spectrum that meets their needs.** I think that’s the future of education, personalization, not only to suit the needs of the student, but also to suit the approach of the instructor.”  
JUDY VERSES, PRESIDENT OF THE GLOBAL INSTITUTIONAL BUSINESS, ROSETTA STONE

“Classrooms (physical or virtual) must become inherently digital. By digital, we mean that all learner and teacher actions and non-actions should be captured for **rich and immediate feedback, insight and engagement.** As schools move to more digital experiences for learning, our ability to capture these digital learning events will drive student success.”  
CAMERON EVANS, U.S. CHIEF TECHNOLOGY OFFICER, MICROSOFT EDUCATION

“Blended and virtual learning models help us use technology and the Web to create education experiences that align with what we know today about learning. We know we all learn in different ways and **blended learning gives students the ability to learn in various forms** that are critical to their development and success. Virtual learning helps students connect with rich content and talented teachers from around the world, as they work in collaborative learning environments.”  
JAIME CASAP, GOOGLE EDUCATION SENIOR EVANGELIST

“Schools everywhere are seeing an influx of both students and faculty members using their personal devices, from PDA to Pad based, within the school environment. **The success and or failure of your BYOD device strategy hinges on your security and access strategy.** Your ability to have proper access, make sure it’s highly available and ensure that your assets and information are truly secure has posed many new challenges in our clients’ environments.”  
BILL S. ANNINO JR, VICE PRESIDENT OF DATA TECHNOLOGIES GROUP, CAROUSEL INDUSTRIES

“Technology is driving unprecedented change in the way that students learn. Education has taken a more customized and flexible approach. This means, **learning at your own pace, with your choice of curriculum media, on your own time schedule**, from a location of your choice. To deliver on this expectation, education IT providers must deliver solutions that protect the student’s academic and personal information, regardless of its location or device on which it resides.”

MIKE MAXWELL, NATIONAL DIRECTOR  
OF U.S. STATE AND LOCAL GOVERNMENT  
AND EDUCATION SALES, SYMANTEC

“Business Process Management (BPM) functions allow learning progressions to be tracked daily. We are presently piloting a program where students receive a daily schedule mapped to their learning needs on a flat screen, sort of like an airline departures board. This is the way to individualize education; students are more responsible for the journey and intake of learning, and teachers learn to guide and direct.”

JIM MARSHALL, PRESIDENT, PROMETHEAN



# Blended and Virtual Learning Lead to Powerful Results

## With Blended and Virtual Learning...

### Students achieve success

#### Graduation rates:

**3.1% Increase** — *Boston Public Schools*

**14% Increase** — *Los Angeles Partnership Schools*

**6.4% Increase** — *Houston Independent School District*

#### Dropout rate:

**5.4% Decrease** — *Denver Public Schools*

**Instruction is individualized** to fit every student's learning style and level of proficiency.

**Teachers engage one on one** with students, gaining a deeper understanding of individual academic needs.

*"We are able to engage students in their learning with the use of Apex Learning digital curriculum. As teachers, we become coaches who facilitate learning rather than instructors who lecture."*

*Nancy Lenhart, Teacher, Boston Public Schools*



### Learn More

Apex Learning is the leading provider of blended and virtual learning solutions to the nation's schools.

Visit [www.Apexlearning.com](http://www.Apexlearning.com) to learn more.

## Sponsors:



## Acknowledgements:

**JOHN HALPIN** is Vice President of Education Strategic Programs for the Center for Digital Education. As a veteran K-12 teacher, college professor and IT consultant, Halpin has been active in promoting the use of technology in education for over 25 years. He has led sales and marketing efforts for some of the largest technology companies and has written for various media outlets. In addition, Halpin is a frequent speaker on public sector technology issues for national professional associations, various state leadership councils and technology companies.

**LORNA COLLIER** has written about education and technology for the Chicago Tribune, THE Journal, Learning Solutions, the National Council of Teachers of English Chronicle, MSN Encarta, ATT.net, and many others. She is the former online editor for GetEducated.com, a website focused on distance learning.



**THE CENTER FOR DIGITAL EDUCATION** is a national research and advisory institute specializing in K-12 and higher education technology trends, policy and funding. Along with its research services, CDE issues white papers and conducts the annual Digital School Districts and Digital Community Colleges surveys and award programs as well as hosting events across the K-12 and higher education arena. CDE also supports the Converge media platform comprised of the quarterly themed Converge Special Reports, Converge Online, and custom publishing services.

1. CDE interview with James Craig, June 12, 2012
2. CDE interview with Janet Leistner, June 8, 2012
3. CDE interview with Mike Martirano, June 20, 2012
4. [http://sloanconsortium.org/publications/survey/going\\_distance\\_2011](http://sloanconsortium.org/publications/survey/going_distance_2011)
5. Ibid.
6. [www.tomorrow.org/speakup/2012\\_PersonalizedLearning.html](http://www.tomorrow.org/speakup/2012_PersonalizedLearning.html)
7. Ambient Insight, The U.S. Market for Self-paced eLearning Products and Services: 2010-2015 Forecast and Analysis
8. [www.innosightinstitute.org/media-room/publications/education-publications/classifying-k-12-blended-learning/](http://www.innosightinstitute.org/media-room/publications/education-publications/classifying-k-12-blended-learning/)
9. CDE interview with Vicky Phillips, June 20, 2012
10. CDE interview with Bob Wise, June 25, 2012
11. [www.udemy.com/](http://www.udemy.com/)
12. [www.tampabay.com/news/education/k12/article1209497.ece](http://www.tampabay.com/news/education/k12/article1209497.ece)
13. [http://sloanconsortium.org/publications/survey/going\\_distance\\_2011](http://sloanconsortium.org/publications/survey/going_distance_2011)
14. CDE interview with Zoe Renfro, July 5, 2012
15. CDE interview with Susan Patrick, June 8, 2012
16. [www.edweek.org/ew/articles/2012/03/07/23biz-state.h31.html?r=1988613152](http://www.edweek.org/ew/articles/2012/03/07/23biz-state.h31.html?r=1988613152)
17. CDE interview with David Haglund, June 28, 2012
18. [www.lrmi.net/](http://www.lrmi.net/)
19. [www.ala.org/advocacy/copyright/teachact/faq](http://www.ala.org/advocacy/copyright/teachact/faq)
20. [http://jolt.merlot.org/vol6no1/masson\\_0310.htm](http://jolt.merlot.org/vol6no1/masson_0310.htm)
21. <http://thejournal.com/Articles/2012/07/02/online-algerba.aspx?Page=1>
22. <http://carrington.edu/news/education/online-education-put-to-the-test-800780930/>
23. [www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf](http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf)
24. CDE interview with Vicky Phillips, June 20, 2012
25. CDE interview with Aaron Slutsky, Jan. 17, 2012
26. Center for Digital Education Webinar: "Digital Community Colleges Survey Overview," [www.convergemag.com/Digital\\_Community\\_Colleges\\_Survey\\_Overview\\_10-27-11.html](http://www.convergemag.com/Digital_Community_Colleges_Survey_Overview_10-27-11.html)
27. [www.sussex.ac.uk/elearning/audioandvideo/me2u](http://www.sussex.ac.uk/elearning/audioandvideo/me2u)
28. Center for Digital Education Webinar: "Tidbits About Blended Learning: Avoiding an Aversion to the Inversion of the Classroom," featuring North Arkansas College, [www.convergemag.com/events/webinars/Tidbits-About-Blended-Learning-Avoiding-Aversion-11-2-11.html](http://www.convergemag.com/events/webinars/Tidbits-About-Blended-Learning-Avoiding-Aversion-11-2-11.html)
29. [www.convergemag.com/paper/The-Flipped-Classroom.html](http://www.convergemag.com/paper/The-Flipped-Classroom.html)
30. CDE interview with James Craig, June 12, 2012
31. CDE interview with Bob Wise, June 25, 2012
32. CDE interview with Greg Ottinger, July 5, 2012
33. [www.convergemag.com/policy/Common-Core-Collaboration-Culls-Content.html](http://www.convergemag.com/policy/Common-Core-Collaboration-Culls-Content.html)
34. <http://alex.state.al.us/ccrs/>
35. CDE interview with Bob Wise, June 25, 2012
36. [www.ecampusnews.com/technologies/colleges-taking-a-team-approach-to-textbooks/](http://www.ecampusnews.com/technologies/colleges-taking-a-team-approach-to-textbooks/)
37. CDE interview with Patches Hill, July 11, 2012
38. <http://enterprise-webtv.alcatel-lucent.com/?dept=CustomerReferences&page=Display&id=30368>
39. [www.huffingtonpost.com/2012/04/04/startups-rival-ivy-league\\_n\\_1403978.html](http://www.huffingtonpost.com/2012/04/04/startups-rival-ivy-league_n_1403978.html)
40. CDE interview with Robert Curran, May 30, 2012
41. CDE interview with Bob Wise, June 25, 2012
42. CDE interview with Greg Ottinger, July 5, 2012
43. CDE interview with Kecia Ray, June 20, 2012
44. CDE interview with Vicky Phillips, June 20, 2012
45. CDE interview with Susan Patrick, June 8, 2012
46. [www.campuscomputing.net/item/2010-managing-online-education-survey-wvideo](http://www.campuscomputing.net/item/2010-managing-online-education-survey-wvideo)
47. CDE interview with Mike Lawrence, July 5, 2012
48. CDE interview with James Craig, June 12, 2012
49. CDE interview with Julie Young, June 28, 2012
50. CDE interview with Greg Ottinger, July 5, 2012
51. CDE interview with Kecia Ray, June 20, 2012
52. CDE interview with David Haglund, June 28, 2012
53. CDE interview with Mike Martirano, June 20, 2012
54. [www.edexcellencemedia.net/publications/2012/20120110-the-costs-of-online-learning/20120110-the-costs-of-online-learning.pdf](http://www.edexcellencemedia.net/publications/2012/20120110-the-costs-of-online-learning/20120110-the-costs-of-online-learning.pdf)
55. CDE interview with Greg Ottinger, July 5, 2012
56. CDE interview with David Haglund, June 28, 2012
57. CDE interview with Jeremy Pollack, July 2, 2012
58. [http://trendmag2.trendoffset.com/display\\_article.php?id=1080603](http://trendmag2.trendoffset.com/display_article.php?id=1080603)
59. CDE interview with David Haglund, June 28, 2012
60. Ibid.
61. CDE interview with James Craig, June 12, 2012
62. CDE email interview with Brad Hellickson, July 10, 2012
63. CDE interview with Mike Martirano, June 20, 2012
64. CDE interview with Janet Leistner, June 8, 2012
65. Ibid.
66. CDE email interview with Brad Hellickson, July 10, 2012
67. CDE interview with Matt Federoff, May 31, 2012
68. CDE interview with Bob Wise, June 25, 2012
69. CDE interview with Susan Patrick, June 8, 2012
70. CDE interview with Kecia Ray, June 20, 2012
71. [www.nmc.org/publications/horizon-report-2012-higher-ed-edition](http://www.nmc.org/publications/horizon-report-2012-higher-ed-edition)
72. <http://chronicle.com/blogs/wiredcampus/online-degree-program-lets-students-test-out-of-what-they-already-know/37097>
73. [www.insidehighered.com/news/2012/07/11/northern-arizona-u-partners-pearson-competency-based-degree-programs](http://www.insidehighered.com/news/2012/07/11/northern-arizona-u-partners-pearson-competency-based-degree-programs)
74. [www.insidehighered.com/news/2012/06/06/mcgraw-hill-wgu-announce-deal-would-shift-accountability-content-provider](http://www.insidehighered.com/news/2012/06/06/mcgraw-hill-wgu-announce-deal-would-shift-accountability-content-provider)
75. <http://chronicle.com/blogs/wiredcampus/groups-team-up-to-turn-free-online-courses-into-cheap-college-credit/36312>
76. [www.mafound.org/media/article\\_pdfs/Badges\\_for\\_Lifelong\\_Learning\\_Announcement\\_FINAL.pdf](http://www.mafound.org/media/article_pdfs/Badges_for_Lifelong_Learning_Announcement_FINAL.pdf)
77. [www.excelined.org/Perspectives/2012/Former\\_FL\\_Gov\\_Jeb\\_Bush\\_Fully\\_unleashed\\_virtual\\_education\\_can\\_transform.aspx?page=Default.aspx&pagenum=0](http://www.excelined.org/Perspectives/2012/Former_FL_Gov_Jeb_Bush_Fully_unleashed_virtual_education_can_transform.aspx?page=Default.aspx&pagenum=0)
78. CDE interview with Mike Martirano, June 20, 2012

# Don't miss any of the *Converge* Special Reports

## Coming in 2012:

Technology Innovation in Education, **YEARBOOK**

Specialty Classroom Technologies, **ISSUE 4**

## Past Reports:

### 2010 – ISSUE 1

Campus Management  
Systems

### 2010 – ISSUE 2

Classroom Technology

### 2010 – ISSUE 3

Campus Technology  
Infrastructure

### 2010 – ISSUE 4

Digital Content & Learning  
Management Platforms

### 2011 – ISSUE 1

Digital Teaching &  
Professional Development

### 2011 – ISSUE 2

Mobility & Security

### 2011 – ISSUE 3

The Education Dashboard

### 2011 – YEARBOOK

Technology Innovation  
in Education

### 2011 – ISSUE 4

The Evolving Classroom

### 2012 – ISSUE 1

Campus Infrastructure

### 2012 – ISSUE 2

The Textbook Reformation  
and Digital Content

Download them at:  
**[www.centerdigitaled.com/reports/](http://www.centerdigitaled.com/reports/)**

