APRIL 2007

NACOL
North American Council for Online Learning

A National Primer on K-12 Online Learning

WRITTEN BY
John F. Watson
Evergreen Consulting Associates

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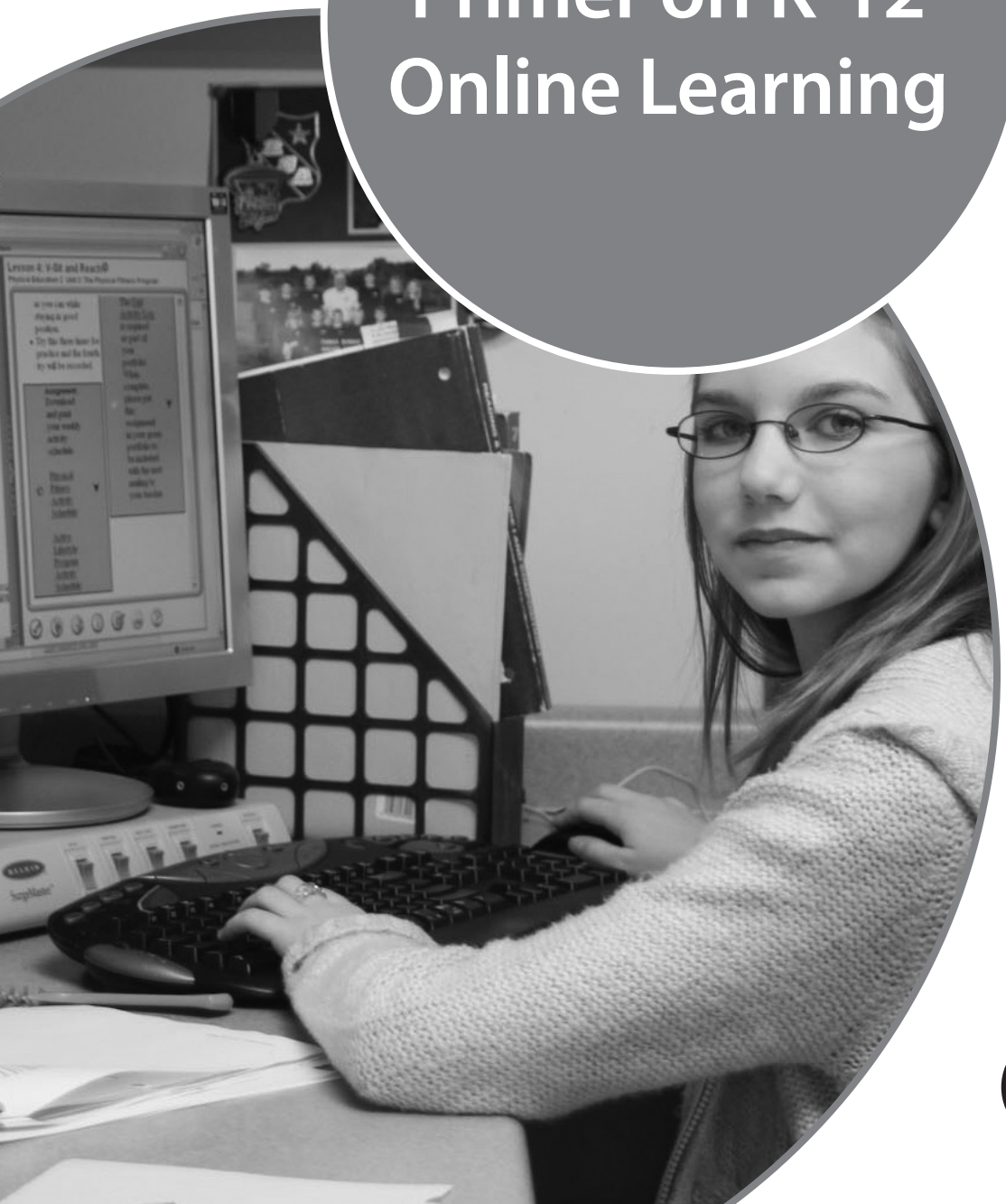

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Acknowledgements

In 2006 the University of California College Prep Online program, along with eScholar Academy, Institute for Computer Technology, Rainbow Advanced Institute for Learning Digital Charter High School, and the California Virtual Academies commissioned the report *The State of Online Learning in California: A Look at Current K-12 Policies and Practices.* The organizations listed above were a subgroup of participants of an informal ad hoc California e-learning group, loosely composed of government education segments and e-learning practitioners, including representatives from the University of California (including its Office of the President), College Prep Online, California Department of Education, county offices of education, school districts, the California Charter School Association, and various online schools. The purpose of the ad hoc committee was the informal exchange of information about online education in California between government and e-learning practitioners. *The State of Online Learning in California* was released in late September at a full-day launch in Sacramento, with numerous speakers and panel discussions exploring how to expand the benefits of online learning in California.

After the release of the report, Gordon Freedman, Vice President for Educational Strategy for Blackboard, noted that many elements of the report were applicable far beyond California and that a national edition of this report would be most useful. Susan Patrick of the North American Council for Online Learning and John Watson of Evergreen Consulting Associates—the lead author of the California report—also recognized the value of a national report and undertook the effort to create the national edition. Connections Academy and the North American Council for Online Learning provided the project's financial support.

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Preface

As I travel around the country talking with students, parents, teachers, administrators and public officials about online education, I sense enormous excitement about the promise of online learning to prepare today's students to succeed in an increasingly technology-driven global economy. After all, the young people of this "Millennial" generation grew up with the Internet and thrive in a multimedia, highly communicative environment. Learning online is natural to them—as much as retrieving and creating information on the Internet, blogging, communicating on cell phones, downloading files to iPods and instant messaging. Online learning and virtual schools are providing 21st century education and more opportunities for today's students.

So what is online learning all about? The realization by administrators, teachers and parents that online courses can fill gaps in course offerings as well as complement traditional classroom instruction with engaging, interactive materials has generated many questions about online learning:

- What courses can be taught online?
- What does an online course look like?
- How do students interact with their teacher?
- What qualifications and training are required of teachers?
- Does online learning really work?
- Do students earn full credit for successfully completing online courses?
- What state or school district policies are needed to implement online learning?

While the level of interest is high, there are few readily available resources to turn to for answers. This report attempts to fill that gap and provide answers. The *National Primer on K-12 Online Learning* provides a comprehensive overview of online learning by examining the basics—teaching and learning, evaluating academic success, professional development, technology and other topics. The North American Council for Online Learning hopes this report will serve as a tool for parents seeking the best educational opportunities for their children and for educators and policymakers who must understand the essential elements of online learning in order to make informed decisions about implementing such programs.

It is troubling that 84% of employers say K-12 schools are not doing a good job of preparing students for the workplace—not only in mastery of math and science but in a basic work ethic. Nearly one-third of ninth grade students that enter our nation's high schools drop out before graduating. As a nation we have to do better, and research shows that online learning provides the interactive, collaborative and self-paced learning environments where students can gain the skills needed to succeed.

Online learning is experiencing dramatic growth across the nation. According to the 2006 *Keeping Pace with K-12 Online Learning* study (available on www.NACOL.org), 38 states have now established state-led online learning programs, policies regulating online learning, or both. Enrollments in online courses have surged in the past year, increasing by as much as 50% in some states. Twenty-five states have established state-wide or state-led virtual schools. Michigan this year became the first state to require high school students to take at least one online course for graduation.

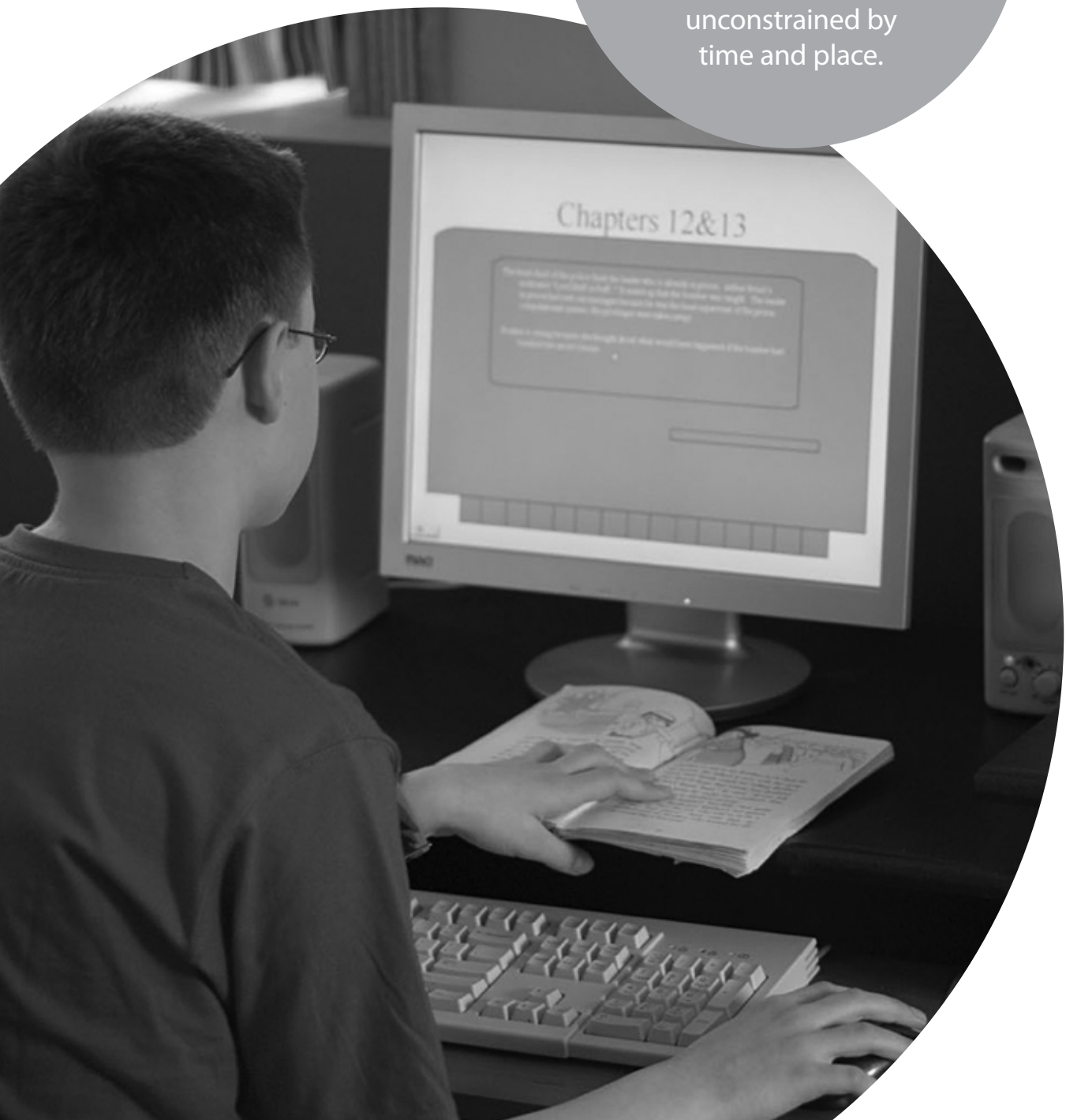
What's behind the growth in the number of online courses and enrollments? The number one reason school districts cite for offering Internet-based courses is that the courses are otherwise unavailable. Many schools in rural or poorer urban districts find it difficult to recruit and retain highly qualified teachers to teach advanced mathematics, science and language courses. Online courses can meet specific needs, such as gifted students seeking opportunities for Advanced Placement or accelerated learning at their own pace, or homebound students needing access to more curriculum choices.

For far too long, access to a high quality education has been too closely tied to the student's zip code. We must prepare all students with opportunities to succeed with 21st century skills, great teaching and rigorous courses. We must ensure that all children are accelerated forward.

We all have to do our part to make the benefits of online learning available to all students—regardless of their neighborhood.

Susan Patrick
President, North American Council for Online Learning (NACOL)

Online learning is growing rapidly across the United States, as more and more students and educators become familiar with the benefits of learning unconstrained by time and place.



Executive Summary

Online learning is growing rapidly across the United States within all levels of education, as more and more students and educators become familiar with the benefits of learning unconstrained by time and place. Across most states and all grade levels, students are finding increased opportunity, flexibility, and convenience through online learning. Teachers are discovering a new way to reach students, many of whom were not successful in traditional schools and courses. Administrators are exploring ways to offer a wider range of courses to students and professional development opportunities to teachers.

Although K-12 education lags behind post-secondary in using the Internet to teach, many states and school districts are realizing the potential of online education. As of the end of 2006, 38 states have established state-led online learning programs, policies regulating online learning, or both. Of these, 25 states have state-led online learning programs, and 18 states are home to a total of 147 virtual charter schools serving over 65,000 students.

Online programs vary significantly by grade level, type of students served, and whether the program is primarily full-time or supplemental. Despite the variations, most programs share common characteristics of using highly qualified teachers, learning management software, and digital course content to deliver education to meet a range of student needs.

Full-time cyberschool students take state assessments that are required of all public school students, and cyberschools are subject to adequate yearly progress, accreditation, and other state-by-state measures that are required of public schools. Supplemental online programs track numerous measures of student outcomes. Most are internal, such as course completion rates, while a few compare students in online courses to students in traditional classroom courses. Although relatively few studies have been done comparing online education to physical classrooms, the research suggests that online education is as good as or better than face-to-face teaching and learning.

Despite the rapid growth of K-12 online education and the way it is meeting critical education needs, online learning faces challenges and, in some states, controversy. The issues largely center on fitting this new model of learning into existing policies created for physical schools, and redefining the preconceived notions of some educators, policymakers, and legislators. A few states have voiced concerns about whether online learning is an appropriate way to teach, learn, and use public education funds. Many states have no data or reporting requirements on how many students are taking one or more online courses, how many online programs exist, and how those programs are operating. Some states have begun to create the mechanisms to oversee online programs while allowing the programs the freedom to meet student needs in new and innovative ways. While the challenges of online education are small compared to its actual and potential rewards, it is clear that both online programs and state oversight must evolve thoughtfully to continue to increase educational opportunities and improve outcomes.

1 Introduction

Online learning is growing rapidly across the United States within all levels of education, as more and more students and educators become familiar with the benefits of learning unconstrained by time and place. Although K-12 education lags behind post-secondary in using the Internet to teach, many states and school districts are realizing the potential of online education to allow students unparalleled equity and access to a high quality education. As of the end of 2006, 38 states have established state-led online learning programs, policies regulating online learning, or both. Of these, 25 states have state-led online learning programs,[1] and 18 are home to a total of 147 virtual charter schools serving over 65,000 students.[2] Notable examples include:

- The Florida Virtual School (FLVS) served more than 31,000 students in 68,000 half-credit courses in school year 2005-2006.[3] FLVS, which has grown steadily since its inception in 1997, has shown the popularity of online learning when students are given the choice of taking online courses, and has demonstrated the ability of a program to grow rapidly.
- In Chicago and Detroit, the Illinois Virtual High School and Michigan Virtual High School respectively have partnered with inner-city school systems to bring the benefits of online learning to a range of student populations. In Michigan, the legislature recently passed a law requiring that all high school students take some form of online instruction before graduating.[4]
- The Louisiana Virtual School is working with local schools that lack a qualified algebra teacher by offering an online algebra course that is taken by students sitting together in a classroom. The students learn from a highly qualified teacher online, and a teacher not certified in math assists in the physical classroom. This arrangement serves the dual purpose of providing both a highly qualified teacher for students and a mentor to the classroom teacher being trained in algebra.
- Traditional public schools are benefiting and learning from online program successes. The Electronic Classroom of Tomorrow (ECOT), Ohio's largest charter eSchool with over 7,000 students statewide, moved into the Continuous Improvement category on the 2005/2006 state assessment tests, placing it ahead of most of the state's urban school districts in achievement. This year many public school districts are now using ECOT's online practice tests to prepare their students for the next round of testing.

[1] *Keeping Pace with K-12 Online Learning: A review of state-level policy and practice*, 2006, available at www.nacol.org. *Keeping Pace* lists 24 state-led programs, and one has been added, in Tennessee, since *Keeping Pace* was published in October 2006.

[2] *The Simple Guide to Charter School Laws*, 2005, Center for Education Reform. (Note: There are 147 virtual charter schools with 65,354 students in 18 states, up from 86 such schools with 31,000 students in 13 states in 2004-05 and 60 schools in 13 states in 2002-03).

[3] http://www.flvs.net/educators/fact_sheet.php

[4] *Keeping Pace with K-12 Online Learning*, 2005 and 2006

The number of students taking one or more online courses has grown rapidly, with annual growth rates in individual programs, and in some states, consistently in the range of 15% to 50% over multiple years. Although the exact number of students taking online courses across the country is unknown, knowledgeable estimates put the number of enrollments at about 500,000 to one million students.

Online education represents a critically important response to the shortcomings of K-12 education and the need for reform. With the United States economy shifting away from manufacturing and towards a greater percentage of knowledge-based jobs, 90% of the fastest growing jobs in the economy require a college degree.[5] At the same time, according to one estimate, just 70% of all students in public high schools graduate, and only 32% of all students leave high school qualified to attend four-year colleges.[6] In addition to helping address these shortcomings, online education also can facilitate mastery of essential 21st century skills by stressing self-directed learning, time management, and personal responsibility along with technology literacy in a context of problem solving and global awareness.[7]

Across most states and all grade levels, students are finding increased opportunity, flexibility, and convenience through online learning. Teachers are discovering a new way to reach students, many of whom were not successful in traditional schools and courses. Administrators are exploring ways to offer a wider range of courses to students and professional development opportunities to teachers. Online learning is spreading also because technology in education is an appropriate, and perhaps necessary, way to educate the many digital students of this generation. For this Millennial generation, technology is an integral part of their lives, essential to how they find information, communicate, and entertain themselves, and they expect their education to be in line with their technology-rich experiences.

Despite the rapid growth of K-12 online education and the way it is meeting critical education needs, online learning faces challenges and, in some states, controversy. These issues largely center on fitting this new model of learning into existing policies created for physical schools, and redefining the preconceived notions of some educators, policymakers, and legislators. The controversies in a few states have fueled concerns about whether online learning is an appropriate way to teach, learn, and use public education funds. While these challenges are small compared to the actual and potential rewards of online learning, it is clear that online learning must grow carefully and thoughtfully.

Many educators and policymakers remain unaware of the basics of how online education programs operate, what an online course looks like, and most fundamentally, how students can learn online. This report aims to help fill the gaps, to be a resource for anyone who is new to online learning and wishes to quickly gain a broad understanding of the academics, operations, policies, and other key issues in online education.

[5] *Public High School Graduation and College Readiness Rates in the United States*, 2003, from the Manhattan Institute, www.manhattan-institute.org

[6] Ibid.

[7] *Virtual Schools and 21st Century Skills*, The North American Council for Online Learning and the Partnership for 21st Century Skills. www.nacol.org

2 About Online Learning

Many terms and definitions in the field, such as online learning, e-learning, eSchools, virtual schools, cyberschools, do not have commonly understood definitions. This report is focused on distance learning that takes place via the Internet, both in real-time (synchronous) and not (asynchronous), and uses the term "online learning" to describe this method of education. This type of learning includes video and audio that is delivered via the Internet, but not through other channels such as video conferencing.

A list of terms and definitions used in this report is provided in Appendix A.

2.1 Common misconceptions about online learning

Because online learning is a relatively new phenomenon beyond the direct experience of many policy-makers and parents, misconceptions abound. Most of these are directly addressed in this report.

- Online learning is just a high-tech version of the old correspondence course.
- Online students spend all of their time in front of a computer.
- Online learning is essentially "teacher-less."
- Online courses are easy to pass—and easy to cheat in.
- Online learning is only appropriate for high school students.
- Online learning is only good for highly motivated, highly able students (or conversely, only for dropouts and students in need of remediation).
- Online learning is much cheaper than face-to-face instruction.
- Online students are isolated from their peers and short-changed on important socialization skills.

Well-developed online courses are not at all described by these misconceptions. They are teacher-led, with extensive interaction between teachers and students, and often between students. Because the teachers are so closely involved, students find that it is not easy to cheat in an online course. Given that online courses are so interactive, and that full-time programs provide opportunities for students to interact in person, online students are not isolated, but instead can focus on learning and socializing at different times.

Many educators and policymakers remain unaware of the basics of how online education programs operate, what an online course looks like, how students can learn online.

2.2 How online learning is being used

Online learning is being used in many ways. Examples that suggest the range of possibilities include:

- Expanding the range of courses available to students, especially in small, rural or inner-city schools, beyond what a single school can offer;
- Providing highly qualified teachers in subjects where qualified teachers are lacking;
- Providing scheduling flexibility to students facing scheduling conflicts;
- Affording opportunities to at-risk students, elite athletes and performers, dropouts, migrant youth, pregnant or incarcerated students, and students who are homebound due to illness or injury; allowing them to continue their studies outside the classroom;
- Addressing the needs of the Millennial student;
- Increasing the teaching of technology skills by embedding technology literacy in academic content; and
- Providing professional development opportunities for teachers, including mentoring and learning communities.

The ability of online learning to allow schools to expand their course offerings is particularly relevant because of the mandates of No Child Left Behind (NCLB). NCLB required that by the end of the 2005-06 school year, all teachers must demonstrate subject matter competence in the core academic subjects they teach (NCLB lists ten core subjects). For secondary school teachers in very small schools and settings this requirement has presented major challenges. Because one or two teachers may not be able to demonstrate subject matter competence in all core subjects, the result may be that the schools are unable to offer all the courses that their students need. Federal guidance on how to meet these challenges advises districts to consider using online learning, for example stating that "educators must embrace e-learning solutions if they want to ensure that every student has a quality educational experience."[8] Another paper suggests ways that school districts and other organizations can use e-learning to provide professional development to teachers.[9]

2.3 Types of online education programs

There are many types of online education programs, and indeed programs do not necessarily fit into distinct categories. There are, however, several key distinguishing factors:

- **Full-time programs (eSchools and cyberschools) versus supplemental programs:** One important distinction is whether the online program provides a full set of courses to students enrolled full-time, or provides a small number of supplemental courses to students enrolled in another school. Full-time programs, called cyberschools in this report, must address accountability measures in the same way as all other public schools.

[8] Collins, Susan, *eLearning Frameworks for NCLB*, U.S. Department of Education Secretary's No Child Left Behind Leadership Summit, available at http://www.ed.gov/about/offices/list/os/technology/plan/2004/site/documents/S.Collins-e-LearningFramework.pdf

[9] Kleiman, Glenn, *Meeting the Need for High Quality Teachers: e-Learning Solutions*, U.S. Department of Education Secretary's No Child Left Behind Leadership Summit, available at http://www.ed.gov/about/offices/list/os/technology/plan/2004/site/documents/Kleiman-MeetingtheNeed.pdf

- **Grade level:** The differences in online learning at different grade levels are important to consider. Although online courses exist at all K-12 grades, the ways in which online learning is used vary at different grade levels, beginning with how much time a student typically spends online. In grades 9-12, students in an online school may spend between one-half and three-quarters of their course time online, while in the lowest grade levels students often spend 15% or less of their time online. At the lowest grade levels many programs rely heavily on parents or other learning coaches to help the online student.[10] At the traditional high school level, many online courses are supplemental, offered to students who are taking most of their courses in regular classrooms. Most K-6 online programs are for full-time online students. Online programs for middle school students are a mix of full-time and supplemental.[11]

- **Geographic reach:** Online programs may operate within a school district, across multiple school districts, across a state, or in a few cases, across multiple states or internationally. The geographic reach of online programs is a major contributing factor to the ways in which education policies can be outdated when applied to online programs, because the policies do not account for the possibility that a student in California may be learning from a teacher in Illinois who is employed by a program in Massachusetts.

- **Synchronous vs. asynchronous:** Most online programs today are asynchronous—meaning that students and teachers are working at different times, not necessarily in real-time interaction with each other—but those that operate classes in real-time may present a somewhat different set of program and policy questions depending on state policies.

Online programs and courses also range between highly interactive distance courses, courses that are delivered at a distance but are less interactive, and hybrid courses that combine distance and face-to-face aspects. Susan Lowes, of Columbia Teachers College, has suggested a valuable distinction between what she calls virtual courses and virtual classrooms:[12]

- Virtual courses include online resources such as simulations, document archives, and electronic textbooks, are delivered over the Internet, and generally come in two forms: self-paced with minimal teacher involvement, similar to a classic correspondence course, and self-paced with ongoing, one-on-one teacher-student interaction, generally by phone, email, chat, or other digital means.

- Virtual classrooms include virtual resources and teacher-student interaction but also incorporate extensive student-student interaction, generally through the use of the course management system's discussion forums. Because of the student-student interaction, these courses are not self-paced, although they usually are asynchronous. Virtual classrooms have a cohort of students, follow a course calendar, and use a set of discussion forums as the main method of student-student and teacher-student interaction. Programs that are primarily synchronous are a subset of virtual classrooms.

[10] The time online numbers are from a brief provided by Connections Academy, *Questions and Answers for Policy-Makers about Virtual Public Schools*, undated.

[11] Based on analysis of programs described in *Keeping Pace with K12 Online Learning*, Learning Point Associates, 2005 (www2.learningpt.org/catalog/item.asp?productID=143) and 2006 (available at www.nacol.org)

[12] This analysis is adapted from Dr. Susan Lowes' chapter, "Professional Development for Online Teachers", in *What Works in K-12 Online Learning*, an edited volume with 19 chapters exploring elements of success in online learning. Cathy Cavanaugh and Robert Blomeyer, editors, International Society for Technology in Education .

2.4 The cost of online learning

The cost of online learning, alone and in comparison to the cost of traditional classrooms, has recently been the focus of several studies. Some preliminary indicators suggest that the cost of online courses is about the same as traditional classroom classes, especially within online programs that are relatively new and small. These indicators include:

- The Ohio legislature has studied the cost of its eCommunity Schools, which are online charter schools. The Legislative Committee on Education Oversight looked at five statewide online schools and found that they spent $5382 per student, compared to $7452 for students in brick and mortar charter schools, and $8437 for students in traditional, non-charter schools. Technology made up 28% of the spending, followed by instruction at 23%, administration at 16%, and curriculum at 9%. The report concluded that these costs are "reasonable."[13]
- An independent study commissioned by the BellSouth Foundation and done by the school finance consulting firm Augenblick, Palaich, and Associates (APA) found that the "operating costs of online programs are about the same as the operating costs of a regular brick-and-mortar school."[14]
- The Southern Regional Education Board (SREB) studied costs of state-led supplemental online programs and estimated that a small program with 1,000 one-semester student enrollments would cost $1,500,000, while a larger program with 10,000 one-semester student enrollments would cost $6,000,000.[15]

account for the possibility that a student in California may be learning from a teacher in Illinois who is employed by a program in Massachusetts.

While online programs may have some cost savings due to less need for physical classrooms and other facilities, these savings are offset by the need for hardware, software, and connectivity for classes, on-going technical support, comprehensive student support, course development or licensing, and other costs, especially while a program is starting.

[13] Ohio Legislative Committee on Education Oversight, *The Operating Costs of Ohio's eCommunity Schools*, June 2005; retrieved from http://www.loeo.state.oh.us/reports/PreEleSecPDF/eSchools2_Web.pdf

[14] *Costs and Funding of Virtual Schools*, Augenblick, Palaich, and Associates, October 2006, available at www.apaconsulting.net

[15] *Cost Guidelines for State Virtual Schools*, Southern Regional Education Board, August 2006; http://www.sreb.org/programs/EdTech/pubs/PDF/06T03_Virtual_School_Costs.pdf

2.5 Challenges in online learning

The fact that online learning has been successful for many schools across the country does not mean that it has been free of challenges or controversy. Indeed, there are numerous issues and challenges in online learning; many are covered in more detail in other sections of this report. A few of the most pressing issues include:

The Millennial generation students in K-12 schools today are children of a digital age, and are typically far more comfortable with technology than their parents and teachers.

- **Many parents, administrators, educators, and legislators do not fully understand online education:** Online learning is new enough that many people in administrative decision-making positions, and in the general public, do not understand it (see "Common misconceptions," above). As a result, policies governing online learning may be outdated or inappropriate.
- **The growth in online education has outpaced education policy in many states:** In many states, online programs are guided and overseen by rules and regulations created for traditional schools. In 2001, the National Association of State Boards of Education, writing about online education, stated "In the absence of firm policy guidance, the nation is rushing pell-mell toward an ad hoc system of education that exacerbates existing disparities and cannot assure a high standard of education across new models of instruction."[16] Six years later, many states are only beginning to address these policy issues, and in some states there has been controversy surrounding the effectiveness and legality of cyberschools.
- **Funding for online students and programs has not been resolved:** Funding of online students, and in particular online charter school students, has been controversial in several states. This controversy is due in part to the fact that online schools sometimes draw students across district lines, and funding often follows the student. The result is students leaving their "home" school district for the online school, resulting in a drop in funding for that school district. A related issue concerns online schools attracting students who were formerly home-schooled, because when a student goes from being home-schooled to being in a charter school (cyber or otherwise), the state pays the cost of educating that student. Because of online schools' transcendence of geographical boundaries, the controversy they have created in some states belies their small size; across the country online students in charter schools make up only about 3% of all charter school students.[17]
- **Equal access remains a challenge:** Online courses require, at a minimum, that the student have access to a computer, basic software, and the Internet. For students in affluent areas such access is expected, but for students in poor inner-city and rural areas the hardware and Internet access are not a given. Educators must work to ensure that the opportunities of online education are available to students across all income levels, geographic regions, and ethnic groups. In addition, online courses can pose challenges for students with learning or physical disabilities. Most schools have been quite good about

[16] *Any time, any place, any path, any pace: Taking the lead on e-learning policy,* National Association of State Boards of Education, 2001.

[17] Center for Education Reform (2005) National Charter School Directory, Washington, DC., quoted in *A Synthesis of New Research on K-12 Online Learning*, Smith, Rosina; Clark, Tom; Blomeyer, Robert, Learning Point Associates, October 2005.

ensuring that online programs are available to students with disabilities; as online programs become increasingly mainstream, they must continue this commitment.

- **Determining the proper role of technology in education:** The growth of online programs has highlighted the general lack of technology in many of our public schools. Some would argue that virtual classrooms should be part of all teaching and learning, especially as more and more of the jobs and lifestyles for which we are preparing students have critical technology components. Many students in the 21st century don't think of technology as something separate from daily life, and perhaps online learning should not be thought of as separate from the teaching and learning that goes on in schools every day.

3 Teaching, learning, and curriculum in an online environment

One of the misconceptions about learning online is that online courses consist mostly of reading on a computer screen. While this may be true of a few online programs, in most online courses there is a high degree of communication and interaction between teachers and students. In fact, many online teachers report that teaching online is more time consuming than teaching in a classroom because of the amount of individual attention that each online student receives.

3.1 The online course environment

Teaching and learning in an online class vary in the same way that classroom teachers and classes vary. Some similarities and common approaches that many online classes share include:

- Courses are delivered via a software package called a course management system (CMS) or learning management system (LMS). The LMS is rarely created by the teacher or online program.
- Learning management systems share some common features, including:
    - Communication is a combination of synchronous (i.e., real-time) and asynchronous. Asynchronous communication tools include email and threaded discussions. Synchronous communication tools integrate video (sometimes via webcam), audio (including voice over IP), text chat, and whiteboard. Some programs also use phone calls between teachers and students to supplement communication via the Internet. Communication is a critical part of an online course, and many programs have specific communication requirements of teachers and students. Programs may require that students be in touch with their teachers three times a week, or that teachers check email at least once every school day and respond the same day.
    - Courses are often divided into lessons and units, with much of the course material offered online. This course content may include text, graphics, video, audio, animations, and other interactive tools.
    - Many courses use offline materials, including textbooks and hands-on materials, to complement the content delivered via the Internet.
    - The type of course, and teacher preferences, determine to what extent certain features are used. An English course might rely heavily on online and offline text; Spanish might rely on audio clips so that students can hear proper pronunciation; a biology course might use animations demonstrating cell division in a way that no textbook can match.
    - Online assessments include different types of questions such as multiple choice, true/false, long answer, short answer, and matching. Some of these questions can be automatically graded by the

course management system using correct answers provided by the teacher, while others require individual assessment and commentary by the teacher.

- Some asynchronous courses are self-paced, in which a student starts and ends at any time, and proceeds through the course at whatever pace is deemed appropriate by the teacher. Other courses have start and end dates so that students go through as a cohort, and pass certain milestones together, allowing for class discussions and projects. Synchronous courses are paced at the teacher's discretion, much as they are in a regular site-based classroom.
- Student activity online is usually tracked by the LMS. However, time online is not a good proxy for time in a classroom, because it doesn't take into account student activity offline, which may be a substantial part of learning activity. The LMS may also track other information including discussion board posts, emails, and assignments submitted.

3.2 The role of the online teacher

A fairly common misperception about online learning is that in the online environment the teacher is less important than in the classroom. The previous discussion about curriculum and instruction should make it clear that the teacher is as integral to an online class as to a classroom.

While teachers remain the central part of learning in the online virtual classroom, experienced online teachers—and indeed anyone familiar with technology in the 21st century—recognize that the role of the teacher is changing. The teacher and school system (including education materials such as textbooks) can no longer be the *only* conduit of information to students—there is simply too much good information available. As the nature of learning (and working) changes due to the explosion of available information via the Internet and new ways of managing and accessing information, the focus of education must continue to evolve from passing along information to students to helping students be better thinkers and learners. The role of the teacher, especially at the high school level, is increasingly to help build students' literacy skills so that they can "…ask questions, define inquiry, research multiple sources, authenticate sources of information, process and synthesize data and information, draw conclusions, and develop action plans based on their newfound knowledge."[18]

The online teacher's role can be broken down into several categories, with some of these tasks sometimes being accomplished by teams of teachers, instructional designers or content specialists who may not actually teach the individual course:

- **Developing the online course content and structure:** As with a classroom course, the teacher must plan the course. What topics will be covered? How will the course material align with state content standards? How will content be delivered? What will be the homework, group projects, and other course tasks? How will content mastery be assessed?

  Within course creation there are several differences between an online course and a traditional classroom course. These include:

[18] Pape, Liz. *High School on the Web*. American School Board Journal, July 2005. The quote is from this source, as well as the larger discussion of the importance of the teacher in online learning, and the changing roles of teaching and learning in the information age.

- **Material Delivery.** Except for synchronous instruction, little course material can be delivered via the equivalent of a classroom lecture. PowerPoint-style lectures can be developed and delivered with audio as one part of a course, but this is not an ideal use of the online environment. In synchronous instruction, course material is delivered via the equivalent of a classroom lecture and group discussions.
- **Content Availability.** In an online course, many types of content are available, including pre-developed digital content for many courses. Digital content is increasingly being developed by publishers, and digital content companies and non-profit organizations are also providing course material.
- **Content Development.** The online environment allows for capturing the development of the course and individual content elements in ways that are not available in a classroom. Many online programs have instructional designers or design teams that develop courses together in a more formal way than most traditional classrooms use.

- **Communication:** One of the main roles of the teacher in a student-centered learning environment is to be available consistently to provide guidance around the course material. For this reason many online programs have requirements for how often teachers must log in to their classes, and how quickly they must respond to student emails. Some programs also require and/or facilitate communication by telephone or online synchronous methods, such as online office hours. Online teachers recognize the potential communication advantages and drawbacks of the online environment. The advantages include the increased comfort some students feel in participating in an online discussion board and the teacher's ability to record everything "said" in class. Disadvantages include the inability for the teacher to use non-verbal cues to determine a student's level of understanding of course topics.

- **Guiding and individualizing learning:** In addition to course creation and communication, the teacher is guiding student learning in the online course. There are many ways in which this can be done, from creating and facilitating group discussions, to developing group projects, to constantly adjusting course resources to respond to students' questions and the concepts that they are finding most challenging. In most programs there is a face-to-face mentor available to work as a partner with the online teacher on these tasks. Connections Academy uses what it calls the "learning coach," who is often a parent or close relative. [19] Supplemental programs in which students are enrolled in a physical school usually have the local school provide a mentor to students taking an online course.

- **Assessing, grading, and promoting:** Online teachers are also responsible for tasks which any traditional classroom teacher would recognize, such as creating, giving, and grading tests, labs, and homework assignments; providing overall course grades; and determining whether the student is ready to move on to the next unit, course, or grade level. While the technology may automate some grading functions and the student's face-to-face mentor may provide input, these crucial assessment decisions remain the professional teacher's to make.

[19] Connections Academy, *Questions and Answers for Policy-Makers about Virtual Public Schools*, undated.

3.3 Professional development for online teachers

The discussion of teaching online in the sections above should make it clear that teachers are an integral part of learning online, and may further suggest that the skills needed to teach online not only include but often go beyond skills needed to be a successful teacher in the traditional classroom. Online programs recognize this, and most have professional development requirements for their online teachers.

The elements of learning to teach online fall into two categories. The first, learning the technology and tools of the learning management system, is fairly straightforward. Online programs have people who know their technology well, and can both train teachers before a class starts and provide ongoing help. The learning management system vendors typically provide training on their systems to teachers in a program, or in a train-the-trainer model where the vendor teaches one person in the program how to use the system and that person becomes the expert for the program. The technology in learning management systems is not highly sophisticated, and teachers with basic computer skills such as web browsing, email, and Microsoft Office applications are usually able to learn the technical aspects of teaching online fairly quickly. Some programs weed out potential teachers without basic computer skills by requiring that initial teaching applications be submitted by email. In addition, teacher training is often done online, or through a hybrid approach that combines traditional classroom and online learning, in order to ensure that teachers understand online education from the student perspective.

The second element of teaching online, effective online pedagogy, is much more complex. At a simple level, consider the difference between knowing how to post messages on a discussion board, versus understanding how to use a discussion board to create a lively, educational class debate. The first is easy; the second is far more difficult. Many online program professional development requirements focus on helping teachers understand how to motivate individual learners, enhance student interaction and understanding without visual cues, tailor instruction to particular learning styles, and develop or modify interactive lessons to meet student needs.

Online teachers and researchers studying online learning report several key skills for online teachers that should be enhanced through professional development opportunities:[20]

- Teachers must develop heightened communication skills, particularly in written communication. In many programs, teachers and students are communicating primarily through email, discussion board postings, and other texts; therefore teachers must "recognize the tone of their writing and pay attention to the nuances of words."
- In asynchronous programs, time management skills are critical for teachers (and students) because they can be online at any time.
- In synchronous programs, teacher planning is an issue as the lessons taught must have a multimedia component that requires much more planning for than is usual for traditional classrooms.

[20] Information in this section, and all quotes in this section, are based on *Essential Principles of Online Teaching: Guidelines for evaluating K-12 online teachers*, Southern Regional Education Board, April 2003.

- Teachers must be able to recognize different learning styles and adapt the class to them. Some online programs, and many online teachers, pay special attention to gaining an understanding of each student's skills and challenges in the early days of an online course to ensure that the course meets all students' needs.
- If teachers have any students with disabilities, they must know how to adapt course content and instruction to meet these students' needs. Reaching visually impaired, hearing impaired, or learning-disabled students online can be quite different than in a physical classroom.

Some online programs evaluate their teachers on many more dimensions than most physical schools. This is possible in part because of the nature of the learning management system technology, which captures teacher-student interactions, class discussions and course content in a way that is not possible in a traditional classroom. A school administrator can drop into a threaded discussion much more easily than a classroom discussion. Also, many online programs survey students once or more times per semester, and may ask the students' opinions about their teachers.

3.4 Simulated laboratories in online courses

Many science courses in physical classrooms have a laboratory component as a key element of the course. This laboratory component presents both opportunities and challenges for online learning.

The opportunity arises when schools are unable to offer laboratories for their classroom-based courses, and high schools can't offer advanced courses. For example, 40% of high schools in the U.S. do not offer Advanced Placement courses.[21] In addition to shortages of highly qualified teachers for lab science courses, many rural and high-poverty schools don't have the personnel and funding to run wet labs, and teachers may not have the necessary certifications to handle chemicals and other laboratory materials. In these cases an online simulated lab can be a viable alternative.

Quality online programs argue that online simulations are able to demonstrate key concepts to achieve learning outcomes. Online labs may include video of an instructor demonstrating a procedure, explanations of equipment that would be used to run the lab, and options for students to manipulate variables in order to show lab results. Educators note that students in Advanced Placement courses take an end-of-course exam to determine whether the student receives credit or advanced standing from a post-secondary institution, and argue that the outcome is what matters, not the input or course interface.

3.5 Online content and standards

The discussion of standards for online courses addresses two major issues: the need for online courses to meet general state learning standards (also known as academic or content standards); and the need for quality standards specific to online courses.

The state learning standards issue is straightforward. An online course must meet state learning standards in the same way as any other public school course. Online programs recognize the need to have courses based

[21] NACOL's Position on Advanced Placement Science Audit Criteria (NACOL statement, 4/13/06), available at http://www.nacol.org/docs/NACOLPositiononCollegeBoardAPScienceCriteriaFINAL.pdf

on learning standards in the same way that physical schools do. Indeed, demonstrating and tracking the alignment of course content to state standards may be easier in an online course than in a classroom-based course.

A state's broad vision for online education should recognize that online programs can expand educational outcomes and opportunities while challenging existing policies.

The second issue, the need for specific online course quality standards, is recognized by many practitioners. There is no universally accepted set of standards; however, NACOL is conducting a review of standards and will publish the recommended national standards in the near future. Standards to be reviewed include the Southern Regional Education Board's *Standards for Quality Online Teaching* and *Standards for Quality Online Courses* [22] and the *Guide to Online High School Courses*[23] developed by the National Education Association and Virtual High School, among others. Recommendations from these and other publications include many that are relevant for any course, online or otherwise, such as:

- Course content and assessments must be aligned with state learning standards.
- Courses should engage students in learning activities that address various learning styles.
- Courses should provide students with opportunities to engage in abstract thinking and critical reasoning.
- Courses should provide "appropriate teacher-to-student interaction, including timely, frequent feedback about student progress."
- Courses should provide for and monitor appropriate student-to-student interaction, and students should be monitored to ensure academic honesty.
- Courses must accommodate students with disabilities.
- Copyright issues should be addressed.
- The academic calendar of the students and teacher should be coordinated before the course begins.
- Online teachers should be evaluated at least once a year.
- The online program should be able to verify a student's participation and performance in the course.

At least one non-profit organization, the Monterey Institute for Technology and Education (MITE),[24] is evaluating online courses from a variety of sources and making the best courses available for licensing by other programs. MITE's Online Course Evaluation Project (OCEP) provides course evaluations at a website

[22] Available from www.sreb.org

[23] Available from www.nea.org/technology/onlinecourseguide.html

[24] Information on the Monterey Institute for Technology and Education is available at http://www.montereyinstitute.org/; OCEP is located at http://ocep.edutools.info/

called EduTools, which also evaluates learning management systems. OCEP evaluates Advanced Placement courses as well as courses being used in post-secondary institutions, so is not applicable to a wide range of K-12 online courses. Its evaluation criteria, however, can be applied to many online courses. Courses that meet Monterey Institute standards are sometimes made available through the National Repository of Online Courses.[25]

3.6 Assessing students in online courses and programs

As noted above, assessment and grading is as important a teacher task in an online program as in a brick-and-mortar classroom. An online student typically completes a variety of quizzes, tests, exams and work products, such as essays and projects, that the teacher will use in determining the student's grade in that class. For students taking individual online courses in combination with traditional classes as part of their brick-and-mortar school program, online course grades simply become part of their overall grade point average; their school transcript may or may not highlight the medium in which specific classes were provided. While students' mastery of concepts learned in supplemental online courses may be assessed in more general standardized tests, such as high school exit exams, the online course provider is typically not responsible for administering these general tests. Rather, the student's "home" school, where she or he is officially enrolled, is held accountable.

One exception to the typical accountability pattern in the supplementary online course realm is the online Advanced Placement course, which is directly accountable for student results on the relevant AP test. Quality online AP course providers track these results carefully and disclose them as part of key course information.

Full-time cyberschool programs, on the other hand, bear full accountability for all student assessments. As with all public schools, cyberschool students must take state assessments required by No Child Left Behind. Test administration can be a complex task, especially for programs serving most or all of an entire state. This challenge is exacerbated by the need for students to travel to testing sites during the customary testing dates set by the state, leaving the best-laid testing plans vulnerable to early spring snowstorms and other weather challenges. A solution to this challenge would be allowing fully web-based, distributed testing, such as Virginia's model online assessment systems, to be used for online schools.

In addition to the challenges to cyberschools, states may be missing an opportunity to increase the effectiveness of testing by requiring that assessments be in physical locations in a paper format. The U.S. Department of Education noted in a recent report "One of the major requirements for NCLB is annual assessment of students in core subjects beginning with reading and math.

[25] http://www.montereyinstitute.org/nroc.html

[T]he traditional paper-based approach [of annual assessments] has several downsides—including untimely feedback which takes 4-6 months to generate results, high costs associated with administrative overhead and use of multiple resources to duplicate, administer, collect, collate, code, score and analyze data." The report also noted "Computer-based, technology-based, or online assessments hold the possibility of revolutionizing both how assessments are implemented and how student data inform teaching and learning."[26]

3.7 Academic honesty and authenticity of student work

While the concern about how to ensure students are doing their own work is commonly raised regarding online courses, generally online teachers believe this issue is handled fairly easily. Because teachers and students are in such close communication, the teacher can recognize when students are not submitting their own work. Most teachers ensure that student grades are based on a range of assignments and tests, and not heavily weighted to a few large tests, thus ensuring that students do most of the work required in order to pass the class. Many online courses and teachers also integrate portfolio assessment into their evaluation of student work, comparing work samples against test responses and also making use of technology-based "plagiarism check" tools favored by regular classroom teachers. In addition, some online programs require final exams and other major tests to be proctored in order to ensure that students are completing these tests unaided.

3.8 Student support

A key challenge for online programs is providing effective support to their students. Support needs include both technical (i.e., issues of accessing the course, problems with computers or software, etc.) and academic (issues with the course content, tutoring and counseling). The following are some ways that programs offer technical and academic support:

- Most programs provide technical support to students separate from academic support for two reasons. First, even when they possess the skills to address such issues, teachers' time may not be well spent providing lost passwords or helping with software downloads. Second, because an asynchronous online course is always available, and one of the reasons that the student may be taking an online course is for the time flexibility, technical support may be needed rapidly and at times the teacher is not available.
- Both technical and academic support may be provided by appropriate online program staff via phone, email, live chat, or some combination thereof.
- Most students in online supplemental programs attend a physical school, and in many cases the online program expects or requires that this "home" school will provide a mentor to the student. This mentor often provides both technical and academic support as a supplement to support available by phone or email (or sometimes as the exclusive support provider).
- Full-time programs often identify a mentor or learning coach to support the student. Because full-time students are not attending a physical school, this mentor is usually a parent.

[26] U.S. Department of Education, Office of Educational Technology, 2004. *Helping Practitioners Meet the Goals of No Child Left Behind*. Washington , D.C..

- Online programs typically provide an orientation course to guide first-time students through the basics of an online course.

Online programs must follow federal and state laws regarding students with disabilities in considering support options. Courses and learning management software must be developed to be compliant with the Americans with Disabilities Act (ADA), for example, addressing visually impaired or hearing impaired students through well-thought-out course design and technology solutions such as screen readers. Full-time cyberschools must also ensure additional support services for special education students with Individualized Educational Programs (IEPs), often through modification of curriculum and contracts for face-to-face therapies near the student's home.

3.9 Isolation and socialization issues[27]

An issue often raised as a concern about full-time online students is the potential isolation and lack of socialization of students who are not interacting with peers in a traditional classroom. A related concern is the perceived lack of extracurricular activities that enrich students' experiences beyond the learning that takes place in the classroom. (For supplemental programs this is not an issue, because students are taking only one or a small number of courses online, often from a physical school that they are attending.)

Some online programs with full-time students address these concerns by providing field trips, student clubs, and other extracurricular activities that are a mix of online and face-to-face. For example, Connections Academy schools all have local community coordinators who organize field trips, typically on a monthly basis, for students within their regions to visit museums, monuments, local businesses and other points of interest. Florida Virtual School offers a science club, Latin club, and newspaper club. The science club competes in state and national competitions, and the newspaper club produces two newspapers per month. These clubs meet online most of the time; for example, in competitions the science club often does not meet in person until the competition, doing all planning and preparation through the Internet.

Online students also develop socialization skills through school projects and academic activities that require collaboration via technology as well as face-to-face. Real-time web conferencing tools that integrate chat, voice, webcam and whiteboard help facilitate these projects online. Students may also meet in person periodically. Online schools such as FLVS note that this is similar to the real world, where companies often have employees from different offices collaborating on projects, and in fact may effectively prepare students for the 21st century workplace.

[27] Examples in this section are from a report in eSchool News online, http://www.eschoolnews.com/news/showStory.cfm?ArticleID=6065, January 19, 2006, and from online program providers.

Online students also develop socialization skills through school projects and academic activities that require collaboration via technology as well as face-to-face.

4 Technology for online programs

Technology issues are obviously an important consideration in online learning. In many respects the hardware and software are essentially the "facilities" of an online school, much as physical buildings are the facilities of a traditional school. However, unlike traditional school facility funding, there is no such funding mechanism for online facilities.

Although technology is important to online learning, it is crucial not to overstate its role. In the online environment teachers and students are still the primary players; the technology plays a supporting role. In addition, while some cutting-edge educational technology tools hold great promise for online learning—and indeed classroom-based learning as well—the basic technological components in online education are fairly simple. The hardware that is required is available in most schools and many homes across the country, and the software may, with some exceptions, be on its way to becoming a commodity, judging by the vendors' focus on price and services.

In fact, one of the key "technology" issues in online learning is more of a generational issue than strictly a technology one. The Millennial generation students in K-12 schools today are children of a digital age, and are typically far more comfortable with technology than their parents and teachers. According to the report "The Digital Disconnect: The widening gap between Internet Savvy Students and their Schools," "there is evidence that many students are more frequent users of the Internet and are more Internet savvy than their parents and teachers."[28] This difference is not just about what today's students do with their time; it is also about how they use technology differently than older generations, and how deeply technology is integrated into their lives. This difference is clear to anyone who has watched teenagers use cell phones to send text messages, using their thumbs to type faster than many people can type on a computer keyboard. Online learning's challenge today is to be technologically in synch with its consumers, while also meeting education's broader policy and social imperatives.

In the online environment teachers and students are still the primary players; the technology plays a supporting role.

[28] Levin, Douglas and Sousan Arafeh, 2002, The Digital Disconnect: The widening gap between Internet Savvy Students and their Schools, for the Pew Internet & American Life Project.

4.1 Software and hardware necessary for online programs

The basic software necessary for delivering and receiving online courses is fairly simple. Although it is a significant cost for online programs, there are numerous competing products that are keeping costs in check.

Software includes:

- **The course management system (CMS) or learning management system (LMS):**[29] As discussed in section 3.1, the CMS or LMS is the software system that packages the course content, communication tools (asynchronous and synchronous), grade book, and other elements of the course. While most CMS have both asynchronous and synchronous tools, they are focused on asynchronous delivery of courses.
- **Student information system (SIS):** This capability is required of all full-time and many supplemental online programs, to keep track of key student demographic, contact, and assessment data for reporting as well as for data-driven decision-making.
- **Audio and video plug-ins:** Teachers and students will usually need a media player for video and audio. Programs may also integrate third-party software for real-time web conferencing capability.
- **Basic productivity software:** Students and teachers need to have basic software for web browsing (e.g., Internet Explorer), word processing (e.g., Microsoft Word), reading text documents (e.g., Adobe Acrobat reader) and developing/reading presentations (e.g., Microsoft PowerPoint). Some of these are free, such as the browser and Adobe Acrobat reader, while others must be purchased either by the course provider, the school, or the student's family.

Hardware needs of an online program depend on the program, but generally include:

- **Servers and bandwidth:** An online program needs a server that hosts the courses and the bandwidth to deliver them. Most vendors that provide course management systems also have an option to provide hosting. Synchronous programs further require other servers to operate the interactive component of the program, with additional bandwidth needs. Broadband internet access by users requires sufficient bandwidth to host courses and online services, and to be able to sustain peak periods of teacher and student usage without a reduction in performance. Synchronous programs have additional bandwidth needs.
- **Computers:** The need for computers for all teachers and students is a significant issue for online programs, partly because of the cost, and partly because of the potential to exacerbate issues of inequality. Supplemental programs often expect the student's school to provide access to a computer lab so that the student can access courses from the school. Programs that serve full-time students sometimes provide computers on loan to their students as part of their service.
- **Internet access:** While many programs attempt to make their courses accessible for dial-up access, broadband Internet access provides a far better learning experience. Again, students in supplemental

[29] "Course management system" (CMS) and "learning management system" (LMS) are terms that are increasingly being used interchangeably, partly because of convergence of features. Software used to support online courses, with the features described above, was originally called a CMS. An LMS was originally software used to track registrations, course completions, and similar administrative functions in a corporate training setting. Over time CMS and LMS software has converged as each has added features of the other, hence many people use the terms interchangeably.

programs often primarily access their online courses through school-based computer labs with broadband access, and sometimes connect from home or a community library. For students in full-time cyberschools, access is always from home or a community location. Many cyberschools provide a subsidy to defray the cost of home Internet access.

- **Basic work environment:** Although not computer hardware, students also need a reasonably quiet place for the computer, desk, etc. This is not a significant barrier but one that programs serving full-time students are aware of and usually communicate to students and parents.

4.2 The digital divide

Another key technology issue is that of the digital divide—the disparity in the availability of computers and Internet access among students. While for many students and families an up-to-date computer and broadband Internet access are a standard household amenity, for many other students, especially low-income and minority students, this is not the case. A key part of public education's mission is providing a quality education to all students, and online programs must make sure that they are available to all, not just to higher-income students.

A 2006 report from the National Center for Education Statistics, using data from 2003, reports that "There is a 'digital divide'… Computer and Internet use are divided along demographic and socioeconomic lines. Use of both technologies is higher among Whites than among Blacks and Hispanics. Students living with more highly educated parents are more likely to use these technologies than those living with less well-educated parents, and those living in households with higher family incomes are more likely to use computers and the Internet than those living in lower income households." In addition, "Disability status, metropolitan status, and family/household type are associated with the digital divide." However, "schools help bridge the digital divide" because "many disadvantaged students use the Internet only at school."[30]

Some online programs address these digital divide issues by loaning computers, printers, and other tools to students, and providing a place for students to work. Other programs work with local schools to provide computer and Internet access. However, the digital divide is likely to persist, and online programs must remain aware of and focused on these issues.

4.3 Future technology changes

Online education programs are innovators of technology for teaching and learning, although they are constrained by the need to keep their programs accessible to a wide variety of students—from students who are very comfortable with technology to those who aren't, and from students on dial-up Internet access in rural areas to those with a fast broadband connection. Therefore, it is worth considering how the technology will change over time when assessing the future of online programs.

The overarching technology trend, of course, is that computing is rapidly growing more powerful and cheaper. Moore's Law, the well-known observation of Intel founder Gordon Moore that computing power

[30] DeBell, Matthew, and Chris Chapman, 2006. *Computer and Internet Use by Students in 2003*. National Center for Education Statistics, U.S. Department of Education

doubles about every two years, has allowed computers to become more and more ubiquitous. Our lives are increasingly digital and connected; from the way we take pictures, to the way we consume and share music and video, to the many companies that operate as distributed work groups. The constant doubling of computing power means that the pace of change is increasing, and the cost of computing power is being driven down rapidly.

These changes have numerous implications for education in general, as well as for online education, and go far beyond the scope of this report. A few of the major changes and implications are:

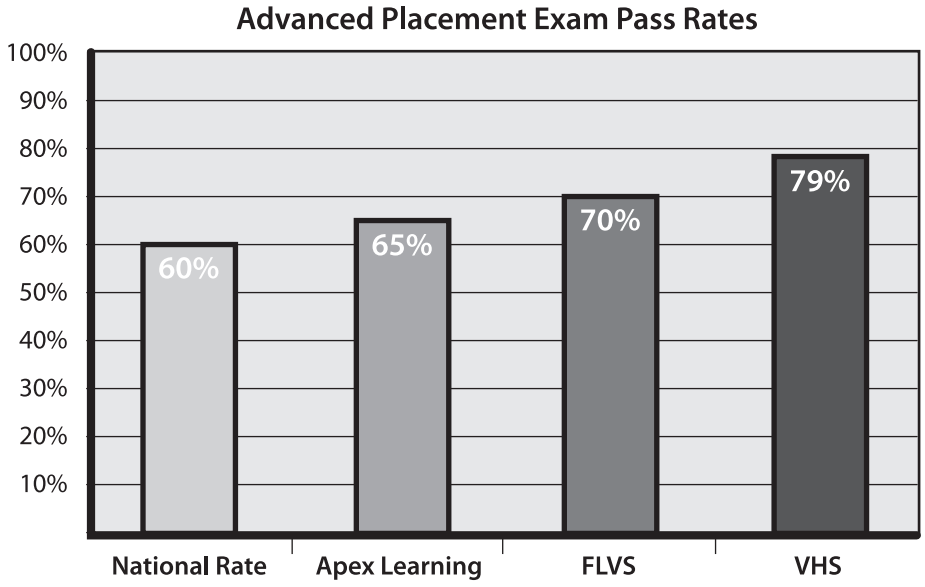
- One-to-one computing programs, in which each student and the teacher have a computer, are likely to become more common as the price of computers continues to drop.
- The cost of broadband access will continue to fall and broadband penetration will increase. The result will be a smaller number of students on the wrong side of the digital divide, but a greater loss for those left behind.
- Greater use of Internet technology in the classroom, and a blended model of online learning. More teachers will use Internet resources and course management systems for their traditional classroom classes, following the path of post-secondary institutions.
- Schools administrative technology, such as student information systems, will increasingly tie in to instructional functions.
- There will be an increase in the types of devices that can access the Internet, and a convergence of capabilities of these devices. Consider the ways in which cell phones are now used as digital cameras and for text messaging, or the advent of video iPods and "podcasting."

Online programs are, and will continue to be, among the leaders in using technology for teaching. Some programs will remain focused on delivering courses online using the available technology in the most educationally appropriate ways, and draw greater numbers of students who are interested in learning through digital channels. Other programs, especially those that are connected to schools and districts, will become leaders in using blended online models in the classroom.

5 Evaluating the effectiveness of online learning

Educators, students and parents who have been pleased with the student outcomes from taking online courses and programs have no doubt that online learning can be effective. Indeed, many people who question the effectiveness of online learning do so out of misunderstanding; they do not realize the extent to which teachers are involved with and communicate with students, the quality of material available online, and the academic rigor of many online courses. Still, the question remains as to whether online learning is equally, more, or less effective than traditional classroom teaching.

Full-time cyberschool students take state assessments that are required of all public school students, and cyberschools are subject to state adequate yearly progress, accreditation, and other state-by-state measures of public schools. Supplemental online programs track numerous measures of student outcomes. Most are internal, such as course completion rates, while a few compare students in online courses to students in traditional classroom courses. For example, a comparison of AP exam data from three online programs, Apex Learning, Florida Virtual School, and Virtual High School, against the national average of all students taking AP exams, shows the online programs exceeding national averages for exam results:[31]



[31] Smith et. al. 2005.

In an attempt to address the effectiveness of online learning, in 2005 Learning Point Associates reviewed several previous meta-analyses and provided a synthesis analysis of eight new research studies into the effectiveness of K-12 online learning. The report concluded that online learning can be effective as classroom-based learning, but that more research is necessary:

> "In reviewing these five meta-analyses related to K–12 online learning… one conclusion seems clear: On average, students seem to perform equally well or better academically in online learning. Because of the very small number of high-quality quantitative studies available for review and synthesis… this conclusion should be described as showing promise, but with the realization that we cannot have real 'confidence' in these conclusions until there is much more support available from high-quality quantitative research."

The challenge in answering "Is online learning effective?" is made clearer if we pose the question "Is classroom learning effective?" The answer to the latter is "Yes, however…" with the "however" encompassing all the constraints that many schools and teachers face. Because online education is relatively new, it would benefit from additional research into all areas, especially the comparison of student outcomes in online courses to classroom-based courses. Other research could include studying different student populations, student-to-teacher ratios, and different types of online courses.

6 Developing a state policy framework

In many states the rapid growth of online education has challenged the laws and rules that were created for physical schools and are not well adapted to education unconstrained by time and place. Some states have created policies that are specific for online programs, but in many states online programs have been governed by policies that have to be creatively interpreted to make sense in an online environment. A simple example is the common approach of public education funding based on seat time and census counts, neither of which translates easily to the online world.

Some states, including Minnesota, Oregon, Colorado, and Kansas, have worked towards creating a more comprehensive vision for online education. Many other states recognize the value in bringing together stakeholders to create the appropriate policies, procedures and standards for management and operations of full-time and supplemental online programs, consistent with the goals of expanding access to high-quality education for all. The details of many policy issues vary by state, but the issues tend to fall into general categories that are common across states.

6.1 Creating a statewide vision for online education

A state's broad vision for online education should recognize that online programs can expand educational outcomes and opportunities while challenging existing policies. It might also acknowledge that online learning accelerates issues that already exist across education, and brings them to the forefront. A report by the Trujillo Commission, formed in Colorado to respond to concerns about some online programs raised by a state audit, suggests several valuable guiding principles for state oversight of online education:[32]

- Public education should include a variety of high quality educational options for students, including online learning, and students across the state should have equal access to these opportunities.
- Online programs should include both full-time and supplemental opportunities for students.
- Ongoing innovation requires that states and oversight agencies not stifle innovation by becoming overly prescriptive in regulating online programs. The rapid pace at which online education is developing requires that oversight systems, rules and regulations be continually evaluated.
- Teachers are an integral part of online learning.

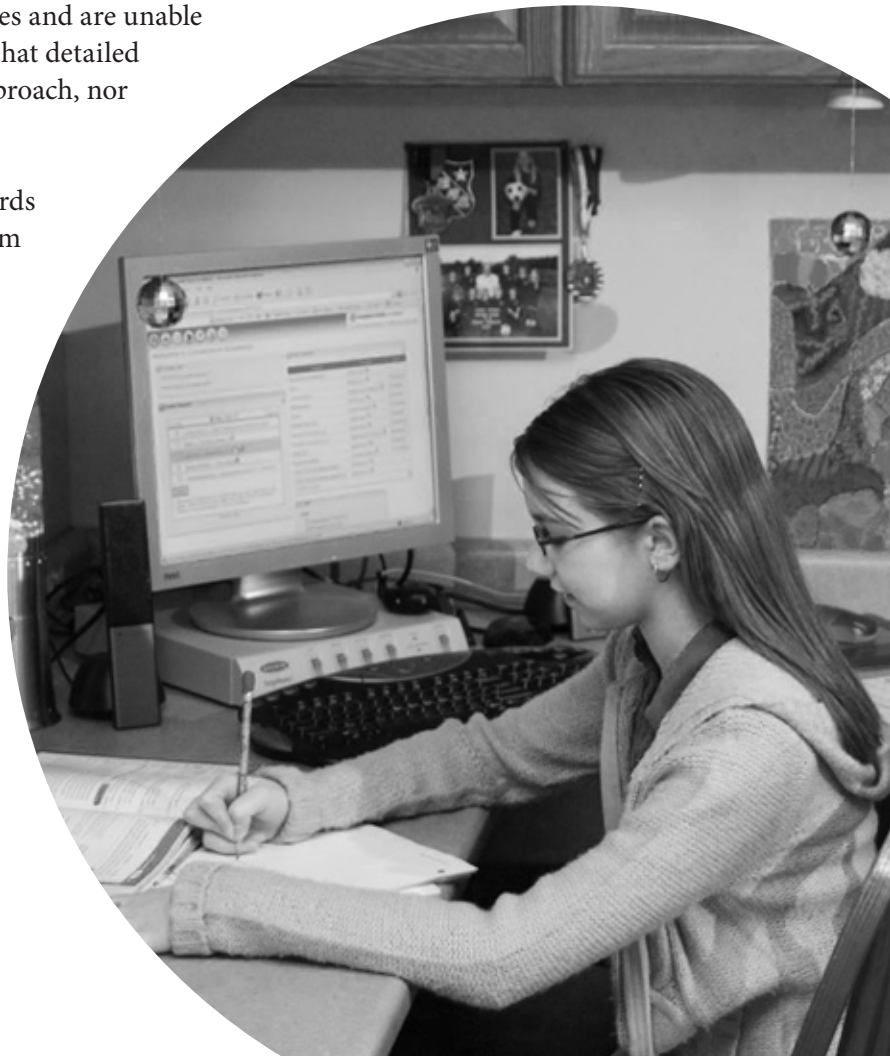
[32] The Trujillo Commission report is available on the website of the Donnell-Kay Foundation, at www.dkfoundation.org. The guiding principles are abbreviated from a slightly longer list that appears on page 5 of the report.

- The involvement of a parent or other responsible adult in the education of a student is to be encouraged.
- Online programs must use high quality curricula aligned with state and applicable district standards.
- Some statewide education policies, requirements, and oversight do not fit online programs. New online education policy should address these inconsistencies directly. Discussion of policy challenges raised by online learning should acknowledge that many of the issues being discussed exist across all modes of education delivery.
- Online programs offer the opportunity to transcend time and place. So long as they can demonstrate quality and successful student outcomes, they should not be subject to state education policies that impose barriers of time and place, such as requiring face-to-face meetings or other on-site requirements.
- Resources to support online programs must be sufficient to ensure quality, opportunities for innovation, and meeting the needs of a broad range of students.

6.2 Oversight of online programs

Many states have no data or reporting requirements on how many students are taking one or more online courses, how many online programs exist, and how those programs are operating. Other states recognize that in order to maintain any oversight role they need to benchmark quality and collect data on online programs. A mechanism to track online programs and students is an apparent first-level policy requirement that a surprising number of states have not yet put into place.

Most state education agencies have limited resources and are unable to closely monitor online programs. It is not clear that detailed monitoring of prescriptive mandates is the best approach, nor that it is necessary to create a separate department.



Two better approaches are to either provide standards and monitoring expectations for the online program authorizer (such as a charter school authorizer), or require that online programs have policies and processes in place that can be monitored. Kansas, for example, requires a "desktop audit" of online programs in which the online programs certify that they have a set of policies, procedures, and personnel in place. A similar method might require that online programs have policies to ensure and demonstrate quality in the following areas:

- Curriculum and assessment
- Supervising, evaluating, and training teachers

- Attendance and activity tracking in a course
- Communication and teacher response times
- Student support
- Awarding credit
- Funding
- Participation in state assessments
- Accessibility and provision of special education services

The state's approach to the policies listed above should not be prescriptive, but should instead allow for flexibility and innovation, keeping in mind that the overarching method of full-time online program oversight should be the same as all other public schools.

Two other possible roles of an oversight body would be to develop key definitions that would apply across online programs, such as successful course completion, enrollment, attendance, and at-risk, and to create and impose penalties for programs that do not meet requirements and standards.

6.3 Data-driven decision-making, reporting and analysis

Data are increasingly at the center of education management and policy decisions. Online learning provides an inherent advantage over traditional classrooms in the amount and quality of data that are available through the learning management system: discussions, questions, assessments, time online, progression through and mastery of course material, and numerous other data points are typically captured by the software. The information management capacity of online programs is often well ahead of state information systems. Improving statewide data systems that allow the state to track overall progress of individual student performance and teacher quality in order to enhance accountability would help all public schools and allows for valid comparisons between online programs and physical schools. These data systems should capture and analyze a wide array of program, teacher and student data, including:

- Student data:
    - Attendance
    - Participation (completion of lessons, response to teacher communications and engagement)
    - Performance (course assessments, portfolios, NCLB state tests)
    - Withdrawals
- Teacher data:
    - Highly qualified status under NCLB
    - Teacher training
    - Meeting instructional expectations (such as response time)

Ohio at the cutting edge

With over 20,000 K-12 students in over 40 full-time online learning programs, Ohio is among the leading states in terms of the number of online education programs and the number of students enrolled in these programs. Ohio also provides a good example of what can happen when online education practice outpaces online education policy.

Ohio is unusual in having a formal name for its online schools: eCommunity Schools. Community Schools are similar to charter schools in other states, and an eCommunity school is an Internet- or computer-based community school in which the enrolled students work primarily from their residences. Seven of the eCommunity Schools operate state-wide, while others are limited in geographic scope. In addition, Ohio has hybrid public schools with e-school components. eCommunity schools are funded in a similar manner to other community schools in Ohio. Their per-pupil state funding includes base cost funding, as well as special education and career-technical education funding.

A recent report by the Fordham Institute notes that eSchools' student demographics are very similar to demographics across Ohio: 20% of eSchool students are non-white, compared to 23% of students in Ohio, and 41% are economically disadvantaged, compared to 35% across the state.[33]

eCommunity schools first opened for the 2000–2001 school year. Legislation adopted in April 2003 provided additional guidance for their operation. Legislation enacted in 2005 imposed a moratorium on new eCommunity schools until the State Board of Education adopts standards for the schools, due to a number of concerns including funding and low rates of participation in state assessments (which have since increased). The State Board of Education came up with standards, but the Legislature has not given the Board authority to adopt them, as they are extremely restrictive (especially compared to any other public program).

The policy suggestions made elsewhere in this report are highly applicable to the situation in Ohio and can be adapted to the specific needs of Ohio. The state should consider enacting eSchool standards in statute but not those developed in 2003 by the State Board of Education. Instead it should establish standards incorporating input from eCommunity Schools and other stakeholders to reflect best practices, including:

1. Strengthen accountability by ensuring the same accountability over other public schools for eSchools, taking care not to become overly prescriptive and to avoid the one-size-fits-all approach when addressing a wide variety of program models.
2. Create an advisory council for eSchools to provide input to the State Board of Education.
3. eSchool sponsors should ensure programs have clearly defined policies, standards and procedures for curriculum, assessment, teaching, attendance, funding, and other issues.
4. If effective oversight is not performed by the responsible sponsor, the state should impose penalties on that sponsor or program, such as accreditation watch or an academic watch procedure.
5. Provide equitable and non-restrictive funding for eSchools, as a number of new studies show the costs and funding of quality online programs is equal to face-to-face schooling. *(Note: At press time, Ohio eSchool funding was once again the focus of intense legislative debate, following Governor Ted Strickland's proposal to reduce per-pupil funding for eSchools by more than 40%.)*
6. Success should not be measured in "seat time" or minutes, but based on competency, student learning and "successful completion" of courses.
7. Ensure eSchools have the autonomy to operate with sponsors held accountable for oversight.
8. Remove moratoriums on online charter programs.
9. Consider authorizing online assessment options for eSchools to meet state testing and *No Child Left Behind* requirements.
10. Apply all standards equally to both eCommunity Schools and traditional public schools operating eSchool programs.

New policies based on these recommendations would allow Ohio's eSchools to continue to offer increased educational opportunities and outcomes to students and parents across Ohio.

- Program data:
    - Student and parent satisfaction surveys
    - Staff and instructor satisfaction surveys
    - Learning effectiveness based on outcome measures such as standardized tests, AP Tests, end-of-course testing, and/or high school exit exams
    - Cost effectiveness (financial, budgetary and market-based)
    - Access as measured by student demographic data including "at-risk" categories
    - Retention rates
    - Attrition, both to physical schools and out of public education
    - Course quality evaluations
    - Teacher evaluations
    - Accreditation and external evaluations
    - Course completion rates
    - Enrollment growth
    - Course credit recovery rates

Some of the data points listed above could be required of online programs. This reporting could be required simply to ensure that students and parents are able to make well-informed choices, or alternatively the state could set expectations tied to certain data points. A significant state role would be to create definitions that would be used by online programs, such as "at-risk." Regardless of the specifics of the state's role, each online program could be expected or required to create measurement benchmarks, disseminate data, and show that it is using its program data as part of continuous self-improvement.

6.4 Online policy as a starting point to explore larger policy issues

Some online policy issues cannot be easily addressed outside a larger education policy discussion. These issues might be raised in online program discussions as a starting point for larger education discussions:

- Funding based on educational attainment instead of seat time
- Student progression based on outcomes instead of social promotion
- Enhanced use of data throughout education

Ideally, the continuing evolution of high-quality but diverse online learning programs, together with development of thoughtful state online learning policies, will provide a laboratory for exploration of these issues that will benefit students in every learning environment.

Appendix A: Definitions[34]

Asynchronous: Not occurring at the same time. Most K-12 online education programs are primarily asynchronous, allowing students and teachers to participate according to their schedule. Communication and interaction take place via email or discussion boards.

Average daily attendance (a.d.a): One measure used to determine school funding, a.d.a is "(i) the aggregate number of days of attendance of all students during a school year; divided by (ii) the number of days school is in session during such school year." (U.S. Department of Education, 2002). Another popular funding measure is "average daily membership," which counts aggregate days of enrollment rather than aggregate days of attendance.

Course management system (CMS): The technology platform through which online courses are offered. A CMS includes software for the creation and editing of course content, communication tools, assessment tools, and other features designed to enhance access and ease of use. "Learning management system" (LMS) is often used interchangeably.

Cyber charter school: Similar to a brick-and-mortar charter school but instruction is primarily delivered over the Internet; see also "cyberschool," below.

Cyberschool (virtual school): An online learning program in which students enroll and earn credit towards academic advancement (or graduation) based on successful completion of the courses (or other designated learning opportunities) provided by the school; "cyber charter school" is a form of cyberschool.

Digital content: Subject matter developed and delivered via computer technology.

E-learning: Instruction and content delivered via digital technologies, such as online or CD-ROM, or learning experiences that involve the use of computers.

Online learning: Education in which instruction and content are delivered primarily via the Internet. Online learning is a form of distance learning.

Registration: A single student signing up to take a course in an online program. (Registration is distinguished from enrollment, which in this report means that a student is counted by a school towards the school's share of state FTE funds.)

Seat time: The actual physical presence of a student in a brick-and-mortar school setting, often used as a measure for funding in K-12 education.

[34] Adapted from *Keeping Pace with K-12 Online Learning*, which in turn developed its definitions from two sources: Arkansas Department of Education. (n.d.). Finance school funding: Rules and regulations; retrieved May 4, 2004, from http://arkedu.state.ar.us/administrators/026.html; U.S. Department of Education (2002). Part A: Definitions [No Child Left Behind legislation];retrieved May 4, 2004, from http://www.ed.gov/policy/elsec/leg/esea02/pg107.html

Supplemental online program: An online learning program that offers courses or other learning opportunities to students who are otherwise enrolled in physical schools (or cyberschools); credit for successful completion of these learning opportunities is awarded by the school in which each student is enrolled.

Synchronous: Occurring at the same time. While most online education programs are asynchronous (see above), a few are synchronous and use real-time Internet-based collaborative software that combine audio, video, file share, and other forms of interaction.

Threaded discussion: A chronological listing of students' and teacher's comments, linked to participants' names, which replicates a classroom discussion in an online course.

Appendix B: Additional resources

Organizations

BellSouth Foundation www.bellsouthfoundation.org
BellSouth Foundation's mission is to improve education in the South and other communities where BellSouth operates by stimulating fundamental change in education institutions and systems. In 2005 the BellSouth Foundation launched a new e-Learning initiative, BellSouth's 20/20 Vision for Education, which has led the Foundation to fund numerous online learning initiatives in the Southeast and several valuable research projects. Research reports, including a recently published study on the cost of online education, are available at http://www.bellsouthfoundation.org/publications.aspx

Monterey Institute for Technology and Education (MITE) www.montereyinstitute.org
The Monterey Institute for Technology and Education is an educational non-profit organization committed to improving access to education. MITE sponsors a range of projects from establishing development standards and specifications for online courses, to educational research and multimodal content development.

North American Council for Online Learning (NACOL) www.nacol.org
NACOL is a Washington, DC-based non-profit organization made up of K-12 online programs; it provides a variety of resources to members and non-members and hosts the annual Virtual School Symposium, the main K-12 online learning conference.

Southern Regional Education Board (SREB) www.sreb.org
The Southern Regional Education Board, the nation's first interstate compact for education, was created in 1948 by Southern states. SREB helps government and education leaders work cooperatively to advance education and has had a significant focus on online learning.

Published reports

A Synthesis of New Research on K-12 Online Learning
Learning Point Associates, October 2005
http://www.ncrel.org/tech/synthesis/

Cost Guidelines for State Virtual Schools
Southern Region Education Board, August 2006
http://www.sreb.org/programs/EdTech/pubs/PDF/06T03_Virtual_School_Costs.pdf

Costs and Funding of Virtual Schools
Augenblick, Palaich, and Associates, October 2006
http://www.apaconsulting.net

Guide to Online High School Courses
National Education Association and Virtual High School
http://www.nea.org/technology/onlinecourseguide.html

Keeping Pace with K-12 Online Learning: A review of state-level policy and practice, October 2006
http://www.nacol.org/resources/

Standards for Quality Online Courses
Southern Region Education Board, November 2006
http://www.sreb.org/programs/EdTech/pubs/2006Pubs/06T05_Standards_quality_online_courses.pdf

Standards for Quality Online Teaching
Southern Region Education Board, August 2006
http://www.sreb.org/programs/EdTech/pubs/PDF/06T02_Standards_Online_Teaching.pdf

Virtual Schools and 21st Century Skills
The North American Council for Online Learning and the Partnership for 21st Century Skills, November 2006
http://www.nacol.org/docs/VSand21stCenturySkillsFINALPaper.pdf


Berenstain Bears Lost in
Cyberspace