

## Competing in a Global Economy through Open Education

By

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Between 2010 and 2025, nearly 80 million “baby boomers” in the U.S. will leave the work force en masse, just as they entered it between 1960 and 1980. When this mass exodus occurs, only 20 percent of U.S. workers remaining will possess the skills required for most of the jobs being created today.

On a global scale, the U.S., European Union, Japan, China and India will face critical shortfalls of 32 million technically specialized professionals. Throughout the world, the demand for educated professionals is growing faster than populations of people with the required skills.

Unfortunately, today’s educational systems -- typically under-funded and under pressure to do more with less -- are ill-equipped to close the skills gap. Despite billions of dollars in spending, technology has produced inconsistent results. Siloed enterprise applications, lack of data interoperability, high software licensing fees, escalating total cost of ownership, absence of industry standards -- all contribute to inefficient processes, creating barriers to collaboration and innovation.

To address these challenges, the Education Industry must commit itself to becoming more open. That means more open access to educational opportunities for more students, more open data and processes within and across institutions, and a more open culture of collaboration and sharing. Open access is not only a challenge for developing countries, but even in major markets. Access to learning needs to be improved to support working and house-bound students, compliance with accessibility standards, and diverse device usage driven by the consumer IT marketplace. Institutions need to create more open data to improve processes and insight to decision making, by both administrators and instructors, such as data warehouses of student or institutional performance metrics. A more open culture of collaboration will also foster reuse and sharing, to ultimately lower costs of operation and delivery within the industry. Of course, with all this openness, security and privacy concerns will be critical to address. All of these changes can be enabled by more open technologies, which together we call Open Education.

Open education offers the opportunity to realize the promise of technology to create a productive and efficient environment that enables every student to achieve his or her full potential. Open standards, open source applications, and an open architecture can deliver a common framework that spurs innovation, increases interoperability and flexibility, improves service delivery, and drives down total cost of ownership. The open technology-based model enables access for all to educational tools, applications and processes, and facilitates open communities of collaboration to create a lifelong learning continuum and help build the skill sets to survive in the 21<sup>st</sup> century.

Globally, the education industry is facing challenges that make improvements in education more critical than ever:

- 1) *Demographic shifts:* In many developing countries, 50 percent of the population is under 25 years of age. Over half of India’s population is under 25 and within a decade the working population could peak at 800 million people. Education and skills set development are crucial to the continued growth of economies like these.
- 2) *Declining labor force populations in developed countries.* Japan’s workforce population today is about 2.5 times smaller than that of the U.S. and it is trending to be five times smaller by 2050. According to the U.S. Census Bureau, by 2030 the European Union can expect to have 14 percent fewer workers than it does today. Innovation in education

is crucial to continued productivity as workforce populations decline in industrialized countries.

- 3) *Poor system performance.* In the U.S., a study conducted by the Manhattan Institute in May 2006 found that for every 100 ninth graders, 68 graduate from high school on time. Of those 68, 40 enroll in college and only 27 are still in college a year later. And only 18 of those earn an Associate's degree within 3 years or a Bachelor's degree within 6 years. With numbers like these, it is questionable whether or not the U.S. will continue to have the necessary skilled labor force to compete in the global economy.

Facing a ticking time clock, education institutions must act now. An open education model will bring learning capabilities to any student who has access to the Internet – anywhere in the world. This open access will facilitate learning inside and outside the classroom by creating learning environments that are not dependent on a physical campus or classroom

Many education institutions are already taking steps to embrace open education by creating more open, flexible processes and data access to improve quality and performance outcomes, while lowering cost. In late 2005, the School District of Philadelphia implemented a data-driven management process called SchoolStat within 270 of its non-charter schools. Tailored for the K-12 environment, the SchoolStat data-driven management process quantifies performance in areas such as attendance, school climate, human resource, and instructional results. School leaders are equipped with timely, actionable data from the district's IBM-powered data warehouse, which provides a monthly dashboard view via SchoolNet. Data on key performance indicators such as benchmark test scores, student and staff attendance, and suspension rates are evaluated monthly by principals and superintendents to identify trends, brainstorm strategies, monitor progress toward goals and share best practices.

Measured changes that occurred after SchoolStat implementation indicate marked district improvements, including decrease in student suspensions, increase in student attendance, and decrease in long-term teacher absences in the school year (SY) 2007 versus 2006, and improvements in short-term teacher absences between SY04 and SY07. These results indicate that stat programs are not just for business, government and higher learning institutions. Large public education systems can also use data to drive changes in performance and achievement, without a complete overhaul of existing systems.

Open data and business processes like the one in Philadelphia can contribute not only to improved student and teacher performance, but also to improved decision making and communication, opening up channels among principals, regional supervisors, central administrators, and parents that did not exist before. With better integration of information, processes and people, there is more flexibility, and frequently less cost, to respond to changing educational requirements.

Such was the case for the School Board of Broward County (SBBC) in Florida, the sixth largest school district in the U.S. With 231 K-12 schools, 274,000 students and 19,000 teachers, tracking student data and achievement was a daunting challenge and No Child Left Behind mandates required realignment in educational technology. While the existing student information transactional system contained all the necessary information, the process for reporting was cumbersome and fraught with inefficiencies -- manual tracking, re-keying of information into usable formats, lower reported test scores because students that could have been excluded were not filtered out. Beginning in November 2004, SBBC began laying out a series of solution requirements and ultimately chose the IBM On Demand Workplace for Education suite because it aligned best with SBBC's need for integration of people, business processes, applications and data in a network-centric, manageable environment.

Following a four-stage implementation process, the new data warehouse and reporting system has become the backbone of all data and reporting in Broward. Data and reports permeate

nearly every aspect of state reporting, monitoring, class management, test score improvement, and student counseling. Not only do Broward teachers use the reports to enhance their curriculum planning based on best practices, but warehouse data is used throughout the district for a wide variety of reporting and student assistance uses, including: grades, attendance monitoring, exceptional student tracking, standardized test score monitoring, student health records, teacher class composition, staff certification, student discipline tracking, curriculum planning based on test score performance, state reports on high school student absenteeism (driving licenses are revoked for non-attendance), and state-required reporting on a number of different criteria. Broward has even developed a portal interface to the data warehouse that allows district personnel and teachers to have a personalized front end to the data through the intranet. With the IBM data warehouse firmly in place, the County has enjoyed both budget savings and the opportunity to understand the potential of every student, tailor educational pathways, and engage in more meaningful dialogue with students, parents and educators.

Open communities of collaboration support the improvements in education quality through open data and business processes that enable greater reuse, shared services, and efficiencies. Communities like rSmart/IBM Sakai 2.0 can now harness the innovation and creativity of the education system to create tools, content, and courseware that the broader education community can leverage. The Sakai community is an international alliance of over 150 universities, colleges and commercial affiliates working with standards organizations and other open-source software initiatives to develop and distribute freely enterprise software applications using Sakai's community-source approach. The rSmart/IBM Sakai 2.0 platform was built specifically for easy adoption and integration into the education enterprise. It can be used as a pure course management system (document distribution, a grade book, discussion, live chat, assignment uploads, online testing) or can serve as a collaborative tool for research and group projects.

The positive implications of collaborative learning environments like Sakai are endless. They offer platforms for innovation and enhancements developed by educators for educators, while also providing for better alignment in the pipeline of learning from K-12 to higher education. The open source and open standards improve integration and reuse, which ultimately lower costs and improve service quality.

In China, for example, approximately 70 percent of the population lives in rural, less developed areas of the country. To address the educational disparity that ultimately exists between developed cities and these western rural areas, the Chinese Minister of Education partnered with IBM to develop an easy, reliable, low cost e-Learning solution based on open source distance collaboration technology. On June 30, 2006, BlueSky Open Platform for Basic Education was launched to begin bringing online education resources to China's approximately 210 million students. BlueSky offers functionality, collaboration and support to classrooms across the country, no matter how remote or funding strapped. Piloted in 15 cities across China, BlueSky registered 56,204 total users in less than one year, including 1,829 teachers, 54,360 students and 15 administrators.

Virtualization is another critical component of open education and is instrumental in accelerating innovation and improving access. In 2006, North Carolina State University partnered with IBM in a Virtual Computing Initiative to make education tools and resources available to students at all levels across the state. Together, NCSU and IBM succeeded in building a community of users, researchers and educators who utilize and support a Virtual Computing Lab (VCL) supported by an open infrastructure of IBM BladeCenter servers. In less than a year, the open infrastructure helped over 30,000 students and faculty to cost-effectively share and use resources to support everyday educational and research requirements. Resources are managed at a server level and students and faculty can login and schedule time, either immediately or in the future, to use certain applications.

NCSU has seen real benefits in terms of increased utilization of resources, thus reducing the cost to deliver the services; a reduction in IT overhead for construction and maintenance; a way to

level the technology playing field at an affordable cost; an advanced level of resource customization; and an option for viable disaster recovery and business continuity solutions. In addition, the VCL was tapped to support new pilot programs at several regional universities, community colleges and K-12 schools, and has since grown into a multi-thousand server cluster supporting K-12 and higher education across much of North Carolina.

The great success of this program can truly be seen in the power of virtualization to provide equal access to critical curriculum and technology resources to even the most economically disadvantaged and/or remote parts of the state. The NCSU-IBM initiative has led to a K-12 VCL pilot project in the North Carolina school districts in Granville, Franklin, Halifax and Northampton counties that lays the groundwork for computing tools never seen before in these districts. These tools are aimed at closing the achievement gap and ensuring students from these schools remain globally competitive.

The utility of open technologies like virtualization has spurred an industry paradigm shift from client-server to cloud computing. With the promise of improved accessibility, better resource management, reduced infrastructure costs, and improved performance, cloud computing is an information technology infrastructure in which computing resources are virtualized and accessed as a service. Reminiscent of the old days of the mainframe and centralized computing, cloud computing takes advantage of developments like broadband Internet, optical networking, and advances in computing power and storage to eliminate the costly and arduous process of procuring, provisioning, configuring, testing and securing new applications. The idea is fast gaining ground, as companies like IBM expand their cloud computing capabilities around the world.

In an effort to build and maintain its highly-skilled competitive IT workforce, the Vietnamese government partnered with IBM in May 2008 to launch the Vietnam Information for Science and Technology Advance Innovation Portal, which will enable open and collaborative relationships with other universities and research institutions around the world. Live on an IBM cloud computing infrastructure, Vietnamese government institutions and universities are using this interactive online portal to develop education programs for Service Science, Management and Engineering (SSME). Beyond supporting teaching and learning functions, the portal can also be used to support research and development activities among broader academic and business communities to foster new services for local and global markets.

This open platform is currently being used on university campuses, but the Vietnamese government has plans to adopt the academic programs nationwide through a joint effort by the Ministry of Education and Training, the Ministry of Science and Technology, and the Ministry of Information and Communications. These programs will offer computing courses in IT Service, free software tools, and business case studies representing real-world challenges. Once implemented broadly, Vietnamese officials hope these resources will help provide a competitive edge in the global market.

For students, open education means the promise of consistent and secure access as well as a more level playing field. For educators and administrators, it means increased business flexibility through access from any workstation, as well as lower costs, increased security and responsive IT infrastructure. For countries around the world, open education is critical to future economic sustainability.

## **Conclusion**

Open education is not just about technology; it is about new ways of communicating, collaborating and exchanging information such that every student is able to achieve his or her full potential. The fundamental shift that is taking place toward cloud computing is indicative of an underlying need for education to become more seamless, to breakdown the silos within and

across education institutions. Open education will not only enable seamless delivery, but it will do so at a reduced cost.

The technology industry has an obligation to the global education system to fulfill its promise to make life easier for teachers and more effective for students. As technology has advanced, complexities seem to have gotten in the way of this vision, and now is the time to step back and ensure the provision of more content, more access, more collaboration and more support. The question is not if open education should become a global reality, it is when. Children and learning should not be proprietary. Education systems around the world should all have access to the best content and resources possible.