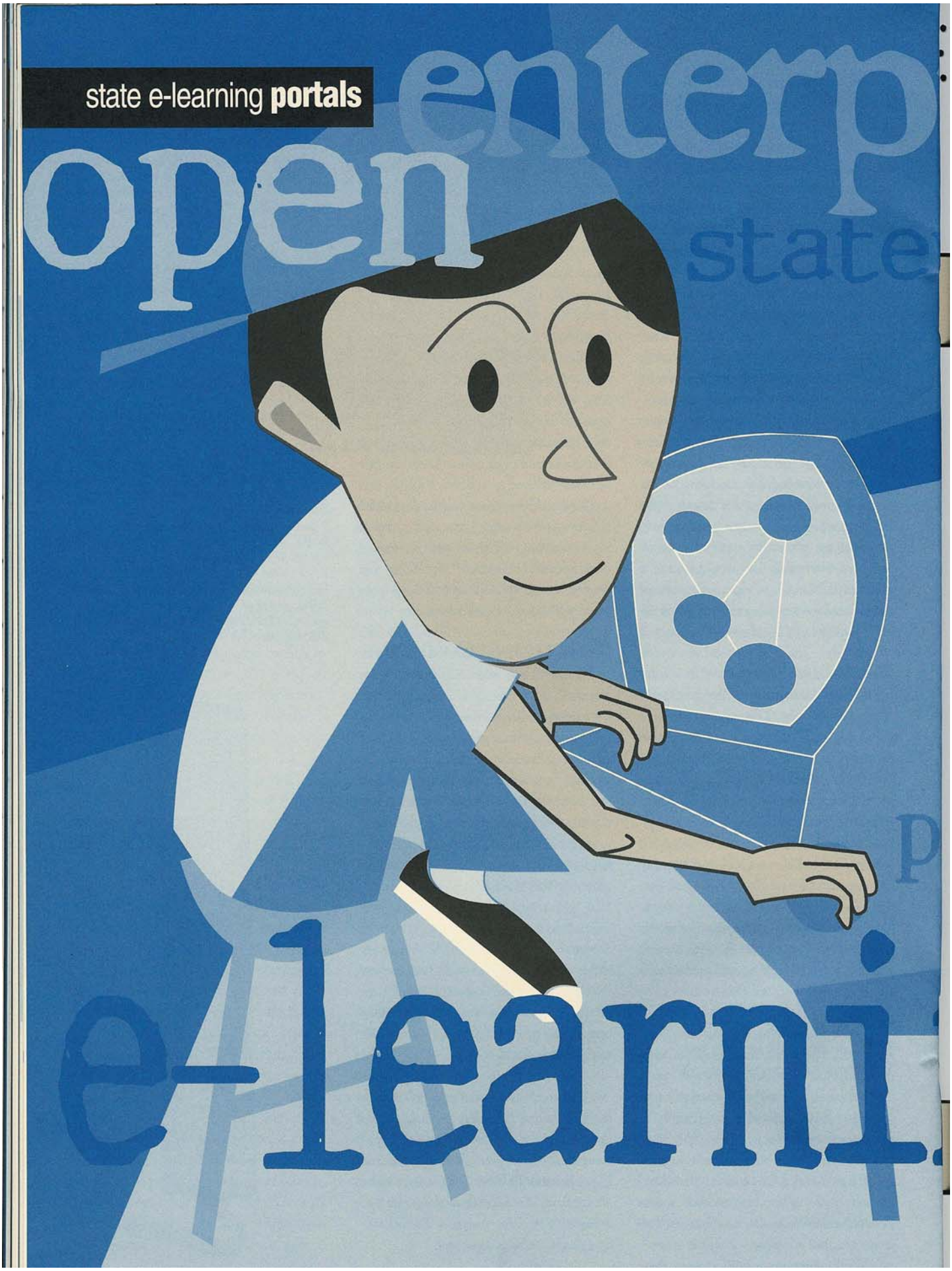
state e-learning **portals**



a Virtual laptop for every kid

Creating Virtual Education Spaces for All Teachers, Students, and Parents

by Greg Nadeau

Each year our nation spends between $6 and 8 billion dollars installing and supporting computers in our K-12 schools. No one believes that these expenditures are yielding an acceptable return on the investment for our nation's new bottom line—performance on state tests.

This is about to change profoundly. Just as information technology has transformed the workplace in hospitals, UPS trucks, law firms, financial centers, entertainment, and other information-intensive industries, it is about to transform K-12 public education.

Two emerging conditions make this possible:

- 49 of the 50 states now have state and district curriculum standards and learning objectives that can be universally aligned (like the Dewey Decimal System) to the world's educational content.
- increasingly pervasive Internet access now connects the vast majority of our schools and homes, allowing education systems to touch every teacher, student, and parent.

The breakthrough that is now possible will be the proliferation of statewide, open, enterprise, e-learning portals.

These five words—*statewide, open, enterprise, e-learning,* and *portals*—taken together sound complex. In fact, they are common concepts, new only in the way they associate with each other. I will explain them in reverse order.

portals

A portal has come to mean different things to different people. *First-generation portals* were really just Web pages with links to other sites organized in some new way. A *travel portal,* for example, might pull together links from various cities' tourism groups organized by city.

Second-generation portals improved on this idea by collecting some profile information from users to pass off to the other sites so you don't have to re-log-in and input your profile again. Amazon.com and MyYahoo are leading examples of such portals.

Third-generation portals fully integrate an ecosystem of diverse application and content providers into a seamless system. Such portals can now provide all of the applications that you typically get from your personal computer hard drive, as well as the world of content from any source on the planet into a single frame or *virtual desktop.* While such portals are only now beginning to emerge, America OnLine provides a good example of what they will look like.

Since this desktop can be accessed from any Internet device on the planet, the user no longer needs to be tied to a particular location or device. Students and teachers using such portals can go from class to library to community center to home using a different computer in each location, each time logging back on to his or her virtual desktop with a personal set of applications and data. This *virtual laptop* brings the power of personal computing to K-12 education.

e-learning

e-Learning is, simply, education's use of the World Wide Web. It is obviously still a moving target, but a clear consensus is emerging that education will use the World Wide Web to provide teachers, students, and parents with tools and content *"Any Time, Any Place, Any Path, Any Pace."*

K-12 e-learning is focused on the same issues as K-12 education in general. The entire industry is focused on state curriculum-aligned individualized instruction to make sure "No Child is Left Behind."

The emerging vision of the future is one in which typical teachers start each day by logging on in homeroom to access applications that allow them to enter attendance and check homework assignments from their classes. Teachers could view summary data from state tests, classroom assessments, and other sources to help refine that day's planbook of activities and assignments. Teachers would be able to take global data and localize it in an instant.

Students would access daily assignments through their personal portal. These could include interactive Web-delivered distance learning and online textbooks, or more familiar learning materials, such as a teacher's notes about a recent field trip, for example, or the plan for a day of face-to-face activities. Students who were absent would not need to ask what they missed; they would know this information is in their online assignment book.

Parents would no longer wonder what their children's homework really is. They could measure how their child is doing against local and state standards and address areas where their children's work is coming up short by partnering with teachers, after-school tutors, and others to create common expectations for the student.

enterprise

Wal-Mart has become the biggest company on the planet in part by providing every employee from clerks to the CEO with the information they need (and nothing more). The clerk knows when to re-stock, the manager knows when to re-order, and the executive knows trend information.

Education is in dire need of a similar *enterprise* solution. From teacher to principal to superintendent to President, decisionmakers are hungry for real information about student achievement. Teachers obviously need and should have access to more granular individual student data, whereas the President needs only the broadest summary data. (However, I've long thought that news sources should publish the nation's daily student attendance rate instead of the Dow Jones average to more accurately reflect the nation's long-term economic health.)

While student achievement is clearly Job #1 for schools, the education system is a complex inter-connected enterprise with information-intensive administrative applications at the school, district, region, state, and federal levels. The extensive new reporting requirements of the No Child Left Behind Act are the tip of the iceberg. From buses to libraries to nutrition systems, schools have extensive administrative computing needs that have traditionally been met by *stove pipe* applications that do not talk to each other.

An enterprise solution creates a rational system where each piece of data comes from one place and is shared with all applications. If a student moves from one school to another, for example, the nutrition and transportation systems should automatically be updated. The core information in a student's special education plan should be used to drive individualized accommodations in other

systems. Items released from state tests should be available to classroom teachers. Summary information collected from classroom assessments should roll up to the principal to be compared against state assessment results.

open

There are two—and only two—ways to work toward enterprise solutions.

In the first way, schools have traditionally turned to vendors with bigger and bigger pieces of the application pie so that (in theory) the pieces would work together. However, no matter how much of the pie the vendor offers, there will always be a majority of functionality and content that is not available from that one source.

The other way that enterprise solutions can evolve is through open systems. If the systems talk to each other well enough to be considered *interoperable*, they function as if they are one system even if they are not. The clear advantage of this approach is that the education enterprise need not be confined by one vendor solution and can harness the full power of the World Wide Web.

Three main groups are developing specifications in which open systems are required to talk with each other:

- The U.S. Department of Education's Office of the Chief Information Officer will publish the first components of a complete data handbook this fall. This handbook will contain data elements, definitions, and code developed by the National Center for Education Statistics (NCES).
- IMS Global, an international group of engineers and academics, is creating specifications for interoperability of e-learning objects.
- The software industry's School Interoperability Framework (SIF) is expanding from its roots in school administrative systems to incorporate NCES and IMS specifications into a comprehensive reference model for U.S. K-12 education.

Although these groups are starting to grow together to form a complete set of specifications, interoperability alone will not solve the enterprise needs of our schools.

statewide

In its 2001 report, *Any Time, Any Place, Any Path, Any Pace: Taking the Lead on e-Learning Policy*, the National Association of State Boards of Education argues strongly for states to step up to the plate and provide real leadership on e-learning. However, for this to happen, certain key components of the educational enterprise need to be "owned" by the states. From a system standpoint, states must do two core things:

- Every state must assign a unique ID for each student, maintain an enterprise directory of every student and educator, and enable *single sign-on* to a third-generation portal.
- Every state must put its curriculum standards documents into an interoperable database and share with its school districts the state assessment data aligned to the state standards.

No Child Left Behind mandates that states also do a third thing: every state must deploy a *data warehouse* of student achievement data (linked by the unique ID) to gauge *Adequate Yearly Progress*.

Last fall, fourteen states came together with a grant from the U.S. Department of Education to form the U.S. Open e-Learning Consortium to accelerate statewide deployments of statewide, open, enterprise, e-learning portals. The Consortium's first project is to create a State-2-State (S2S) Assessment Exchange of test items from released state tests. The resulting pool of test items will be accessible for free to school districts and states to lower the costs of classroom-based formative assessments. The Consortium has applied for Phase II funding to expand the number of states involved and to bring the S2S Assessment Exchange to scale with 10,000 test items. The Consortium will also provide a forum for other multi-state information technology projects such

definitions of selected italicized terms used in this article

Adequate Yearly Progress—the term used to describe the standard for improvement in student achievement that schools must meet under the No Child Left Behind Act.

Any Time, Any Place, Any Path, Any Pace—the NASBE 2001 report on e-learning.

data warehouse—a type of database that is structured to store major portions of data from multiple sources over time.

interoperable—the seamless sharing of data and applications between systems.

Performance-Based Data Base Initiative—a multi-year project that will receive $10 million in October to improve education data collection from states.

single sign-on—the ability to log-on to multiple systems by entering a single user name and password once.

stove pipe—systems that were built in parallel and do not interoperate.

virtual desktop/laptop—the equivalent to a personal computer desktop, accessible through a Web browser.

Virtual Education Space (VES)—a statewide set of online tools and implementation strategies under development in Massachusetts and Washington.

Grade Your State's e-Learning Readiness

Pervasive Personalization

State Action	Grade
Your state provides every student and every educator with a unique identity to sign on to a wide array of public and private e-learning tools and content.	A
Your state maintains a directory of every student's and every educator's current relationship to schools and districts.	B
Your state assigns a unique ID to every student enrolled in public schools.	C
Your state maintains current information on all employed educators.	D
None of the above.	F

Standards-Based Curriculum

State Action	Grade
Your state maintains a trusted repository for state and district curriculum standards for public and private e-learning providers to access and to deliver their tools and content.	A
Your state offers a tool to district curriculum committees to enable them to access state standards in order to align local curriculum.	B
Your state maintains a structured database for state curriculum standards.	C
Your state posts your state curriculum standards documents on the Web.	D
None of the above.	F

No Child Left Behind

State Action	Grade
Your state provides access to individualized remedial and supplemental material for all K-12 students based on their personalized profile.	A
Your state tracks Adequate Yearly Progress for every student enrolled in a public school.	B
Your state provides educators, students, and parents with personalized information about individual student performance.	C
Your state maintains a structured data warehouse for individual student performance on state assessments.	D
None of the above.	F

as the White House's new *Performance-Based Data Base Initiative* and public-private partnerships like *Virtual Education Space (VES)*.

In sum, statewide, open, enterprise, e-learning portals will enable individualized instruction and data-driven decision-making by creating a personalized view of education information for every educator, student, and parent. Such systems will create breakthrough gains in productivity by bringing the power of personalized computing to educational users.

Traditional market failures

Don't wait for the marketplace to provide these solutions. The existing e-learning market remains stuck in low gear. While schools are spending more and more on technology, the return on investment for student achievement remains questionable. From the vendor perspective, sales are difficult and expensive to make. Each year brings another wave of bankruptcies and mergers as the investment community continues to look for a successful business model.

To date, the only model that appears to be succeeding is for e-learning vendors to offer bigger and bigger pieces of the pie to districts that are large enough to justify the marketing costs of making the sale. Less than seven percent of the nation's fifteen thousand school districts have over ten thousand students. Successful e-learning vendors focus on these districts at the expense of all others.

Whereas each individual application slice of the e-learning pie costs districts $10 to 20 per student, states such as Arizona, Massachusetts, and Washington have begun to show that the whole statewide enterprise pie can be delivered for $1 to 3 per student.

How can your state lead, not trail?

States should immediately designate a cross-agency leadership team to participate in the U.S. Open e-Learning Consortium and the School Interoperability Framework. The team should include people representing school districts, the state department of education, and other organizations that play a major role in the state's edtech efforts. The team should bring expertise in enterprise systems, educational data collection, curriculum, assessment, and professional development. Lead states should consider participating directly in VES and IMS Global.

States should also stop reinventing the wheel. No one has the time or money to waste by solving problems other states have already solved. By working together, sharing information, expertise, and code, states can dramatically reduce the cost and time involved with implementing statewide, open, enterprise, e-learning portals and give their teachers, students, and parents the tools that they need to make sure no child is left behind.

Greg Nadeau is director of the U.S. Open e-Learning Consortium. He served as chief technology officer of the Massachusetts Department of Education from 1996 to 2001, and in 1984–85 he was the student representative on the Massachusetts State Board of Education.