SHORT-CIRCUITED:
The Challenges Facing the Online Learning Revolution in California

By Lance T. Izumi, J.D. and Vicki E. Murray, Ph.D., with
Evelyn B. Stacey, Rachel S. Chaney, and Ian D. Randolph

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To April and David, whose love, support, understanding and encouragement bridge the tangible and virtual worlds.

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November 2010

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ACKNOWLEDGEMENTS

The authors would like to thank the Jaquelin Hume Foundation and the Fisher Fund for their generous support of this book. We would also like to express our appreciation to the Koret Foundation Funds for its support of the fellowship for the lead author of this report.

We would like to thank Bill Lucia for his advice and suggestions, and Anne McKinney, Tori Hatada, and Jules Stein for peer-reviewing the drafts of the book. Amy Fontinelle provided copy editing. Any remaining errors or omissions are the sole responsibility of the authors. Also, the authors would like to acknowledge the contributions of the dedicated staff of the Pacific Research Institute: Rowena Itchon, vice president of marketing; Kelly Gorton, marketing associate; Lloyd Billingsley, editorial director; Dana Beigel, graphic designer; Jason Clemens, director of research; and Sally Pipes, president and CEO. The authors of this report have worked independently and their views and conclusions do not necessarily represent those of the board, supporters, or staff of PRI.

EXECUTIVE SUMMARY

Of all the states, one would expect that the impact of technology on the delivery of educational services would be greatest in California, home to Silicon Valley and major high-tech companies. Indeed, many expected this environment to wield considerable influence on the school system. Yet, when it comes to harnessing the technological revolution as it applies to education, it turns out that California is lagging in many respects.

One of the most highly publicized concerns regarding educational technology and online learning centers is the ability of all students, regardless of their backgrounds, to access the Internet. In 2010, among adult Californians with children under 18 years of age, 71 percent have broadband Internet access at home, a 15-percent increase over the 54 percent in 2008. Thus, while a large majority of children have access to broadband Internet at home, around three out of 10 do not.

Addressing these access gaps, Governor Arnold Schwarzenegger's Broadband Task Force issued a report that called for the public and private sectors to work together to, among other things, "build out high-speed broadband infrastructure to all Californians," increase the use and adoption "of broadband and computer technology," and leverage "educational opportunities to increase broadband use." These are all laudable goals, but the digital divide is not the only or even the most important issue involving the expanded use of online learning.

Even if every Californian had broadband Internet access, many K–12 students would still find it difficult to take advantage of online learning opportunities because of a variety of governmental and special-interest obstacles.

- **Short Circuit #1:** Governmental Red Tape. California has enacted a raft of regulations that has prevented the reasonable expansion of online learning options such as virtual charter schools. Virtual charters are governed by obsolete independent-study rules that fail to recognize the potential of online learning options. Also, there is no evidence to show that the regulation mandating a 25:1 student-to-teacher ratio for virtual charter schools improves teacher effectiveness. Further, students can attend only those virtual charter schools located in the counties in which the students reside or in a contiguous county. In other states, such as Pennsylvania, students can attend a virtual charter school located in any part of the state. California also limits the availability of teachers by requiring all teachers to have California teaching credentials, thereby shutting out from virtual schools those high-performing teachers who have out-of-state credentials.

- **Short Circuit #2:** Funding Disparity. The California legislature reduced funding to virtual charter schools to 70 percent of what brick-and-mortar charter schools receive.

- **Short Circuit #3:** Union Opposition. The California Federation of Teachers has issued a model framework for contract negotiations related to educational technology issues. The union states up front, "No employee shall be displaced because of distance learning or other technology." The framework also says that no distance-learning course shall be taught by anyone other than a local union member. The union's technology committee admits, "Most kids know technology web2 tools better than their teacher," which may be why the framework allows union members to block the use of technology in their classrooms: "Courses taught with

the use of technology may be included in a faculty member's workload only with his/her consent" and "No faculty member shall be required to teach a course using distance technology."

- **Short Circuit #4:** Systemic Inertia and Dysfunction. Software developers who have created proven teaching and learning products have found that school districts are often not interested in implementing their programs. Part of the reason for this lack of interest is that California's public-education finance system has conditioned school-district leaders to only consider those programs that have a specified stream of funding attached to them. However, even where costs are covered by philanthropic grants, software vendors say that bureaucratic inertia is often a major obstacle, as is the poor implementation of their products by classroom teachers.

Despite these short circuits, there are many success stories coming out of California's online learning revolution. The mainly low-income Hispanic students at San Jose's Rocketship Mateo Sheedy charter school, which uses a part traditional classroom/part online learning "hybrid" model, post higher scores on the state math exam than their peers in schools in neighboring wealthy suburbs. Further, Rocketship achieves its impressive student outcomes while saving half a million dollars per year because of reduced need for credentialed teachers.

In interviews, online learning providers rebut the myths associated with this mode of education delivery. Teachers at California Virtual Academy charter schools, for instance, have a great deal of interaction with their students through counseling sessions, face-to-face meetings, and an advanced learning management center they use to monitor students' progress. This close monitoring allows teachers to see immediately when a student is lagging and to intervene quickly. In fact, students and online learning practitioners say that there is often more interaction between teacher and student in online courses than in traditional classrooms.

Individual interviews with students and parents show that online learning can be very effective for students with special needs and for those from immigrant backgrounds. The adaptive nature of online learning allows instruction to address the individual needs of students. Peter McLean, a former community college faculty union representative, says that his son Mark, who is autistic, was performing at the basic or below-basic level in the core subjects at a traditional public school. "He is now proficient to advanced," according to Peter, because of the individualized learning program that Mark receives through a virtual charter school.

In order to remove the obstacles to online learning alternatives and allow more students to take advantage of these emerging options, the following recommendations should be considered:

- **Reform the contiguous counties rule.** The rule should be eliminated either completely or through a waiver system where the State Board of Education could suspend the rule if virtual charters present sufficient achievement and accountability evidence that meet an agreed-upon standard. One possibility is for virtual charter schools to post performance bonds that would guarantee improvement in student performance, based on measures such as growth in student test scores, in exchange for waiving rules like the contiguous-counties regulation.

- **Eliminate the 25:1 student-to-teacher ratio for virtual charter schools and take virtual charters out of the category of independent study.**

- **Allow multiple authorizers for charter schools.** In California, only local and state boards of education can authorize a charter school. Given the demand for virtual charter schools, multiple authorizers will help increase the supply of these schools.

- **Lift the cap on charter school expansion.** California limits the expansion of charter schools to 100 per year. If the state continues the contiguous counties rule, operators will want to establish many individual virtual charter schools in the future and could be stymied by the cap.

- **Allow full teacher licensure reciprocity.** California is one of many states that fails to allow teacher licensure reciprocity. The state requires a California teaching credential to teach in public schools. Teachers with out-of-state credentials must meet various requirements, depending on the number of years they have been teaching and the type of credential they are seeking, in order to obtain a California credential. Forcing teachers to have California credentials prevents the possibility of virtual schools using star teachers in other states to teach online students.

- **Attach funding to each child so that they can take it to the school of their choice.** It is absolutely imperative that California's education-funding system be changed to make it more student centered. In Sweden, education funding is attached to a student so that he or she can take it to the public or private independent school of his or her choice. The portable funding amount is equivalent to the per-pupil spending amount designated for the government-run municipal schools. A similar portable funding system could address issues of funding disparity between regular public schools and distance and online alternatives, could still save money on capital and other costs, and would also force the regular public schools to compete fully with expanded numbers of private schools and virtual charter schools. This heightened competition would give school districts and their employees incentives to overcome the bureaucratic inertia from which they suffer and would eliminate the earmark problem where public schools resist any innovation that does not have a funding stream specifically attached to it. Giving parents and their children full choice would also get around the opposition of teacher unions and restrictive collective bargaining contracts and force the unions to adapt to the demands of their customers.

Introduction

Of all the states, one would expect that the impact of technology on the delivery of educational services would be greatest in California, home to Silicon Valley and major high-tech companies. Indeed, many expected this environment to wield considerable influence on the school system. Yet, when it comes to harnessing the technological revolution as it applies to education, it turns out that California is lagging in many respects.

This book explores the education technological landscape in California. To give perspective on California's place among its sister states and nations abroad, the first portion gives a national and international overview of the state of technology and education. A survey of the foundation of distance- and online-education policy in California follows.

The third section discusses and analyzes several areas where the actions of state governments, local governments, and education special interest groups have impeded the natural expansion of distance and online learning. This section looks at regulatory burdens, funding disparities, collective-bargaining language, and bureaucratic inertia.

The fourth section zooms down from the 30,000-foot policy level to the ground-level views of distance- and online-education suppliers, practitioners, users, and

experts. The authors conducted interviews with representatives of K12, Inc., one of the largest for-profit providers of distance education, and with the chief academic officer of Rocketship Mateo Sheedy charter school, which uses a so-called "hybrid" learning model. Also interviewed were the head of a virtual charter school start-up, students and parents using distance learning, and one of California's top education policy experts.

Although California's current policies related to distance and online learning are deeply flawed, there is hope for the future if policymakers adopt key reforms. The paper concludes with thoughts and observations to that end, plus the authors' policy recommendations for going forward.

International and National Overview

Expanding the promise of education is one of America's most urgent needs, according to President Barack Obama. As he explained during a joint session of Congress in February 2009,

> In a global economy where the most valuable skill you can sell is your knowledge, a good education is no longer just a pathway to opportunity—it is a pre-requisite. Right now, three-quarters of the fastest-growing occupations require more than a high school diploma. And yet, just over half of our citizens have that level of education. We have one of the highest high school dropout rates of any industrialized nation. And half of the students who begin college never finish. This is a prescription for economic decline, because we know the countries that out-teach us today will out-compete us tomorrow. That is why it will be the goal of this administration to ensure that every child has access to a complete and competitive education . . . Already, we have made an historic investment in education through the economic recovery plan . . . But we know that our schools don't just need more resources. They need more reform.[1]

The president is correct to emphasize the importance of competition in education, not simply more resources. Fully 70 percent of the countries that outperformed the United States in combined math and science literacy among 15-year-olds had more schools competing for students, according to data from the Paris-based Organisation for Economic Co-operation and Development (OECD).[2] On average, those countries also spend significantly less on education than the United States but achieve superior results.[3]

Moving beyond one-size-fits all, mass provision of schooling to personalized instruction will require the effective use of technology.

Sir Michael Barber, one of the lead architects of the Labour Party's education reform agenda under Prime Minister Tony Blair, noted, "The characteristics which defined the successful education systems of, say, 1975, are unlikely to be those which will define success in the future."[4] Among industrialized countries, there is growing recognition that schooling systems must be more demand-oriented to promote participation and personalized instruction.[5] "Despite the challenges of the 21st Century," notes the OECD, "many of today's schools still operate as they did at the beginning of the last century and are not encouraging the deep learning and skills that underlie innovative activity."[6] Moving beyond one-size-fits-all, mass provision of schooling to personalized instruction will require the effective use of technology.[7]

A Global Survey of Technological Innovation in Education

"There is remarkable consensus among educators and business and policy leaders on one key conclusion," according to a recent *Time* magazine cover story. "We need to bring what we teach and how we teach into the 21st century."[8] Susan Patrick, president and CEO of the International North American Council for Online Learning (iNACOL), has listed countries that are leading the way—particularly developing countries.

Mexico. In 2003, the Mexican Secretariat of Public Education (SEP) and the Latin American Educational Communication Institute (ILCE) launched the Enciclomedia Project in recognition of the positive effect of technology on student motivation and learning. The ILCE team is made up of 300 specialists from the education, research, engineering, history, and design fields. Considered one of the most ambitious technology projects in the world, the Enciclomedia Project aims to transform 200,000 schools into interactive learning environments by combining online K–12 academic content with videos, maps, music, images, and virtual tours. The result is dynamic and engaging software for use in the classroom. Fully 97 percent of participating teachers say their students are more motivated, and 80 percent of students report that the Enciclomedia program content has helped them understand concepts better.[9] Beginning in 2004, all pre-service teachers have been trained in their university programs to use digital content to teach more effectively, and in 2005 every new teacher was provided a laptop.[10]

Turkey. In just three years, the number of students taking online courses went from none to 15 million (as of 2008). Public-private partnerships helped create "gold standards online courses," train teachers to teach online, and develop the delivery system to provide online courses.[11]

Singapore. Today, all secondary schools in Singapore use online learning, and all teachers are trained to teach online. Each year Singapore holds E-Learning Week, when brick-and-mortar schools are closed down to ensure that teachers use e-learning to provide continuity in learning and enhance disaster preparedness. Singapore is also working to train its teachers to use a game called Second Life (in which users create virtual worlds) for educating students.[12]

India. India struggles with a shortage of good teachers and needs 200,000 more schools. In response, it has set a goal of providing universal access to K–12 education in 10 years, developing a $10 laptop, and leveraging its teachers by using technology to bring its plan to scale. India's Educomp Program is digitizing learning resources to put K–12 academic content online. And, through

technology and the power of the Internet, India is working to turn its teacher shortage into an export opportunity by making its best teachers, especially in math and science, available to students around the world.[13]

China. With 1.3 billion people, China has set a goal to provide 100 million new students in underserved areas with a quality education using technology and a digitized, online curriculum. It is already training its master teachers to provide online instruction, and as of 2004, China had put its entire K–12 curriculum online. According to Chinese University of Hong Kong president Lawrence Lau, broadband is critical to overcoming poverty; and China increased its Internet connections from four million in 2009 to 250 million in 2008. Not to be outdone by India, China and the United Kingdom reached a $58 billion e-learning exports agreement in 2007 to give Chinese K–12 students access to English educational opportunities.[14]

Most schools are still unable to provide the powerful learning opportunities afforded by technology, placing our children at a competitive disadvantage in the new, international marketplace of jobs, commerce, and trade.

European Union. The International Baccalaureate (IB) Diploma Program is available online to 125 countries. The online IB program hires master teachers from 26 countries and trains them to teach online. "Gold standard" online IB courses are being developed to produce a world-class curriculum with an internationally recognized high school diploma, which requires students to be fluent in multiple languages. These students will interact with classmates from dozens of countries, learn from master teachers across Europe, and collaborate on an international scale.[15]

United States. "Online education is now an international export, and no longer a cottage industry," sums up Susan Patrick, a former director of the U.S. Department of Education's Office of Educational Technology. She points out a troubling contrast between the United States and the rest of the world when it

comes to embracing technological innovation in public schooling. While other countries are seizing upon technological advances,

> the United States is shutting itself out of many of these opportunities both for the U.S. educational industry—but more importantly for our students. We need to change our approach to education to recognize globalization. Every student in the United States needs access to a world-class education. And, if students can get this by walking to their local school—that's great! But, I purport that too many of our schools are experiencing the appalling disparities that exist in our public education system. We need to take advantage of a new distribution model (global)—it is using the Internet to deliver high quality courses and instruction. We can reduce inequity, level the playing field and accelerate learning and track student performance better, too.[16]

Making Technology in American Public Schools a National Priority

The U.S. Department of Education shares the goals Patrick has expressed. In a recent address to the Association of American Publishers, U.S. Education Secretary Arne Duncan emphasized the central role technology must play in transforming the American schooling system to increase the number of college graduates and close achievement gaps:

> We believe that now is the time to truly incorporate technology into the core practices and strategies of our programs and schools . . . . With the first decade of the 21st century now history, we've committed to securing the vitality of our nation by transforming the way we teach our students. We aim to build a public education system that helps all students set goals, stay in school, earn a high school diploma, and secure college and career success . . . . The urgency has never been greater. Our children and our

> future are at risk, so let us together do the difficult but necessary things our schools demand. We have a moral and economic imperative that requires us to act.[17]

To that end, the U.S. Department of Education's Office of Educational Technology unveiled its National Educational Technology Plan (NETP) in March 2010. It describes how information and communication technologies (ICT) can help transform American education and offers concrete goals to inform state and local educational technology plans.[18] Secretary Duncan's 2010 NETP calls for "revolutionary transformation rather than evolutionary tinkering" and urges "innovation, prompt implementation, regular evaluation, and continuous improvement" along with timely scaling of successful projects and coherent, strategic regulations.[19]

Thus far, there has been no technological revolution from the top down.

The trouble is that revolutionary rather than evolutionary transformation has been the strategic goal of the U.S. Department of Education for nearly 15 years. During his first State of the Union address back in 1996, President Bill Clinton made technology in education a leading priority, stating, "Every classroom in America must be connected to the information superhighway with computers and good software and well-trained teachers."[20] That summer, Secretary of Education Richard W. Riley unveiled the country's first National Educational Technology Plan. "Over the last decade, the use of technology in American life has exploded," explained Secretary Riley. "Yet most schools are still unable to provide the powerful learning opportunities afforded by technology, placing our children at a competitive disadvantage in the new, international marketplace of jobs, commerce, and trade."[21]

Almost a decade later, Secretary of Education Rod Page noted in his NETP, *Toward a New Golden Age in American Education*, "There is a new fervor in American education, a new creativity—driven in part by this generation of tech-savvy students—which I believe bodes well for the future of our country."[22] Still, he noted that little systemic progress had been made:

> Our schools have generally trailed other areas of our society in exploring the many opportunities offered by technology. Too often, schools have simply applied technology to existing ways of teaching and learning, with marginal results in student achievement . . . . In the realm of technology, the educational community is playing catch-up. Industry is far ahead of education. And tech-savvy high school students often are far ahead of their teachers.[23]

President George W. Bush explained, "We cannot assume that our schools will naturally drift toward using technology effectively. We must commit ourselves to staying the course and making the changes necessary to reach our goals of educating every child."[24] Frustration at the slow pace of systemic improvement among education leaders at the time was palpable.

"Our children can't wait. The future is now," according to Mark Edwards, former superintendent of Virginia's Henrico County Public Schools. "We need to be preparing them for a future that few of us can even visualize."[25]

Secretary Duncan's emphasis on prompt and timely implementation and scaling-up of successful programs was therefore well placed. Since 1996, however, subsequent NETPs issued about every five years have shared the same interim goals, summarized as follows:

1. Teachers and students shall have access to technology in the classroom.
2. Teachers and students shall be trained in using technology to enrich learning and improve performance.
3. Research and evaluation shall help improve instruction and learning applications.
4. Technology shall improve productivity in terms of how time, money, and staff are used.
5. Technology shall make the American public-schooling system more innovative and responsive.[26]

The number of NETP goals has certainly changed over the years. It increased from four in 1996 to five in 2000 during the Clinton administration. In 2004, during the Bush administration, Secretary Paige increased the NETP goals to seven. Secretary Duncan's 2010 plan presented five goals along with four "grand challenge problems" all relating to "the ultimate grand challenge problem in education: establishing an integrated end-to-end real-time system for managing learning outcomes and costs across our entire education system at all levels."[27]

Most people would probably agree that a grand problem in American education is high cost and poor outcomes, but education experts across the political spectrum increasingly question the likelihood of grand solutions coming from the federal government working within the current K–12 government monopoly structure. Thus far, there has been no technological revolution from the top down.

Can Technology Transform American Public Schooling?

Based on the latest findings from the U.S. Department of Education, it appears that many of the interim goals contained in NETPs dating back to President Clinton's administration have been achieved in terms of computers in classrooms and well-trained teachers who know how to use them. Today, every public school in the country has at least one instructional computer with Internet access, and the ratio of students to instructional computers with Internet access is three to one. Virtually every public school (97 percent) has one or more instructional computers in its classrooms, while more than half of all public schools (58 percent) have laptops on carts.[28]

Public schools are also using their district networks or the Internet to provide standardized test results to teachers so they can individualize instruction (87 percent), data to inform instructional planning (85 percent), online student assessments (72 percent), and digital content that is described as high quality (65 percent). More than two-thirds of public schools (67 percent) report that their teachers helped integrate technology into instruction.[29]

Nearly all public school districts also report offering teachers professional development in integrating technology into instruction (95 percent), using the Internet and other communication resources for instruction (91 percent), and Internet safety (89 percent). In fact, a majority of public school districts (55 percent) require teachers to take professional development in Internet safety.[30] A majority of public schools, both low and high poverty, also report that teachers are sufficiently trained to use technology (74 percent and 62 percent) and integrate it into classroom instruction (67 percent and 56 percent). Technical support for educational technology is considered adequate (74 percent and 60 percent), and educational technology funding is being spent in the most appropriate ways (79 percent and 69 percent).[31]

"Taxpayers, philanthropies, and corporations have spent more than $60 billion to equip schools with computers in just the last two decades. And yet the machines have made hardly any impact," concluded Harvard Business School professor Clayton M. Christensen and Michael B. Horn, executive director of education at the Innosight Institute, coauthors of *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*.[32] Larry Cuban, professor emeritus of education at Stanford University and author of *Oversold and Underused: Computers in the Classroom*, explains why:

> Technology is linked to progress in the American mind and has a rich history in the culture . . . [but] no "revolutions" in technology use have occurred in U.S. schools and classrooms . . . .
> It is a mistake to assume that if schools just adopt classroom technologies, academic achievement will improve, teaching will change dramatically, and students will be better prepared for the 21st-century workplace . . . . the bedrock of schooling remains an organizational structure introduced in the mid-19th century . . . . Advances in new technologies have hardly made a dent in this permanent structure . . . . Until the age-graded school and funding mechanisms change, the use of new technologies for classroom instruction will remain peripheral.[33]

Other experts question the federal government's ability to affect innovative reform, especially on such a grand scale, given how impervious public-sector institutions are in general to change and innovation. Commenting on the state of national education reform efforts, *Reason* magazine senior editor Katherine Mangu-Ward concluded that:

> It's time to take online education seriously—because we've tried everything else. Education Secretary Arne Duncan debuted his Blueprint for Reform this month to mixed reviews, joining at least 30 years' worth of government officials who have promised that this time, honest, they're going to fix education. Even the reforms promoted by the much-ballyhooed federal Race to the Top funds, which are supposed to encourage innovative educational practices, offer mostly marginal changes to the status quo. In an early March speech on technology in education, Duncan touted $500 million in new federal spending over 10 years to develop post-secondary online courses—an area of online education already thriving without federal assistance—thus arriving at the dance 15 years late and an awful lot more than a dollar short.[34]

Just weeks after Secretary Duncan released the National Educational Technology Plan, the Pew Research Center's Internet and American Life Project released a national survey on the impact technology will have on a variety of institutions in the future. According to the survey, "Many respondents noted that government agencies are conservative and protective of their prerogatives; and they noted that the changes that are driving commercial firms to upend traditional business models and practices are not necessarily being felt in the public sector with the same urgency."[35]

According to Michael Nelson, Georgetown University professor and former White House and Senate technology specialist, the reason is that "government

and some other institutions are not in a free-market situation, and thus will be much slower to redefine the relationship [with their stakeholders]."[36]

Susan Crawford, a member of the University of Michigan's law faculty and of President Obama's National Economic Council, agrees that government agencies are cumbersome and resistant to change. "Having just spent some time in government, I'm less optimistic about the possibilities for change than I used to be. It takes a very long time for entrenched interests to be open to paradigm shifts, and I'm afraid to say that our era is one of great entrenchment . . . . For years to come, they'll give lip service to openness (and they will commit to better customer service), but they won't actually change their ways."[37]

Technology and School Choice: Two Sides of the Education Innovation Coin

In spite of such skepticism about the effectiveness mandates from the top for technological innovation and reform, there is a growing consensus about the inevitability of change. Such change is being fueled by technology as an innovative force, not a specific reform proposal.[38] "What is happening to newspapers will happen to retail, advertising, many sectors of manufacturing, education, and government," says Jeff Jarvis, City University of New York Graduate School of Journalism professor. "There is no going back. There is no protecting the past."[39]

Stephen Downes, senior research officer at Canada's National Research Council, paints an even more emphatic portrait of the future. Information-age institutions will have all but replaced their industrial-age predecessors. "It won't even make sense to talk of these institutions as 'efficient' or 'responsive,'" says Downes. "By 2020, it will be clear that people are governing, managing, educating, and supporting themselves, not waiting for some institution to be 'effective' or 'responsive' to these needs."[40]

John Chubb, chief development officer and senior executive vice president of Edison Learning, and Stanford University political scientist Terry Moe provide

an important insight about what all these developments mean for the future of American education. They concur with Cuban that in the current public-schooling structure, technology is an "add-on." Once a week, elementary-school students may visit a computer lab. A bunch of computers that students can use if there is time once teachers finish the day's lessons probably sit at the backs of classrooms. High-school students use the Internet and computers for word processing, but technology is not integrated into instruction. "It need not be this way," say Chubb and Moe, who explain:

> Curricula, teaching methods, and schedules can all be customized to meet the learning styles and life situations of individual students; education can be freed from the geographic constraints of districts and brick-and-mortar buildings; coursework from the most remedial to the most advanced can be made available to everyone; students can have more interaction with teachers and one another; parents can readily be included in the education process; sophisticated data systems can measure and guide performance; and schools can be operated at lower cost with technology . . . . But the advance of technology is also threatening to powerful education groups, and . . . these people are represented by organizations—most prominently, the teachers unions—that are extraordinarily powerful in politics, and are even now taking action to prevent technology from transforming American education.[41]

While the remarks of some education experts and former government officials, such as Cuban, Crawford, and Nelson, might suggest inevitability about the status quo in education, Chubb and Moe present an optimistic alternative—regardless of how entrenched special interest groups may be:

> Technology is a double-barreled agent of change. It generates the innovations that make change attractive, and at the same time it undermines the political resistance that would normally prevent

> change from happening. There will be struggles and setbacks, and the process will take decades. But the forces of resistance will ultimately be overcome, and American education transformed. This will mean real improvement for the nation, its children, and its schools. It will also bring the dawning of a new era in which education politics is more open, productive changes are more readily embraced, and learning is liberated from the dead hand of the past.[42]

Demand from parents, students, and educators for better education options has been a powerful force for the steady growth of technology in the classroom over the past several decades, and this growth is intensifying. The expansion of school choice, however, goes hand in hand with the continued proliferation of technology-based innovation in education. As Moe explains, regardless of opposition from teachers unions and others, as a force technological innovation "is going to seep into the system." However, if the soil is too parched for technological innovation to seep in, it needs to flow to more fertile ground.[43] School choice is the channel that helps get it there.

Put another way, technological innovation as a force needs the proper outlet. As described earlier, public schools now have the technology. Still, the innovation is lacking. For technological innovation to bear fruit on a grand scale requires a diverse educational landscape where it can find receptive outlets and begin to take hold in unexpected places—and in unanticipated ways. By the time defenders of the status quo grasp the threat, it will be too late to reverse course. Choice and technology will have evolved into a yet-unimagined form.

The expansion of school choice goes hand in hand with the continued proliferation of technology-based innovation in education.

Beginning with alternative public schools in the 1960s, public-school choice expanded in the 1970s and 1980s with the advent of magnet schools designed to

help reduce racial segregation in school districts and/or provide curricula with a specific academic or cultural focus. As of the 2007–08 school year, 5,700 schools offering magnet programs enrolled approximately 4.3 million students.[44]

The use of technology in the classroom, like the expansion of school choice, is a demand-driven phenomenon, not a supply-driven one.

Plans that allow students to attend public schools based on their parents' choice, rather than where they can afford to live, include interdistrict school choice, which lets students go to public schools outside their resident districts; and intra-district school choice, which lets students choose public schools within their resident districts other than the ones they are assigned to. As of the 2007–08 school year, these public school options were available in almost half (48 percent) of school districts nationwide.[45]

Home schooling is another vibrant and growing education option that began 40 years ago. In 1970, around 15,000 students were educated by their parents at home. As of 2007, the U.S. Department of Education reports an estimated 1.5 million students are home schooled.[46]

A new breed of public-school choice emerged in 1991 in Minnesota, when it became the first state to enact charter school legislation.[47] Charter schools are public schools, founded by teachers, parents, or community organizations, that operate under a written contract with a state, school district, or other entity. Because they are public schools, charter schools are open to all students. They cannot charge tuition, have no religious affiliation, and abide by the same state and federal testing, financial, anti-discrimination, health, and safety regulations. Today 5,039 public charter schools enroll more than 1.5 million students in 39 states and the District of Columbia.[48] As of the 2008–09 school year, charter schools represented 4.8 percent of all public schools nationwide.[49]

Unlike traditional public schools, however, charter schools operate with more autonomy from district control and more flexibility than traditional public schools. This structure has given rise to a wide variety of schools, including back-to-basics, vocational, college preparatory, and Montessori.[50] It also fosters better partnerships among parents, teachers, and students to create an environment in which parents can be more involved, teachers have the freedom to innovate, and students are provided the structure and individualized attention they need to learn.

In exchange for more autonomy, charter schools are held strictly accountable for meeting the terms of their performance contracts, which detail each charter school's mission, program, goals, students served, financial plan, and assessment methods. The duration of charter schools' contracts varies from state to state, but contracts typically range from three to five years. At the end of the contract, the chartering agency determines whether to renew or end a school's contract based on academic results and fiscal management, as well as any other stipulated terms.[51]

Of course, the most potent accountability measure of all for charter schools is that if parents are dissatisfied with their child's education, they can transfer them elsewhere. If enough parents are dissatisfied, charter schools must close their doors because they will not receive transfusions of public funding for years at a time until they turn around.

Private-school choice has also expanded significantly since 1990, when the country's first voucher program was enacted in Milwaukee. The U.S. Department of Education reports that from 1995 to 2007, the percentage of elementary and secondary students enrolled in private schools has ranged from 10 to 12 percent.[52] Publicly funded voucher programs and privately funded tax-credit scholarship programs are putting private education within the financial reach of a growing number of low- and middle-income families. As of October 2009, 24 private-school choice programs were operating in 15 states and the District of Columbia. These programs are serving approximately 160,000 students. Another 650,000

students are benefiting from personal tax-credit and deductions programs that help reduce education costs such as private-school tuition, books, and supplies.[53]

With the expansion of options, it is not surprising that the number of students attending assigned government-run schools has declined from 80 percent in 1993 to 73 percent in 2007.[54] Still, the U.S. Department of Education has been slow to embrace school choice fully. The various National Educational Technology Plans are virtually silent on the subject. During the Bush administration, education options for parents were limited to public schools. Even if their children were trapped in chronically failing public schools with no quality alternatives in their resident districts, children still were not permitted to escape to neighborhood private schools.

Likewise, the Obama administration stood by while Congress ended the D.C. Opportunity Scholarship Program, which provided vouchers so low-income students in failing D.C. public schools could attend private schools instead. The official evaluation from the president's own education department concluded, "Students who were offered vouchers to attend private schools scored higher on reading tests compared to students who were not offered vouchers. These gains were equal to three months of additional learning." In addition, of the 11 studies conducted by the department, the D.C. Opportunity Scholarship Program was "one of only three programs to show positive results, and showed by far the biggest achievement gains."[55]

The use of technology in the classroom, like the expansion of school choice, is a demand-driven phenomenon, not a supply-driven one. Absent options, demands for alternatives, including innovative uses of technology in the classroom, could fall on deaf ears without penalty. Parents and their children would be a captive audience. Once parents have alternatives, however, unresponsive schools pay a steep price because students can go elsewhere, including home.

Only in a competitive educational landscape is there a reason for public schools to use technology purposefully instead of as an afterthought. Federal

and state policies, plans, and initiatives that fail to recognize this fundamental reality—namely, that there must be incentives to improve and consequences for stagnation—are doomed to failure. Yet, as the following sections suggest, parents and students no longer seem satisfied with simply picking this school or that one. Instead, they want to choose providers that will work with them to customize education itself. Technological innovation makes this possible so that school choice truly becomes educational choice.

Growing Demand for Technology in Education

More than two million students are currently attending a virtual school for all of their classes or are taking at least one course using the Internet. Experts believe that number will increase to 10 million by 2014.[56] Recent growth in online course-taking in recent years appears to substantiate this projection.

Enrollment in technology-based online courses increased 60 percent from the 2002–03 school year through the 2004–05 school year, from 317,000 students to more than 506,000 students.[57] Online enrollment grew another 47 percent from 2005–06 to 2007–08 to 1 million students, and public school administrators predict a 23 percent increase in online course enrollments over the next two years.[58] The online programs offer credit-granting courses to elementary and secondary school students and help public schools address overcrowding, student demand for Advanced Placement (AP) and college-level courses, and individualized schedules.

The Sloan Consortium adds that online courses and schools are helping improve access to high-quality teachers and schools, which makes the public-schooling system more equitable:

> It has been well reported over the past decade that the United States has a severe teacher shortage. One critical aspect of the teacher shortage issue is its uneven distribution among subject

> areas and geographical locations. The highest shortages of teachers are in mathematics, science and special education in poorer rural and inner city school districts. As an example, it has been estimated that high school students in rural areas are less likely (6.8 percent versus 26.5 percent) to take advanced placement science courses than students in central cities and in suburban fringe areas because of a lack of teachers and resources. In addition, small rural districts have smaller student populations so if they are able to find teachers in high demand subjects, the small number of students that might enroll in their courses would result in very low student to teacher ratios and hence much higher per-pupil costs. Online learning provides these districts with a cost-beneficial method of providing courses for students who otherwise would be taught by under-qualified teachers or would require the hiring of teachers who would not have enough students to justify their salaries.[59]

Technology-based online learning is helping to meet the needs of students who need to make up coursework, who are in the juvenile corrections system, who need extra help, and who want to take more advanced placement and college-level courses.[60] As the Southern Regional Education Board sums up, technology-based online education is not ultimately about technology, but rather about using current technology to meet the needs of students in ways that never before available.[61]

As of 2009, 45 states and the District of Columbia provide students with online learning opportunities, including full-time and supplemental online instruction through virtual schools and online courses.[62] States with few or no such online learning opportunities include Delaware, which had to eliminate funding for its state virtual school because of the budget deficit.[63] New Jersey has one virtual charter school but few online programs, and distance learning is provided mainly through video.[64] New York, aside from a few online programs through Boards of Cooperative Educational Services (BOCES), has no state-level policy

for online learning, a charter-school cap, and a precedent for blocking online charter development.[65] Rhode Island has one virtual charter school but few online programs, with just 14 percent of the state's high schools offering online courses through the Virtual High School Global Consortium.[66] While Vermont is considering a state online initiative, it offers students few online learning opportunities.[67]

Student demand for online learning is outpacing supply at an alarming rate, based on available surveys. Nearly half of high-school and middle-school students have researched or are interested in online classes, but just 10 percent have actually taken such classes at their schools.[68] Students and teachers also agree about the benefits of online learning. Nearly half of high-school students surveyed (47 percent), almost 40 percent of middle-school students (39 percent), and 25 percent of third through fifth graders think that online courses would make school more interesting because students want to be in control of their learning. Those students believe the format, not the content, would make it easier for them to succeed because it would be easier to review material and ask their teachers for help. Teachers agree.

Fully 75 percent of teachers who have taught online courses agree that they help empower students in their own learning.[69] Teachers who have taught online courses also report that online courses improved their effectiveness, encouraged students to be more self-directed (67 percent), promoted collaboration among students (48 percent), and facilitated student-centered learning (47 percent).[70]

Student demand for online learning is outpacing supply at an alarming rate.

Parent surveys add another dimension to the growth of online learning. Only one-third of parents and 40 percent of sixth through 12th graders believe their schools are doing an adequate job of preparing them for the 21st-century world. In contrast, half of school principals say their schools are adequately preparing students. Parents are also dissatisfied with their children's schools' and teachers'

integration of technology in the classroom, with only about one-third of parents reporting that they are satisfied with their children's technology skills.[71] As Project Tomorrow survey researchers concluded:

> Parents have stated it emphatically. From their vantage points, effective technology implementation in schools is essential to student success. They believe that teachers need more training and more access to up-to-date technology. They're open to and in many cases, strongly in favor of schools adopting 21st century technology-infused approaches to teaching and learning . . . ranging from online textbooks to more use of tools such as interactive white boards, laptops for students, computer projection devices and technology-based organizational tools . . . it's critical to remember that parents are experiencing the value and potential of technology in their own lives and they see great potential ahead when their children can use technology to learn and succeed in school and beyond.[72]

Empirical research about the academic achievement of K–12 students participating in online education is sparse. A recent analysis sponsored by the U.S. Department of Education, however, reviewed more than 1,000 studies comparing online learning with traditional learning. Most of the studies reviewed focused on postsecondary students, and researchers caution about generalizing higher education findings to K–12 education given the smaller sample size. Still, researchers acknowledge that their K–12 findings resembled their higher education findings, which concluded that online classes, whether completely online or hybrid, produce stronger average student achievement than traditional classes and promote more time on-task.[73] Evidence of specific state-based online education programs also suggests that they can improve student achievement at a lower cost than traditional classroom instruction.[74]

Public school districts rely heavily upon outside providers, including other districts, schools, and postsecondary institutions, for their technology-based online courses.[75] Many school districts use multiple online course providers, so an exact distribution of online course providers is not possible. However, Sloan researchers have identified the frequency with which school administrators report using particular providers. Postsecondary institutions account for nearly half of public schools' online courses (47 percent).[76] State virtual schools, which provide centralized K–12 online courses, provide 41 percent of online courses, while independent vendors provide 35 percent. Other in-state public-school districts and education agencies, including virtual schools, provide 29 percent.

It is important, however, to be clear on terminology. A leading source of confusion is the interchangeable use of terms such as "virtual," "cyber," "online," or "electronic" (or "e-"). These terms are essentially synonymous when used to describe a school; however, local preferences dictate which terms are used. Virtual schools are referred to as cyber schools in Alaska and Pennsylvania. Minnesota and Colorado use online schools instead; while Ohio prefers e-schools. A more general, related term is "ICT," information and communication technologies, which refers to the use of electronic technology in various fields such as education, business, and government, as well as in daily life.[77] This study prefers "virtual school."

Another source of confusion is that virtual schools are often conflated with distance and online education.[78] Virtual schools are both online *and* remote. They are a distinct online learning category, which in turn is a subset of distance education. Virtual schools offer formal instruction through an Internet Web site, in which most of the instruction occurs while teacher and learner are separate instead of together in a brick-and-mortar classroom.[79] Students earn credits toward grade-level advancement, graduation, or both.[80] Private vendors selected by the virtual schools typically provide the "learning management system" (LMS), the software that creates the web site delivery "portal" where course

syllabi, assignments, chat rooms, students' homework, and teachers' feedback is found. Virtual schools usually provide students with computers and additional instructional materials.[81] In contrast, online learning can be classroom-based or remote; and it can be online (Internet-based) or offline (software-based but not Internet-based). Meanwhile, distance education can consist of online courses or correspondence programs.[82]

Students in virtual schools typically work at their own pace and meet with their fellow students and teachers online, although some virtual schools also offer opportunities for field trips or extracurricular activities. Students spend between 20 percent and 80 percent of their time on the Internet. While parents are expected to supervise students' work, teachers spend up to one-third of their time giving students individual attention by phone or email. Students are assessed on their course portfolios and through both online and offline tests.[83]

A third source of confusion is uniformly associating virtual schools with home schooling or charter schools. Virtual schools encompass elements of home schooling, along with independent study and tutoring. Likewise, as described in more detail below, many virtual schools are also charter schools, but not all virtual schools have this governance structure.[84] Many other distinctions could be made, but the National Association of Charter School Authorizers provides a helpful conceptual model:

> The way to think about a virtual school . . . is simply to think of a regular school and remove the building: swap in a computer instead and the Internet connection becomes the "bus" transporting students to school. As with other schools, most virtual schools have an office, administrators, teachers, professional development, curriculum, attendance, grades, report cards, parent conferences, special education services, field trips, school events, state testing, school board meetings and even disgruntled parents. However, there are important differences between schools comprised of electrons and those fashioned of bricks: more individualized

> and self-paced instruction; greater dependence on technology; complicated logistical issues due to the dispersion of students; different kinds of socialization (some face-to-face, some virtual); no snow days; and more. One of the key differences relates to time and learning. In a traditional classroom, time is fixed and learning is variable (i.e., classes are held for a set period of time each day and when the bell rings the amount of actual learning that has occurred will vary, sometimes dramatically, by student). In a virtual environment, learning is fixed and time is variable (i.e., the lesson continues until the student achieves mastery).[85]

Thus, virtual schools hold many advantages over traditional brick-and-mortar schools. They are not limited by geographic boundaries or by rigid schedules, so students may live anywhere across a given state, the country, or even the world and complete their work during day or night. Given such flexibility, virtual schools are better equipped to serve a broad array of students with diverse learning styles. They can also offer many choices when it comes to curricula, along with individualized attention.

Virtual schools hold many advantages over traditional brick-and-mortar schools.

Randall Greenway, head of school at the Arkansas Virtual School and a former state department of education official, and Gregg Vanourek, a former executive at K12, Inc., explain, "Students with intensive acting or athletics regimens and children of high-mobility military families are served well by the flexibility. Urban parents may want to address safety or overcrowding concerns, while rural parents may seek advanced or specialized academic offerings not available locally."[86]

The flexible schedules also open up new opportunities for teachers, who do not need to live near the virtual school where they teach. Virtual schools also expand opportunities for parents to be involved in their children's education. Finally, virtual schools challenge the notion of prevailing school governance and financing structures because they can enroll students regardless of where they live, and class

size is no barrier to self-paced, individualized instruction or access to high-quality teachers.[87]

Still, virtual schools may not be ideal for every student. Students with limited English proficiency, visual impairments, severe and/or multiple disabilities, or problems with motivation may struggle in a virtual-school setting. It is also estimated that only around 1 percent of teachers nationwide have the necessary training to be online instructors.[88] "This type of school is not for everyone, but for the kids who need it," according to Tom Scullen, Appleton (Wisconsin) Area School District superintendent. "This may be their best—or even only—opportunity to succeed."[89]

Virtual schooling takes many forms and can be categorized according to six leading dimensions: comprehensiveness, reach, type, location, delivery, and operational control, detailed in figure 1.[90] This analysis focuses on virtual charter schools, a distinct type of virtual school, examined in greater detail in the following sections.

Figure 1. The Six Defining Dimensions of Virtual Schooling

Defining Dimensions of Virtual Schooling						
Comprehensiveness	Part-time program (individual courses)			Full-time school (full course load)		
Reach	District	Multi-District	State	Multi-State	National	Global
Type	District	Magnet	Contract	Charter	Private	Home
Location	School		Home		Other	
Delivery	Asynchronous			Synchronous		
Operational Control	Local Board	Consortium	Regional Authority	College or University	State	Independent Vendor

Source: Authors' figure adapted from figure 2 of Gregg Vanourek, "A Primer on Virtual Charter Schools: Mapping the Electronic Frontier," Issue Brief No. 10, National Association of Charter School Authorizers, August 2006, p. 3.

How Virtual Charter Schools Work

Given the diverse and innovative nature of charter schools generally, it is not surprising that they would embrace virtual learning. There is no such thing as a typical virtual charter school. They serve a diverse student population, provide varied, customized curricula, and offer a variety of grade configurations. Because many virtual charter schools are designed for self-paced students, however, students could be performing at various "grade" levels depending on their mastery of different subjects. Even so, virtual charter schools share some basic operational characteristics.

Most virtual charter schools are full-time schools instead of part-time online programs. Once students enroll, they typically receive a computer on loan from the school, and their families are reimbursed for Internet access and instructional materials. Students can log on to their virtual schools from any location with Internet access, but most do so from home. Students then click through interactive lessons that can include text, audio or video clips, animated graphics, and links to related Web sites. They take online quizzes, do reading, write essays, and conduct experiments. Students also e-mail their teachers as well as log on to threaded discussion and chat groups with their classmates and teachers. Parents supervise students and can assist them with their lessons and help keep them motivated.[91]

Virtual charter school teachers either work out of a school office building or from their homes. The schools provide computers, Internet access, and training. Virtual charter school teachers oversee and grade assignments as well as monitor attendance and progress, and some even help develop lessons or courses,
They give feedback through phone conferences, e-mail, instant messaging, or Web conferencing, and sometimes they meet in person with their students. Virtual charter school teachers often customize their instruction by creating individualized learning plans for their students based on diagnostic assessments, standardized tests, feedback from parents, and students' personal interests. Virtual school administrators typically work at the school office and perform the same

tasks as their nonvirtual peers except for those involving building facilities, transportation, and cafeterias.[92]

Virtual charter school students—and virtual school students in general—typically transfer from district public schools. Virtual schools are also becoming popular with home-schooling students as an opportunity to connect with other students and professional staff. The flexibility of virtual education also makes it a popular option among nontraditional students, including athletes, actors, and high-mobility students (such as children from military families). The self-paced study benefits struggling students as well as advanced students, who can work at their own pace without embarrassment, distractions, or delays. Parents also appreciate many aspects of a virtual learning environment for their children. These include improved safety (especially for students who are victimized or bullied at school), the absence of negative peer pressure, the absence of overcrowded or disruptive classrooms, and greater curricular offerings (such as Advanced Placement classes, which are more limited in rural areas).[93]

The Virtual Charter Schooling Sector: Size, Scope, and Specialties

Virtual charter schools are a small but growing segment of online education providers at around 9 percent.[94] Nondistrict online education programs, including virtual charter schools have increased rapidly but still enroll around 1 percent of the overall student population. Yet even this seemingly slight growth is spurring traditional public school districts to change.[95] "Across the country, strong demand for online learning is pushing it from a fringe offering to a strategic imperative for districts," according to Gregg Levin, vice president of KC Distance Learning. "This is likely being driven by the growing popularity of statewide virtual charter schools, increasing acceptance of online learning for all populations of students, and its cost effectiveness during tough economic times."[96]

There are currently 219 virtual charter schools enrolling nearly 63,000 students in 28 states and the District of Columbia, according to the Center for Education Reform.[97] Thus virtual charter schools represent slightly more than 4 percent of

all charter schools and enroll slightly more than 4 percent of all charter-school students.

Virtual schools are also becoming popular with home-schooling students as an opportunity to connect with other students and professional staff.

These schools are serving students in a variety of grade configurations, ranging from preschool (including programs offering infant care) to students beyond grade 12. More than two-thirds of virtual charter schools (68 percent) offer grades nine through 12. Another 13 percent offer both middle and high school grades, while 2 percent offer middle grades only. The remainder of virtual charter schools offer more comprehensive grade spans: 10 percent offer preschool through grade 8, and 7 percent offer kindergarten through grade 12.[98]

Virtual schools are also serving a diverse student population. Fully 43 percent of virtual schools expressly identify special education or at-risk children and youth as their target student population.[99] These include students in the juvenile justice system; students who have dropped out or who are at risk of dropping out; students who are parents, students who have discipline problems, and students who need more comprehensive social services, such as welfare-to-work programs or substance-abuse treatments. Other students simply were not succeeding in their previous schools because they needed more advanced curricula or they were struggling to keep up and could not get the individualized attention they needed.

To meet the needs of a variety of students, the virtual schools these students attend offer before- and after-school programs, year-round programs, and intensive summer programs. They provide a wide array of curricula, but a common theme from schools' mission statements is an emphasis on individualized and self-paced learning. Categorizing virtual schools' curricula is difficult given the diversity of programs and courses of study offered. Still, three very broad—but by no means mutually exclusive—categories can be identified.[100]

Approximately 43 percent of virtual charter schools have an expressly academic focus with a wide range of programs offered, including special and alternative education, accelerated and college prep, and back-to-basics. About half of the academic programs offered at virtual schools also have special emphases or approaches to their academic programs such as cultural or racial, behavioral, technological, the arts, sciences, humanities, and interdisciplinary programs.

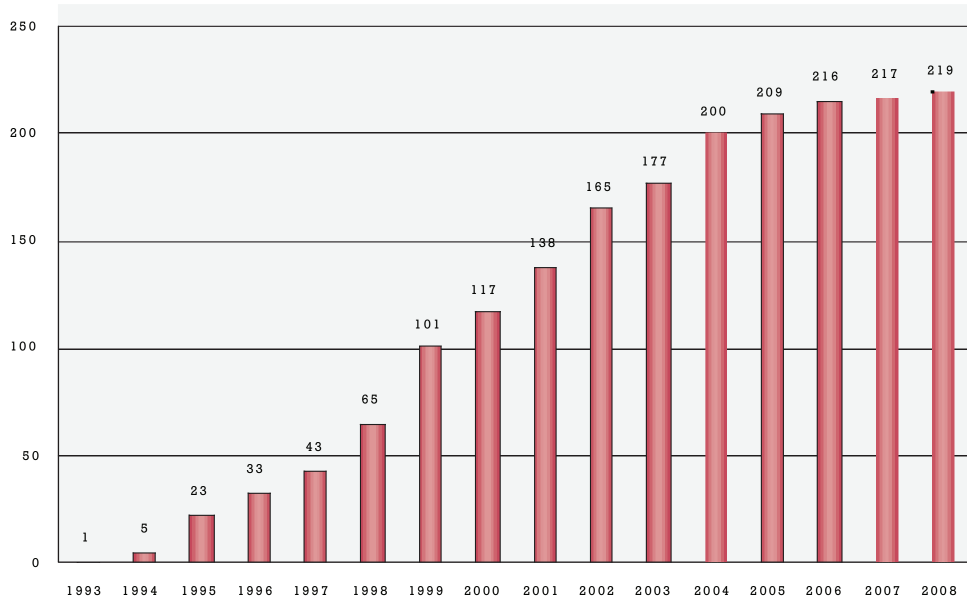
> Virtual schools are also serving a diverse student population.

About 34 percent of virtual charter schools offer what could be called a blended curriculum that is both academic and vocational. In general, these programs focus on academics, meeting state standards, and hands-on life and work skills. In addition to academics, many of these virtual schools offer training in industries such as agriculture, automotive, health, technology, and construction.

The remaining 23 percent of virtual charter schools offer vocational and career-specific training. As with schools offering blended academic and vocational programs, career-specific virtual charter schools combine academics with a strong emphasis on preparing students with industry-specific skills and hands-on training in a variety of fields. These fields include organic farming, economics, finance, accounting, hospitality, engineering, computer science, health care, culinary arts, plastics manufacturing, building trades, and equine veterinary science. Students enrolled in these virtual schools can make up credits to graduate from high school, acquire life skills and leadership training, and hold apprenticeships.

While the number of virtual charter schools increased steadily and significantly from 1993 to 2008, the number of virtual charter schools has remained steady at 219 from 2008 to April 2010.

Figure 2. Charter School Growth, 1993–2008



Source: Authors' figure based on data from the Center for Education Reform.

Until 2005, there was a steady increase in the number of states with virtual charter schools. In spite of the growing number of states with virtual charter schools, it is clear that a relative handful is responsible for the significant growth in the number of virtual charter schools. These states are Arizona, California, Ohio, Michigan, and Florida. In contrast, a number of states have only one or two virtual charter schools.

Figure 3. Virtual Charter Schools by State

Alphabetical by State			Chronological by Year		
State	Number of Virtual Charter Schools	Year First Virtual Charter School Opened	State	Number of Virtual Charter Schools	Year First Virtual Charter School Opened
Arizona	36	1995	California	29	1993
Arkansas	1	2001	Minnesota	4	1994
California	29	1993	Nevada	2	1994
Colorado	5	1995	Arizona	36	1995
District of Columbia	7	1998	Colorado	5	1995
Florida	20	1996	Massachusetts	2	1995
Georgia	5	2000	Michigan	24	1995
Idaho	2	1999	Wisconsin	13	1995
Illinois	2	1997	Florida	20	1996
Indiana	1	2004	Texas	12	1996
Kansas	5	1998	Illinois	2	1997
Louisiana	2	2000	Pennsylvania	7	1997
Massachusetts	2	1995	Rhode Island	1	1997
Michigan	24	1995	District of Columbia	7	1998
Minnesota	4	1994	Kansas	5	1998
Missouri	1	2001	New Jersey	1	1998
Nevada	2	1994	Utah	1	1998
New Hampshire	2	2004	Idaho	2	1999
New Jersey	1	1998	Ohio	28	1999
New Mexico	1	2005	South Carolina	2	1999
Ohio	28	1999	Georgia	5	2000
Oregon	2	2000	Louisiana	2	2000
Pennsylvania	7	1997	Oregon	2	2000
Rhode Island	1	1997	Arkansas	1	2001
South Carolina	2	1999	Missouri	1	2001
Texas	12	1996	Virginia	1	2002
Utah	1	1998	Indiana	1	2004
Virginia	1	2002	New Hampshire	2	2004
Wisconsin	13	1995	New Mexico	1	2005

Source: Authors' figures based on data from the Center for Education Reform.

Figure 3. Virtual Charter Schools by State

Ranked by Number of Virtual Charter Schools		
State	Number of Virtual Charter Schools	Year First Virtual Charter School Opened
Arizona	36	1995
California	29	1993
Ohio	28	1999
Michigan	24	1995
Florida	20	1996
Wisconsin	13	1995
Texas	12	1996
Pennsylvania	7	1997
District of Columbia	7	1998
Colorado	5	1995
Kansas	5	1998
Georgia	5	2000
Minnesota	4	1994
Nevada	2	1994
Massachusetts	2	1995
Illinois	2	1997
Idaho	2	1999
South Carolina	2	1999
Louisiana	2	2000
Oregon	2	2000
New Hampshire	2	2004
Rhode Island	1	1997
New Jersey	1	1998
Utah	1	1998
Arkansas	1	2001
Missouri	1	2001
Virginia	1	2002
Indiana	1	2004
New Mexico	1	2005

Source: Authors' figures based on data from the Center for Education Reform.

Policy Considerations and Promising Practices

Many cornerstone assumptions of the current public schooling system will have to be overhauled if the full promise of technological innovation is to succeed in American schools. Instead of measuring education by inputs such as "seat time" and organizing students by age-determined groupings, outcomes such as student proficiency, achieved at students' own pace, should be the yardstick of success.[101] Financing systems will also have to become student-centered instead of system-centered, as well as results-oriented rather than rigidly formulaic.[102] Charter schools have already begun challenging these assumptions, and strong virtual charter school policies begin with strong charter school laws.

Opposition to technological innovation in schools remains strong.

Currently, there are an estimated 365,000 students nationwide on charter school waiting lists, so policies must be in place to ensure that students have better access to the education their parents think best meets their individual needs.[103] Elements of a strong charter school law include multiple authorizers and no caps on the number of charter schools that can open or the number of students who can enroll.[104] Operational autonomy is another key characteristic of a strong charter school law.

To promote greater innovation and performance, charter schools need autonomy over their day-to-day operations and should be freed from bureaucratic regulations at the state and local levels. Such autonomy includes the freedom to contract with private service providers and the freedom to opt out of state retirement plans if they believe they can offer their employees better salary, benefits, and pension plans. Additionally, "seat-time" mandates and agrarian-era school-year calendars dictating the number of hours or days students spend in class do not work well with virtual schools designed for self-paced and outcomes-based learning.

Autonomy is also essential to attract and retain good teachers. Charter school teachers should be free to decide for themselves whether they want to participate in local districts' union bargaining agreements and the state's retirement plans. Rigid teacher certification mandates often keep talented individuals with advanced degrees or industry-specific experience and skills out of public-school classrooms—even though organizations such as Teach for America receive more applications than positions they can fill.[105] With regard to virtual charter schools, such mandates also hinder parents from overseeing their children's education.

Funding should also be equitable compared to traditional district public schools, particularly since charter schools cannot generate revenue for such things such as facilities through local property taxes as traditional public schools can. Many leading experts recommend student-centered or outcomes-based funding that is based on the actual costs of educating students so they achieve proficiency in core subjects. Under the current system, funding is largely based on formulas that have to do with inputs such as seat-time defined attendance rather than actual student needs.

In spite of numerous examples of successfully using technology to improve academic performance among students who are gifted, struggling, dropping out, or who have special needs, opposition to technological innovation in schools remains strong, according to Neal McCluskey, Associate Director of the Cato Institute's Center for Educational Freedom. He noted that many of the charges leveled against virtual charter schools "are very similar to those that have been thrown against many reforms that have sought to change education on a systemic level."[106] Other education experts agree.

Josh Dunn, a professor at the University of Colorado, Colorado Springs, and Martha Derthick, professor emeritus at the University of Virginia, explain that opposition from teachers unions goes well beyond growth caps and funding disputes. "The student-teacher ratio for virtual schools is much higher than the ratio for 'brick and mortar' schools, so virtual schools threaten to reduce employment," they explain. Many virtual-school teachers also work from home,

which can "weaken the solidarity of the unionized workforce."[107] This section examines these and related policy issues in greater detail.

Clarify Laws to Allow Virtual Charter Schools. Online schools, including virtual charter schools, are growing rapidly, and state legislation is trying to catch up.[108] Interestingly enough, in spite of Secretary Duncan's support for both charter schools and online education, Delaware and Tennessee were the only two states to win first-round federal Race to the Top funding. Yet neither of those states allows virtual charter schools. In fact, Delaware also eliminated funding for its state-run virtual school because of budget deficits.[109] Alaska, Hawaii, and Wyoming permit virtual charter schools but do not have any.[110] In contrast, according to the Center for Education Reform, some states prohibit virtual charter schools outright: Connecticut, Delaware, Iowa, Maryland, North Carolina, Oklahoma, and Tennessee.[111]

In other states, the law is unclear whether virtual charter schools are permitted. The District of Columbia has seven virtual charter schools. Its charter school law was amended to permit operational, not facilities, funding for existing virtual schools, but it does not provide for funding for virtual schools that may be approved in the future, leaving the status of virtual charter schools unclear.[112] Florida has 20 virtual charter schools, even though the law is silent on them. According to the National Alliance for Public Charter Schools, recent appropriations bills have forbidden them.[113] Likewise, New Hampshire's charter school law is silent on virtual charters, but two are currently operating.[114] In contrast, New York's charter school law does not expressly prohibit virtual charter schools, but authorizers have interpreted a provision prohibiting a single grade from being housed at more than one site as banning virtual charter schools.[115]

Allow Multiple Authorizers. Allowing multiple authorizers to approve and oversee charter schools helps improve school quality overall and ensure that supply keeps pace with demand. Examples include local school boards; independent, statewide authorizing agencies; state and county departments of education; colleges and universities; mayors and other municipal offices; and

nonprofit organizations.[116] Allowing multiple authorizers helps streamline the charter application process, prevent any one group from politicizing the process, provide better quality oversight, and ensure supply meets growing demand. Of the 29 states with virtual charter schools, 19 states allow multiple authorizers. In Wisconsin, however, multiple authorizers exist only in Milwaukee, and in Georgia, only local school boards are allowed to authorize virtual charter schools. Arkansas has a two-tiered authorization process that makes it difficult to open new charter schools.

Lift School and Student Caps. Limiting the number of charter schools that can open and/or the number of students allowed to enroll is no guarantee of school quality. In fact, this practice typically has more to do with politics than policy. If there is no demand for alternatives, then there is no need for a cap. Some states have removed their caps. Arizona recently eliminated its cap on the number of districts and charter schools that can offer online instruction. To be more competitive for first-round federal Race to the Top funding, Illinois and Tennessee raised their caps on charter schools, but included restrictions on where schools could locate and what kinds of students they could serve.[117] Louisiana lifted its charter school cap of 70 outright to be more competitive for federal Race to the Top funds. While in New Orleans, charter schools account for 60 percent of public school enrollments, statewide, few charter schools are approved, in large part because of hostility from traditional government-run school districts, a burdensome regulatory climate, and a complicated charter application process.

Unfortunately, a majority of states with virtual charter schools, 17, impose charter-school caps, and recent events suggests that virtual charter schools may be in jeopardy even in states that do not currently cap charter school numbers. Arkansas, Oregon, Michigan, and Wisconsin each imposed distinct virtual charter-school caps in the past two years because so many students were enrolling in virtual charters and leaving their traditional government school districts.[118]

In 2005, Ohio lawmakers imposed a moratorium on virtual charter schools. In spite of findings that Ohio's virtual charter schools produce superior results, the moratorium has not been lifted.[119] The Georgia Board of Education limited the state-run Georgia Virtual Academy's enrollment to 5,000 students in 2009–10 and to 6,000 students the following school year.[120]

Schools that are succeeding should not have regulatory barriers between them and students who desperately need the kind of education they provide.

Wisconsin, however, became the first high-profile example of capping virtual charter schools when it limited statewide enrollment to 5,250 students in 2008. This cap persists in spite of a February 2010 audit by the Wisconsin Legislative Audit Bureau, which found that more than 90 percent of parents, students, and teachers were satisfied with their virtual charter schools. Moreover, 95 percent of virtual high school students reported that they were satisfied with the availability of their teachers. Experts also noted that since 93 percent of the money spent by virtual charter schools goes to teachers and curriculum, they use public tax dollars well.[121] Wisconsin is also considering stopping the Internet at county lines to maintain brick-and-mortar school enrollment quotas.[122] In a recent interview, Wisconsin Sen. John Lehman (D-Racine), Chair of the Senate Education Committee, told Reason Foundation's Katherine Mangu-Ward that the teachers unions are "fearful of virtual education in Wisconsin . . . They don't like to see the money leave brick-and-mortar schools."[123]

Arkansas imposed an enrollment cap of 500 students on it sole statewide virtual charter school in 2009, even though the waiting list is twice that long.[124] This measure was supported by the Arkansas Education Association, the Arkansas Association of Educational Administrators, and the School Boards Association, which opposed raising the enrollment cap to 1,000 students.[125] Oregon passed a selective two-year moratorium on virtual charter-school enrollment in 2009, which is creating a waiting list.[126] In May 2010, the Oregon Education

Association proposed that the Oregon State Board of Education eliminate virtual schools altogether for students in kindergarten through 5th grade.[127]

Michigan raised its charter cap by 10 schools, including two virtual charter schools, in December 2009 as part of its Race to the Top application. The new virtual charter schools must primarily serve public-school students who have dropped out of high school. They are initially limited to 400 students and cannot exceed 1,000 students identified by the state as dropouts. The new virtual school operators must also be teaching 10,000 students in at least five other states to prove they have experience using a significant cyber component to serve urban, high-risk students.[128] The Michigan Education Association had defeated efforts in recent years to lift the state's charter school caps.[129] As for virtual charter schools, Michigan Education Association representative Doug Pratt objected, "You can't just put a student in front of a computer and expect them to learn."[130] The debate in Michigan also popularized a compromise policy called "smart caps" that is gaining some traction in political and public-policy circles.

The concept of smart caps was first proposed in 2007 by Andrew J. Rotherham, prominent education writer and Special Assistant to the President for Domestic Policy during the Clinton administration. His work promotes policies that improve public-school quality. Ohio and Connecticut have already adopted variations of the smart-caps concept. Then in October 2009, Michigan Senator Buzz Thomas (D-Detroit) proposed exempting successful charter schools from the state's charter school cap.[131] The smart-cap idea is touted as a palatable political compromise between charter school proponents who want no caps and opponents who want no charter schools. It is based on the idea of earned growth, in which only quality charter schools are allowed to expand. In practice, however, smart caps are more caps than smart.

A handful of new charter schools with enrollment restrictions cannot possibly accommodate Michigan's estimated 12,000 students currently on waiting lists for charter schools.[132] Likewise, more than 3,300 students in Connecticut are on such waiting lists,[133] and an estimated 52,500 students in Ohio could be as

well.[134] Schools that are succeeding should not have regulatory barriers between them and students who desperately need the kind of education they provide. When it comes to quality assurance, smart caps are a poor substitute for rigorous authorizing agencies guided by proven and promising practices and policies of charter schools.

In California, for example, virtual schools can only provide services to students in their own area and contiguous counties.

The smart-cap approach lets policy makers off the hook for not implementing sensible charter-school authorizing laws, which in turn opens up a host of other potential policy problems. These include conflicts of interest between authorizers and favored charter schools. Once established, charter-school operators could become a distinct special interest group hostile to new operators, no matter how promising they might be. Most important, smart-cap theory is bogged down by the same kind of nineteenth-century master-plan thinking plaguing the traditional schooling system today: the notion that elected officials, bureaucrats, and other such "experts" know better than parents what kind of education is best for every child.

Student Access to Virtual Charter Schools Should be Universal. Related to the practice of capping schools and enrollment is the practice of limiting which students can enroll in virtual charter schools. One of the greatest benefits of virtual education is that it opens access to students regardless of where their families can afford to live. In fact, as China and India demonstrate, virtual education has the potential to become a leading export industry connecting countries' best teachers to students around the world. Unfortunately, state policy concerning virtual charter schools appears to be dominated by parochial turf wars that make little sense in cyberspace.

Several states limit student access to virtual charter schools by imposing geographical limitations. In California, for example, virtual schools can only provide services to students in their own area and contiguous counties. Students

in the Chicago Virtual Charter School (CVCS) must meet at a physical location once a week in order to address a legal provision that charter schools not be home-based. New Jersey's charter school statute requires that 90 percent of enrollments come from contiguous districts. In both Nevada and Wisconsin, virtual charter schools must report to students' resident districts before they can enroll.[135]

Other states limit enrollment in virtual charter schools to certain types of students. Originally, Arkansas' virtual charter law was intended primarily for home-schooled students, but it is now available to any student. However, its newly imposed enrollment cap largely negates that policy improvement.[136] In contrast, Michigan's home-schooled students are prohibited from enrolling in its two new virtual charter schools. While the Oregon Education Association wants the Oregon State Board of Education to eliminate virtual schools altogether for students in kindergarten through 5th grade, the Nevada State Board of Education repealed its ban on virtual charter schools serving grades K–3 in 2008. Likewise, Colorado repealed its prohibition on funding online students who were not public-school students in the prior year.[137]

Texas limits enrollment in its virtual charter schools to public-school students; however, it exempts students in foster care and certain dependents of military personnel. Pennsylvania's law also makes clear that children of deployed active-duty military parents retain their resident status and the right to enroll in virtual charter schools. Meanwhile, Missouri's virtual charter law is silent about the enrollment eligibility of private and home-school students. Proposed legislation in Florida would have made Florida's home-schooled students eligible to attend state-funded virtual schools, allow students in one district to use the virtual program in another district, and allow authorized virtual providers to create charter schools within districts. The bill, however, died in the Senate calendar in April 2010.[138]

Allow Full Teacher Licensure Reciprocity. China, India, and other countries are opening their borders to ensure that students have access to the best and brightest

teachers. Here in America, however, most states' licensing regulations deprive students of talented teachers beyond state lines because they do not recognize out-of-state teaching licenses. One of the leading benefits of virtual education is that students, especially those in rural or underserved areas, have access to highly qualified teachers in advanced subjects or special fields. John Watson and Butch Gemin of Evergreen Consulting Associates, an online learning consulting and research firm in Evergreen, Colorado, note that

> Very few states have made the next logical observation that online teachers should not be restricted to teaching within state lines. While state content standards vary in some subjects, for many topics such as algebra there is simply not much variation by state. States could easily balance the supply of highly qualified teachers by creating reciprocity with other states—recognizing each other's certification of qualified online teachers. The result would be increased access for students who otherwise might not be able to easily take a course in a subject such as physics, chemistry, or a foreign language—online or otherwise.[139]

Currently, only Michigan, Nevada, North Carolina, and West Virginia allow full teacher reciprocity. The remaining states effectively cap the supply of teachers by not allowing any teacher licensure reciprocity, or by allowing some reciprocity with other requirements, including additional coursework.[140] The more autonomy charter schools have over their day-to-day operations, including staffing, the more likely they are to be able to hire talented teachers with out-of-state licenses, even if traditional district-run public schools in their state cannot. Oklahoma is one of only a few states that recognize the out-of-state teaching licenses of those who teach online courses.[141]

Several states are confronting the issue of equitable funding for virtual charter schools.

Provide Equitable Funding. Another emerging trend relating to caps on virtual charter schools is fiscal caps. Faced with a tough economy and budget deficits,

state-funded virtual programs are being eliminated from budgets. This has happened in Delaware and Missouri. According to iNACOL's Susan Patrick, this trend is "going to be a problem in the next three years. And it's more likely to happen to virtual schools than brick-and-mortar ones, since they have more funding sources."[142] Several states are confronting the issue of equitable funding for virtual charter schools.

"There is no good argument that the overall funding level should be different for a child in a virtual school than any other kind of [public] school," according to Nelson Smith, president of the National Alliance for Public Charter Schools. "Instead of bricks and mortar, you see virtuals place an investment in software and technology and things like travel time. They have teachers that provide in person coverage of a geographic region."[143]

Some officials in Pennsylvania object that virtual charter schools save too much money.

iNACOL explains that online learning is not "cheap," but it is "cost effective."[144] Effective financing of virtual education, including virtual charter schools, requires accurately identifying the costs of providing a quality education, determining how dollars should flow to online schools, and making funding sustainable.[145]

Actual costs of providing online education include expert teachers, curriculum licensing and development, computers, course-delivery and data systems, special services, and physical materials. While virtual education programs do not have the same facilities and transportation costs as traditional public-school districts, they have significant technological costs, such as hardware and bandwidth. Teachers also travel for in-person training and technical support. Some research suggests that the cost of providing a high-quality virtual education is roughly equivalent to educating the same students in a brick-and-mortar public school.[146]

Virtual education is cost-effective, however, because it offers students courses that meet their needs but that their school districts could not afford to provide. It also

does not require new construction to do so.[147] Allowing online education to grow to scale based on demand also improves efficiency through increased competition; however, district representatives typically object to such competition because it costs them money when they lose students, and state lawmakers oftentimes cap popular virtual education opportunities in response, as noted previously.[148] While most traditional public-school districts object that charter schools cost them and the state money, some officials in Pennsylvania object that virtual charter schools *save* too much money.

In 2001, school districts in Pennsylvania refused to fund virtual charter schools and joined the Pennsylvania School Boards Association in a lawsuit alleging that virtual charter schools are illegitimate. The court ruled against them the following year, and in response legislation was adopted making the Pennsylvania Department of Education the authorizer of any new or renewing virtual charter school. The funding controversy has not subsided, and in August 2009 legislation was introduced to reduce funding for virtual charter schools.[149]

At issue is the fact that under states' public-school funding formulas, including Pennsylvania's, districts receive more funding for some students than others because the associated costs of educating them are higher. These include students with special needs, students from low-income families, and students struggling in school. Education officials, including those at the Pennsylvania Department of Education, object.

"If you get $10,000 for one student and $25,000 for another, they have the potential to make a profit," said Mike Race, spokesman for the Pennsylvania Department of Education. "The district's argument has been that if you are making money off a student and the cost of educating them is the same, that extra money should be returned to the district that sent it to you."[150]

Of course, Race assumes that virtual charter schools freed from district control are more efficient. Rather than addressing the reason district-run virtual programs are incapable of improved efficiency, in which case they too should be

allowed to keep unused funds in reserve, he and other opponents prefer to punish virtual charter schools. Under proposed legislation, traditional school districts in Pennsylvania would continue receiving different levels of funding for students, but virtual charter schools would be funded for the same students at a lower, flat rate. The Pennsylvania Families for Public Cyber Schools called this "a clear double standard" that would affect about 20,000 families.[151]

A recent committee hearing was held on a proposed bill to require students who choose a virtual school outside their resident district to pay the entire bill themselves. Jon D. Marsh, CEO of 21st Century Cyber Charter School, which enrolls students from 230 different school districts across Pennsylvania, testified that the bill would "impermissibly curtail school choice," especially choice among economically disadvantaged children. Marsh also noted that the rates cyber charter schools charge students are set by the school districts based on what the state pays them.[152]

Many states' funding mechanisms have little to do with what matters most in education—student achievement.

In response, Pennsylvania House Education Committee member Rep. John Pallone (D-Westmoreland) stated that virtual charter schools "were becoming a difficult burden for school districts to support financially, despite their success." As for limiting students' education options, Rep. Pallone added, "We don't get to pick the best all the time, sometimes we have to pick the solution that satisfies the most."[153] Pennsylvania is a textbook case of what John Watson and Butch Gemin of Evergreen Consulting Associates mean when they observe that many states' funding mechanisms have little to do with what matters most in education—student achievement.

This situation is beginning to change. Watson and Gemin note, "States that fund based on successful completion find that having defined benchmarks or milestones for incremental completion (for example, 50 percent and 100 percent complete) provides a more rational and predictable approach than 'all

or nothing.'"[154] Florida is a leading example. The state-operated Florida Virtual School does not get funding until students successfully complete each course segment. Florida Virtual School CEO Julie Young explains the rationale behind the outcome-based funding system:

> In our early days of development, we were highly influenced by a 1992 SCANS report [Secretary's Commission on Achieving Necessary Skills]. One quote we've returned to over and again says, "In our current system, time is the constant and achievement the variable. We have it backwards. Achievement should be the constant and time the variable." As we continue to evolve, we keep this central focus on achievement as our guidepost for development.[155]

Funding flowing from state appropriations to virtual schools also has sustainability problems. As noted previously, in tough budget times, states eliminate funding for their virtual schools. One issue is that virtual schools are treated as public-school add-ons instead of as integral parts of a state's public-schooling system. Another problem, exacerbated during times of budget shortfalls, is that traditional districts are pitted against virtual schools for funding. A better approach is switching from a system-centered appropriation model to a student-centered funding model. This is the system Florida currently uses.

In addition to funding the Florida Virtual School based on student performance, it also uses a per-student funding model. Holly Sagues, chief strategist and policy officer for the Florida Virtual School, explained that before 2003 when legislation was passed changing the funding model from an appropriations-based system to a per-pupil, performance-based model, "We would figure out how many students we would be able to serve . . . It really does hurt kids, because we had a waiting list a mile long, but we weren't funded appropriately. There was no way for us to grow our enrollment base with that model."[156] Once the funding model was changed, enrollment at the Florida Virtual School more than doubled, increasing from 14,000 to 31,000 in one school year.[157]

Protect Parents' Rights as Educators. Improving parental involvement is a common theme in public-schooling reform debates. Virtual schools have a great advantage in this regard because parents must oversee and supervise their children's education. Yet opponents have taken steps in recent years to limit this kind of involvement. In 2004, the Wisconsin Education Association Council (WEAC) sued the state-run Wisconsin Virtual Academy, alleging in part that the extensive role parents play in their children's online education violated the state's teacher certification and licensing requirements. Although the case was initially dismissed, an appeals court found in 2007 that the virtual school was violating the state's teacher licensing law.

"According to this ruling, if I want to teach my daughter to tie her shoes, I'd need a license," said Bob Reber, whose daughter attends Wisconsin Virtual Academy.

WEAC president Mary Bell disagreed. "The court did not say that parents cannot teach their children—it said parents cannot teach their children at taxpayers' expense."[158]

Lawmakers responded in 2008 by exempting parents and other persons providing educational services in the students' homes from state licensing requirements. The new law also defined the role of online teachers apart from parents; however, protecting parents' rights came at a price.[159] To pacify Wisconsin teachers-union members, the law also imposed a cap on enrollment in virtual charter schools. Showdowns between union bosses and parents could soon become commonplace in other states. Barbara Stein, manager of the 21st Century Initiatives at the National Education Association, the country's largest teachers union, recently stated that her organization has concerns about "an excess of parent involvement" in virtual education and "about deputizing whoever happens to be at the kitchen table as a teacher."[160]

Make Compulsory Education Codes Compatible with Virtual Education. Related to teacher licensing laws are statutory supervisory laws that limit how many students any given teacher may oversee. For example, in Ohio, no teacher of

record can be responsible for more than 125 students. In New Hampshire, the State board of Education creates policies over such matters. In Arkansas, class loads must remain at a ratio of no more than 30 students per class and 150 students each day for both synchronous and asynchronous online courses. South Carolina restricts instruction in virtual charter schools to no more than 75 percent of a student's core academic instruction.[161]

Perhaps the most high-profile direct-supervision challenge to virtual charter schools occurred in Chicago. In 2006, the Chicago Teachers Union alleged in court that the Chicago Virtual Charter School was not a legal charter school and was therefore ineligible to receive state funds because it violated Illinois' "direct supervision" regulations, which stipulate that charter schools cannot be home-based. The case was dismissed in 2009. The court found that the virtual charter school's curriculum must follow state and federal standards; therefore, it is not a home-schooling program. Second, as a charter school, the Chicago Virtual Charter School is exempt from Illinois School Code provisions defining days of attendance and direct supervision.[162]

Showdowns between union bosses and parents could soon become commonplace in other states.

Other regulatory barriers facing virtual charter schools should be handled by strong charter laws themselves by giving charter schools in general autonomy over their-day-to-day operations. In California, for example, virtual charter schools can avoid class-size mandates if certain conditions are met. States' compulsory education laws typically stipulate the number of hours or days of attendance required for students to be counted as full-time for funding purposes. Rigid rules regarding "seat time" often put virtual charter schools at a disadvantage because they are structured around students' mastery of subject material.

In Kansas, virtual students are counted based on census date attendance within specific timeframes, verified by their online activities or journal log of activities.[163] This method, however, is imprecise and could result in funding a district that

is not providing most of the teaching should students switch districts around the count day.[164] Ohio virtual charter schools can count student attendance in days lasting at least five hours.[165] A full-time program in Nevada must have as many instructional hours or minutes as a 180-day program.[166] In contrast, Michigan provides a small number of waivers from seat-time requirements so students can take online courses on a full-time basis and their school can receive full funding.[167]

Online education is not going away,

For all the various education reform issues and controversies that intersect with virtual charter schools and technological innovation in education generally, one thing is clear: online education is not going away, as Watson and Gemin sum up:

> Online learning may . . . be one of the truly transformative influences on all of education, because many online policy issues cannot be easily addressed without looking at education as a whole . . . Ideally, the continuing evolution of high-quality but diverse online learning programs, together with development of thoughtful state policies, provides a laboratory to explore issues that benefit students in every learning environment. The many intricate policy details and questions can be confusing, and certainly challenging to understand and explain. In fact, even when you find something that works in one state, there is no guarantee it will work everywhere . . . There is, however, a simple litmus test for evaluating online learning policy. Good policy answers two key questions affirmatively:
>
> - Does the policy hold promise for increasing student educational opportunities?
> - Does the policy hold promise for improving student educational outcomes?
>
> If the answer to both questions is yes, the policy is likely to be beneficial.[168]

Online Education Policy in California

One of the most highly publicized concerns regarding online learning is the so-called "digital divide," which centers on the ability of all students, regardless of their backgrounds, to access the Internet and online services. While this divide has shrunk in recent years, it still exists.

The digital divide affects some groups and some areas more than others.

In California, Internet usage and availability has grown significantly over just the past few years. According to a survey by the Public Policy Institute of California, in 2010, 81 percent of adult Californians reported using the Internet, up from 70 percent in 2008.[169] Seventy percent in 2010 said that they had broadband Internet access at their home, a considerable increase over the 55 percent in 2008. Despite these increases, the digital divide affects some groups and some areas more than others.

While 82 percent of whites, 77 percent of Asians. and 70 percent of African Americans reported that they had broadband Internet access at home in 2010, just 50 percent of Hispanics said that they had such access. Also, only 49 percent of adult Californians with incomes under $40,000 had broadband Internet access at home, versus 94 percent of those with incomes of $80,000 or more. In the San

Francisco Bay Area, 79 percent had broadband Internet access at home, while just 64 percent in the Central Valley had such access. Of interest to those seeking to expand online learning options for children, it is noteworthy that broadband Internet access has risen among families.

In 2010, among adult Californians with children under 18 years of age, 71 percent have broadband Internet access at home, a 15 percent increase over the 54 percent in 2008. Thus, while the large majority of children have access to broadband Internet at home, around three out of 10 do not.

Even if every Californian had broadband Internet access, many K–12 students would still find it difficult to take advantage of online learning opportunities because of a variety of governmental and special-interest obstacles.

In response to these access gaps, Governor Arnold Schwarzenegger's Broadband Task Force issued a report that called for the public and private sectors to work together to, among other things, "Build out high-speed broadband infrastructure to all Californians," increase the use and adoption "of broadband and computer technology," and leverage "educational opportunities to increase broadband use."[170] The task force also called on participating state entities to document and share successful policies and programs to promote digital literacy and to assist educators to share ways that technology could be employed to enhance instruction. The report also promoted curricula integration strategies that would increase digital literacy and use. These are all laudable goals. These efforts could support the expansion of online learning, but they do not address all of the issues involving the expanded use of online learning.

Even if every Californian had broadband Internet access, many K–12 students would still find it difficult to take advantage of online learning opportunities because of a variety of governmental and special-interest obstacles. These obstacles are not apparent if one just examined California's official distance learning policy framework.

While the federal government has issued periodic National Educational Technology Plans for the past decade and a half, California put out its policy blueprint for technology and education five years before the first Washington plan. Enacted in 1991, the California Distance Learning Policy is now enshrined as California Education Code Section 51865.

However, despite the online-friendly foundation laid down by this law, later actions by state government and education special-interest groups have combined to limit the natural expansion of online learning.

According to one recent legal analysis, "California law does not draw formal distinctions among distance learning, online learning, and online instruction." The analysis continues, "Distance learning is a broadly defined term that means technology-enabled learning in which the instructor and student are not at the same location," while "online learning is learning from sources available on the Internet, including books, videos, lessons, and software." The analysis then says, "Online instruction is instruction between the instructor and the student via the Internet."[171]

Thus, distance learning could include options such as virtual charter schools, where much of the learning takes place using a computer and the student and teacher are miles away from each other, while online learning could include alternatives such as "hybrid" charter schools, where a portion of the learning takes place in a traditional classroom and another portion takes place in a learning lab using the Internet and computer software programs.

For its part, Education Code 51865, section (b), defines distance learning as instruction in which the student and the instructor are in different locations and interact through the use of computer and communications technology. Section (b) also says that distance learning should be utilized by the state to achieve a variety of goals, including:

> (1) Equity in education, which requires that every pupil in California's public schools, and every adult in the state, have equal access to educational opportunities, regardless of where he or she lives or how small a school the pupil attends.
> (2) Quality in education, which would be enhanced through the creative application of telecommunications, as pupils are given the opportunity to interact with pupils from other cultures and geographical locations, and with outstanding educators from other educational institutions.
> (3) Diversity among educational institutions, which has been recognized in California through the support of various types of public educational institutions as well as independent and private colleges and universities. Distance-learning technology permits greater diversity in the means of instruction and in the delivery of educational and training services to an adult population that is more likely to seek education outside of the traditional baccalaureate program designed for four consecutive years on a full-time basis shortly after graduating from high school.
> (4) Efficiency and accountability, which receive increasing emphasis as state budget resources become increasingly restricted. Distance learning technologies can be effective only through the cooperative efforts of individuals from different institutions, a collaboration that has the potential to reduce costs and increase efficiency. A technology-integrated educational delivery system would allow for the electronic transmittal of files and reports, thus providing the information needed for accountability more rapidly and at a lower cost, and for video teleconferencing for state and local education and other government agencies, thereby diminishing travel requirements.[172]

In addition, section (d) of the law says that the state "should encourage the use of multiple technologies in distance learning education," with priority "placed upon interconnecting the various delivery systems, while providing educators with the

opportunity to experiment with each alternative distance learning technology."[173]

Finally, in section (f), the law reads: "In expanding the use of distance learning technology, the state should emphasize the delivery of education and training services to populations currently not receiving those services, the ease of access by educational institutions to the technology, and the lower cost over time of providing instruction through distance learning rather than on site."[174]

However, despite the online-friendly foundation laid down by this law, later actions by state government and education special-interest groups have combined to limit the natural expansion of online learning.

Short-Circuiting Online Education in California

Short Circuit I: Government Red Tape

Based on some indicators, California may seem like a national leader in the online education revolution. For example, no other state has more than the 30-plus virtual charter schools operating in California. The state also boasts highly successful hybrid charter schools such as the Rocketship charter school network. Yet, despite these outward signs of leadership, California has erected a number of regulatory and funding barriers that are impeding the smooth and natural expansion of online learning.

John Fensterwald is a respected journalist who spent 11 years as an editorial writer for the *San Jose Mercury News* specializing in education issues. Now with the Silicon Valley Education Foundation, he runs *The Educated Guess*, a widely read blog. In a May 2010 post he criticizes California's online-education regulatory regime:

> California is lagging behind other states, like Florida, in online education, in part because of regulations enacted nearly a decade ago to clamp down on independent study scams masquerading as charter schools. As a result, virtual schools face stifling rules dictating student-teacher ratios, limiting their operations to contiguous counties, and requiring teachers leading virtual courses—they could be living anywhere—to have California credentials.[175]

> California has erected a number of regulatory and funding barriers that are impeding the smooth and natural expansion of online learning.

Each of the regulations cited by Fensterwald is not only a significant obstacle to wider delivery of online-education services, but makes no common sense when considering the ever-changing and improving technological age in which we live. Take, for example, the student-teacher-ratio requirement that California imposes on virtual charter schools.

For the most part, California law does not distinguish between brick-and-mortar charter schools and virtual charter schools. Also, students at virtual charter schools are treated as independent-study students, a designation that brings with it a slew of onerous and illogical regulations. According to a report by the University of California College Prep Online program:

> With certain exceptions, online education must meet the student-teacher ratios for independent study. Under California Education Code Section 51745.6(a), the ratio of average daily attendance (ADA) for independent study pupils to full-time equivalent certificated employees responsible for independent study shall not exceed the equivalent ratio of pupils to full-time certificated employees in other programs in the district.[176]

In other words, the student-teacher ratios in virtual charter schools cannot exceed the ratios in the regular classroom programs run in the school district. This ratio is not some sliding number, but is mandated by state regulation. The UC report notes:

> In a charter school, for the purposes of Education Code Section 51745.6, the ratio of independent study pupils, regardless of age, to full-time equivalent (FTE) certificated employees responsible for independent study shall not exceed a pupil-teacher ratio of

> 25:1 or the equivalent ratio of pupils to full-time certificated employees for all other educational programs operated by the largest unified school district in the county or counties in which the charter school operates.[177]

The 25:1 student-teacher ratio was imposed even though there is no evidentiary basis for that specific ratio. The UC report pointedly observed that the ratio was mandated even though "no studies have been done to look into whether teachers can or should have more or fewer students online than teachers in physical classrooms."[178] Further, California's brick-and-mortar student-teacher ratio requirement of 20:1 for grades K–3 has proven to be ineffective in raising student achievement. A state-sponsored research consortium found "no relationship between [class-size-reduction] exposure and student achievement."[179]

The 25:1 student-teacher ratio was imposed even though there is no evidentiary basis for that specific ratio.

On its face, the 25:1 ratio does not make much sense. Why should a virtual charter school have such a low student-teacher ratio when the online technology can reach hundreds or thousands of students and the software programs are often adaptive (i.e., the programs adapt the curriculum and the learning process to the individual needs and abilities of each student)? Thus, even though many more students can attend a virtual class than a regular class, students in virtual classes may actually receive more individualized instruction than they would in a regular classroom with a 25:1 student-teacher ratio. Practitioners and officials at virtual charter schools, not surprisingly, have criticized the student-teacher-ratio regulation.

Don Burbalys, president of the board of directors of the California Virtual Academy (CAVA) at San Mateo, points out that CAVA teachers communicate with students regularly through "e-mail, telephone, online meetings and synchronous (live, real-time) class sessions." The teachers "provide daily instruction, manage the learning process of their students, review work, assign

grades, and oversee the academic programs of their students." He further explains, "In the virtual class setting, teachers and parents can work together as partners to provide the best education environment and learning methods."[180]

Yet, says Burbalys, "even though CAVA's education model is different from traditional schools, it is still required by statute to maintain the student-teacher ratio found in classrooms of 25:1."[181] Title 5 section 11963.5 of the California Code of Regulations does give virtual charter schools a route to avoid the 25:1 ratio, but the list of requirements is long:

- The charter school must maintain an 8 or above ranking on the state's Academic Performance Index in either its statewide or similar schools ranking and must have no less than a 6 in the other of these two rankings.

- Instructional expenditures must comprise at least 85 percent of the overall school budget, and a substantial portion of these expenditures, at least 25 percent, must be spent on technology that directly benefits students and teachers and results in improved student achievement.

- Teachers must be provided with technology tools and print media, which includes a means of electronic communication for frequent student contact.

- All students must be provided with an individualized learning plan that is based on initial testing of the students and that is monitored. either remotely or in person, by the teacher to evaluate student progress.

- All students must have access to a computer, Internet, printer, and monitor.

- All students eligible for special-education services must receive these services, and the charter school must recruit a student population with ethnic and racial representation similar to that of the counties served by the program.[182]

Taken as a whole, these requirements place a burden on those virtual charters that would like to avoid the 25:1 student-teacher ratio. The most onerous requirement mandates that a virtual charter school recruit a student body with a similar ethnic and racial makeup to the counties served by the school. If a virtual charter wanted to focus on helping low-performing, low-income students, who happen to be minorities, the demographic requirement might impede it from doing so if the populations of the counties were, for example, mostly middle-class whites.

It is also possible for the state to find mitigating circumstances that would allow for the waiver of the 25:1 student-teacher-ratio requirement, plus several other requirements for increasing funding for non-classroom-based charter schools. Title 5 section 1193.4(e) of the California Code of Regulations says that the state can consider mitigating circumstances such as "one-time or unique or exceptional circumstances" and other specific and narrow considerations. In practice, such mitigating circumstances are not usually found and approved.

If the student-teacher ratio makes little sense, then the geographic requirement imposed on virtual charters is truly absurd.

In their book *California School Law*, Frank Kemerer and Peter Sansom write, "A non-classroom-based charter school may not receive state funding for instruction of students who do not reside in the county where the school is chartered or in an adjacent county (89 Ops. Atty. Gen. 166, 2006)." They note, "This is because the State Board of Education requires non-classroom-based instruction in any school to comply with independent study requirements."[183]

A non-classroom-based charter school may not receive state funding for instruction of students who do not reside in the county where the school is chartered or in an adjacent county.

Independent study is defined, under California Code of Regulations Title 5 section 11700(c). as an alternative to classroom instruction consistent with a district's course of study. Charter schools that offer independent study, such as through

distance learning and computer-based education, were made subject to laws and regulations governing independent study by Education Code section 47612.5(b). State funding, say Kemerer and Sansom, "is available only for independent study programs when students are residents of the county in which the school is located or an adjacent county (Education Code Section 51747.3(b))."[184]

Does it make sense to apply older independent-study rules and regulations to the new and constantly morphing online-education revolution? One person who does not think so is Jim Konantz, senior vice president for the Western region for K12, Inc., which created the network of California Virtual Academy charter schools.

"There needs to be a major change in California," says Konantz. "Most of the states that allow for online education have statewide laws that allow for it," he observes, but "what California has done is to take independent study and place online education into independent study with all the rules and regulations that apply." He points out, "Independent study is at least thirty years old, it still envisions a teacher getting on a horse and riding to schools and sitting down and meeting with a student and saying: 'Okay here is your work for the next week. You go home and work on it and I will be back next [week], then I'll give you more work and you work on that and I'll see you the next week and so on.'" Konantz concludes, "It is an old paradigm," and "it doesn't make sense anymore."[185]

"There needs to be a major change in California," says Konantz.

The new paradigm of online learning is much different. According to Konantz, "Today we are delivering high-speed, interactive, online education on the Internet with Web-based access for anywhere, anytime learning and 24-7 supervision," which he emphasizes "was not even conceived of in independent study rulings." He continues, "In online learning, we have attendance rosters, we have a log in, we know how many minutes they've been online, we have work samples, we have all the other stuff." He is surprised that much of the online-education technology "started out here in Silicon Valley and we're the last to get on board here in California."

Konantz humorously criticizes policymakers in Sacramento, saying:

> You're absolutely right Mr. and Mrs. Sacramento, you know if you were to travel to San Diego County to Orange County the Internet would change. The kids in Orange County wouldn't be able to use the same Internet as the kids in San Diego use. Oh, you know if you are out to L.A. County it changes again, and if you go out to Riverside it changes again. So you have to have separate charter schools to be able to provide the right kind of education using the Internet because the Internet changes from county line to county line.

Thus, the fact that California has a relatively high number of virtual charter schools does not mean that the state has a forward-thinking regulatory regime vis-à-vis distance learning. Rather, it indicates that state regulations have reduced efficiency and increased costs for no convincing reason. Konantz is very serious about who is behind this absurd situation.

"I truly believe what has been promulgated in public policy for online education is not developed from the common good, I think it was developed for the lesser common good and that lesser common good is dictated by the traditional public education sectors." He specifically singles out county offices of education and local school districts:

> [The county offices of education and the school districts] knew they had a safeguard in site-based [charter schools] because if you're in San Francisco and you want to go to High Tech High School in San Diego you have to get your body there every day. Well, the chances of that happening are pretty nil. If you wanted to go to a high quality online school and you were in San Francisco it wouldn't make any difference, you could enroll in a San Diego school. I think folks were afraid of losing money.

Konantz makes the valid point that if the California Department of Education or other state or local agencies are worried about oversight and accountability issues, the state education code gives "a lot of latitude for county offices, authorizing districts and the state to close charter schools." In addition, there is ongoing work on new charter revocation and renewal regulations, which would provide even more accountability. One does not need a contiguous counties rule to make use of that existing power.

Konantz also strongly criticizes another requirement of the contiguous counties rule. As the UC report states, "There are also limitations on the number of students that can be served by online schools in adjacent counties when using resource centers; a charter school must operate with at least 50 percent of its students from the county in which the school is chartered if the online school operates regional centers in adjacent counties."[186] Konantz tells of a phone call he had with the State Department of Education where he told officials that there were students in central Los Angeles who needed remediation for the state subject exams and the California Virtual Academy in Kern County wanted to provide tutoring and support for these children by setting up a center in Los Angeles. Offering this extra help through online education made sense since it allowed for flexible scheduling.

Although Kern and Los Angeles are contiguous counties, Los Angeles is a much more highly populated county than Kern. A large tutoring center in Los Angeles would mean that the majority of students might no longer be located in Kern County, the county where the school was chartered. A frustrated Konantz recounts: "So the answer was that these children in South Central L.A., who are all on welfare, would have to take the bus to Kern County in order to get tutoring . . . So we had to open another charter school [in Los Angeles] just to get tutoring for these kids." Again we see reduced efficiency and higher costs courtesy of state regulations.

When asked to compare the government regulatory burden in the Western states, Konantz says, "California is probably the most burdensome." He elaborates, "California is just overactive when it comes to regulations; it creates quite a burden." Minority communities are often hit hardest by the contiguous counties rule.

Konantz explains:

> By the very nature of contiguous counties, by the very nature of no learning facilities in any other place than where you have the majority of students, things like that basically redlines high-need communities from getting any kind of exceptional online delivery. I look at Jordan High School in Watts [which has a limited number of advanced classes], why should those children be penalized if we all know that four mouse clicks away there is advanced physics and advanced calculus, all AP approved by the UC system . . . So why redline those kids from being able to take advantage of this?

In contrast, other states have no contiguous counties rule. Thus, in Pennsylvania, it does not matter where a child lives: whether in Philadelphia or Pittsburgh, he or she can attend a virtual charter school located in any part of the state. "So, really for the first time in American history, geography, zip code, no longer defines where a child can go to school," observes Charles Zogby, Pennsylvania-based CEO of K12 Online Learning.[187] That may be the case in the Quaker State, but it is still not the case in the Golden State.

How might the contiguous counties rule be changed? Bill Lucia, president of the education reform organization EdVoice and one of California's top education policy experts, says that the contiguous counties rule "is absolutely a constraint." He offers that an appeal process could be created so that virtual charters could ask for a waiver from the State Board of Education if they had a track record of excellence, a proven model, and accountability. Barring the simple elimination of the rule, Lucia thinks that it may be possible "to unshackle the county boundary in a controlled way."

Lucia, however, is not sanguine about the chances to reform the contiguous counties rule. He views it as "a tough road," given the legislature's anti-charter-school lobby which has introduced "a slew of anti-charter bills" with the intent of conditioning legislators to vote for anti-charter legislation. "I think charters are such a threat to the traditional school model that there is that much thought into the tactics of it," says Lucia.[188]

Finally, as mentioned earlier, California is one of many states that fail to allow teacher licensure reciprocity. California's Commission on Teacher Credentialing says, "A California credential is required for employment in California public schools."[189] Teachers with out-of-state credentials must meet various requirements, depending on the number of years they have been teaching and the type of credential they are seeking, in order to obtain a California credential. Forcing teachers to have California credentials prevents the possibility of virtual schools using star teachers in other states to teach online students.

Research has shown that simply having an instructor with a California teaching credential does not guarantee high student achievement. A research consortium that included RAND, the American Institutes of Research, WestEd, Policy Analysis for California Education, and EdSource studied California student testing data in six large school districts. When the consortium compared the performance of teachers with regular California teaching credentials with teachers who had been issued less rigorous emergency credentials, the researchers found that credential status "appeared to be unrelated to student achievement after controlling for student and classroom characteristics."[190]

Forcing teachers to have California credentials prevents the possibility of virtual schools using star teachers in other states to teach online students.

If it makes no difference to student achievement whether a teacher has a regular California teaching credential or a much less demanding emergency credential, then there is no reason to expect that having a regular California teaching credential will guarantee better student performance versus having an out-of-state credential. California's credentialing requirement, therefore, makes little sense, especially in an online setting where virtual schools can tap the best teachers across the country to teach students.

Short Circuit II: Funding Disparities

California's system of funding public education is extremely complicated and the methods of funding online education are a case in point. Funding formulas differ depending on whether the online learning is conducted in traditional public-school classrooms, classroom-based charter schools or virtual charter schools.

Traditional public schools are funded based on the average daily attendance of students at the schools. A 2009 report by the Center for Education Policy and Law at the University of San Diego (USD) notes that the California Education Code gives all schools the authority to offer online classes, and "the method of computing average daily attendance for online classes is the same as for traditional classes."[191] The report points out that Code section 46300(a) "requires the online class to be an 'educational activity' and the pupil to be 'under the immediate supervision and control' of a certificated employee."[192] The California Department of Education advises these schools to use the regular attendance forms that are used for other class periods.

Classroom-based charter schools can also have online classes, but the method of funding their online classes differs from traditional public schools. "For the purposes of funding charter schools," observed the USD report, "the law differentiates between classroom-based instruction and non-classroom-based

learning."[193] As in traditional public schools, classroom-based instruction at charter schools is defined to take place when a certificated teacher supervises students, who are then required to complete educational activities in a classroom at the charter school site. "Non-classroom-based instruction," says the report, "which does not have to meet these requirements, includes distance and computer-based education."[194]

Funding for classroom-based charter schools is based on average daily attendance. The USD report explains, "For the purposes of calculating average daily attendance for classroom-based instruction apportionments, at least 80 percent of the instructional time offered by the charter school must take place at the school site."[195] Online learning is deemed to be included if it takes place in the classroom. However, if the bulk of online learning takes place in a non-classroom-based setting, then the funding formula changes since these charters are subject to the law governing independent study.

According to the State Board of Education, a virtual charter school is defined as a charter school where 80 percent or more of teaching and student interaction takes place over the Internet.[196] The UC study noted that funding for virtual charter schools is governed by Education Code sections "that were revised by the passage of SB 740 in 2001 to address concerns about independent study programs potentially misusing funds."[197] To receive funding, a virtual charter school must spend 80 percent or more of its total revenue on instruction, and it must spend 40 percent or more of public revenues on certificated staff salaries and benefits.[198] Despite these requirements, the USD report points out that virtual charter schools receive much less funding than classroom-based charters:

> Because of concerns that non-classroom-based charter schools should not be entitled to the same amount of state funding as classroom-based charter schools, the California legislature reduced the state funding for these schools beginning in 2003–04 and thereafter to not more than 70 percent of the amount a charter school would otherwise be entitled to, unless the State

> Board of Education decides that a greater or lesser amount is appropriate.[199]

It is therefore theoretically possible for the State Board to make individual determinations giving specific non-classroom-based charters up to 100 percent of funding to which classroom-based charters are entitled. In practice, the reduced funding for virtual charter schools makes for stark comparisons with traditional public schools.

Don Burbulys, the California Virtual Academy board member, says that CAVA students receive less total funding than their counterparts in traditional brick-and-mortar public schools. "According to data from the California Department of Education," he says, "average per-pupil funding for all public schools for the '08–'09 school year was approximately $8,700." In contrast, "per-pupil funding for CAVA during '08–'09 was about $5,900." He points out that unlike traditional public schools, "CAVA does not receive local tax revenue or funds for capital outlays, therefore CAVA receives a total amount of public funding that is significantly lower than what traditional public schools get."[200]

The reduced funding for virtual charter schools makes for stark comparisons with traditional public schools.

Although Burbulys acknowledges that virtual charters have less overhead than traditional public schools, the virtual charters have higher costs in other areas: "While CAVA and other virtual schools across the state do not have overhead costs that brick-and-mortar schools face—such as buses, buildings, or cafeterias—virtual schools spend more on technology, online courses and content, educational materials, and other costs directly related to student instruction."[201] Even though virtual charters may have higher costs in some areas, they are often still more efficient than traditional public schools.

Jim Konantz of K12 was an assistant superintendent in the Los Angeles Unified School District and recalls, "Los Angeles Unified spent $127 per year per student on instructional materials." With the current price of $95 per book, Konantz observes, "You can see that a whole lot of money is going to other places than into teaching and learning tools for students." In contrast, he says, "California Virtual Academies spend over $800 per student on instructional materials and supplies, so there are some cost efficiencies there." He points out, "We are not spending 60 to 70 cents on the dollar just to fix the roof and keep the bathrooms clean," so we "can retarget resources . . . to what taxpayers are really paying for appropriate education for the children."

Short Circuit III: Union Opposition

Labor has historically feared new technology. Many unions believe in a zero-sum game: more technology means better efficiency, which means fewer workers are necessary to do the same job. Organized labor thus has often tried to preserve their collective clout by fighting technological innovation. In the standard model of industrialized labor, the consequences of such blocking are a suboptimal output and therefore a higher cost of goods. In education, blocking by the teacher unions can mean higher operational costs and potentially lower student performance.

Teacher unions believe that the spread of distance and online learning has the potential to displace the role of the traditional teacher at the head of the brick-and-mortar classroom. Besides the shock to orthodox pedagogy, and hence a priori objectionable to unions, this new form of learning can allow for higher student-teacher ratios. Fewer teachers mean fewer dollars for union coffers, which take a cut of every teacher's pay. Thus, unions have a strong incentive to fight distance learning to protect their membership numbers and their swollen treasuries.

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Our democratic system gives unions many points at which to block proposals for effective and efficient technological innovation. Since they need only be successful at one stage to halt change, the odds favor their success.

Misinformation and Misdirection

Unions use their power in the public sphere to deny the benefits of technology in education and highlight its disadvantages. This tactic allows them to steer public debate, refocusing attention on traditional education practice while quashing new ideas. This strategy can create an environment of doubt that prevents many promising experiments in distance education from getting tried.

> The unions, not the education technology companies or the technology itself, represent one of the most imposing obstacles to the full potential of online education.

Early on, teacher unions tried to portray online education as low quality. In 1999, the two biggest national teacher unions, the National Education Association (NEA) and the American Federation of Teachers (AFT), commissioned a report by the Institute of Higher Education Policy titled *What's the Difference?: A Review of Contemporary Research on Distance Education*. The report casts doubt upon a wide body of research supporting the parity of distance education to traditional courses, with similar learning outcomes in the overwhelming majority of cases. While attempting to discredit the potential of distance education, the report offered little in the way of new ideas, suggesting only a refocusing of the debate on "pedagogy—how we actually teach students."[202]

Unions also claim that online education is expensive. In 2001, the NEA released a manual asserting, "Online instruction is almost always more expensive than traditional, in-person instruction."[203] Yet, the case of Rocketship charter school, detailed in one of the following sections of this paper, and other real-life examples demonstrate the hollowness of this argument.

Further, unions contend that online education is unprofitable. In 2002, the NEA Higher Education Research Center released a report, "The Promise and Reality of Distance Education," which focused on assertions based on questionable evidence. The report says that distance education companies do not grow as fast as other technology companies and represent a small percentage of overall postsecondary returns: "The clear message is that distance education has not proven to be an easy way to make money."[204] This reasoning is stunningly shoddy. The relative profitability of companies offering online education services compared to other technology companies says nothing about the absolute profitability of these firms.

Finally, the unions argue that there is low interest for distance education. The same NEA report states: "Many (online) programs have discounted tuition in order to attract students. For students, the lack of enthusiasm could be a result of the missing social structure. Students may complain about boring classes, tests, and arbitrary schedules, but these attributes may account for the success of traditional programs."[205] That some private online education companies may offer discounted tuition for their programs is irrelevant and obscures the larger reality that thousands of students across America have enthusiastically sought out virtual charters and, in some cases, are on waiting lists for those schools.

Regardless of these claims, the unions, not the education technology companies or the technology itself, represent one of the most imposing obstacles to the full potential of online education.

Teacher Union Contracts in California: The Devil in the Details

Few documents are more important to the quality of education-delivery systems than the locally negotiated collective bargaining agreement with the teachers union. The unions are not so superficially Luddite as to deny the importance of online technology. Rather, their strategy is to demonize online alternatives such as virtual charter schools as bad for students and the public and to limit and constrain distance and online learning. This strategy has the important benefit of protecting union members from the competition of these online alternatives.

Although the California Teachers Association (CTA) does not directly address virtual charter schools and other online learning options in its official statements, the CTA's parent organization, the mammoth and powerful National Education Association (NEA), says, "there also should be an absolute prohibition against the granting of charters for the purpose of home-schooling, including online charter schools that seek to provide home-schooling over the Internet."[206] Further, the NEA opines, "Charter schools whose students are in fact home schoolers, and who may rarely if ever convene in an actual school building, disregard the important socialization aspect of public education, do not serve the public purpose of promoting a sense of community, and lend themselves too easily to the misuse of public funds and the abuse of public trust."[207] Despite this high-minded rhetoric about student socialization, sense of community, and public trust, the real rationale for union opposition is grounded in simple self-interest.

If unions let any technology into schools, they therefore go out of their way to make sure teaching is never contracted out of union control.

Teachers unions fear that their services might be contracted out to a third party if districts begin offering online education. This would be disastrous for unions because it would reduce their bargaining power. Third parties, such as private education firms and nonunionized teachers, offering online education are most often outside of union control. In the short term, replacing unionized educators with independent educators means a drop in membership and dues for the unions. In the long term, this practice opens the door to alternative educational options for districts, and if the third parties can do a better job for less, unions could recede as they lose their monopoly stranglehold on public teaching. In any case, teacher unions endeavor at all costs to maintain the "integrity of the bargaining unit," an oft-repeated value in internal union literature, which basically means preserving the power and privileges of the local union. If unions let any technology into schools, they therefore go out of their way to make sure teaching is never contracted out of union control.

Official union documents instruct contract negotiators to preserve the domain of the unions. The California Federation of Teachers (CFT) is the second of the two major teacher unions in the state. In 2005, the CFT's Educational Technology Committee issued its revised contract template titled "A Framework for Contract Negotiations Related to Educational Technology Issues." This template is still being used by the union and is referenced on its website. The template is to provide a model for union negotiators statewide.

Although the template includes language specific to community colleges, the document emphasizes, "These issues were important at ALL levels of education"[208] (emphasis in original). Thus, the template says:

> The impact of technological changes is most pronounced in the community and universities, but that is changing rapidly. Clearly technology is rapidly becoming fully implemented in K–12 as well. The word "college" is used quite often in our document. Generally, similar principles apply to all education, so just substitute the term "school" where necessary.[209]

The Committee contends that it "has arrived at a sense of what constitutes good (or model) policy regarding educational technology."[210] However, internal union discussions led to template language that represents "negotiated compromise rather than that which is entirely in the best interests of faculty and students."[211] This caveat notwithstanding, the template is, not surprisingly, weighted heavily to what is in the best interests of union members rather than students.

Although the CFT recognizes the growing importance of online education, the template makes it clear that the offering of any online education alternatives to traditional classroom instruction should be limited. "As a general rule," advises the CFT's template, "distance education should be undertaken when a campus-based alternative is impractical."[212] Note that "impractical" is not the same as "less efficient" or "less effective." Even in such circumstances, the union says, "Where possible, these courses should also be offered in the traditional classroom

manner."[213] So even where distance learning is more efficient and more effective than traditional-classroom learning, the union still wants to protect traditional classrooms and the teachers who staff them.

Why the bias against distance education? The CFT explains: "Our experience as educators tell[s] us that teaching and learning in shared spaces of a campus is an important part of the educational experience and cannot be diminished too greatly without reducing the education to training or some subset of measured competencies."[214] Certainly this observation is a self-serving one since the union's power and the employment interests of its members demand a more traditional campus-based setting for teaching and learning. However, even if one were to ignore the union's self-interest in making this supposedly professional observation, choosing between a traditional classroom and a distance-learning model should be the decision of parents and their children. A union contract should not limit that choice.

Yet, the CFT's template aims to take online-education choices off the table. Programs "taught entirely at a distance, are generally undesirable because of the lack of personal interaction between student and teacher." Therefore, "only a limited number of credits should be awarded for distance education."[215] Such limitations on learning are difficult to defend for a variety of reasons, but especially given the stories of students who have excelled using virtual learning models (their stories are included in later sections of this book).

A key union concern is that online education could lead to non-bargaining-unit members teaching courses. Whether such individuals may be better instructors or whether students may benefit from these instructors is not the priority. The union's single-minded focus is to ensure that online education not affect the employment of union members. For example, the union warns:

> When administrators determine that the skills and knowledge to provide instruction by means of that technology does not exist in their districts, the issue of "contracting out" or "outsourcing" arises. Responsibilities normally performed by members of a CFT bargaining unit are often circumvented without the knowledge, either express or implied, of the bargaining agent.[216]

The union then advises: "Contract language should address all possible methods that might be used, whether intentionally or not, to undermine the integrity of the bargaining unit by having its work performed outside of the district."[217] Thus, even if the union members within the college or school district are not equipped with the skills and knowledge to make the best use of online-education technology, the main issue for the union is the potential that nonunion individuals or organizations may provide the educational services that the union's members cannot. While the impact on students is not mentioned, the CFT underscores whose interest is paramount:

The union still wants to protect traditional classrooms and the teachers who staff them.

> Contracting out bargaining unit work can take the form of a district contracting with an independent contractor to produce course software. A district could contract with a company to produce certain course offerings or could offer courses over the Internet that have not been developed in-house. In each case, someone else is doing the bargaining unit's work.[218]

To combat this threat to union hegemony, the CFT deploys an arsenal of model contract provisions and language to its local affiliates to ensure that the union monopoly is maintained:

> No employee shall be displaced because of distance learning or other educational technology. The use of distance education technology shall not be used to reduce, eliminate, or consolidate faculty positions within the district.

> No work normally performed by any member of the faculty bargaining unit shall be contracted out without the express agreement of the Federation.
>
> No distance education sections shall be instructed or conducted by persons not employed within the faculty bargaining unit.
>
> No distance education or technology-related work shall be performed by other than members of this bargaining unit.
>
> No member of the bargaining unit will be displaced because of distance learning or computer-aided courses as long as workload in credit courses is available in traditional modes.[219]

Like a medieval potentate, the union seeks to build a wall around its fiefdom and grant itself veto power over any change that would, in its opinion, adversely affect union members. Local affiliates are instructed to treat outside education providers as invaders to be fended off:

> Courses traditionally taught by bargaining unit members, or courses for which they met the minimum qualifications that lie within the curricular purviews of district course offerings, will not be awarded to other institutions for transmission into campus by electronic means.
>
> No class shall be scheduled or received via distance learning from another institution if that course, or its equivalent, is scheduled to be offered at the college in the same semester as the proposed receipt of the distance learning course.[220]

The message of this language is clear: if technology is to enter the classroom, it must be under union control. Even if the courses conducted by other institutions are more effective and result in better student performance, if a school or district

offers those same courses taught by teachers who meet "minimum qualifications," then those outside courses are blocked from student use. The unstated rationale for these provisions is to limit competition.

Under a competitive arrangement, distance-learning courses and alternatives would be allowed into a school or school district and it would be up to parents and students to choose whether these alternatives or more traditional classroom-based courses were better suited for individual student needs. If students favored the distance-learning alternatives, the number of classroom-based courses could be reduced or limited. Fewer local union members would therefore be needed to teach courses. Such a possibility is not to be countenanced, however, hence the strictures against competing distance-learning choices.

Regardless of its rhetorical bows to students, the union's bottom line is, "No employee shall be displaced because of distance learning or other educational technology."[221] That is why the unions are vigilant when it comes to educational technology entering regular public schools and why they are especially suspicious of virtual charter schools and other tech-based educational alternatives.

> Like a medieval potentate, the union seeks to build a wall around its fiefdom and grant itself veto power over any change that would, in its opinion, adversely affect union members.

Teacher unions also fear that technology will make teachers more efficient and effective and hence able to serve a larger number of students. This too is a threat, as a low student-teacher ratio ensures high union membership. Teacher unions were all for California's magic bullet in the 1990s, small class sizes, since that reform required the hiring of more teachers. While this reform did almost nothing to boost student achievement, it proved to be a huge winner with the teachers unions. Anything that might allow teachers to serve more students would be a step backwards. Unions want to make sure technology displaces none of their dues-paying members.

The CFT contract template prioritizes keeping class sizes down and union membership high. To address that priority on campus, the report advises each school to create a joint management-labor committee to deal with educational technology issues. In direct language, the report describes the committee's duties:

> When a proposed course utilizes technology as a significant part of delivering education, it shall further be the committee's duty to investigate the proposal and make a recommendation to the bargaining agent about implementation, after determining whether or not the proposed use of voice, image, or text reproduction to teach a significant part of a course
>
> - would reduce the number of teaching positions existing at the college,
> - would deprive any bargaining unit member of his/her faculty position,
> - would in any way modify or alter the terms and conditions of the bargaining agreement.[222]

Issues of how technology could benefit the students are not the committee's primary concern.

> No employee shall be displaced because of distance learning or other educational technology.

The CFT's parent organization, the American Federation of Teachers (AFT), anticipated the threat technology posed to unions and in 1996 released a document with national guidelines for negotiating technology issues titled "Teaming Up with Technology: How Unions Can Harness the Technology Revolution on Campus." The report advises, *"The union should pursue a policy of no layoffs and resist attempts to reduce staffing levels as a result of adopting new technologies"*[223] (emphasis in

original). As the CFT's model contract language indicates, the AFT's Golden State affiliate took this advice to heart.

When pressed to defend why student-teacher ratios should be capped, unions fall back upon traditional notions of "pedagogy." When the AFT report says, "Enrollment in courses taught with the use of technology shall be limited for reasons of sound pedagogical principle,"[224] that principle is invariably left presumed and unexplained. The CFT model contract includes this exact same AFT language.[225] One of the great advantages of distance education is that it allows teachers to reach greater numbers of students than a single classroom space could contain, yet there is no room for the possibility of such innovation when the union defines best practices in the form of their notion of "pedagogy."

In order to distance teachers from the possibility of obsolescence, unions often try to reframe the role of technology as supplementary, as something to enhance pedagogy and improve the teaching experience. This perspective is embodied in the CFT policy rationale for "Technology, Privacy and Security in the Educational Work Environment," which states, "The use or non-use of technology should not drive the teaching environment, and faculty should be free to determine the appropriate use of technology in the curriculum for which they are responsible. Faculty positions should not be displaced or replaced by the use of technology, but rather technology should be used as a tool to enhance the educational experience."[226] Indeed, the CFT template would guarantee union participation in any decision-making regarding technology implementation in schools.

When schools wish to offer "technology mediated instruction," the template says, "Such courses should be taught only by faculty chosen and evaluated in a special consultative process involving faculty and the department."[227] The CFT recommends the establishment of a "Joint Committee on the Impact of Technology (or Joint Committee on Technology Working Conditions)."[228]

Since "technological change may affect the terms and conditions of employment and professional duties and responsibilities of faculty and disciplines," this committee will "address itself to any issue concerning or related to information technology and technological change in the district where there may be an impact on the terms and conditions of employment and professional responsibilities of members of the bargaining unit."[229] The committee will also "consider issues of technological change and, in that context, the future well-being of the district and the members of the bargaining unit."[230]

Californians are forced to accept the unbelievable premise that the union's self-interest is the same as the public interest.

The union can request that the "relevant representatives of the district shall meet with the Committee to outline relevant policies and actions and discuss their impact on the terms and conditions of employment."[231] Although the union and this committee are not given veto power over the issue of technological change, the template says that the recommendations of the committee "shall be seriously considered in the decision-making process."[232]

What if union members do not want to use the latest online-education technology? According to the CFT template, the decision to use or not to use such technology should reside completely with individual union members. The template's section on "Faculty Rights" states:

> Courses taught with the use of technology may be included in a faculty member's workload only with his/her consent. No faculty member shall be required to teach a course using distance-learning technology. No faculty member shall be sanctioned for declining a course taught primarily using various educational technologies.[233]

In other words, even if advances in educational technology would improve efficiency, student access, and student achievement, unionized faculty members cannot be forced to teach courses that make use of them. Under this contract language, there is no incentive for union members to grow professionally and become familiar with the latest technological offerings. Teachers who still want to use chalkboards and Xerox copies need not fear that the technological revolution has passed them by. They can continue to drive their educational Model Ts. Their students, unfortunately, will be forced to be their passengers.

One of the great advantages of online education is the possibility that many more students may be served with existing or fewer teachers. As has been seen, California has undercut this advantage by imposing a 25:1 student-teacher ratio. To further ensure that their members are protected from online education's ability to reach a great many students over wide geographic areas, the CFT template says, "Enrollment in courses taught with the use of technology shall be limited for reasons of sound pedagogical principle."[234] "Sound pedagogical principle," once again, is not defined, but it is interesting to note how sound pedagogical principles always seem to coincide with the union's self-interest.

> The CFT template would guarantee union participation in any decision-making regarding technology implementation in schools.

The CFT template claims, "The parties to this contract agree that all decisions regarding distance learning courses will consider primarily what enhances student learning."[235] Yet, the limitations on the implementation of distance learning contained in the template are not meant to promote and prioritize student learning and achievement. If distance-learning programs improved student performance but displaced union members, the model contract would disallow the programs. The template makes no mention of student-performance measures or benchmarks that would allow parents and the public to judge whether the limitations on distance and online learning are warranted. In the end, Californians are forced to accept the unbelievable premise that the union's self-interest is the same as the public interest.

Courses taught with the use of technology may be included in a faculty member's workload only with his/her consent. No faculty member shall be required to teach a course using distance-learning technology.

In the minutes for their January 23, 2010, meeting, the CFT Education Technology Committee notes that the model template "was the committee's big success."[236] The Committee makes a telling admission: "We acknowledge that most kids know technology web2 tools better than their teachers."[237] That acknowledgement should be no surprise since the model contract removes incentives for teachers to keep themselves technologically current. The realization that students may know more about technology than their teachers seems to push the union committee to circle the wagons.

In its discussion about its purpose, the minutes report that the Committee is "a vehicle to inform and protect membership from the policies that may harm the membership." They state, "We need to look at how tech affects educators in the near and distant future" and "set CFT policy about technology and how it affects the workforce."[238]

According to the minutes, the "most important mission of the committee work this year is: We MUST be informed as a committee in order to formulate policies and recommendations to support and protect faculty and the union"[239] (emphasis in original). One certainly gets the sense that the union sees technology as a threat to be thwarted or co-opted. Regarding the latter, the Committee asks, "How can we use technology to strengthen the union?"[240]

Given the union's anxieties and self-interested goals and objectives, it is no wonder that the CFT model contract language attempts to blunt and steer the online-education revolution to the benefit of union members rather than to that of students, parents, and the public.

Short Circuit IV: Systemic Inertia and Dysfunction

While government regulatory barriers, funding disparities, and union blocking tactics present formidable obstacles to the spread of online education, perhaps the most difficult challenge to overcome is simple inertia. Without much real pressure exerted by the state's almost wholly ineffective school-accountability system, and with not enough competition from private, charter, and home-schooling alternatives, many regular public schools have no incentive to take the fullest advantage of the latest technological innovations.

A case in point comes from the MIND Research Institute (MRI), a nonprofit organization that conducts research on learning and the brain and applies this research to the development of K–12 education programs. These programs teach all children, regardless of socioeconomic or cultural background, how to think, reason, and create mathematically. According to the organization:

> Born out of neuroscience research at the University of California, Irvine, MIND's unique approach accesses the brain's innate "spatial temporal" reasoning ability. This ability allows the brain to hold visual, mental representations in short-term memory and to evolve them both in space and time, thinking multiple steps ahead. MIND's approach consists of language-independent,

> animated representations of math concepts delivered via computer software games. Self-paced and self-motivating, the Spatial Temporal Math programs provide students with immediate, instructive feedback, and deepen problem-solving and reasoning skills.[241]

The UC Irvine research is the same research that found that students tested better immediately after listening to the music of Mozart—the so-called "Mozart effect." Based on that research, MRI's Spatial Temporal (ST) math program is designed to enable students to recall basic math facts accurately, quickly, and effortlessly. MRI says: "Basic math fact fluency and automaticity in students then allows them to more efficiently solve problems at higher levels of math. Research points to the need to free up working memory through avoiding getting slowed down by mental effort spent on basic calculations."[242]

> The ST math program does not use text or symbols so that students not fluent in English can easily use the program.

In an extensive interview with the authors of this book, Ted Smith, the chairman and CEO of MRI, says that since all humans have spatial temporal reasoning, if on-screen manipulatives, such as blocks, were connected with math principles, students could work with the manipulatives to "begin to understand the math principle linking these objects and go on from there."[243] An important aspect of the ST math program is its emphasis on having students visualize math principles. Smith says, "given everyone's ability to reason in space and in time, one could visualize the problem and its structure, recognize a path or several paths by which one might solve the problem and then follow one of those paths and solve the problem." He explains:

> That involves reasoning your way through what you're looking at or visualizing. And it involves manipulating the image of the problem that you're visualizing—manipulating it in your memory. In the course of doing this whole process, reasoning

> your way through this, kids remember how they did it much more effectively than they do when they memorize in rote the algorithm.

The ST program's key tool is the animated penguin JiJi. In the program's math games, JiJi illustrates math principles and math problems by engaging in various activities, including walking along a brick pathway, confronting problems such as encountering a gap in the walkway, and then getting students to use math, such as algebraic concepts, to solve the problem.

The program collects information on every keystroke that each individual student uses to solve the problem confronting JiJi. Whether it takes him or her five strokes, 10 strokes, or 20, all are recorded and fed to his or her teacher so that the teacher knows where the student is having difficulty. In addition, the program, notes Smith, "actually shows [students] what they did wrong, if they did it wrong." He observes, "it is almost like individual tutoring." He points out, "There is one other aspect to this thing, and that is kids reason their way through these games, [and] in the course of doing this they do things hundreds of times that in the classroom, [under] the traditional approach, they might do five to 10 times."

The ST math program does not use text or symbols so that students not fluent in English can easily use the program. Smith says, "our philosophy is basically to remove the symbols and remove the text" because "the kids don't read English in the first place and you just teach the math principle." He says, "Once they've mastered that, we introduce symbols as a part of the game."

In schools that have implemented the program according to the guidelines issued by MRI, the results have been astonishing. At Madison Elementary School in Santa Ana, 95 percent of the students are Hispanic and an equal percentage participates in the federal free/reduced lunch program. Eighty percent of the students are English language learners. The school has used the MRI math program for nine years and the impact on student test scores has been huge.

Through use of MRI's math program, nearly eight out of 10 third graders scored at or above the proficient level on the 2009 state math test.

Under the federal No Child Left Behind law, all students are to be proficient in math and English by 2014. In 2003, only a quarter of Madison students scored proficient or above on the state math exam. By 2009, nearly 83 percent of the school's students met or exceeded the proficiency mark. "What I'm happiest about," says Marti Baker, the school's principal, "is that we have been able to bring up the lowest performing students." The ST program, she believes, "has truly leveled the playing field."[244]

Not only has the ST program leveled the academic playing field for disadvantaged students, it has done so while reducing the cost of education. Recognizing that school budgets are going to be squeezed for years to come, Smith says that with MRI's math program, "teachers can manage a large number of students, therefore you can operate within lower budgets and still get higher achievement." He points out that at Madison Elementary, Baker informed him that she could have 35 students in her classes and still get outstanding student outcomes. Such results no doubt make state regulators and union leaders blanche given their push to limit class sizes and raise costs in the face of cost-lowering technological innovation.

At Frontier Elementary School in the Sacramento area, 62 percent of third-grade students are socioeconomically disadvantaged. However, through the use of MRI's math program, nearly eight out of 10 third graders scored at or above the proficient level on the 2009 state math test. By comparison, in 2006, before the program was adopted, only four out of 10 third graders scored at or above the proficient mark.

During a visit to the school, the authors of this book were informed by Frontier principal Ellen Griffin that the program is effective because "the kids love it and so they want to do it." She says with a smile, "It is not math, it is JiJi."[245] In fact,

when given the choice, students pick JiJi math as their first choice of activities during the school's Friday fun day.

The program has achieved similar successes in schools across California. In Orange County, Smith says that in one year alone the 64 elementary schools that agreed to implement the program saw, on average, a nearly 13 percent increase in students scoring at or above the proficient level on the state math test. Yet, despite the indisputable evidence of success, MRI has run into a variety of problems in getting school districts to consider adopting the program.

> Bureaucratic inertia, however, is just one obstacle that technological innovators must overcome.

"I've been involved in building companies and marketing products my whole career and this is the toughest sell I've ever encountered," says Smith. "In fact," he says with exasperation, "we can't even give it away sometimes." The problem: bureaucratic inertia.

Smith describes his experience with the mammoth Los Angeles Unified School District:

> I went to LAUSD three years ago when [retired Admiral David] Brewer was just arriving as superintendent and through the mayor's office in L.A. I got to the then chief academic officer. She was responsive, but she then delegated the whole thing to the curriculum people who, frankly, were just completely nonresponsive. They didn't really care. I think some were approaching retirement and didn't want to rock the boat with any change. They felt not empowered to make something happen. So I just gave up after a series of meetings.

When Ray Cortines replaced Brewer as superintendent, the district became more responsive, and MRI's program is starting to be used there. However, the point

remains that depending on the quality of leadership of the district and the energy or lethargy of the district bureaucracy, students may never get the chance to use proven technology-based programs.

Mary Gifford, MRI's Northern California representative, has had similar experiences. "I've talked with people in San Juan [a Sacramento-area school district] and in Sacramento [City Unified School District] so far and we've not made any headway with those districts yet," she says. Why these difficulties when local schools like Frontier Elementary show such progress? "One thing I find in working with districts," she explains, "is they think 'okay, it worked there but it won't work in mine,' even if the demographics are very similar, even if they have the same problems." She notes sadly, "It's just how it works."[246] Smith adds, "We not only don't have [these programs] in our classrooms, we don't even know that we should have it."

Students may never get the chance to use proven technology-based programs.

The unresponsiveness of districts is not always based on funding considerations. While districts must allocate funds to purchase MRI's math program, Smith points out, "even when we offer donor support we get [from principals]: 'Well, we can't burden our teachers with another new way to do this. We've heard one silver bullet a month over the last five years.'" Smith says of the principals, "They are pretty cynical about changing."

Under MRI's Math Initiative, potential donors are approached in order to build a fund so that more schools can implement the ST math program. Donors include CEOs from high-tech companies and other business leaders. In Orange County, Smith says that 142 principals from low-performing schools were invited to a briefing on the ST program and the grant initiative. Despite the backing of Orange County school superintendent Bill Habermehl, just 88 principals came to the meeting. Eventually, 73 principals, about half of the original 142 who were invited, applied for the grants.

Smith describes state and district bureaucracies as a series of walled-off fiefdoms uninterested in software advances:

> You have the old stovepipe thing where every district and the state level have a technology department and they also have a curriculum department. The curriculum people are textbook-centric and the technology people are network-centric and there was no real advocate for instructional software. This is one reason why venture capitalists will not fund companies to do advanced technological education products: because it is so impossible to penetrate the market with new things.

Bureaucratic inertia, however, is just one obstacle that technological innovators must overcome. Even when districts decide to adopt cutting-edge programs like MRI's math program, getting principals and teachers to implement the programs correctly can be tremendously difficult.

For the MRI program to work effectively, students must complete a high percentage of the math games in each grade level. Smith says, "If you don't get the kids the recommended amount of time so they get through all the games in their grade level or at least 75 percent of the games then the statistics on our big database show us that that will not move the needle."

What we found was 35 to 40 percent of teachers did not follow our protocol and as a result the kids were way behind the achievement level that we normally expect.

"For example," he notes, "if [students] get through 50 percent or less of the games, we don't see any significant difference between them and kids that don't use our ST math." Yet, despite this research and the program's instructions to teachers, Smith says, "What we found was 35 to 40 percent of teachers did not follow our protocol and as a result the kids were way behind the achievement level that we normally expect."

"The teacher needs to understand how that game works," says Smith, "and how it illustrates the math principle so he or she can, in regular classroom math five days a week, make a connection for the students between how 'JiJi' illustrated the math and the problem that they are dealing with."

Smith relates a story about his meeting with Los Angeles school district officials:

We're in a very slow transition," he notes, speculating that it might take up to 50 years for the teacher corps as a whole to be ready to handle ever-evolving technology.

> One of the things that always amazes me is that educators always talk about using best practices. What they don't talk about is the next step and that is following the protocol that made them best practices. I had a meeting with the chief academic officer of Los Angeles Unified and her three senior math people and [when] I told them that 35 to 40 percent of their teachers were not following the protocol, they looked stunned. So I asked them about that . . . and they said, "No, you don't get it—how did you get 60 percent to follow the protocol?"

"This is an endemic problem," warns Smith, "and it goes along with the famous axiom that when a teacher goes in a classroom and closes the door, what goes on in the classroom is strictly up to the teacher." He goes on to say that:

> the educators don't think about this as a process they are trying to optimize. I can't explain why the industry is in the shape it is in, but it has institutionalized these defects, frankly. Although there are lots of effective teachers and obviously lots of kids do learn what they are supposed to learn, there is also the fact that too many teachers are unable to achieve the results that everybody is expecting.

Smith acknowledges that older teachers are often afraid of computers, while younger teachers may or may not have high levels of computer skills. He says that only a small minority is technologically savvy and takes advantage of all that technology has to offer. "We're in a very slow transition," he notes, speculating that it might take up to 50 years for the teacher corps as a whole to be ready to handle ever-evolving technology.

MRI's focus is on regular public schools. "We choose public schools," says Smith, because "the bulk of students go through public schools and if you don't fix that problem you haven't had an impact on the nation." Yet, when asked about the obstacles confronting his organization, he exclaims, "it is practically impossible!" Where MRI's math program has been adopted and where it has been implemented well, the results have been phenomenal. However, as MRI's experience has also shown, the bureaucratic inertia, the lack of incentive to improve, the inability of teachers to follow program guidelines, the lack of consequences for failure to follow those guidelines, the inability of administrators to get teachers to adhere to those guidelines, and the cynicism of educators and school and district leaders combine to demonstrate how difficult it will be to improve the traditional public-school system, even if a technological silver bullet is available.

Voices of the Revolution

Bureaucratic inertia and reactionary unions are among the many obstacles threatening to short circuit the technological revolution in education. Since that revolution is not going away, policymakers should turn their attention to the many success stories in the use of educational technology. The following sections of this book examine the experiences of charter school operators, students, parents, and virtual schooling providers and provide the observations and advice of education experts.

Rocketing to Excellence: Rocketship Charter School

California's Silicon Valley may seem like the perfect place to establish a school that makes innovative use of instructional technology. The image of such a school would likely include a nice suburban neighborhood, nearby high-tech companies in spic-and-span industrial parks, and a student body of affluent high achievers. Rocketship Mateo Sheedy Elementary charter school explodes that comfortable stereotype.

Located in the gritty inner-city neighborhood of Washington Guadalupe in San Jose, Rocketship Mateo Sheedy serves a mainly low-income Hispanic community. More than 91 percent of the students are Hispanic and 85 percent are socioeconomically disadvantaged. Adjacent to the school sits not a high-

tech industrial campus, but a nonprofit-run employment-training center that prepares individuals for jobs in industries like food preparation. Many of the neighborhood residents are newcomers to this country, with about three-quarters of the school's students categorized as English language learners.

The school itself is unprepossessing. From outside the chain-link fence, the buildings look clean and functional, with the usual physical education apparatus on the playground. But what goes on inside the school sets it apart from the regular public schools in the area.

Founded in 2007 by software entrepreneur turned elementary school teacher John Danner and former Alum Rock School District principal Preston Smith, the school is named after Father Mateo Sheedy, the Roman Catholic pastor of Sacred Heart Parish, who was shocked at the poor education that children in his parish were receiving in local government-run schools.

In 1999, Father Sheedy was asked to recommend students from his parish for a scholarship program at Jesuit-run Santa Clara University. When he attempted to find students who could qualify for the scholarships, he found hundreds who had not received the level of education necessary to prepare them for college-level work. In response, Father Sheedy worked with Danner and Smith, and eventually Rocketship Mateo Sheedy Elementary charter school was created.

Given the genesis of the school, it is not surprising that the school's vision and mission are focused on closing the achievement gap between the neighborhood's students and their more affluent peers. "Rocketship seeks to create a future," says the school's vision statement, "in which thousands of low-income elementary school children have graduated from four-year colleges and have come back to their neighborhoods to eradicate the last traces of the achievement gap." Thus, the mission of Rocketship: "To help low-income elementary school students reach academic proficiency by the time they graduate from Rocketship so that they are prepared for a rigorous middle and high school education leading to a four-year college."[247]

"The mission is to ensure all students are at grade level by second grade," says Smith. "The other mission is by the time they leave us in the fifth grade they are at grade level or above in language arts and math," he explains, and the "big overall mission is to eliminate the achievement gap in our lifetime."[248]

In order to eliminate this achievement gap, Rocketship uses a hybrid-learning model. While the majority of the instruction takes place in a traditional brick-and-mortar classroom, a quarter of the school day is spent in a learning lab that uses software programs geared to the individual abilities of students and designed to teach them math and literacy skills.

The school believes that technology can be used effectively to give students extra practice.

Rocketship divides up the instructional day for students using a block-scheduling system. According to the school, each student attends one block of math/science, two blocks of literacy/social studies, and one block of Learning Lab. The school emphasizes individualized instruction for pupils that, in addition to guided reading in literacy classes and individual tutoring in small groups during and after school, includes an intervention program that allows teachers to address the specific needs of every student performing below grade-level proficiency. Individualized Learning Plans for each student focus time, planning, and professional development on in-class individualized instruction.

The Learning Lab is a key part of Rocketship's instructional program. The school believes that technology can be used effectively to give students extra practice. The 100-minute daily block for Learning Lab combines computer curricula, independent reading, and enrichment programs that focus on skills in areas where students are struggling.

"This year we've made huge strides in that we're actually implementing data-testing curricula that is adaptive so that when a kid gets a question right it gets more difficult," says Smith, but "if they get it wrong it backs up and re-teaches."

He says, "I think this is where we've got amazing potential to really start pouring out some individualized instruction where online learning and the classroom are really synced up."

In Learning Lab, Smith says that in math, of those online curricula that are adaptive, "DreamBox and Reasoning Mind are really impressive." Danner says that Rocketship is "clearly excited about companies like DreamBox, Reasoning Mind, [and] Mind Research Institute." Smith observes, "as an educator, the number sense, the practice the kids are getting, they're thoroughly engaged and we've seen really positive effects." He believes that the impact on student performance is significant: "I think it is a big reason that our kids are more confident and more successful when they take these standardized exams and also when they go to class. They just get more practice and the adaptive practice is better than homework because it is really challenging kids and they are super motivated by it. It has been really, really positive."

Of the three online curricula mentioned by Danner, Mind Research has already been mentioned and described earlier in this book. The Reasoning Mind online curriculum uses animation and minimal text to convey mathematical concepts and instruct students.[249] It is based on the Russian math curriculum developed in the mid-twentieth century, which is the foundation of the Chinese and the famed Singaporean math curricula. The software focuses on the individual child, adjusting the level of difficulty based on the child's demonstrated knowledge and ability to ensure that all students are challenged.

As the topics are taught using computer animation, students do exercises to catch any misconceptions and mistakes immediately, before they solidify.

Reasoning Mind's Basic I curriculum uses the animated dinosaur character Mortimer and the little girl Becky to teach children skills such as counting. Another character called the Genie also mentors students as they use the program. The curriculum is saturated with characters, pictures, and animation that serve to illustrate concepts. For example, counting sheep teaches students

> According to Hastings, Rocketship hopes that "improved online software and assessments can provide close to 50 percent of instruction."

the concept of the structure of the natural numbers. Students are then taught to compare numbers from the foundation of counting. Thus, concepts are not taught in isolation, but build on previous topics and lay the foundation for subsequent ones.

Topics are presented in many ways and reviewed thoroughly. As the topics are taught using computer animation, students do exercises to catch any misconceptions and mistakes immediately, before they solidify. Answers are explained to students, and they have the option of receiving more detailed explanations if they need them.

The Reasoning Mind curriculum includes different levels of exercise difficulty. Also, as students learn skills such as addition, they gain knowledge of algebraic concepts. The curriculum developers believe that algebraic notions, including numerical expressions, algebraic expressions, and equations, should be introduced early and developed gradually and systematically. Conceptual understanding and computational fluency are believed to be both necessary and mutually reinforcing.

When students use the Reasoning Mind curriculum, they spend most of their time working on the computer independently and at their own pace. The lessons are interactive and focused on problem solving. The animated genie character raises or lowers the difficulty of the problems based on the individual student's performance. He also diagnoses and addresses gaps in a student's knowledge.

Students receive points for doing the exercises correctly, plus extra points for solving many problems consecutively. If they become stuck, they can ask for a hint, but in order to deter overreliance on hints, fewer points are granted for correct answers using hints.

All the work is not done on the computer, however. Students use a notebook to write down key definitions and rules, and they also use the notebooks to show their work when solving problems. The difficulty level of the material is automatically adjusted to meet the needs of the individual student.

Teachers give assignments, monitor the progress of each student, and provide one-on-one assistance when necessary. Under the Reasoning Mind curriculum, teachers also give homework assignments created individually for each student, as opposed to the usual one-size-fits-all model. Students complete the assignments overnight and enter the answers in the computer the next day. The Reasoning Mind system evaluates the homework and reports the results to the teacher.

Data analysis is a key component of Reasoning Mind. Every keystroke that a student types is recorded and stored. Teachers can review this recorded data, inspect student answers to specific problems, and view a data summary of students' progress and knowledge of particular topics.

Netflix CEO Reed Hastings, a member of Rocketship's national strategy board, recently purchased the education software company DreamBox Learning and then donated ownership to the nonprofit Charter School Growth Fund. At a Rocketship strategy meeting, Hastings said that DreamBox, which offers adaptive math software for first through third grade, "can identify areas that individual students aren't getting, then diagnose and break down the problem areas into pieces that the students will understand." Like Reasoning Mind, "Students go at their own pace." According to Hastings, Rocketship hopes that "improved online software and assessments can provide close to 50 percent of instruction."[250]

The DreamBox curriculum delivers deep, individualized learning to individual students by adapting the curriculum to their needs. The curriculum contains more than 500 lessons, which are designed to develop computational fluency, conceptual understanding, and problem-solving ability. These lessons are based on so-called Focal Points, which are essentially academic objectives for each grade

level that have been set by the National Council of Teachers of Mathematics. Thus, for example, the curriculum focal points for grade two include developing an understanding of the base-10 numeration system and of place-value concepts and developing quick recall of addition facts and related subtraction facts as well as fluency with multi-digit addition and subtraction.

Rocketship is eliminating the achievement gap between poor minority students and their more affluent peers.

Rather than using an animated character that acts as a teacher or mentor, students choose for themselves a character and a theme (e.g., pirates, dinosaurs, or pets). The program does not look simply at whether students get the correct answer: it also determines how quickly students answered problems without hints. The program monitors improvement, and based on student progress, the curriculum adapts to the child through the number and types of hints given, through the speed of pacing, and through the sequence of problems. The program then analyzes each student's online behavior, doing real-time assessment to determine if a student should skip content he or she already knows or if reinforcement in a particular area is needed. If a student needs more help in an area, then the lesson sequence is adjusted immediately to provide more practice-based lessons.

DreamBox uses continuous assessment throughout the curriculum. As they make progress, students earn rewards for effort and achievement. Of the new software programs, Smith says, "I can say as an educator that the number sense, the practice the kids are getting, they're thoroughly engaged and we've seen positive effects."

The school's online learning setup does face obstacles. One of the problems with California's regulations regarding minimum instructional minutes, according to Smith, is that "our learning labs do not count for instructional minutes." He believes that "if it can be demonstrated that online learning really can have a positive impact on student achievement, I think people will be invested and kind to removing those barriers." However, at present, those regulatory barriers remain.

Due to the Learning Lab, intervention strategies for struggling students, effective reading programs and activities, incentive pay for teachers, and other innovations, Rocketship Mateo Sheedy is meeting its goal of closing the achievement gap despite its short time in existence. This result can be seen on the state's Academic Performance Index or by looking at percentages of students achieving grade-level proficiency in math and English.

The Academic Performance Index, or API, uses student results on the state's California Standards Tests to calculate a score on a 200-to-1,000 scale for every public school. State education officials have designated 800 as the target all schools should strive to achieve.

In 2009, Rocketship Mateo Sheedy posted an amazing 926 on the API. In comparison, the average API in the San Jose Unified School District was 782, while the average for the schools surrounding Rocketship was an even-lower 748. It is in grade-level proficiency, however, that the real story of Rocketship's academic achievement can be fully appreciated.

Grade-level proficiency—full mastery over grade-level subject matter—is an important concept because the federal No Child Left Behind law says that all students must be proficient in math and English by 2014. While the public has little idea what API numbers represent, it is easier to understand grade-level proficiency figures. An impressive 85 percent of Rocketship's second graders scored at or above the proficient level on California's 2009 state English-language-arts exam. By comparison, at predominantly white and Asian Addison Elementary School in affluent Palo Alto, home to Stanford University, an equivalent 84 percent of second graders scored at or above proficient.

In mathematics, Rocketship second graders actually bested their Addison counterparts. Ninety-five percent of Rocketship's second graders met or exceeded proficiency on the state math exam. In contrast, a smaller proportion of Addison second graders, 87 percent, scored at or above the proficiency bar on the math test. These results show that Rocketship is eliminating the achievement gap between poor minority students and their more affluent peers.

When asked what he says to those, especially at neighboring regular public schools, who claim that Rocketship is "creaming" the best students in the area, Preston Smith retorts:

> So the first thing I usually like to say to them is to ask them if they've informed their parents on their campus that they've got the dumb parents and the dumb kids because that would be very important to let them know. Start off very transparent with those families so they know what to expect in their lives. Typically, they don't like that response, which I think gets to the real base of this issue, which is that to say that kids are smart and dumb is ignorant in itself. All human beings and all children are capable and it is a matter of what you do with their time and with their talent.

The California Federation of Teachers, in its model contract template, says, "Better education, not cost cutting or revenue enhancement, must be the primary consideration in deciding to offer technology mediated instruction." But what if one could offer better education through the use of educational technology and save money, too? The Rocketship model does both.

Because of the staffing setup of Rocketship's Learning Lab, the school reaps substantial savings. The Learning Lab does not have to be overseen by certificated teachers, so not as many teachers need to be employed by the school. Smith observes that because the Learning Lab reduces staffing needs, "For every four classes, we only have three teachers rather than four, so we reduce staffing by six people, which means a half a million dollars." In revenue-starved California, saving $500,000 a year while also pushing up student achievement to the highest levels is an incredible combination.

"For every four classes, we only have three teachers rather than four, so we reduce staffing by six people, which means a half a million dollars."

Smith says that the school uses the money it saves on certified teachers to help pay for an academic dean, a teaching coach/mentor for teachers, professional training for the principal, an arts program, and facilities. “It changes the game,” emphasizes Smith. As opposed to school districts across the state, which have been handing out pink slips to teachers because of budget deficits, Smith says, “we are not laying off any of our teachers, in fact, we’re giving teachers raises, which is unheard of in a public school district in California.” Rocketship teachers are paid 20 percent above their peers in the local district. The use of educational technology “is a big deal,” he notes, “so it gives us that advantage in funding.”

Rocketship is therefore a teacher-friendly institution, but not defined by the narrow parameters set forth by teacher unions. Co-founder Danner says that teachers should be treated as white-collar professionals. Acknowledging that teaching is a hard job, Danner says, “We don’t believe even in hybrids that kids are going to get a year and half’s progress without a lot of adult time.”[251]

Although the Learning Lab saves on teacher expenses, Smith emphasizes the importance of teachers. “We deeply believe in the social development of children, we deeply believe in the power of a teacher,” he says. “Online learning,” he observes, “can only take things so far, but you really need a teacher for higher order thinking and critical thinking.” Thus, he says, “I don’t think doing a fully virtual school is where we want to go yet.”

Smith links the money saved to improved student performance. He laughs, saying, “it is not like it pays for cookies and soda on Fridays.” Rather, “It pays for things that really make a difference in what we do at Rocketship, and you can see the effects on student achievement.”

Even though the school has made the most of its resources, there is always room for improvement. One of the school’s key objectives is to speed up the use of assessment information so that teachers can use “real-time data” from sources

such as the Learning Lab to address student weaknesses in a timely manner. In other words, it is not enough simply to have good educational software products: there must also be high-performing platforms so that information can be exchanged between student and classroom teacher quickly and effectively. Close observers of the school have said that "platform" rather than "product" should be the school's next technology priority.

> Adams says that the school has low-income students whose families "are making the sacrifice to do home schooling because they don't feel safe sending their child to [the local public] school.

Unlike other successful charter schools that operate as isolated islands of student success, Rocketship's management realizes that in order to make a far-reaching difference in the lives of more than just a few lucky children, they need to replicate their model. The organization has therefore opened up a second school in San Jose and its goal is to create a network of 10 schools within four years. Rocketship is also contemplating expansion to other states. Rocketship's vision, says Danner, is ambitious and expansive:

> Our vision is that online learning should be responsible for the majority of basic skills learning at Rocketship (80 percent), freeing our teachers to use classroom time to teach students how to think. We believe that we will see an equal split in time between basic skills online and thinking skills in a classroom. This 50/50 online/classroom hybrid model has a lot of properties that help us scale. First, we will have 10 teachers at each campus instead of 20. With 10 teachers on each campus, we have much less need for talent. With the extra money we save ($1M), we can double teacher pay to well over $100,000 per year. With Learning Lab and [Response to Intervention remediation program] delivering 80 percent of basic skills, teachers can spend their class time to teach values and higher order thinking skills. We think that both financially and from a talent perspective,

> the model gets more and more compelling as we drive online learning forward.[252]

Preston Smith advises policymakers, "if there is somebody who has demonstrated quality and demonstrated a good school, figure out a way to get more of them, figure out a way to fund them." He says, "Let's get down to the fact, this isn't about adults," and asks, "Do we agree it is about closing the achievement gap? Do we agree it is about great schools? Is it about college graduation rates?" He answers himself: "What is the one thing we want, let's determine it as a society and let's drive towards it." The Rocketship model offers an extremely promising vehicle to drive to that goal of ensuring overall student excellence.

Starting Up a Virtual Charter: Golden Valley Virtual Charter School

Golden Valley Charter School (GVCS) is a home-school-based charter school headquartered in Ventura County, California, that serves regions in both southern and northern California. The school's philosophy is to provide a more personalized learning plan for students based on their individual needs. In an interview with the authors of this book, Terri Adams, the school's director, says that in practice this means "different types of curriculum, different delivery methods of instruction, different activities and those types of things to enhance their education."[253]

Started in 2001, GVCS is a K–12 school, although its emphasis is K–8. According to Adams, "what happens in this school is that the parent is actually the day-to-day teacher for their own student" and "our teachers, our credentialed teachers, supervise the parents and students." The teacher ensures that the students are learning according to state grade-level standards. The teacher and the parents work together to choose the curriculum for the particular child, and, says Adams, "we literally have hundreds and hundreds of vendors that provide curriculum and services."

GVCS students come from a wide variety of backgrounds. Adams says that the school has low-income students whose families "are making the sacrifice

to do home schooling because they don't feel safe sending their child to [the local public] school." In addition, the school has special-needs students plus high-achieving students "who don't want to be held down by sitting in a regular classroom, waiting for the other 29 to 35 kids in the class to catch up and get it."

Adams explains that a virtual charter school, Golden Valley Virtual Charter School (GVVCS), is starting operations in the fall. Students at the school will be provided a computer and reimbursement for an Internet connection if needed. The virtual charter will serve high school students. It was felt that a virtual school was needed because of federal and state credentialing requirements. Adams says, "If we have a student who is in the ninth grade and is taking math, English, history, science and foreign language you now need five different credentialed teachers for one student." Setting up a virtual school helps relieve this burden by allowing students to access a pool of credentialed teachers.

Virtual instruction "eliminates all those barriers."

GVVCS will use Advanced Academics, an Oklahoma company, to provide the curriculum, the teachers, the marketing, and the back office support. "But mainly what they provide," Adams says, "is the online curriculum, and they have a humongous supply of credentialed teachers that are credentialed in all of those single subject areas." As opposed to its home-based charter school sister, in the virtual school the teachers "provide the day-to-day instruction for all of the high school students."

Teacher unions like the California Federation of Teachers would have people believe that interaction between students and teachers is limited in virtual learning models. That is not the case, argues Adams:

> In a virtual school, the teacher that we contract with through Advanced Academics is providing that instruction . . . Under No Child Left Behind, the student has to be taught by a qualified

> teacher, but what is happening in our system is the student logs on, they do their work online, and the teacher is there live 17 hours a day. So if a student is working on math, he is online and he's doing his math and he doesn't get it, he just pushes this little button on his screen that says, "Talk to a teacher" and up pops a list of all the teachers that are online and he can click on any teacher in that list that has 'math' next to their name, and they say, "Hi, how can I help you." And [the student] says, "I'm taking algebra and I'm on page 20 and I need help with number two." And [the teacher] says, "Okay, open up your whiteboard."

As opposed to the comparatively limited availability of teachers in a brick-and-mortar setting, Adams underscores that at GVVCS, "it's on-demand help from credentialed teachers all day, every day." In terms of teacher time, students "are getting a lot more and they don't have to be afraid to raise their hand; they don't run out of time; the class isn't going to be over in 40 minutes and everyone is going to run off to their next class; and you've got to get that homework done whether you caught on to what the teacher says or not." Virtual instruction "eliminates all those barriers."

According to Adams, having good teachers is critical:

> It's huge, it's huge. If we have a teacher who is really underperforming or if all of the parents, all of the families don't want to work with that teacher, we can do something about it. When you're in a regular school and you have a teacher down the hall in Room 12 and nobody wants to have their kid in that class, the school has its hands tied. Sorry, 30 unlucky kids have to go to Room

"So it's keeping these kids on a regular high school track . . . it is just that they are getting individual attention all day long, " she says, "and they can do it [at] their own pace and in their own individual house."

> 12 with Miss So and So because we can't get rid of her, she's tenured. There is a lot of dissatisfaction when you're tied to things like that.

It's no wonder that Adams says, "I would never, ever work in a regular public school district. I would go into an entirely new field."

In addition to instant help from teachers, Adams notes that through Advanced Academics, students have access to 24-hour technical assistance. "So there is always someone to talk to," she says. In addition to making sure that there is always live assistance, GVVCS has developed strategies to meet the needs of students with challenging problems.

The school has a plan for students who are low performing. The plan uses a Student Success Team (SST) process to develop a plan to address the individual needs of the student. The school says that the SST clarifies problems and concerns, develops strategies and organizes resources, provides a system for school accountability, and serves to assist and counsel the parent, teacher, and student.

For English-language-learner (ELL) students, a teacher carrying appropriate credentials to serve ELL students will provide additional English language development assistance. The school states that this assistance will include academic intervention in vocabulary development and comprehension either outside of the student's core courses, or working with the core course instructor(s) to insure the students receive the support they need to increase their English language development and be successful in their courses.

Adams observes, "The virtual school is going to be more like a regular high school except you don't drive to the school and sit in a class." The curriculum is rigorous and students have to put in "five to seven hours a day, at least, to get their work done." She points out, "They also are required to complete [their work] all in one semester, so if you're taking English 9A, you're going to finish it the last day of the semester and [for] anything you don't finish you're going to get a zero factored into your grade."

"So it's keeping these kids on a regular high school track . . . it is just that they are getting individual attention all day long, " she says, "and they can do it [at] their own pace and in their own individual house."

The charter document for GVVCS outlines what students can expect in a typical day of distance learning:

> **A Day in the Life of an Online Student**
>
> The student below has completed a 7-hour day, working in his/her [s]cience, English, [h]istory and [a]lgebra courses. Many students do not work consecutively on their courses, hence the time lapse between school work and other responsibilities.
>
> 8:00–8:45 A.M. You get up and log onto your AAI [Advanced Academics, Inc.] website while eating breakfast. You check "My Grades" and "Calendar" to plan your busy day. You go to "Class Mail" to read, and respond to 4 messages from your teachers. You received input from your science teacher and now have a plan for remediation. You look at the quiz that the teacher said needed to be reviewed, and you study the questions that you missed, referring to the lessons for help.
>
> 8:45–10:00 A.M. After 30–45 minutes of study, you access the "Talk to a Teacher" chat feature to contact your science teacher to review the questions and go over the remediation plan. After 15–20 minutes of review with the teacher, you go into the science virtual lab assignment to work on today's lesson . . . until 10:00.
>
> You have other responsibilities and have the freedom to take care of them[,] so you leave to pick your brother up from soccer practice.

10:45–12:00 P.M. You log back into the site and contact your English teacher about comments on your graded research paper draft that was in [your] class mail this morning. Comments and suggestions help you plan your revisions[,] and you do some additional research on the internet. You find information that is relevant, so you proceed to work on the final draft [of] your research paper. After over an hour of work, you submit the final draft of your research paper to your English teacher, [and] you think to yourself, "This is going [to be] the best research paper I've ever completed."

You should let the student and the parents make the decision about what they want to do for education.

12:00–1:00 P.M. You eat lunch.

1:00–2:00 P.M. You begin working on your American History essay, but you need some help from the history teacher. You speak with the history teacher for about 15 minutes about the facts that need to be included in the paper and relevance of different web sites. Then, you spend the next 45 minutes doing some research online to find relevant information to include in your essay.

2:00–4:00 P.M. You log onto the AAI website and access your Algebra 1 course. You have questions about the lesson and contact the teacher in chat. You spend an hour with the teacher on the whiteboard reviewing practice problems, and then you access the homework on the concept and work on it for an hour. You complete and submit the assignment.

4:00–9:00 P.M. Time for work! You go to work at your part-time job.

> 10:00–10:45 P.M. You log onto the website one more time before you end the day and check class mail for updates. You spend 30–45 minutes adding the relevant information [that you found earlier in the afternoon] to your American History essay. It has been a productive and fun day![254]

When asked about the cost savings of a virtual schooling model, Adams replies that savings are significant: "You don't have the facility costs, you don't have the people—you don't have to pay for a gardener." Fielding a football team and building and maintaining a football stadium, she observes, "cost a lot of money." Also, at a virtual school, "you don't have to buy the physical textbooks." The books are digital, as are the updates, which make it easier to ensure that students have access to the most current material.

Like others involved in the online-education revolution, Adams criticizes California's regulation that limits enrollment to students residing in counties contiguous to the county in which the virtual school is based. She recalls, "I remember when they made that rule about contiguous counties, and they did it because all the districts were threatened that a charter school would open up in Sacramento . . . and take their students." She continues, "So they tried to put a control in place, so that a charter school couldn't come in and take kids from all over the state." That policy, she concludes, is "kind of crazy."

> By middle school, 40 percent of learning is done online, and in high school the proportion goes up to 80 percent.

"At the end of the day," says Adams, "you just have to offer a program that attracts students and meet their needs." If schools, whether brick-and-mortar public schools or virtual charters, met those needs, "you wouldn't have to worry about losing your students."

In conclusion, Adams says, "my viewpoint is you should let the student and the parents make the decision about what they want to do for education." She says, "I think when people feel that they've had a choice, everyone involved is just going to be a lot happier."

Virtual Leader: K12, Inc.

In California, one of the leaders in virtual education has been K12, Inc., a for-profit company started in 1999 by former United States secretary of education Bill Bennett and Ron Packard, the firm's current head. The company started off at the K–2 level and now serves close to 70,000 K–12 students in virtual schools and hybrid programs in 26 states. The company went public in 2007 and trades on the New York Stock Exchange.

Charles Zogby, the chief of K12 online learning, told the authors of this book that going public allowed the company to raise capital, invest more in the company, and, despite the down market, grow the company.[255] In California, the company has 10 virtual charter schools run under the name California Virtual Academy (CAVA). Whereas K12 can operate a single virtual charter school in Pennsylvania, Agora Cyber Charter School, which any student anywhere in the state may attend, the company must operate multiple virtual charters in California because of the state's contiguous counties law. These CAVA schools serve approximately 11,500 students.

There is no waiting around in the classroom for everyone to catch up.

Jim Konantz, K12's western regional senior vice president, points out that CAVA's demographics "are pretty much reflective of the state." He observes that CAVA has eight to 10 percent special-education students, "which is pretty much the norm across the state and across the nation."[256] While many people assume that the bulk of CAVA students were home-schooled before enrolling, Konantz says, "Only about 14 to 16 percent of the total population is actually from previous

home-schooling." One thing that links many CAVA parents, he says, "is that they need alternatives because their children haven't or don't do well in a traditional public-school setting."

"Part of what we do is move students from a dependent learning environment to [an] independent learning environment," explains Konantz. While many people believe that all learning in virtual schools is done using computers, he points out that in grades K–4, only about 20 percent of the learning is done through the computer. Teachers, parents, relatives, and others oversee the non-computer-learning time. All the instructional materials that a student would receive in the classroom in the early grades are shipped to the home.

Konantz says that students "receive boxes of science supplies and art supplies, textbooks, paint, modeling clay, phonics tiles for reading, and manipulatives." He notes that the virtual school wants to make sure "that our young people have the opportunity to handle physical materials and to do those motor development activities that are so important in those early grades." The company's philosophy, he says, is that "the appropriate use of technology in combination with physical materials is the right way to do it."

Every student also receives a computer and the family is reimbursed for Internet access. "So there is no digital divide for these students," emphasizes Konantz. By middle school, 40 percent of learning is done online, and in high school the proportion goes up to 80 percent.

Regarding the Internet-based curriculum, Zogby says, "We basically built as a company a lesson plan for every day for every subject area in grades K–12, including . . . over a hundred high school courses, [with] core subjects for four levels of learners, including AP courses." He notes, "The curriculum is a blend of online lessons [and] traditional learning materials." Thus, when one looks at CAVA's description of its K–8 English language arts curriculum, it looks very much like a traditional curriculum:

> K12 Language Arts/English helps students develop important reading and writing skills, while also inspiring a love of literature. Combining phonics, literature, language skills, and spelling lessons, the Language Arts/English program emphasizes classic works, teaches writing as a process, and prepares students for standardized tests in the areas of language skills and reading comprehension. Younger children learn the basics of phonics and grammar and prepare for reading through systematic, multi-sensory activities, while older students develop literary analysis and comprehension skills by reading novels and nonfiction works.[257]

Despite the similarity to traditional classroom-based curricula, the virtual learning model allows great flexibility for students to study and learn at their own pace. Konantz points out that K12 offers "anywhere and anytime learning" so that if students are moving quickly, they may be ready for Algebra 2 after completing Algebra 1 at mid-semester. "There is no waiting around in the classroom for everyone to catch up," he says. "If you're an advanced learner you move ahead," he observes, and, "[i]f you're a struggling learner you have a lot of input from your teacher and your learning coach." He says, "Our curriculum is mastery-based" so that students must demonstrate competency in the unit they are studying before moving on.

Both Zogby and Konantz say that teachers in a virtual schooling model actually get more professional satisfaction than teachers in a regular classroom do.

The online curriculum also allows for opportunities that are becoming rarer in the traditional classroom. Zogby says, "Our online chemistry course, for instance, uses computer simulations and models that allow students to do experiments that, maybe, wouldn't even be available in schools when they are cutting back on science lab equipment." He says, "They can be done in a very safe environment . . . we're not working with toxic chemicals or anything like that."

While the teacher unions like to caricature virtual schools as having little real teacher-student interaction, that is not the case in reality. "One of the features of the K12 program," says Zogby, "is we have lots of contact . . . with our families and our students." According to Konantz, "We actually believe and uphold the belief that children need interaction with their teachers and the teacher needs interaction with the children. Even though we do a lot of things via the Internet in the way of student supervision and evaluation, our teachers are very active in the instructional program and they live in the vicinity or the same communities that the children live in, for the most part."

Each month teachers provide an outing for their class centered on one of the academic subjects. Teachers also have individual counseling sessions with students and parents, face to face, once a quarter. Teachers go over student progress and discuss work samples at these sessions.

Virtual education is not perfect. While many CAVA students have excelled under the virtual learning model, there is evidence that others still need improvement.

CAVA teachers monitor student activity very closely through an advanced learning management center that allows teachers to see exactly what a student is doing at any given time and to see the progress that student is making. So, for instance, they can see how much time the student is spending on math or on English. They can also view a progress bar for all students in their class, which Konantz says allows teachers to see which students are lagging behind and to intervene immediately. This intervention assistance is targeted to the student's specific needs and can be done using tools like Elluminate, which allow teachers to work one-on-one or in small groups sessions on the Internet. These remedial sessions can also take place in brick-and-mortar settings.

Both Zogby and Konantz say that teachers in a virtual schooling model actually get more professional satisfaction than teachers in a regular classroom do. Zogby says that teachers feel they are "focused on the teaching and learning,

not the various and sundry things they have to do at brick-and-mortar schools, particularly classroom management." Konantz offers, "When you have 25 to 35 kids in your class, [you are] managing behavior problems, managing organization, passing out papers, collecting papers, [and] you end up teaching to the middle of the classroom." However, because the virtual model is adaptive to the needs of each individual student, no one, including the high achievers and the struggling students, is left behind.

Zogby also underscores the training given to the company's teachers:

> We put a lot of time into teacher training and development. Our teachers work year round, they don't have the summer off. We have national teacher training that we run for our new teachers in the summer. They'll be there two weeks before school starts . . . They have monthly trainings and professional development with our teachers and [with] all our schools. So they are coming together with their peers to hone their skills. They'll look at data as well . . . We also use formative assessment or Scantrons that we give students throughout the year that are aligned with state assessments and state standards to see whether students are performing on track to meet state proficiency requirements. We can use that data to look at where our strong teachers are, where our weak teachers are, and . . . to customize professional development for those who maybe need a little bit more help. And we're able to exit teachers that really aren't performing. You're really working to ensure that every teacher working with students really is an effective teacher.

Virtual education is not perfect. While many CAVA students have excelled under the virtual learning model, there is evidence that others still need improvement. For example, at K–12 CAVA Los Angeles, which has nearly 3,600 students, of whom around 31 percent are socioeconomically disadvantaged, more than half the students at many grade levels do not score at the proficient level in English or math.

On the 2009 California Standards Test (CST) math exam, no grade level had more than 45 percent of students scoring proficient or above on the test. Looking at test scores from 2007 to 2009, the proportion of students scoring at or above proficient stayed basically flat in many grades. For example, in 2009, 30 percent of fifth graders scored at or above the proficient mark, while in 2008, 29 percent made proficiency, and 31 percent hit proficiency in 2007.

The scores of CAVA Los Angeles students on the 2009 CST English exam were better, but in no grade did more than 62 percent of students score at or above proficient. Again, looking at test results from 2007 to 2009, the year-to-year proficiency percentages are mostly flat. Other CAVA schools show similar results.

When asked about such student outcomes, especially in mathematics, Jim Konantz replies that teacher preparation in math is often weaker than he would like. Also, he faults teaching methods saying, "it is true in virtual schools, too, we teach mathematics as a purely theoretical model and there are very few children that learn in a pure theoretical model." Thus, "we're not doing a good job of teaching by example and application in mathematics, [and] I think that is a shortcoming." He admits, "Everyone has a lot of work to do in mathematics." He laments, "I wish we had a silver bullet, but we don't."

For his part, Charles Zogby notes that K12 is often the last hope for many students who have failed elsewhere. Therefore, "They're coming to us a year or two behind and we're having to progress with them," he says. "That takes time, and is not necessarily reflected in state accountability systems that are only interested in proficiency as opposed to growth," he explains. "That can be a challenge."

Konantz does say that many CAVA students show growth in learning and achievement that is not always apparent by looking at results on the state exams. A value-added measurement that detects this growth would help the public and policymakers better judge the performance of schools such as CAVA.

Although he works for a virtual-schooling company, Konantz openly acknowledges that online learning "is not for every student," and that online instruction "is not for every teacher." He continues, "But it is for a lot of kids and a lot of teachers." He observes that opposition to virtual learning comes from those who believe "if you're not in a classroom with 35 to 40 kids with a teacher then you're not learning." Certainly that seems to be the view of teacher unions such as the CFT.

Mark's experience in his regular public school was a nightmare.

In contrast to the self-serving assertions of the unions, Zogby points out that virtual charter schools "have literally been lifesavers for children who weren't succeeding in traditional schools or [who were] behind grade levels." In the following two sections, this book explores the stories of two families, their reasons for choosing a virtual learning model, and the success that the children have experienced.

The McLean Family

Many people might think that gifted students, bored by the lowest-common-denominator drudgery of traditional classroom instruction, would benefit the most from the virtual learning experience. These people would not be thinking of Mark McLean.

Mark is a sixth grader living in the well-to-do town of Scotts Valley in beautiful coastal Santa Cruz County. He is the son of caring and loving parents, Peter and Maureen. He is also autistic.

Mark started his education in the Scotts Valley school district as a student at Scotts Valley Elementary School. Known for their liberal-progressive bent, one would think that the public schools in Santa Cruz County would be perfect for special-needs students like Mark. Think again. Mark's mother Maureen, an administrator for an astronomical research group at the University of California at Santa Cruz, says, "I can't say much using polite words about the Scotts Valley

school district in regards to Mark's education. To be fair, there were some aspects throughout the years that were okay; mostly it was not okay."[258]

Maureen says that many autistic children are fully capable of doing academic work not delivered in a special-education classroom. "It is really critical that our kids be included and have access to the academic curriculum," she points out. If a school does have a good program for these children, "then often what happens is the kids become independent and they can function with less and less support." In contrast, the Scotts Valley school district, says Maureen, "is not creating programs that can help—rather, the whole impetus is to segregate these kids and so they're not getting support, and they're not getting access to academic work."

I'm a teacher and I was a union rep at Cabrillo [Community College]," ...so "I was kind of insistent on keeping Mark in the regular system and pushing to have the system adjust, but it became evident [that] it wouldn't."

Scotts Valley "prides itself at being top notch," observes Maureen, but "the principal and many of the teachers and all the way down the administration are not special-ed friendly." School personnel "are very resistant to supporting children on the [autism] spectrum." Mark was assigned an aide in the classroom and had an Individualized Education Program (IEP), a federally mandated individual plan designed to help meet the needs of children with disabilities. Yet, despite these tools, Mark's experience in his regular public school was a nightmare.

Mark's father Peter described a shocking incident. Ordinarily, the aide would meet Mark outside the classroom and then take him into the classroom. One day, the aide simply left Mark outside the classroom. It turned out that the teacher had asked the aide to leave Mark outside to see what he would do. Then, when Mark eventually entered the classroom, the teacher complained that Mark was late. Peter notes, "he could have bolted, he's not a bolter, but anything could have happened." Mark said of his feelings when the incident took place, "I remember I felt I would rather be yelling." When Maureen started asking questions about the incident, the school responded by issuing what Peter says was a falsified report.

Another incident involved the school grouping Mark with other children. Under his IEP, Mark was supposed to have one-on-one individual services in occupational therapy. Peter would occasionally go to the school to check on Mark and he would find him grouped with other children: "in a 20-minute session there would be two or three other kids and that reduced the amount of time [Mark] would get individual work."

When he was in public school he was testing at the basic or below basic levels. "He is now advanced to proficient," Peter proudly says.

While other families with special-needs children hired lawyers to get the services to which their children were entitled, Peter and Maureen did not want to go that route. "We wanted to put our energy and our resources into positive things for Mark," says Maureen. Yet, services like occupational therapy and speech therapy were dismal. Also, Maureen said that the behavior of Mark's second-grade teacher and the school's principal, both of whom had special-education backgrounds, was "more egregious" than that of a brand-new teacher.

Perhaps the most troubling episode for the family, however, was one of the last meetings Peter and Maureen had with teachers and other school personnel to discuss Mark's IEP. Maureen called the meeting "mind boggling." She said, "The hostility, the nastiness, and they knew everything was being taped, that is the level at which they were bent to force us out."

In the end, Maureen said that it was obvious that the problem was with the public-school system itself:

> Trying to do something new, innovative and creative in a public school system is virtually impossible. The people are just not capable of doing it. Then it gets to a point where first they say they are going to do these things and they are not going to follow through. Then they began putting up resistance and obstacles all

> the way along the line. It is one thing when parents have to deal [with] that in meetings. We would have 30 hours of IEP sessions and that whole kind of stuff and [problems would] still not be resolved. But when it started affecting our child in the classroom, we just said, "This is not worth it."

Being driven out of the regular public-school system turned out to be a blessing in disguise for Mark and his parents. "I'm a teacher and I was a union rep at Cabrillo [Community College]," explained Peter, so "I was kind of insistent on keeping Mark in the regular system and pushing to have the system adjust, but it became evident [that] it wouldn't." As Maureen says, "it turned out to be the best thing for our family."

A family friend told the McLeans about the California Virtual Academy (CAVA) and Maureen said, "I was very impressed with CAVA for a couple of reasons. One is that Mark was already showing a lot of interest in computers and working on computers so that looked like it would be a good motivator. Second, I was very impressed with the curriculum." The curriculum, she notes, conforms with California's academic-content standards.

Maureen works with Mark on math and Peter handles language arts and literature instruction. They also have a college student come in to work with Mark on subjects like history. "On math, there are a couple things I really love," says Maureen. She is a fan of the curriculum's "skills update," which are "four to six problems refreshing concepts that have already been reviewed." Using the example of studying circumference, she says, "Mark is going to keep seeing things about circumference, not every single day, but periodically throughout the skills update."

The moral of Mark McLean's story is that students and their parents should be able to decide what educational experience works best for them.

Pointing out that he teaches at the local community college, Peter says that CAVA's

curriculum at the fifth- and sixth-grade levels is "like [college] 1A level in language arts." He notes that the public schools encourage students "to write and make mistakes in spelling and things like that." CAVA, on the other hand, emphasizes vocabulary and spelling, which is why he observes, "My [college] students can't spell as [well] as Mark."

CAVA's homework regimen is also better for Mark. The public school, according to Maureen, would assign "20 problems to do in the classroom and then . . . 20 more at home for homework," which would present a difficulty "because Mark works at a different pace." In contrast, she says, "what I love about CAVA is their whole philosophy is you work towards mastery." She describes CAVA's way of doing things:

What I love about CAVA is their whole philosophy is you work towards mastery.

> You don't have to do 20 problems to show mastery, you can do four to six to eight. You have a daily lesson, you have a skills update of previous concepts; you have a daily lesson; you have a daily assessment of four to six problems of that particular lesson. At the end of a unit, which might be six to 10 lessons, then you have a unit assessment of 10 to 12 problems, and, of course, then you have your semester assessments, which are going to be roughly half a year. A semester assessment may have 30 to 35 problems, but you're not doing problem after problem just for the sake of doing problems. There's no concept of doing busy work just to do busy work at home. You just do the work until you're done with the work and your child understands it. And if they don't pass the particular daily assessment, CAVA uses 80 percent as a pass, then you review the material and then you do it again.

Mark also takes the standardized state tests in the core subjects. When he was in public school he was testing at the basic or below basic levels. "He is now advanced to proficient," Peter proudly says.

One of the important tools that CAVA offers is to have written text or closed captioning augment the online lesson's voice that instructs students. Saying that Mark is very visual, Maureen mentions that he always opts "to have the text so he can be reading along, instead of just listening along, to add to the explanation that is being made."

The CFT and other unions insinuate that online students are isolated from their peers. Maureen disagrees and points out, "There is a real sense of being in a classroom." Children from diverse backgrounds participate in common computer-aided instruction and learning. "They're all part of this classroom and curriculum," she says, "and that has been really fun and exciting for Mark to participate in."

CAVA also provides a general education teacher and a special-education teacher who are available as resource teachers to provide information and feedback. Referring to the general education teachers, Maureen says, "If we send e-mails . . . she gets right back to us," and, "She comes out to meet with us and get work samples usually about once a quarter."

With a mixture of happiness, satisfaction, and relief, Maureen concludes, "It is working now, it is working well. He is excited about learning and that just makes my heart go pitter-pat to have a 13-year-old boy who loves learning. I daresay there can't be very many of them at Scotts Valley Middle School."

The California Federation of Teachers says that traditional campus-based teaching and learning should not be diminished substantially and that distance-learning programs are generally undesirable. Yet, the campus experience of Mark McLean, a bright special-needs student, was a disaster. Thankfully, there was a distance-learning alternative that has proved to be a godsend to Mark and his parents. The moral of Mark McLean's story is that students and their parents should be able to decide what educational experience works best for them.

The Wilson Family

If lay people do not associate autistic children like Mark McLean with virtual learning, neither do they likely think of immigrant children from non-English-speaking countries using online education. Yet, students like Mariya Wilson have thrived online.

> Kay also likes the schedule flexibility that virtual learning gives the family.

Mariya and her sister were born in Russia and were adopted by Kay Wilson, a Quaker pastor, when Mariya was in her early elementary-school years. The family lives in Arcadia, a suburb of Los Angeles in the San Gabriel Valley, best known for the historic Santa Anita racetrack and the county's beautiful arboretum. When Mariya first came to the United States, Kay enrolled her at Rio Hondo Elementary School in the El Monte City Elementary School District. Mariya went to Rio Hondo from the third to the sixth grade. She is now 19 and has been admitted to Azusa Pacific University.

Although Mariya picked up English quickly, Kay said that what Mariya and her sister needed was just "some extra help in filling in the gaps, in terms of what they had missed in their first couple years of schooling having not been in the United States."[259] "They would come home," she says, "after a full day of schooling, but they needed a lot of explanation to fill in what was missing from the first three or four years of schooling." The inability of Mariya's regular public school to provide those explanations forced Kay to think about alternatives.

On the bus ride home from a school field trip, Mariya's teacher told Kay that Mariya "asked funny questions." When pressed to give examples, the teacher simply replied that Mariya would ask a lot of questions and she didn't always have time to answer those questions. Mariya was simply trying to fill holes in her knowledge, says Kay:

> So in order for her to get the full picture of her education, like in history or science, she needed those holes plugged . . . . It is kind of like going from addition and subtraction to algebra without knowing multiplication and division. It wasn't that her teacher wasn't doing the best she could, but the public school basically wasn't, it was just too much . . . . It was way too much for them.

That the regular public schools are not as transparent as CAVA.

"I found I started not liking school very much because I was struggling all the time," Mariya says. "I was in shape to be proficient in some of these areas at the time," she observes, "I would ask my teachers for assistance, they would try the best they could, I still didn't understand." After coming home from school she would take out her papers for homework and Kay had to explain the lesson all over again. "Work, work, work," she recalls, "and it didn't seem like I was progressing very much at the time." In response to Mariya's school problems, Kay took her out of Rio Hondo after the sixth grade and decided to home-school her.

Home-schooling worked wonders for Mariya. From posting average or below average test scores, after being home-schooled for just one year, Kay said Mariya shot into the top 10 to 20th percentile. Kay says that after two years in home-schooling, Mariya was scoring at the advanced level, and after the third year she was performing at college level. "The difference in the academic performance . . . being home-schooled," according to Kay, "was amazing!" For Mariya's high school education, however, Kay was reluctant to continue home-schooling her by herself.

The poor performance and gang infestations of the nearby regular public high schools ruled them out as options. The cost of private schools took them out of the running. Kay then checked out the California Virtual Academy (CAVA) because she had friends that were using it and "they really liked it." She liked CAVA because of its access to teachers so that "it wasn't like you did your work with no support system." CAVA used Elluminate, which is an online collaboration system that allows students and instructors to hold live class

sessions. Members of the class can use a chat space on their computer to type text messages and receive responses from others. They can also use a microphone to verbally speak with each other. "I really liked that about the system," Kay says.

Mariya admits that the prospect of receiving her schooling through online education was initially intimidating "because it was more technical than I was used to, in terms of computer use and typing." She had never sent an e-mail before enrolling in CAVA. However, Kay notes that CAVA "has a great support system" so that "if she had computer problems, they would stay online with you, for an hour, if necessary, walking you through each step."

A virtual learning environment allows for instruction not available in regular classrooms.

Kay also likes the schedule flexibility that virtual learning gives the family. Mariya can do volunteer work, such as tutoring at the local elementary school twice a week, and still come back home to finish up her day's lessons. The flexibility also gives her the opportunity to take classes at a community college so that she can transfer the units to her university when she starts her freshman year.

When asked about exactly how the instruction and learning take place in the CAVA program, Mariya responds:

> You have a certain link that you go to for each class, kind of like a classroom, but it is a link. You click on the link, the classroom pops up and . . . there will be a . . . list of chapters and section numbers and on the right side you find your reading material, the learning instruction part of it. For example, if you're in American Literature, you can click on unit 5, lesson 3, and then once the link pops up you'll see your questions on *Beowulf* or whatever, you read it, make sure you understand the material and then you can log off. However, sometimes there are quizzes and tests that you have to take, so if that is the case, you have to go to another

> link and you take the quiz and test and the computer scores it. Occasionally, there are graded assignments that the teacher grades, not the computer, the teacher. Most of those are written assignments, so you have to type them, send them through what they call a "drop box" . . . It goes to the teacher's end, then she grades it, puts it back in the drop box and you can view your score and her comments and what she thought you did well, what she thought you could have improved on, and it's added to your grade.

Contact with her CAVA teachers has been easy, according to Mariya. She has their phone numbers, e-mail addresses, and Elluminate links. She can also schedule one-on-one appointments with her teachers to meet on Elluminate. The teacher also has scheduled office hours where students can use the Elluminate link and have the teacher discuss topics and answer questions. Kay adds that anytime a teacher gets a phone call or an e-mail from a student, they have to return it within a specified number of hours. "It does work out very well for me," observes Mariya.

> There are no outdated textbooks; there is a personal tutor; I have access to what my kids are doing without having to contact a teacher at a school or wait until they're there and work out a conference.

As the parent of a CAVA student, Kay is copied on all e-mail traffic between her daughter and the teacher. Attendance is taken and she knows how many hours her daughter spent in school and what days she spent in school. If a student doesn't log in for attendance, the teacher will contact the student. As Mariya says, "they'll check up on you." Kay agrees:

> They really keep close tabs on the students. My requirement is every Friday my kids have to print out their grades so I know where their standing is, what their grades are, because you get a print-out of how many assignments are turned in, if anything is due. I can do that any day, anytime, wherever I'm at. If I'm gone at a

> conference, I can log on and find out what activity my daughters are doing online so I know if they're doing their assignments, how they did on those assignments, and what communication they've had with their teachers.

In contrast, other parents have told her that the regular public schools are not as transparent as CAVA. She says that CAVA has "done well to keep the system honest," and "they do a far better job letting the parent know the activities of students long before pink slips come out or before a teacher would have to call and say, 'you know your kid hasn't turned in a homework assignment for the last three weeks.'" With CAVA, "I wouldn't have to wait three weeks or a quarter; I would know right away that things were not going well."

Mariya points out that in a regular classroom, as the teacher is lecturing, students are less likely to say, "I don't understand, or can you rephrase that, or can you go back to the topic where you were before." She observes, "There's much less opportunity for that, however, with CAVA. If you don't understand something, you just go back to it yourself and it's all there for you."

Kay observes that in a brick-and-mortar school, there is a lot of time wasted getting out books and papers, going from class to class, going to rallies, and participating in other activities. However, if the student is the only one in a virtual classroom, then more time can be focused on the subject matter. In addition, a virtual learning environment allows for instruction not available in regular classrooms. "Say she was studying cubist art," Kay says, "they would send her to sites where she would have a virtual tour of all of these pictures." Kay continues, "She could go to the Louvre, and on her screen, while she is reading her curriculum, she goes to these places in the Louvre—she actually traveled there through a virtual trip."

Mariya has excelled academically under the CAVA program. "In some areas I am at the proficient level and in others I am advanced," she says, referring to the benchmarks on the state subject exams.

While the stereotype of the online student in people's minds is that of an isolated, socially deprived nerd, Mariya says, "Oh, no. That is far from the truth." Kay says that in reality "CAVA has an incredible social system." She elaborates, "They have school newspapers; they have dances; they have field trips; everything you would have in a brick-and-mortar school, they provide." Further, she says, "they have access to music classes; they have their own athletic teams; they have drama class; it's quite an extensive social network."

While online virtual education has worked extremely well for Mariya, Kay acknowledges that online learning is not for every child:

> Yes, our experience has obviously been outstanding. I know there are some family structures that could not handle home school because they are not disciplined. If you don't have a disciplined family, I would really caution someone from doing it. It is too easy for kids to sleep in late, not get it done, get distracted, and fall behind.

Kay relates the experience of the child of a family friend who was enrolled in CAVA, but was distracted by lots of extracurricular pursuits, "so she was falling behind in her regular classes like math and science." She says that the girl is now at a private school "and doing better than she did at CAVA because it is structured."

CAVA provides students with all the tools necessary for the program. Kay says that her children received a computer, printer, and payment for Internet services. Even with providing all this hardware and ensuring Internet access, she points out that it costs CAVA much less to educate a child than it costs regular public schools. "The cost effectiveness is amazing," she notes.

The bottom line for Kay is that the virtual learning model has worked spectacularly for her family:

> For my family and for my daughters it has been a tremendous help. They have benefited greatly from CAVA. It has worked well for our family. I have no complaints. I just think it is an excellent program; there are no outdated textbooks; there is a personal tutor; I have access to what my kids are doing without having to contact a teacher at a school or wait until they're there and work out a conference. I can have a virtual conference at any time during the day with a teacher as need be. My questions are answered, it's easy to use, it is easy to access anything I need to access. I can't think of a downside. The social area is covered; the academic area is covered; the informational area is covered. It is very, very well put together.

Given this type of positive experience with the virtual learning model, policymakers should be making it easier, not more difficult, for parents to have the opportunity to choose this form of education for their children. Parents like Kay Wilson, not the regular public education establishment, should have the ultimate decision-making power. Mariya Wilson says, "There are a lot of things that you can take that are computer related, so many options, so many avenues you can go down." Those organizations with self-interested agendas should not block these options and avenues.

> If two modes of education delivery are producing similar results, then it is reasonable to choose or at least seriously consider emulating the attributes of the less costly system, which in this case is the online model.

The Expert: Bill Lucia

Now president and CEO of EdVoice, the influential Sacramento-based education-reform organization, Bill Lucia previously served as executive director of the State Board of Education, as an official at the U.S. Department of Education, and as a top staff member at the U.S. Senate's Health, Education, Labor and Pensions Committee. He has followed the rise of online education in California and in an interview

with the authors of this book makes keen observations about the past, present, and future of this learning revolution.

"I believe the status of [online learning] is just stepping out of the research and development stage in [the] K–12 grade levels," says Lucia.[260] "There are examples," he points out, "of where it is actually working pretty well in a very coherent way from the standpoint of the curriculum that is being delivered [and] the supporting services that go along with it." He notes, "Then on the other hand, there are people trying to enter the marketplace and they have components, but they don't have the whole thing built out."

While online education is still in its relative infancy, its benefits are easily recognizable. In terms of student learning, Lucia says, "Individualized instruction is probably the single biggest selling point from the standpoint of education." As others have noted, Lucia observes, "Online learning provides an opportunity to figure out where an individual kid is, rather than a group of kids, and take him or her from his or her level and move up."

Also important to parents is the issue of their children's safety at regular public schools. Lucia says that one need only look at the huge popularity among parents of the takeover of Locke High School in South Central Los Angeles by the Green Dot charter school organization to see the importance of the safety issue. Because of persistent gang problems, parents were drawn to a Green Dot-run Locke High "because word was on the street that [Green Dot] had a security firm that would escort kids from their porch to the school and back again." A home-based online education would also address the safety concerns of parents worried about having their children walk unsafe streets to an unsafe brick-and-mortar regular public school.

Turning to efficiency issues, Lucia first addresses California's antiquated textbook adoption process. He observes, "from an efficiency standpoint, [online education] allows for more up-to-date curriculum than currently what we see in textbooks." In the textbook process, he says that a publisher borrows money and estimates

how much paper and ink it will have to buy. "That is why you get all these big heavy hitters coming in on textbook adoption because of the cost of it all," he explains. In contrast, Lucia says online technology reduces costs and keeps knowledge and information current: "People that are able to use online learning are able to exploit knowledge that is already there . . . and do it without having to wait for the next seven-year cycle of a textbook adoption to get up-to-date information or the best research-based curriculum, not to mention the ability to bring an entire library right to your desktop."

Lucia makes the insightful points that "better learning is an outcome of efficiency" and that a mode of delivering education is worth serious consideration if one gets "equivalent rates of proficiency at a much lower cost." The California Virtual Academy, which Lucia's children attend, receives "70 cents on the dollar of what another charter school would get and a lot of charters on average get anywhere from $200 to $400 shy of what regular schools get per kid." Although, as mentioned previously, CAVA test-score proficiency rates, especially in math, are not notably high, many regular public schools are not doing much better.

Another huge plus for online learning is the interaction between students and teachers.

Three studies since 2000 have surveyed available research nationwide and found little difference between the achievement of students in online courses and students taking traditional face-to-face classroom-based courses.[261] One study concluded that "learning outcomes appeared to be the same as in traditional courses."[262] While some may see this "equivalency of proficiency" between online education and classroom-based education as a knock against online learning, Lucia brings a different perspective.

"My take on it is across the board we know in the expanding and successful programs that [online learning] is, on average, academically no worse, and is more personalized and safer than the public school down the street," Lucia says. "So, even that alone tells me that if it's no worse for 70 cents on the dollar, then there's potential for pretty significant efficiency for state and local policymakers

to consider." In other words, if two modes of education delivery are producing similar results, then it is reasonable to choose or at least seriously consider emulating the attributes of the less costly system, which in this case is the online model. "And lower cost doesn't necessarily mean dollars leave the education space," he continues. "Especially in California's public education finance system under the umbrella of the voter-approved Proposition 98, efficiency can mean new flexibility to enable adults to better serve students with special needs and restoring enrichment and extra-curricular programs outside of the core curriculum using existing dollars instead of holding bake sales under the guise of parental involvement or going back to the ballot box and asking grumpy voters for more of their hard-earned money."

School officials "have been well trained in the notion that anything different from the status quo has to have a separate funding stream attached to it."

Lucia acknowledges the potential difficulty of learning math through online means with a parent or adult who is uncomfortable with the subject. Math, he says, "has a discrete set of rules and various algorithms that need to be learned well and the teacher and the students need to work through that systematically." He observes, "I believe many people could have a hard time with that because of the way online generally works, with the idea of a private tutor and/or parent working in conjunction with another public school teacher." He points out, "If you have a bad curriculum, and sloppy oversight, you're toast, and then if you don't have good human interaction with an adult that is teaching or coaching along the way," the student will end up having problems.

He goes on to say, sadly, these same challenges exist in traditional brick-and-mortar public schools, with multiple-subject-credentialed teachers volunteering for the lower grades because they simply don't like math. "It's getting better in California," he observes, "but we still have a way to go."

While the online model has deficiencies, Lucia emphasizes its many positive features. Parents, for instance, can keep track of the progress of their children

much easier than in the traditional classroom model. "I can go home, push a button and see how [my son Lucas] did today," he says. He can easily find out what subjects gave his son trouble on any given day. These data also make it "easier for teachers to figure out where every single kid in class is and appropriately adjust instruction," he says. "And these daily reports can be sorted by the teachers so they can partner with the parents to make sure the kids keep up with the appropriate pace to meet the expectations for proficiency at the grade level in which they're enrolled." All of this means that parents do not have to wait for unit tests, quarter assessments, or midterm exams to find out if their children are having problems and if interventions need to take place. "I believe this is a great benefit and opportunity to improve learning and efficiency," he says.

Another huge plus for online learning is the interaction between students and teachers. Lucia says that there is "more dialogue with the teacher, believe it or not, than you would have if you saw them in person." He explains:

> You'll hear kids [in traditional schools] that will say, "I've never had more than a 10-sentence conversation with my teacher in the entire year," on the one hand. On the other hand, even though they might not be in the same building or zip code, the good [online] teachers feel like they know their students as well or better than their own nieces or nephews because of the interaction back and forth. An axiom of the information age is that most adults too often underestimate a new generation of young people and their ability to become quickly familiarized with technology. Today's young people don't have the kind of rigid boundaries in their mind about how to communicate using technology or how to access knowledge and apply it, learn it, and transfer knowledge . . . So I think there are a lot of opportunities here. Government planning is often very linear, but sooner than many may be aware, the tools will be so robust and proven that the demonstrable progress may require that policymakers and taxpayers look at the whole enterprise of public education from

> an efficiency lens and on a public policy basis and revisit how they want to resource it.

Lucia underscores the opportunity "to revisit the education finance system and focus finances on kids rather than funding adults and inputs."

As for obstacles to expansion of online education, Lucia immediately cites the challenges of collective bargaining. He sees unions as very reluctant to increase the size of classes, even with the help of technology. The prospect of larger class sizes similar to those in Asian countries would anger some folks in the unions so much that "they wouldn't even be able to think straight." However, "other astute and also union-card-carrying teachers will be the cyberspace pioneers and the leaders of [a] new teaching profession that recognizes differentiated skills that can be rewarded handsomely." Further, he says:

> There is no question that sooner rather than later these cutting-edge professionals will force the innovations in teaching itself and [in] future collective bargaining agreements. Light years past the debates over the "digital divide," they will be charting new territory as the hardware infrastructure and, more importantly, the installed software and information—the standards-aligned curriculum, formative and summative assessments, and data crunching capabilities—are exploited to their fullest potential and directed to benefit each student through an individualized education plan.

Lucia says the problem of bureaucratic inertia, which Ted Smith of Mind Research Institute cited, is "pretty big." It is not just an issue of school officials not wanting to get outside their comfort zone: the real issue, Lucia points out, is money. School officials "have been well trained in the notion that anything different from the status quo has to have a separate funding stream attached to it." He goes on to say, "That is how, over the last 35 years, we built up over 60 [earmarked] categorical programs. And the culture in California for public

finance for education has been: don't do a single thing different unless you give me a separate funding stream for it."

Even if software vendors have great products with proven effectiveness, school officials will still think that unless there is a separate funding stream, they will have to dip into discretionary funding. Using discretionary dollars for anything new in California public schools is problematic, according to Lucia, because those funds are what are collectively bargained in union negotiations. That means "you're back to dealing with the union and understandably there will be concern." He reiterates, "anything that is not a categorical, by definition, is on the bargaining table, so you're directly competing for the same resources as the teachers union when you're putting another learning tool with a price tag on the table in contract negotiations."

"I believe the long-term potential is more efficiency in education."

School officials may not be interested in good software and online products even if there is philanthropic funding available because grant proposals have to be written to obtain this funding and that often requires hiring grant writers, which costs money.

There is fear among teachers that technology will cost jobs. Lucia says that if teachers with bilingual credentials are needed less because of technology, which seems possible given the nontextual approach of successful programs such as Mind Research Institute's JiJi math, "and the kids are actually learning and becoming more proficient in math," then "it's about resourcing the enterprise of learning correctly—some skill sets may no longer be needed at the same level while other new or specialized skills will be needed and maybe at a premium relative to other sectors of the economy." That is why the CFT model contract language continually emphasizes that union members cannot be displaced by technology.

Teachers also fear technology because, in many cases, they do not understand it. "The age cohort of teachers come[s] into play here," says Lucia. The minutes of the CFT's Education Technology Committee, which chronicle the union's admission that many teachers do not understand technology as well as their own students, support Lucia's observation. He also lays blame on some of the teacher preparation programs where education professors or local intern-training program staff with teaching seniority are no good teaching with the latest technology," so "they're not doing it, they truly don't know how, and they are not teaching the new teachers how to do it." He finds it shocking that "the rest of the economy is exploiting technology and the reason education has not, in part, figured out how to do it is the need to focus the entire loop, which includes the traditional schools of education and other teacher preparation programs."

Lucia offers his opinion about the importance of hardware versus good software, assessment, instruction, and data:

> We have the naïveté of too many policymakers up here in Sacramento that the way to exploit technology is simply [to] close the digital divide with Internet access or to deliver on an iPad or a digital book. They think that getting the infrastructure done is the sum total of exploiting technology. And it is sad to say that in the 21st century in California, land of Silicon Valley, that there is still overwhelming influence by the infrastructure people and the people that are all about selling laptops, computers, hard drives, licenses for operating systems and delivery mechanisms . . . [It is] not about good software, not about good formative assessment, not about good individualized instruction, not about good data feedback and data crunching to put immediate loop-back into teaching and learning in the classroom and to higher level decision and policymaking.

He lays special responsibility on the California Department of Education (CDE), saying, "the CDE is also a culprit, and certainly compared to its sister

departments of education across the country." Other states have better data systems and better technical capabilities. He says that the CDE "has people that are incompetent to their box on the organizational chart, not that they are individually or intellectually incompetent, but they are wrong-placed and their capabilities do not match the skill set to handle highly technical work or even manage deliverables through contract oversight." He points out, "This is not just my observation, but that of independent consultants that the CDE itself hired to triage the failure in the department's rollout of the latest data system effort."

Integrating technology and improving schools and student achievement become frustratingly difficult because of "the failure of the monopoly of public education in California, and from the top down, particularly at the top, how are you going to expect any different kind of result just because you have a different set of tools but still functional ineffectiveness in the people that are holding the tools in their hands, not to mention those charged with tool development or oversight of contractors building systems from whole cloth?"

Regulations, such as the state's contiguous counties rule for virtual charter schools, are "definitely a problem in terms of the rate of growth of expansion," Lucia says. "It is absolutely a constraint," but he adds hopefully, "it's one that might loosen up a bit once there is more data and evidence of successful practice." He speculates that one option for the future would allow virtual charters to appeal to the State Board of Education for a waiver from the rule if the virtual charter can show a track record of success and adherence to a standard of accountability. Virtual charters could then be "unshackled" in "a controlled way."

Lucia has no illusions, however, that the unshackling process will be easy:

> To get there, politically, is a tough road, given where, I think, there is a sentiment in the legislature by charter antagonists now, coming up on a year where we will have a new governor and a new state [education] chief. There are a slew of anti-charter bills, and I think the strategy of the anti-charter movement is to get

> people used to voting for those bad charter bills, even though the [current] governor will veto them, hopefully. But they will be used to voting for those bad bills.

By voting for these bills, Lucia notes, legislators will accept the premise that there is an imperfect marketplace and they will then be comfortable supporting overly restrictive charter school statutes and regulations that capture not just the supposed bad actors, but academically successful schools, too. Then, depending on the new governor's views, the reintroduction of those bills might actually result in some being signed into law.

Finally, Lucia says that we must acknowledge that even in the twenty-first century, with the great progress California has made from the 1930s, some school boards and even educators still have excessively low expectations of some of their students:

> Then you get people [who], out of sheer ignorance, say that just because somebody's parent is not an English competent person that their kid isn't going to be able to exploit the use of technology because that parent can't help that kid if they have to be able to log on in the evening and check up to see if the child is keeping up with their homework. There is no way that somebody speaking Hmong or Spanish can help them [so] they're not going to access or benefit from it. This technology thing is only about kids with English-proficient parents being able to take advantage of it, so there's some of that. But how does that explain the sales of Nintendo in minority-language communities or the ignorance of a middle-class parent in being able to help their child play a computer game?

Overall, then, Lucia says that online education in California is "way ahead of where it was in the 1990s. California is clearly not nearly as far ahead as it could have been; there have been some statutory obstacles, but really a lack of

creativity and competence at the highest levels, and in the land of Silicon Valley that's shameful, really." For the future, he sees online education promoting "more individualized learning" and helping students not well served by traditional programs and those with special needs and English learners who are "way behind grade level, at grade level, and well above grade level." And the bottom line? Says Lucia, "I believe the long-term potential is more efficiency in education."

Conclusion and Recommendations

After reviewing laws and documents, plus conducting numerous first-person interviews, several realities stand out regarding the current state of online education in California and its future. While not a panacea, and not for every student, the potential is overwhelming.

Online computer programs like the Mind Research Institute's JiJi math program offer individualized adaptive learning systems that have improved student performance dramatically. The "anywhere, anytime" learning of virtual charters with their innovative teacher-student interaction offer the type of flexible learning delivery the government's brick-and-mortar public schools simply cannot match.

Hybrid charter schools such as Rocketship Mateo Sheedy combine the traditional classroom experience of face-to-face teacher-student instruction with carved-out online learning time using effective educational software programs. It is not surprising, then, that Rocketship students from challenging demographic backgrounds are excelling. In a state like California, where a large proportion of students are failing to achieve proficiency in core subjects, the promise of schools like Rocketship and programs like JiJi offer hope where, too often, there has been none.

The performance of students in some online programs could be higher. The proficiency rates, especially in math, at CAVA schools do not inspire awe. However, it is important to point out that even though the aggregate proficiency rate of all students at a particular virtual school may not be extremely high, virtual learning does work for many students, some of whom, like Mark McLean, were ill-served by the regular public school system. Online learning alternatives such as virtual charter schools, therefore, should always be available as an option for parents and should not be shut off, especially when the regular public schools are failing to deliver. If there is equivalency of results between the regular public schools and online or virtual schools, then the cost efficiency alone of the latter would argue not only for their continued existence but for their expansion.

Expanding the availability of online alternatives and increasing the number of students taking advantage of them could result in cost savings at a time when the state budget is chronically in the red.

Online education does offer potential for cost savings. Rocketship Mateo Sheedy saved half a million dollars a year through its online learning lab. These savings have allowed the school to reinvest in itself while regular public schools have been running deficits. Also, under California law, virtual charter schools are allotted significantly less funding than classroom-based charters and regular public schools. Expanding the availability of online alternatives and increasing the number of students taking advantage of them could result in cost savings at a time when the state budget is chronically in the red.

Despite all this potential, there are major obstacles to expanding online options for students in California. State government has imposed regulations that have held back the full growth potential of online learning. The contiguous counties rule, the student-to-teacher ratio requirement, and the independent studies categorization all hamper online programs from serving students who may desire an online alternative.

In addition to state government, the teacher unions have tried to block online learning where it could adversely impact union members. The model contract issued by the California Federation of Teachers contains language that, if agreed upon in contract negotiations, would impede the spread of distance- and online learning options. For the union, the bottom line, as expressed in its model contract, is simple: "No employee shall be displaced because of distance learning or other educational technology." With this statement as the unions' operating principle, widespread expansion of online learning will be a battle.

Bureaucratic inertia will also be a frustrating challenge. The experience of Mind Research Institute trying to get its proven software product into the Los Angeles Unified School District and the perverse incentives of the state's education funding system demonstrate the huge hurdle of trying to get a large, monopolistic, government-run system to change course and adapt to and adopt promising innovations.

Given the potential of and obstacles to online learning, what should California policymakers do? Here are the top six recommendations:

- **Reform the contiguous counties rule.** Other states have no such constraint and virtual schools have operated without major problems. The rule should be eliminated either completely or through a waiver system where the State Board of Education could suspend the rule if virtual charters present sufficient achievement and accountability evidence that meets an agreed-upon standard. One possibility is for virtual charter schools to post performance bonds that would guarantee improvement in student performance, based on measures such as growth in student test scores, in exchange for waiving rules like the contiguous-counties regulation.

- **Eliminate the 25:1 student-teacher ratio for virtual charter schools**

and take virtual charters out of the category of independent study. Not only does the technology not warrant the student-teacher ratio requirement, there is no convincing empirical evidence showing that low student-teacher ratios improve student performance. Also, virtual charter schools should not be hamstrung by outdated independent-study regulations, but should be given flexibility, through a separate law or other means, to use their technological tools to their fullest advantage.

- **Allow multiple authorizers for charter schools.** In California, only local and state boards of education can authorize a charter school. Having multiple authorizers helps to streamline the charter application process, prevent any one group from politicizing the process, provide better quality oversight, and ensure that supply meets growing demand. Examples of non-school-board authorizers include independent statewide authorizing agencies, colleges and universities, mayors and other municipal offices, and nonprofit organizations. Of the 29 states with virtual charter schools, 19 states allow multiple charter authorizers.

- **Lift the cap on charter school expansion.** California limits the expansion of charter schools to 100 per year. If the state continues the contiguous counties rule, operators will want to establish many individual virtual charter schools in the future and could be stymied by the cap. Limiting the number of charter schools that can open and/or the number of students who are allowed to enroll in charter schools, including virtual charter schools, does not guarantee school quality. In fact, this practice typically has more to do with politics than policy.

- **Allow full teacher licensure reciprocity.** California is one of many states that fail to allow teacher licensure reciprocity. The state requires a California teaching credential to teach in public schools. Teachers with out-of-state credentials must meet various requirements, depending on the number of years they have been teaching and the type of

credential they are seeking, in order to obtain a California credential. Forcing teachers to have California credentials prevents the possibility of virtual schools using star teachers in other states to teach online students. As mentioned earlier in this paper, John Fensterwald, the former *San Jose Mercury News* education editorialist, has criticized the regulation requiring "teachers leading virtual courses—they could be living anywhere—to have California credentials." One of the significant benefits of virtual education is that students, especially those in rural or underserved areas, have access to highly qualified teachers in advanced subjects or special fields. Currently, only Michigan, Nevada, North Carolina, and West Virginia allow full teacher reciprocity. The more autonomy charter schools have over their day-to-day operations, including staffing, the more likely they are to be able to hire talented teachers with out-of-state licenses, even if traditional district-run public schools in their state cannot. Oklahoma is one of only a few states that recognizes the out-of-state teaching licenses of those who teach online courses.

- **Attach funding to each child so that they can take it to the school of their choice.** It is absolutely imperative that California's education-funding system be changed to make it more student centered. In Sweden, education funding is attached to a student so that he or she can take it to the public or private independent school of his or her choice. The portable funding amount is equal to the per-pupil spending amount designated for the government-run municipal schools. A similar portable funding system, based on current operational spending per pupil in California, could address issues of funding disparity between regular public schools and distance and online alternatives, still save money on capital and other costs, and force the regular public schools to compete fully with expanded numbers of private schools and virtual charter schools. This heightened competition would give school districts and their employees incentives to overcome the bureaucratic inertia

from which they suffer and would eliminate the earmark problem where public schools resist any innovation that does not have a funding stream specifically attached to it. Giving parents and their children full choice would also get around the opposition of teacher unions and restrictive collective bargaining contracts and force the unions to adapt to the demands of their customers.

Online learning is not just the wave of the future; it is the tidal wave of the future. It is therefore past time for policymakers in California to tear down the government-made breakwaters that have diminished the full impact of this tidal surge.

Get Out of the Way and Let the Future In

State lawmakers recognized the importance of online learning way back in the early 1990s when they enacted Education Code section 51865, the state's distance learning plan. They were correct in stating that online distance education should create "equity in education" that would allow all students "equal access to educational opportunities, regardless of where he or she lives."

Lawmakers were also on target when they said that distance education would improve "quality in education" through "creative application of telecommunications, as pupils are given the opportunity to interact with pupils from other cultures and geographical locations, and with outstanding educators from other educational institutions."

Finally, they had it right when they said that distance education would promote "efficiency and accountability," which is of huge importance "as state budget resources become increasingly restricted." Lawmakers urged "cooperative efforts" to meet "the potential to reduce costs and increase efficiency."[263]

Yet, despite these laudable policy goals to maximize the positive impact of online learning, lawmakers, leveraged by powerful special interests, have undercut these goals over the years through heavy-handed regulations and irrational funding policies.

Reason magazine senior editor Katherine Mangu-Ward has pointed out:

> State governments spend between $10,000 and $15,000 annually on each of the nation's 55 million school kids, making primary and secondary education a $1 trillion market. Under ordinary circumstances, that kind of money attracts entrepreneurs. But the uncertainties of politics, the powerful opposition of the teachers unions, and the astonishing technological backwardness of the education establishment discourage would-be entrepreneurs and, perhaps more importantly, potential investors.[264]

Online learning is not just the wave of the future; it is the tidal wave of the future. It is therefore past time for policymakers in California to tear down the government-made breakwaters that have diminished the full impact of this tidal surge. In other words, it is time for government and its special-interest obstructionists to get out of the way and let the future in so that parents and their children can exercise their fundamental right to choose the type of education that best meets their individual needs.

Endnotes

1 "Remarks of President Barack Obama – As Prepared for Delivery Address to Joint Session of Congress, February 24th, 2009," http://www.whitehouse.gov/the_press_office/remarks-of-president-barack-obama-address-to-joint-session-of-congress/.

2 Vicki E. Murray, "Kids Need More School Choice," *Human Events*, January 21, 2009, http://www.humanevents.com/article.php?id=30346; cf. "California Schools Days," *Investor's Business Daily,* January 22, 2009.

3 Ibid.

4 Keynote address at the 2000 Rotterdam Conference quoted in Organisation for Economic Co-operation and Development (OECD) and Centre for Educational Research and Innovation (CERI), "21st Century Learning: Research, Innovation and Policy Directions from recent OECD analyses," 2008, p. 2, www.oecd.org/dataoecd/39/8/40554299.pdf; cf. Sara Mead, "Education Reform Lessons from England: An Interview with Sir Michael Barber," Education Sector Interviews, January 13, 2006, http://www.educationsector.org/analysis/analysis_show.htm?doc_id=344385; and OECD, *New millennium learners in higher education: Evidence and policy implications*, September 2009, http://www.nml-conference.be/wp-content/uploads/2009/09/NML-in-Higher-Education.pdf.

5 CERI, *Demand-Sensitive Schooling? Evidence and Issues*, OECD, 2006, http://www.oecd.org/document/11/0,3343,en_2649_35845581_37655499_1_1_1_1,00.html.

6 OECD, Innovative Learning Environments Web site, http://www.oecd.org/document/19/0,3343,en_2649_35845581_40787603_1_1_1_1,00.html. For additional resources, see CERI, Schooling for Tomorrow: Related Documents and Publications Web site, http://www.oecd.org/document/15/0,3343,en_2649_35845581_35773263_1_1_1_1,00.html; CERI, Schooling for Tomorrow Web site, http://www.oecd.org/document/6/0,3343,

en_2649_35845581_31420934_1_1_1_1,00.html; OECD, Schooling for Tomorrow: Country Based Initiatives Web site, http://www.oecd.org/document/7/0,3343, en_2649_35845581_37363079_1_1_1_1,00.html; and David Instance, "Innovative Learning Environments—Insights from Recent OECD/CERI Analyses," CERI, EDEN Conference, Porto, October 2009, http://www.slideshare.net/eden_online/innovative-learning-environments-insights-from-recent-oecdceri-analyses.

7 CERI, *Personalising Education*, OECD, 2006, http://www.oecd.org/document/49/0,3343,en_2649_35845581_36168625_1_1_1_1,00.html.

8 Claudia Wallis, "How to Bring Our Schools Out of the 20th Century," *Time*, December 10, 2006, http://www.time.com/time/magazine/article/0,9171,1568480,00.html.

9 "Technology improves learning outcomes—Mexico," Smart Technologies Case Study, http://www.education.smarttech.com/ste/en-US/News+and+research/Case+studies+and+best+practices/K-12+case+studies/Mexico+-+Enciclomedia+Project.htm.

10 Susan Patrick, "How Online Learning Can Increase Opportunities for Students," presentation at the American Legislative Exchange Council Education Task Force, 2009, http://www.inacol.org/research/docs/ALEC_2009_Task_Force_Meeting_7_Minutes_Susan_Patrick.pdf; "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State," January 21, 2010, Webinar presentation hosted by the American Legislative Exchange Council and International Association for K–12 Online Learning (iNACOL); "Online Teaching and Learning: Digital Directions Live Chat," moderated by Michelle Davis, *Education Week*, September 26, 2008, http://www.edweek.org/chat/2008/09/26/transcript_09_26_08.html

11 Patrick, "How Online Learning Can Increase Opportunities for Students"; "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State."

12 Patrick, "How Online Learning Can Increase Opportunities for Students"; "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State"; "Online Teaching and Learning: Digital Directions Live Chat."

13 Patrick, "How Online Learning Can Increase Opportunities for Students"; "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State."

14 Patrick, "How Online Learning Can Increase Opportunities for Students"; "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State"; "Online Teaching and Learning: Digital Directions Live Chat."

15 Ibid.

16 "Online Teaching and Learning: Digital Directions Live Chat."

17 U.S. Department of Education, "Using Technology to Transform Schools—Remarks by Secretary Arne Duncan at the Association of American Publishers Annual Meeting," March 3, 2010, http://www2.ed.gov/news/speeches/2010/03/03032010.html.

18 *Transforming American Education: Learning Powered by Technology, National*

Education Technology Plan Draft, March 5, 2010, http://www.ed.gov/sites/default/files/NETP-2010-final-report.pdf. Available on the U.S. Department of Education, Office of Educational Technology (OET), National Education Technology Plan 2010 Web site, http://www.ed.gov/technology/netp-2010; cf. main U.S. Department of Education, OET Web site, http://www2.ed.gov/about/offices/list/os/technology/index.html.

19 *Transforming American Education: Learning Powered by Technology, National Education Technology Plan Draft*, March 5, 2010, p. v, http://www.ed.gov/sites/default/files/NETP-2010-final-report.pdf.

20 President Clinton, State of the Union, January 23, 1996, quoted on the U.S. Department of Education, Previous National Educational Technology Plans Web site, http://www2.ed.gov/about/offices/list/os/technology/plan/archive.html.

21 Letter from U.S. Education Secretary Richard W. Riley to Members of Congress in *Getting America's Students Ready for the 21st Century—Meeting the Technology Literacy Challenge, A Report to the Nation on Technology and Education,* June 29, 1996, http://www2.ed.gov/about/offices/list/os/technology/plan/national/index.html.

22 Letter from U.S. Education Secretary Rod Paige to Members of Congress in *Toward a New Golden Age in American Education: How the Internet, the Law and Today's Students are Revolutionizing Expectation*, The National Technology Plan 2004, January 2005, http://www2.ed.gov/about/offices/list/os/technology/plan/2004/index.html.

23 See Letter from U.S. Education Secretary Rod Paige and p. 45, http://www2.ed.gov/about/offices/list/os/technology/plan/2004/index.html.

24 Quoted in *Toward a New Golden Age in American Education*, p. 37.

25 Ibid., p. 39.

26 National Educational Technology Plans from 1996 and 2000, along with related materials, are archived on the U.S. Department of Education, Previous National Educational Technology Plans Web site, http://www2.ed.gov/about/offices/list/os/technology/plan/archive.html. See also U.S. Department of Education, *Toward a New Golden Age in American Education: How the Internet, the Law and Today's Students are Revolutionizing Expectation*, *The National Technology Plan 2004*, January 2005, pp. 39–44, http://www2.ed.gov/about/offices/list/os/technology/plan/2004/index.html.

27 *Transforming American Education: Learning Powered by Technology, National Education Technology Plan Draft*, March 5, 2010, pp. xii–xv, http://www.ed.gov/sites/default/files/NETP-2010-final-report.pdf. Available on the U.S. Department of Education, OET, National Education Technology Plan 2010 Web site, http://www.ed.gov/technology/netp-2010.

28 Lucinda Gray, Nina Thomas, and Laurie Lewis, *Educational Technology in U.S. Public Schools: Fall 2008* (NCES 2010-034), U.S. Department of Education, National

Center for Education Statistics, Washington, DC: U.S. Government Printing Office, April 2010, pp. 1–3, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2010034.

29 Ibid.

30 Lucinda Gray and Laurie Lewis, *Educational Technology in Public School Districts: Fall 2008* (NCES 2010-003), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, December 2009, pp. 1–3, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2010003.

31 Gray, Thomas, and Lewis, *Educational Technology in U.S. Public Schools: Fall 2008*, pp. 1–3.

32 Clayton M. Christensen and Michael B. Horn, “How Do We Transform Our Schools? Use technologies that compete against nothing,” *Education Next*, Summer 2008, vol. 8, no. 3, http://educationnext.org/how-do-we-transform-our-schools/.

33 Terry Moe, Larry Cuban, and John Chubb, “Virtual Schools: Will education technology change the role of the teacher and the nature of learning?” *Education Next*, Winter 2009, vol. 9, no. 1, http://educationnext.org/virtual-schools/.

34 Katherine Mangu-Ward, “Traditional schools aren’t working. Let’s move learning online,” *Washington Post*, March 28, 2010, http://www.washingtonpost.com/wp-dyn/content/article/2010/03/26/AR2010032602224.html.

35 Janna Quitney Anderson and Lee Rainie, “The Impact of the Internet on Institutions in the Future,” Pew Research Center’s Internet and American Life Project and Elon University’s Imagining the Internet Center, March 31, 2010, pp. 6–7, http://www.pewinternet.org/~/media//Files/Reports/2010/PIP_Future%20of%20internet%202010%20-%20institutions%20-%20final.pdf.

36 Ibid., p. 9.

37 Ibid., p. 12.

38 See the remarks of Terry Moe in Mitch Pearlstein, “Educational Freedom and Technology,” Capitol Solutions, Center on the American Experiment, February 9, 2010, p. 3, http://www.americanexperiment.org//uploaded/files/2010_publications/capitol_solutions_education/cae_2010_education_recommendations.pdf.

39 Anderson and Rainie, “The Impact of the Internet on Institutions in the Future,” pp. 6–7.

40 Ibid., p. 10.

41 Moe, Cuban, and Chubb, “Virtual Schools.”

42 Ibid.

43 See Moe’s remarks in Pearlstein, “Educational Freedom and Technology,” p. 3.

44 Sarah Grady, Stacey Bielick, and Susan Aud, *Trends in the Use of School Choice: 1993 to 2007* (NCES 2010-004), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, D.C., April 2010, p. 4, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2010004.

45 Ibid.

46 Friedman Foundation for Educational Choice, *The ABCs of School Choice, 2009–2010 Edition*, updated October 29, 2009, http://www.edchoice.org/newsroom/ItemAbc.do?filterId=87; Grady, Bielick, and Aud, *Trends in the Use of School Choice: 1993 to 2007*, p. 4.

47 In 1992, City Academy in St. Paul was the first charter school to open. See http://www.cityacademy.org/.

48 According to the Center for Education Reform (CER), there are 1,536,099 students enrolled in charter schools for the 2009–10 school year. (The author's tally based on CER data is 1,536,119.) The National Alliance for Public Charter Schools reports that there are 1,566,763 charter school students for this school year. See CER, "Charter Connection," http://www.edreform.com/Issues/Charter_Connection/?All_About_Charter_Schools; "National Charter Schools & Enrollment Statistics 2009," updated November 2009, http://www.edreform.com/_upload/CER_charter_numbers.pdf; and the National Alliance for Public Charter Schools, "Public Charter School Dashboard: Students Overview 2009–2010 National," http://www.publiccharters.org/dashboard/students/page/overview/year/2010. U.S. Territories of Puerto Rico and Guam also have charter schools. See National Association of Charter School Authorizers, "The State of Charter School Authorizing 2008: A Report on NACSA's Authorizer Survey," July 2009, p. 2, http://www.qualitycharters.org/files/public/Authorizing_Report_2008_FINrev_web.pdf. Alabama, Kentucky, Maine, Mississippi, Montana, Nebraska, North Dakota, South Dakota, Vermont, Washington, and West Virginia do not permit public charter schools. See CER, Charter School Law Ranking and Scorecard 2010 Web site, http://www.charterschoolresearch.com/laws/; and Grady, Bielick, and Aud, *Trends in the Use of School Choice: 1993 to 2007*, p. 1, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2010004.

49 National Alliance for Public Charter Schools, "Public Charter School Dashboard: Schools Overview 2008–2009 National," http://www.publiccharters.org/dashboard/schools/page/overview/year/2009.

50 Vicki E. Murray, "State's Rules Stifle Charter Schools, Threaten Success," *Arizona Republic*, November 6, 2006, http://goldwater.design44.com/AboutUs/ArticleView.aspx?id=795.

51 For additional information about charter school basics, see CER, "Ed Reform FAQs" Web site, http://www.edreform.com/Fast_Facts/Ed_Reform_FAQs/?Just_the_FAQs_Charter_Schools; CER, "Charter Connection: All About Charter Schools" Web site, http://www.edreform.com/Issues/Charter_Connection/?All_About_Charter_Schools; CER, "National Charter School & Enrollment Statistics 2009," http://www.edreform.com/_upload/CER_charter_numbers.pdf; Maine Association for Charter Schools, "ABCs of Charter Schools" Web site, http://www.mainecharterschools.org/ABCs%20of%20Charter%20Schools/ABCs%20of%20

Charter%20Schools.htm; Mississippi Center for Public Policy, "Charter FAQs Web site, http://www.mspolicy.org/mcpp_reports/mcpp_reports_view.php?entryID=161; Education Commission of the States, "Charter Schools," http://www.ecs.org/ecsmain.asp?page=/html/issuesK12.asp; and US Charter Schools, "Answers to Frequently Asked Questions" Web site, http://www.uscharterschools.org/pub/uscs_docs/o/faq.html.

52 Grady, Bielick, and Aud, *Trends in the Use of School Choice: 1993 to 2007*, p. 4.

53 Friedman Foundation for Educational Choice, *The ABCs of School Choice, 2009–2010 Edition*.

54 Grady, Bielick, and Aud, *Trends in the Use of School Choice: 1993 to 2007*, pp. iv, 7, and 23ff.

55 Vicki E. Murray, "ED's 'What Works' Division Validates Voucher Program the 'Fund Whatever Works' Obama Administration Killed," Independent Women's Forum Inkwell Blog, February 24, 2010, http://www.iwf.org/inkwell/show/22696.html; cf. *Down but Not Out in D.C.: Bi-Partisan, Bi-Cameral Efforts to Continue the Opportunity Scholarship Program*, Independent Women's Forum, Policy Brief #25, August 13, 2009, http://www.iwf.org/publications/show/21880.html; "Death of D.C. Opportunity Scholarship Program Would be 'A Tragedy and an Outrage'," Independent Women's Forum Inkwell Blog, February 4, 2010, http://www.iwf.org/inkwell/show/22631.html; and "Scrooging Schoolchildren," Independent Women's Forum Inkwell Blog, December 14, 2009, http://www.iwf.org/inkwell/show/22464.html.

56 David Nagel, "10.5 Million PreK–12 Students Will Attend Classes Online by 2014," *The Journal*, October 28, 2009, http://thejournal.com/articles/2009/10/28/10.5-million-prek-12-students-will-attend-classes-online-by-2014.aspx.

57 See the executive summary and table 4 in Izabella Zandberg and Laurie Lewis, *Technology-Based Distance Education Courses for Public Elementary and Secondary School Students: 2002–03 and 2004–05* (NCES 2008-008), National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC, June 2008, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2008008.

58 Anthony G. Picciano and Jeff Seaman, *K–12 Online Learning; A 2008 Follow-up of the Survey of U.S. District Administrators*, The Sloan Consortium, January 2009, pp. 6, 10, and 11, http://www.sloan-c.org/publications/survey/k-12online2008.

59 Ibid., pp. 5–6.

60 Ibid., p. 13.

61 Southern Regional Education Board, "Five Academic Reasons: Why State Virtual Schools are Important to Your State," October 2007, p. 3, http://publications.sreb.org/2007/07T07_Five_acad_reas.pdf.

62 John Watson, Butch Gemin, Jennifer Ryan, and Matthew Wicks, *Keeping Pace with K–12 Online Learning: A Review of State-level Policy and Practice*, Evergreen Education Group, November 2009, pp. 8–11, http://www.kpk12.com/. For more resources on online learning, see the iNACOL Reports and Publications Web site, http://www.inacol.org/research/reports.php.

63 Ibid.

64 CER, Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm; and Watson et al., *Keeping Pace with K–12 Online Learning*, pp. 8–11. For more resources on online learning, see the iNACOL Reports and Publications Web site, http://www.inacol.org/research/reports.php.

65 CER, Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm; and Watson et al., *Keeping Pace with K–12 Online Learning*, pp. 8–11 and 87. For more resources on online learning, see the iNACOL Reports and Publications Web site, http://www.inacol.org/research/reports.php.

66 CER, Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm; and Watson et al., *Keeping Pace with K–12 Online Learning*, pp. 8–11. For more resources on online learning, see the iNACOL Reports and Publications Web site, http://www.inacol.org/research/reports.php.

67 Watson et al., *Keeping Pace with K–12 Online Learning*, pp. 8–11. For more resources on online learning, see the iNACOL Reports and Publications Web site, http://www.inacol.org/research/reports.php.

68 "Learning in the 21st Century: 2009 Trends Update," Blackboard K12, Project Tomorrow, July 2009, p. 2, http://www.blackboard.com/resources/k12/Bb_K12_09_TrendsUpdate.pdf.

69 Ibid.

70 Ibid., p. 5.

71 "Learning in the 21st Century: Parents' Perspectives, Parents' Priorities," Blackboard K12, Project Tomorrow, October 2009, http://www.blackboard.com/resources/k12/Bb_K12_ParentsReport.pdf.

72 Ibid., p. 11.

73 Barbara Means, Yukie Toyama, Robert Murphy, Marianne Bakia, and Karla Jones, *Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies*, U.S. Department of Education Office of Planning, Evaluation, and Policy Development, Policy and Program Studies Service, May 2009, http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf. See also William R. Thomas, "Overcoming Doubts About Online Learning," Southern Regional Education Board, November 2009, pp. 2–3, http://publications.sreb.org/2009/09T02_Overcoming_Doubts.pdf; and Rosina Smith, Tom Clark, and Robert L. Blomeyer, *A Synthesis of New Research on K–12 Online Learning*, North Central Regional Education Laboratory/Learning Point Associates, November 2005,

pp. 17–18, www.ncrel.org/tech/synthesis.

74 Thomas, "Overcoming Doubts About Online Learning"; cf. Means et al., *Evidence-Based Practices in Online Learning*; Ohio Alliance for Public Charter Schools, "E-schools Show Superior Results," July 2009, http://www.oapcs.org/files/EschoolStudy_final6-24-09.pdf; KidsOhio.org, "Ohio's 8 Large Urban Districts and Charter Schools Rank Higher on Educational Progress Than on Absolute Test Scores," June 9, 2009, http://www.kidsohio.org/2009/06/09/new-analysis-ohio%e2%80%99s-8-large-urban-districts-and-charter-schools-rank-higher-on-educational-progress-than-on-absolute-test-scores/; Katherine Mackey, "Wichita Public Schools' Learning Centers: Creating a new educational model to serve dropouts and at-risk students," Innosight Institute, March 2010, http://www.innosightinstitute.org/media-room/publications/education-publications/wichita-public-schools-learning-centers/; and Leland Anderson, "Alpine Online case study: A Utah school district's move into K–8 online education," Innosight Institute, August 28, 2009, http://www.innosightinstitute.org/publications/alpine-online-case-study/.

75 Executive summary in Zandberg and Lewis, *Technology-Based Distance Education Courses for Public Elementary and Secondary School Students: 2002–03 and 2004–05*.

76 Picciano and Seaman, *K–12 Online Learning*, p. 20.

77 Gregg Vanourek, "A Primer on Virtual Charter Schools: Mapping the Electronic Frontier," Issue Brief No. 10, National Association of Charter School Authorizers, August 2006, p. 2, http://www.qualitycharters.org/i4a/pages/Index.cfm?pageID=3372.

78 "The modern mail-based 'correspondence school' is said to have been invented at the University of Chicago in 1891. The delivery mechanism subsequently evolved from mail-based correspondence courses and radio programs to television and satellite broadcasts to today's Internet-based virtual schools, which were launched in the 1990s." For more details on the origin and evolution of virtual schools, see Randall Greenway and Gregg Vanourek, "The Virtual Revolution: Understanding online schools," *Education Next*, Spring 2006, vol. 6, no. 2, http://findarticles.com/p/articles/mi_m0MJG/is_2_6/ai_n16118691/; and Smith, Clark, and Blomeyer, *A Synthesis of New Research on K–12 Online Learning*, pp. 8–9.

79 Tom Clark, *Virtual Schools: Trends and Issues. A Study of Virtual Schools in the United States*, WestEd, October 2001, p. 1, http://www.wested.org/cs/we/view/rs/610; CER, Virtual/Cyber Schools Web site, http://www.charterschoolsearch.com/SpecialtyProfile.cfm?&spec_id=5; Watson et al., *Keeping Pace with K–12 Online Learning*, pp. 48–49; and Vanourek, "A Primer on Virtual Charter Schools," p. 2.

80 Vanourek, "A Primer on Virtual Charter Schools," p. 2.

81 Arika Long, "Cyber Schools," Education Commission of the States Policy Brief, April 2004, http://www.ecs.org/clearinghouse/51/01/5101.htm; and Clark, *Virtual*

Schools: Trends and Issues, pp. 20–22; cf. Amy Berk Anderson, "Charter Schools: Cyber Charter Schools," Education Commission of the States Policy Brief, May 2003, http://www.ecs.org/clearinghouse/44/13/4413.htm.

82 Vanourek, "A Primer on Virtual Charter Schools," p. 2.

83 Long, "Cyber Schools"; cf. Anderson, "Charter Schools."

84 Ibid.

85 Vanourek, "A Primer on Virtual Charter Schools," p. 4.

86 Greenway and Vanourek, "The Virtual Revolution."

87 Long, "Cyber Schools."

88 Greenway and Vanourek, "The Virtual Revolution."

89 Quoted in Greenway and Vanourek, "The Virtual Revolution."

90 Vanourek, "A Primer on Virtual Charter Schools," pp. 2–4. These dimensions were originally designed by Greenway and Vanourek in "The Virtual Revolution." See also Watson et al., *Keeping Pace with K–12 Online Learning*, pp. 17–18 and pp. 52–55; Clark, *Virtual Schools*, pp. 11–20; and Long, "Cyber Schools."

91 Vanourek, "A Primer on Virtual Charter Schools," p. 5.

92 Ibid.

93 Ibid.

94 Picciano and Seaman, *K–12 Online Learning: A 2008 Follow-up of the Survey of U.S. District Administrators*.

95 Watson et al., *Keeping Pace with K–12 Online Learning*, p. 42.

96 Quoted in Watson et al., *Keeping Pace with K–12 Online Learning*, p. 24.

97 These data are current as of April 2010. Author's enrollment figure based on data from the Center for Education Reform and in three cases, from the U.S. Department of Education's National Center for Education Statistics. Enrollment data for Ulysses Career Learning Academy in Kansas, which opened in 2008, were not available. See CER, Virtual/Cyber Schools Web site, http://www.charterschoolsearch.com/SpecialtyProfile.cfm?&spec_id=5; cf. Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm.

98 Authors' percentages derived from data from CER, Virtual/Cyber Schools Web site, http://www.charterschoolsearch.com/SpecialtyProfile.cfm?&spec_id=5; cf. Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm.

99 Authors' percentage derived from school descriptions presented by CER, Virtual/Cyber Schools Web site, http://www.charterschoolsearch.com/SpecialtyProfile.cfm?&spec_id=5; cf. Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm.

100 School categories and percentages are the authors' based on school descriptions presented by CER, Virtual/Cyber Schools Web site, http://www.charterschoolsearch.com/SpecialtyProfile.cfm?&spec_id=5; cf. Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm.

101 *Transforming American Education: Learning Powered by Technology, National Education Technology Plan Draft*, March 5, 2010, pp. x and xi, http://www.ed.gov/sites/default/files/NETP-2010-final-report.pdf.

102 Long, "Cyber Schools."

103 National Alliance for Public Charter Schools, "Public Charter School Dashboard: Students Overview, 2008–2009 National," http://www.publiccharters.org/dashboard/students/page/overview/year/2009.

104 Center for Education Reform, Charter School Law Ranking and Scorecard 2010 State Profiles Web site, http://www.charterschoolresearch.com/laws/.

105 Gisèle Huff, "A 'Disruptive' Turnaround Vision," *Education Week*, August 20, 2009, http://www.edweek.org/ew/articles/2009/08/20/01huff.h29.html?qs=virtual+charter.

106 Neal McCluskey, "Beyond Brick and Mortar: Cyber Charters Revolutionizing Education," CER Action Paper, January 11, 2002, http://www.edreform.com/Get_Connected/Educators/?Beyond_Brick_and_Mortar_Cyber_Charters_Revolutionizing_Education.

107 Quoted in Patrick R. Gibbons, "Bit by Bit: Virtual Schools Can Transform Nevada Public Education," Nevada Policy Research Institute, May 17, 2010, p. 12, http://www.npri.org/publications/bit-by-bit.

108 Unless otherwise noted, information about the number of virtual charter schools and laws is from the Center for Education Reform because it has the most recent data, which are quarterly and which were last updated in April 2010. See CER, Virtual/Cyber Schools Web site, http://www.charterschoolsearch.com/SpecialtyProfile.cfm?&spec_id=5; cf. Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm.

109 Watson et al., *Keeping Pace with K–12 Online Learning*, pp. 10, 56, and 60. For more resources on online learning, see the iNACOL Reports and Publications Web site, http://www.inacol.org/research/reports.php.

110 According to the National Alliance for Public Charter Schools, all three states lack model practices relating to charter-school authorizing, renewal, and oversight, and they have weak or nonexistent policies concerning school autonomy and equitable financing. Charter laws in Alaska and Hawaii rank among the 10 worst nationally, in part because of restrictive charter-school caps. In fact, Hawaii has reached its cap of 23 start-up charter schools. Restrictive charter-school caps together with poor authorizing practices make Alaska's charter school law even weaker than Hawaii's law. Wyoming's charter law is slightly better because it does not cap charter schools; however, it is still ranked among the weakest quartile nationally. See the National Alliance for Public Charter Schools, State Charter School Laws Rankings Database Web site, http://www.publiccharters.org/charterlaws/component/2.

111 CER, Laws: http://www.charterschoolresearch.com/laws/; National Alliance for Public Charter Schools, State Charter School Laws Rankings Database Web

site, http://www.publiccharters.org/charterlaws/component/2; CER, Charter Laws Across the States: Ranking and Scorecard, 11th Edition, December 8, 2009, http://www.edreform.com/About_CER/Charter_School_Laws_Across_the_States/?States_Dont_Make_Grade_With_Charter_School_Laws_Report_Shows; Charter School Law Ranking and Scorecard 2010 State Profiles Web site, updated 2010, http://www.charterschoolresearch.com/laws/; and CER, From the States Web site, http://www.edreform.com/From_the_States/. See also the National Alliance for Public Charter Schools, State Charter School Laws Rankings Database Web site, http://www.publiccharters.org/charterlaws/component/2; cf. National Alliance for Public Charter Schools, How State Charter Laws Rank Against The New Model Public Charter School Law, January 2010, http://www.publiccharters.org/files/publications/DB-ModelLaw_Report_01-12-10.pdf; and Education Commission of the States, Recent State Policies/Activities: Choice of Schools—Charter Schools—Cyber Charters database, http://eprints.ecs.org/ecs/ecscat.nsf/WebTopicView?OpenView&count=-1&RestrictToCategory=Choice+of+Schools--Charter+Schools--Cyber+Charters.

112 CER, Virtual/Cyber Schools Web site, http://www.charterschoolsearch.com/SpecialtyProfile.cfm?&spec_id=5; cf. Schools by Specialty Web site, http://www.charterschoolsearch.com/schoolsbySpecialty.cfm. See also National Alliance for Public Charter Schools, State Charter School Laws Rankings Database Web site, http://www.publiccharters.org/charterlaws/component/2; cf. National Alliance for Public Charter Schools, *How State Charter Laws Rank Against The New Model Public Charter School Law,* January 2010, http://www.publiccharters.org/files/publications/DB-ModelLaw_Report_01-12-10.pdf.

113 Ibid.

114 Ibid.

115 National Alliance for Public Charter Schools, State Charter School Laws Rankings Database Web site, http://www.publiccharters.org/charterlaws/component/2; cf. National Alliance for Public Charter Schools, *How State Charter Laws Rank Against The New Model Public Charter School Law,* January 2010, http://www.publiccharters.org/files/publications/DB-ModelLaw_Report_01-12-10.pdf.

116 Louann Bierlein Palmer, *"Alternative" Charter School Authorizers: Playing a Vital Role in the Charter Movement*, Progressive Policy Institute, December 2006, http://www.uscharterschools.org/cs/r/view/uscs_rs/2246; National Association of Charter School Authorizers, *The State of Charter School Authorizing 2009: 2nd Annual Report on NACSA's Authorizer Survey*, May 2010, http://www.qualitycharters.org/images/stories/2009_Facts_Report.pdf; National Association of Charter School Authorizers, State-by-State Map, updated June 1, 2010, http://www.qualitycharters.org/overview-interactive-map; Rebecca Gau, Chester E. Finn, Jr., and Michael J. Petrilli, *Trends in Charter School Authorizing*, Thomas B. Fordham Institute, May 3, 2006, http://www.edexcellence.net/detail/news.cfm?news_id=355.

117 Erin Dillon, "Designing Smart Charter School Caps," *Journal of School Choice*, vol. 4, no. 1, January–March 2010, pp. 74–92. See p. 75.
118 Constance Gustke, "Virtual Ed. Enrollment Caps Face Greater Scrutiny," *Education Week*, April 23, 2010, http://www.edweek.org/ew/articles/2010/04/28/30edtech_onlinereach.h29.html.
119 Watson et al., *Keeping Pace with K–12 Online Learning*; Ohio Alliance for Public Charter Schools, "E-schools Show Superior Results," July 2009, http://www.oapcs.org/files/EschoolStudy_final6-24-09.pdf; KidsOhio.org, "Ohio's 8 Large Urban Districts and Charter Schools Rank Higher on Educational Progress Than on Absolute Test Scores," June 9, 2009, http://www.kidsohio.org/2009/06/09/new-analysis-ohio%e2%80%99s-8-large-urban-districts-and-charter-schools-rank-higher-on-educational-progress-than-on-absolute-test-scores/.
120 Watson et al., *Keeping Pace with K–12 Online Learning*; Ohio Alliance for Public Charter Schools, "E-schools Show Superior Results," July 2009, http://www.oapcs.org/files/EschoolStudy_final6-24-09.pdf.
121 Gustke, "Virtual Ed. Enrollment Caps Face Greater Scrutiny."
122 Mangu-Ward, "Traditional schools aren't working." See also David Kirkpatrick, "Cyber Charter," *EducationNews.org,* January 16, 2010, http://www.educationnews.org/commentaries/31405.html; and Amy Hetzner, "Waiting list for virtual charter school grows," *Journal Sentinel*, May 12, 2010, http://www.jsonline.com/blogs/news/93582414.html.
123 Mangu-Ward, "Traditional schools aren't working."
124 Arkansas Coalition of Distance Learning Families, "Learning across the World Wide Web," July 15, 2009, http://acdlf.org/newsviews/display.cfm?ID=343&type=articles.
125 Douglas Crets, "Building Digital Bridges Over Arkansas," *edReformer*, May 27, 2010, http://edreformer.com/2010/05/building-digital-bridges-over-arkansas/; and the Arkansas Education Association, "Joint Budget Committee Supports Virtual Charter School Cap," AEA Legislative Update Website, http://msg1svc.net/servlet/Pv?c=703d6e6561617226733d30266d3d373826743d4826723d302664613d30.
126 Watson et al., *Keeping Pace with K–12 Online Learning*, p. 138; cf. 250 Senate Bill 767, http://gov.oregonlive.com/bill/SB767/; Gustke, "Virtual Ed. Enrollment Caps Face Greater Scrutiny"; and Oregon Virtual Public Schools Alliance, "Capitol Day Recap / Legislative Update," February 22, 2010, http://www.oregonvirtualschools.org/newsletters/?ID=43.
127 Oregon Virtual Public Schools Alliance, "Oregon Teachers' Union Proposes to Boot K–5 Kids out of Virtual Public School," May 26, 2010, http://www.oregonvirtualschools.org/newsletters/?ID=46.
128 Michigan Education Association, "Various school reforms make the cut in 'Race to the Top' legislation," December 22, 2009, http://www.mea.org/gov/122209_various_

school_reforms_make_the_cut.html; see SB 981 (2009 PA 205) in "Legislative Update," April 14, 2010, pp. 9–10, http://www.mea.org/gov/pdf/041410-leg_update.pdf; and Peter Luke, "Gov. Jennifer Granholm calls Legislature's sweeping education reform 'revolutionary'," Michigan Live.com, December 19, 2009, http://www.mlive.com/politics/index.ssf/2009/12/gov_jennifer_granholm_calls_le.html.

129 Peter Luke, "Chance at $400 million in Race to the Top funding sparks Michigan lawmakers to expand charter schools, allow takeover of districts, change teacher training," Michigan Live.com, December 2, 2009, http://www.mlive.com/politics/index.ssf/2009/12/michigan_lawmakers_move_on_oba.html.

130 Quoted in Katie Kim, "Cyber Schools: Future of Education?" WILX.com, January 30, 2010, http://www.wilx.com/news/headlines/83180892.html.

131 Dillon, "Designing Smart Charter School Caps," pp. 74–92.

132 Michael Van Beek, "The Great Charter School Debate," *Education Report*, Mackinac Center for Public Policy, December 21, 2009, http://www.educationreport.org/11562.

133 National Alliance for Public Charter Schools, *Public Charter School Dashboard 2009*, June 2009, p. 38, http://www.publiccharters.org/files/publications/DataDashboard.pdf. See also *The Lottery: A Film by Madeleine Sackler*, http://thelotteryfilm.com/.

134 Authors' estimate based on data from the Center for Education Reform, which finds that 65 percent of charter schools surveyed report having waiting lists; the average American charter school has a waiting list of 239 students; and there are 338 Ohio charter schools [0 .65(338) * 239 = 52,508]. See *Annual Survey of America's Charter Schools 2010*, April 5, 2010, pp. 8–10, http://www.edreform.com/Issues/Charter_Connection/?Annual_Survey_of_Americas_Charter_Schools_2010.

135 Watson et al., *Keeping Pace with K–12 Online Learning*.

136 Gustke, "Virtual Ed. Enrollment Caps Face Greater Scrutiny."

137 Watson et al., *Keeping Pace with K–12 Online Learning*.

138 Ibid.

139 John Watson and Butch Gemin, "Promising Practices in Online Learning: Funding and Policy Frameworks for Online Learning," Evergreen Consulting Associates for iNACOL, July 2009, p. 14, http://www.inacol.org/research/promisingpractices/index.php.

140 CDE, Online Learning Policy and Practice Survey: A Survey of the States from Center for Digital Education," November 18, 2009, pp. 5–6, http://www.convergemag.com/paper/Online-Learning-2009.html.

141 Watson and Gemin, "Promising Practices in Online Learning," p. 14.

142 Gustke, "Virtual Ed. Enrollment Caps Face Greater Scrutiny."

143 Quoted in D. Aileen Dodd, "Virtual schools chart new course," *Atlanta Journal-Constitution*, November 6, 2009, http://www.ajc.com/news/virtual-schools-chart-new-187817.html.

144 "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State."
145 Ibid.
146 "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State"; and Watson and Gemin, "Promising Practices in Online Learning," p. 10.
147 "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State."
148 "How to Introduce, Sustain, and Expand K–12 Online Learning Opportunities in Your State"; and Watson and Gemin, "Promising Practices in Online Learning," p. 11.
149 Watson et al., *Keeping Pace with K–12 Online Learning*, pp. 8–11; cf. CER, "Beyond Brick and Mortar: Cyber Charters Revolutionizing Education, CER Action Paper, January 11, 2002, http://www.edreform.com/Get_Connected/Educators/?Beyond_Brick_and_Mortar_Cyber_Charters_Revolutionizing_Education.
150 Quoted in Dodd, "Virtual schools chart new course."
151 Pennsylvania Families for Public Cyber Schools, http://www.pacyberfamilies.org/about/.
152 Quoted in Eric Boehm, "New Bills Take Aim at Cyber Schools," *Pennsylvania Independent*, March 17, 2010, http://www.paindependent.com/todays_news/detail/new-bills-take-aim-at-cyber-schools.
153 Ibid.
154 Watson and Gemin, "Promising Practices in Online Learning," p. 11.
155 Quoted in Watson and Gemin, "Promising Practices in Online Learning," p. 11.
156 Quoted in Katie Ash, "Sustaining Funding Seen as Challenge for Online Ed," *Education Week*, April 23, 2010, http://www.edweek.org/login.html?source=http://www.edweek.org/ew/articles/2010/04/28/30edtech_funding.h29.html&destination=http://www.edweek.org/ew/articles/2010/04/28/30edtech_funding.h29.html&levelId=2100.
157 Ash, "Sustaining Funding Seen as Challenge for Online Ed."
158 Sam Dillon, "Online Schooling Grows, Setting Off a Debate," *The New York Times*, February 1, 2008, http://www.nytimes.com/2008/02/01/education/01virtual.html.
159 Watson et al., *Keeping Pace with K–12 Online Learning*.
160 Quoted in Catherine Dolinski, "Florida Parents Happy About Virtual Schools," *Tampa Tribune*, August 13, 2007, http://www.owli.org/oer/node/2396; cf. Liam Julian, "The Rise of Cyber-Schools: Online Education and Its Enemies," *New Atlantis*, Spring 2009, no. 24, pp. 109–112, http://www.thenewatlantis.com/publications/the-rise-of-cyber-schools.
161 Watson et al., *Keeping Pace with K–12 Online Learning*.
162 Watson et al., *Keeping Pace with K–12 Online Learning*; and Adrian G. Uribarri,

“Court: Virtual charter school can receive public funds,” *Chi-Town Daily News*, June 9, 2009, http://www.chitowndailynews.org/Chicago_news/Court_Virtual_charter_school_can_receive_public_funds,28382.

163 Watson et al., *Keeping Pace with K–12 Online Learning*.

164 Watson and Gemin, “Promising Practices in Online Learning,” p. 11.

165 Watson et al., *Keeping Pace with K–12 Online Learning*.

166 Ibid.

167 Quoted in Watson and Gemin, “Promising Practices in Online Learning,” p. 11.

168 Watson and Gemin, “Promising Practices in Online Learning,” p. 20.

169 Public Policy Institute of California, “Just the Facts: California’s Digital Divide,” San Francisco, CA, August 2010.

170 California Business, Transportation and Housing Agency, “Governor Schwarzenegger’s Broadband Task Force Releases Report,” News Release, Sacramento, CA, January 17, 2008.

171 Frank Kemerer, Andrea Cascia, and Kimberly Gee, “A Summary of Existing and Pending Law Involving Online Learning in California Public Schools,” Center for Education Policy and Law, University of San Diego, November 20, 2009, p. 3.

172 California Education Code Section 51865, http://law.justia.com/california/codes/edc/51865.html.

173 Ibid.

174 Ibid.

175 John Fensterwald, “Bricks and clicks: part two,” *The Educated Guess*, May 12, 2010, http://educatedguess.org/tag/flex-public-schools/.

176 John Watson, “The State of Online Learning in California: A Look at Current Policies and Practices,” University of California College Prep Online, September 2006, p. 22.

177 Ibid.

178 Ibid.

179 G. W. Bohrnstedt and B. M. Stecher, eds., “What we have learned about class size reduction,” Sacramento, CA, California Department of Education, 2002, p. 35.

180 “Education: Why Are We Battling Innovation?,” *bizjournals*, June 14, 2010, http:/www.bizjournals.com/prnewswire/press_releases/2010/06/14/DC20449.

181 Ibid.

182 California Administrative Code Title 5 Section 11963.5, cited by Kemerer, Cascia, and Gee, “A Summary of Existing and Pending Law Involving Online Learning in California Public Schools,” p. 8–9.

183 Frank Kemerer and Peter Sansom, *California School Law* (Palo Alto, CA: Stanford University Press, 2009), p. 120.

184 Ibid.

185 Telephone interview conducted by the authors with James Konantz, May 17, 2010.

All comments attributed to Konantz in this paper are taken from this interview.

186 Watson, *op. cit.*, p. 17–18.

187 Telephone interview conducted by the authors with Charles Zogby, April 20, 2010. All comments attributed Zogby in this paper are taken from this interview.

188 Interview conducted by the authors with Bill Lucia, April 22, 2010. All comments by Lucia in this paper have been taken from this interview.

189 See California Commission on Teacher Credentialing, http://www.ctc.ca.gov/credentials/out-of-state.html.

190 Bohrnstedt and Stecher, eds., "What we have learned about class size reduction," appendix D.

191 Kemerer, Cascia, and Gee, "A Summary of Existing and Pending Law Involving Online Learning in California Public Schools," p. 5.

192 Ibid., p. 6.

193 Ibid.

194 Ibid.

195 Ibid.

196 Ibid., p. 8.

197 Watson, op. cit., p. 40.

198 Ibid.

199 Kemerer, Cascia, and Gee, "A Summary of Existing and Pending Law Involving Online Learning in California Public Schools," p. 6.

200 "Education: Why Are We Battling Innovation?"

201 Ibid.

202 *What's the Difference?: A Review of Contemporary Research on Distance Education*, The Higher Education Policy, April 1999, p. 14, http://www.nea.org/assts/docs/HE/diseddif.pdf.

203 Sarah Carr, Union Publishes Guide Citing High Cost of Distance Education, *The Chronicle of Higher Education*, May 11, 2001, http://chronicle.com/article/Union-Publishes-Guide-Citing/14427/.

204 "The Promise and Reality of Distance Education," NEA Higher Education Research Center, vol. 8, no. 3, October 2002, p. 1, http://www.nea.org/assets/docs/HE/PromiseRealityDistanceEd10-02.pdf.

205 Ibid.

206 Katherine Mangu-Ward, "Teachers Unions vs. Online Education," Reason.com, July 20, 2010, http://reason.com/archives/2010/07/20/teachers-unions-vs-online-educ.

207 Ibid.

208 Donald I. Brown, ed., *A Framework for Contract Negotiations Related to Educational Technology Issues*, California Federation of Teachers Education Technology Committee, Winter 2005 Revision, p. 3, http://www.cft.org/uploads/key/framework_final.pdf.

209 Ibid., p. 5.
210 Ibid., p. 3.
211 Ibid.
212 Ibid., p. 6.
213 Ibid.
214 Ibid.
215 Ibid.
216 Ibid., p. 22.
217 Ibid.
218 Ibid.
219 Ibid., p. 23.
220 Ibid.
221 Ibid.
222 Ibid., p. 18.
223 American Federation of Teachers, "Teaming up with Technology: How Unions Can Harness the Technology Revolution on Campus, January 1996, p. 23, http://www.aft.org/pdfs/highered/teamingtechnology0196.pdf.
224 Ibid., p. 21.
225 Brown, ed., *A Framework for Contract Negotiations Related to Educational Technology Issues*, p. 21.
226 Ibid., p. 20.
227 Ibid., p. 18.
228 Ibid.
229 Ibid.
230 Ibid., p. 19.
231 Ibid.
232 Ibid.
233 Ibid., p. 21.
234 Ibid.
235 Ibid., p. 6.
236 California Federation of Teachers Educational Technology Committee, Minutes of the meeting of January 23, 2010, http://www.ctf.org/index.php/component/content/article/40-uncategorized/487-education-technology-committee-minutes.html.
237 Ibid.
238 Ibid.
239 Ibid.
240 Ibid.
241 Mind Research Institute, "Corporate Backgrounder," http://www.mindresearch.net.
242 Mind Research Institute, "ST Math: Fluency," http://www.mindresearch.net.
243 Telephone interview conducted by the authors with Ted Smith, April 21, 2010. All

comments attributed Smith in this paper are taken from this interview.

244 Mind Research Institute, "Profiles in Success," http://www.mindresearch.net.

245 Interview conducted by the authors with Ellen Griffin, May 11, 2010. All comments attributed to Griffin in this paper are taken from this interview.

246 Interview conducted by the authors with Mary Gifford, May 11, 2010. All comments attributed to Gifford in this paper are taken from this interview.

247 Rocketship Education: About Us, http://www.rsed.org/about/.

248 Telephone interview conducted by the authors with Preston Smith, May 14, 2010. All comments attributed to Smith in this paper are taken from this interview.

249 For full information on Reasoning Mind's curriculum, see http://www.reasoningmind.org.

250 Joanne Jacobs, "Innovating with online learning," *Linking and Thinking on Education*, June 27, 2010, http://www.joannejacobs.com/2010/06/innovating-with-online-learning/.

251 Douglas Crets, "Interview: John Danner, CEO, Rocketship Education," May 18, 2010, http://edreformer.com/2010/05/interview-john-danner-ceo-rocketship-education/.

252 Ibid.

253 Telephone interview conducted by the authors with Terri Adams, May 21, 2010. All comment attributed to Adams in this paper are taken from this interview.

254 "Golden Valley Virtual Charter School Charter 2009–2014," pp. 6–7, http://www.goldenvcs.org/.

255 Interview with Zogby, April 20, 2010.

256 Interview with Konantz, May 17, 2010.

257 See http://www.k12.com/courses/k-8-courses/.

258 Telephone interview conducted by the authors with Peter, Maureen, and Mark McLean, May 26, 2010. All comments attributed to members of the McLean family in this paper are taken from this interview.

259 Telephone interview conducted by the authors with Kay and Mariya Wilson, May 28, 2010. All comments attributed to the Wilsons in this paper are taken from this interview.

260 Interview with Lucia, April 22, 2010.

261 Gene V. Glass, "The Realities of K–12 Virtual Education," The Great Lakes Center for Educational Research and Practice, East Lansing, MI, April 2009, p. 6.

262 Ibid., citing Mary K. Tallent-Runnels et al., "Teacher courses online: A review of the research," *Review of Educational Research*, 2006, vol. 76, no. 1, p. 93.

263 California Education Code Section 51865.

264 Katherine Mangu-Ward, *op. cit.*

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In 2008, the United States Army appointed Izumi to its Los Angeles/Southern California Advisory Board Executive Committee. In that capacity, he assists the Army with its community outreach, image enhancement, and recruiting efforts. In 2010, the Army's Sacramento Recruiting Battalion named him president of its grassroots Advisory Council.

In 2007, Izumi was named to the California Advisory Committee of the United States Commission on Civil Rights. He also served a five-year term as a commissioner on the California Postsecondary Education Commission, the state's higher education coordinating body.

Izumi is the coeditor of two books: *Teacher Quality* (Hoover Institution Press and Pacific Research Institute, 2002) and *School Reform: The Critical Issues* (Hoover Institution Press and Pacific Research Institute, 2001). For 10 years, he was a regular contributor to the *Perspectives* opinion series on KQED-FM, the National Public Radio affiliate in San Francisco.

Prior to entering the think-tank world, Izumi served as chief speechwriter and director of writing and research for California Governor George Deukmejian. He also served in the administration of President Ronald Reagan as speechwriter to United States Attorney General Edwin Meese III.

Izumi served as a commissioned officer, holding the rank of captain, in the California State Military Reserve, the state defense force that assists the California National Guard. He was attached to the Public Affairs Office at CSMR Headquarters in Sacramento. During his service, Izumi was awarded the commendation medal and the achievement ribbon.

Izumi received his juris doctorate from the University of Southern California School of Law and his master of arts in political science from the University of California at Davis. He received his bachelor of arts in economics and history from the University of California at Los Angeles.

Vicki E. Murray, Ph. D., is Education Studies Associate Director and Senior Policy Fellow at the Pacific Research Institute for Public Policy (PRI). Dr. Murray's research focuses on education reform measures to improve academic accountability at all levels, promote a competitive education climate, and increase parents' control over their children's education.

Dr. Murray is the coauthor of PRI's groundbreaking 2007 book ***Not as Good as You Think: Why the Middle Class Needs School Choice.*** She is also the associate

producer of PRI's award-winning 2009 film ***Not as Good as You Think: The Myth of the Middle Class School.*** Dr. Murray has authored numerous PRI studies and reports and her op-eds have appeared in top national and California publications.

Dr. Murray is the former director of the Goldwater Institute Center for Educational Opportunity in Phoenix, Arizona. She has advised the U.S. Department of Education on public-school choice and higher education reform. She has also advised education policymakers in nearly 30 states, provided expert testimony before state legislative education committees, and served on two national accountability task forces. Dr. Murray's research helped advance four parental choice voucher and tax-credit scholarship programs in Arizona in 2006, and she provided expert affidavits as part of the successful legal defense of choice programs for low-income, foster-care, and disabled children. Dr. Murray's research and writings on market education policy have been widely published and cited in state and national media and research outlets, as well as outlets in Canada, Great Britain, Mexico, and New Zealand.

Prior to her career in education policy, Dr. Murray taught college-level courses in American politics, English composition and rhetoric, and early British literature. She has lectured at universities nationwide, including the U.S. Military Academy, West Point, and has presented her academic research at annual meetings of the American Political Science Association and its regional affiliates. Dr. Murray received her Ph.D. in politics from the Institute of Philosophic Studies at the University of Dallas, where she was an Earhart Foundation Fellow.

Evelyn B. Stacey served as a Policy Fellow in Education Studies at the Pacific Research Institute. She is currently a graduate student at the School of Public Policy at Pepperdine University in Malibu, California. She earned a bachelor's degree in Liberal Studies, with a focus on elementary education, in 2005 from the Master's College in Santa Clarita, California. She has taught at both the elementary and secondary levels. Stacey also worked for The Heritage Foundation as an events planner and coordinator. She contributed regularly to PRI's ***Capital***

Ideas publication and to the Heartland Institute's *School Reform News*. Her opinion pieces have appeared in numerous publications.

Rachel S. Chaney served as a Policy Fellow in Education Studies at the Pacific Research Institute. She is the coauthor of several PRI publications, including PRI's groundbreaking 2007 book ***Not as Good as You Think: Why the Middle Class Needs School Choice.*** She contributed regularly to PRI's ***Capital Ideas*** publication and her opinion pieces appeared in numerous publications. She is currently a doctoral student at the University of California at Davis. She graduated with honors and distinction from Stanford University in American history and earned her master's degree in Chinese history from Stanford. She taught high school in East Oakland, California, before coming to PRI.

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