iNACOL
International Association for K-12 Online Learning

OCTOBER 2010

A National Primer on K-12 Online Learning

VERSION 2

WRITTEN BY

Matthew Wicks

Matthew Wicks & Associates

WITH SUPPORT FROM

aventa LEARNING

CONNECTIONS ACADEMY®

insight schools℠

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Original Version written by

John Watson, Evergreen Education Group

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Acknowledgements

This is the second edition of *A National Primer on K-12 Online Learning*. The first edition was published in May, 2007 and was written by John Watson of the Evergreen Education Group. Given the fast pace of change in the K-12 online learning field, it is a testament to the foresight of the first report's authors and reviewers that the concepts and issues presented in the initial edition are still quite applicable for today's online learning landscape. Of course that same fast pace of change has resulted in many of the details in the 3+ year old report no longer being accurate. This second edition of the *National Primer* continues to maintain a focus on presenting the basics of K-12 online learning useful for policy makers and practitioners alike, while presenting the most current information available.

This report is sponsored by Aventa Learning, Connections Academy, and Insight Schools. In addition to providing financial support, each of these companies provided knowledgeable online learning professionals to guide and review the development of this report: Gregg Levin and Hanne Rousing of Aventa Learning, Mickey Revenaugh of Connections Academy, and Lisa Gillis of Insight Schools.

In addition to the first edition of the *National Primer*, this report also takes some information from *The Michigan Online Learning Report*. The Michigan report, commissioned by the Michigan Virtual University, was published in January, 2008 and was adapted from the National Primer while providing a focus on Michigan-specific issues.

The first edition of the National Primer itself was an adaptation of an earlier report, *The State of Online Learning in California: A Look at Current K-12 Policies and Practices*, developed in part by the Evergreen Education Group. That report was commissioned in 2006 by 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.

This report also benefits from many other researchers and practitioners in online learning, many of whom are cited throughout the report. In particular the work of iNACOL as well as the guidance provided by Susan Patrick and Allison Powell has been very helpful. Finally, while the influence of John Watson on this report should already be clearly evident, his ongoing mentoring and guidance is very much appreciated.

Matthew Wicks

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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? Online learning is expanding access to courses in K-12 education and providing a new network of highly qualified teachers to schools and students in underserved communities. Online learning has numerous benefits, including expanding course offerings, offering customized and personalized learning, giving struggling students a second chance to master a subject through online credit recovery when they fall behind, and providing a rigorous, interactive learning model for schools with imbedded assessments that is data-rich.

Online learning is being incorporated into the traditional classrooms, known as blended or hybrid learning, with tremendous success, especially for credit recovery, advanced placement (to promote college-readiness), continuity of learning during a pandemic, dual enrollment, and more. 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 implementing online learning programs:

- 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?
- What state or school district policies are needed to implement online learning?

The National Primer on K-12 Online Learning provides a comprehensive overview of online learning by examining the basics about online teaching and learning, evaluating academic success, professional development, technology and other topics.

The International Association for K-12 Online Learning (iNACOL) hopes this report will serve as a tool for educators and policymakers who must understand the essential elements of online learning in order to make informed decisions about implementing online and blended/hybrid programs. These innovations continue to change the landscape of traditional learning and increase student opportunities for a new community of learners.

Today, the U.S. must explore and invest in innovations and create student-centered pathways providing educational opportunity for all children, regardless of geography, family income-level or background. We can change the course of education in America. Online learning is an innovation that is powerful—and for kids, it comes naturally.

Sincerely,

Susan D. Patrick

Susan D. Patrick, President and CEO, International Association for K-12 Online Learning (iNACOL)

Most students in the 21st century don't think of technology as something separate from daily life. Are schools ready to have technology be fully integrated into the learning process?

Executive Summary

iNACOL estimates that over 1.5 million K-12 students were engaged in online and blended learning for the 2009-2010 school year. Although K-12 education lags behind post-secondary in using the Internet to teach, many states and school districts are realizing the benefits of online education which allows students unparalleled equity and access to high quality education unconstrained by time and place.

There are many types of online education programs such as state virtual schools, charter schools, multi-district programs, single district programs, programs run by universities, blended programs, private schools, and consortium based programs to name some of the more common program types. 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 for teachers.

Online learning is expanding 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 as a tool for locating information, communicating, and as a way to entertain themselves. They expect their education to be in line with their every day technology-rich experiences.

As of the end of 2010, supplemental or full-time online learning opportunities are available to at least some students in 48 of the 50 states plus Washington, DC:

- 38 states have state virtual schools or state-led online initiatives, and Alaska is planning to open a statewide online learning network in 2011
- 27 states plus Washington, DC have full-time online schools serving students statewide
- 20 states are providing both supplemental and full-time online learning options statewide

The fact that online learning has been successful for many schools across the country does not mean that it has been free of challenges. Indeed, there are numerous issues and challenges in online learning. Few policymakers anticipated that any space time, any space place learning was possible when most education laws were authored over the past 50 years. The issues largely center on determining when existing educational policies are appropriate for this new model of learning and when new policies should be created. Educators and policymakers are frequently striving to gain a deeper understanding 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.

Across most states and all grade levels, students are finding increased opportunity, flexibility, and convenience through online learning.

1 About Online Learning

Online learning is not a standalone concept. It is an important systemic approach using a new delivery model—the Internet. Susan Patrick, CEO of iNACOL, has developed a framework for online and blended learning adapted from the TPAC model[1] to describe the key elements as an approach to systemic educational transformation (see figure 1).

iNACOL estimates that over 1.5 million K-12 students were engaged in online and blended learning for the 2009-2010 school year.

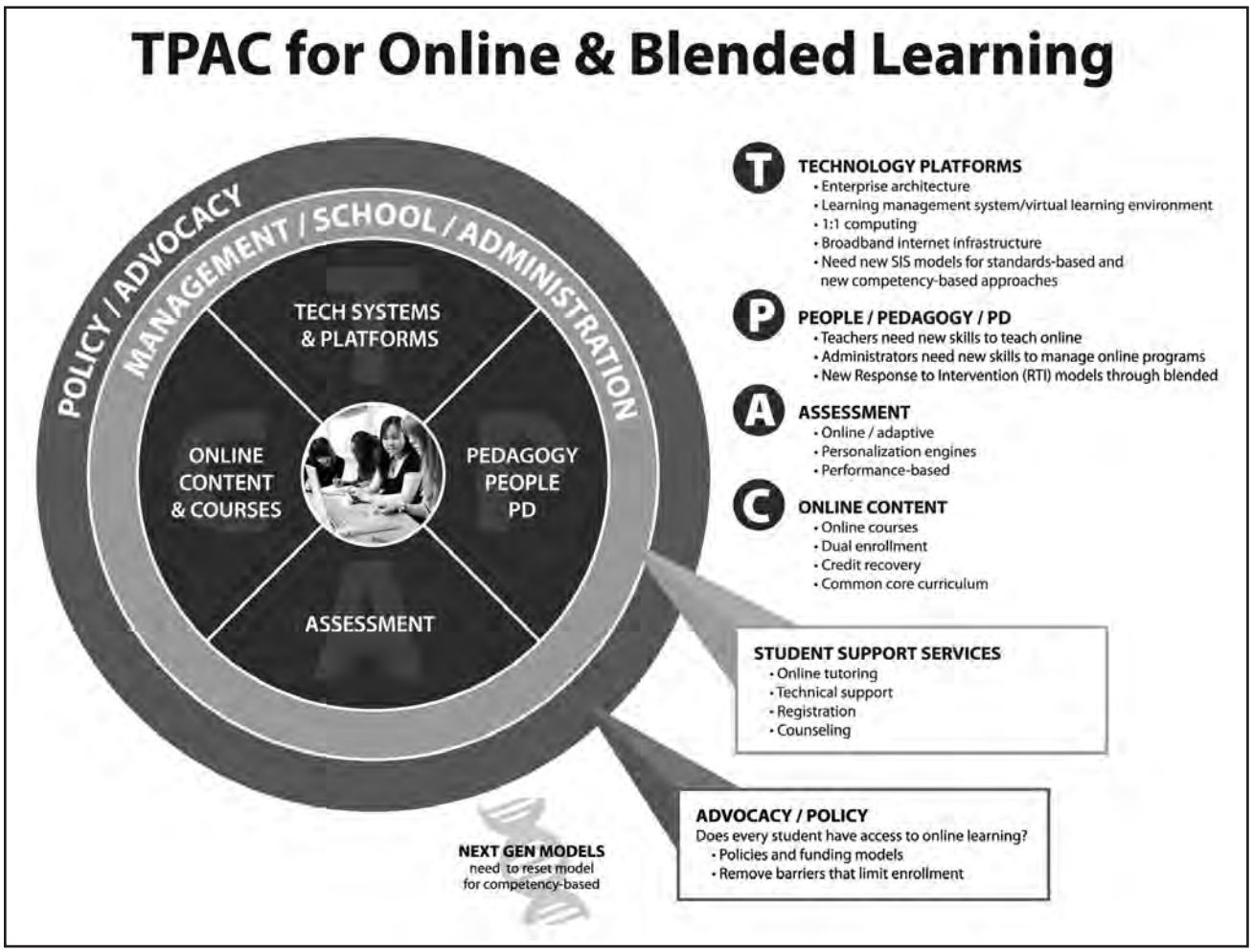
- **"T"** for **technology** platform and **tools** to teach, network, collaborate, and communicate
- **"P"** for **people, professional development,** and **pedagogical** shift toward student-centered learning using technology, data to inform instruction, and engaging digital content
- **"A"** for **assessment** methods that demonstrate a student's proficiency in knowledge, including **adaptive** and performance-based assessments that are data-driven, for improving and personalizing instruction
- "C" is for digital **content** and **curriculum**, including adaptive content

Online learning not only requires teachers to understand and have deep knowledge in their areas of content expertise, but also understanding of online and blended pedagogy. The TPAC model is a holistic approach and is a useful framework for understanding quality online and blended teaching and learning where all aspects are addressed in a student-centered, functional way. In order to ensure quality in online learning, it is necessary to be able to affirmatively answer the following three questions:

1. Does the teacher know the content?
2. Does the teacher know how to teach the content?
3. Does the teacher know how to use the technology to teach the content effectively?

[1] This model was adapted from the Technological Pedagogical Content Knowledge (TPCK) model from Mishra, P., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054. Available for download at http://punya.educ.msu.edu/publications/journal_articles/mishra-koehler-tcr2006.pdf

Figure 1: TPAC for Online Learning



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 for teachers. Online learning is expanding 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 as a tool for locating information, communicating, and as a way to entertain themselves. They expect their education to be in line with their every day technology-rich experiences.

Educators and policymakers are frequently striving to gain a deeper understanding 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.

1.1 Terminology

Many terms and definitions in the field, such as online learning, blended learning, hybrid learning, e-learning, virtual schools, and cyberschools, do not have commonly understood definitions. One reason for multitude of definitions is that the field of online learning is rapidly changing with educators combining various aspects of online learning with traditional classroom instruction.

This report is focused on online and blended learning. Online learning has many definitions but is marked by being a web-based, educational delivery system. Online learning is characterized by a structured learning environment, to enhance and expand educational opportunities, providing instruction that is teacher-led, and may be synchronous (communication in which participants interact in the same time space such as videoconferencing) or asynchronous (communication that is separated by time such as email or online discussion forums), and accessed from multiple settings (in school and/or out of school buildings). Blended learning involves combining online learning with other modes of instructional delivery and is discussed in detail in Section 5.2.

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

1.2 How online learning is being used

Online learning is being used successfully for a wide variety of purposes. Some examples that show the range of current uses of online learning 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 unavailable;
- providing flexibility to students facing scheduling conflicts;
- affording opportunities for 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;
- providing credit recovery programs for students that have failed courses and/or dropped out of school, allowing them to get back on track to graduate;
- helping students that are currently performing below grade-level to begin catching-up through blended learning;
- addressing the needs of the Millennial student;
- providing on-demand online tutoring;
- 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.

1.3 Types of online education programs

There are many types of online education programs such as state virtual schools, charter schools, multi-district programs, single district programs, programs run by universities, blended programs, private schools, and consortium based programs to name some of the more common program types. Every online program can be described based on a series of defining dimensions as shown in figure 2.

Figure 2: The Defining Dimensions of Online Programs

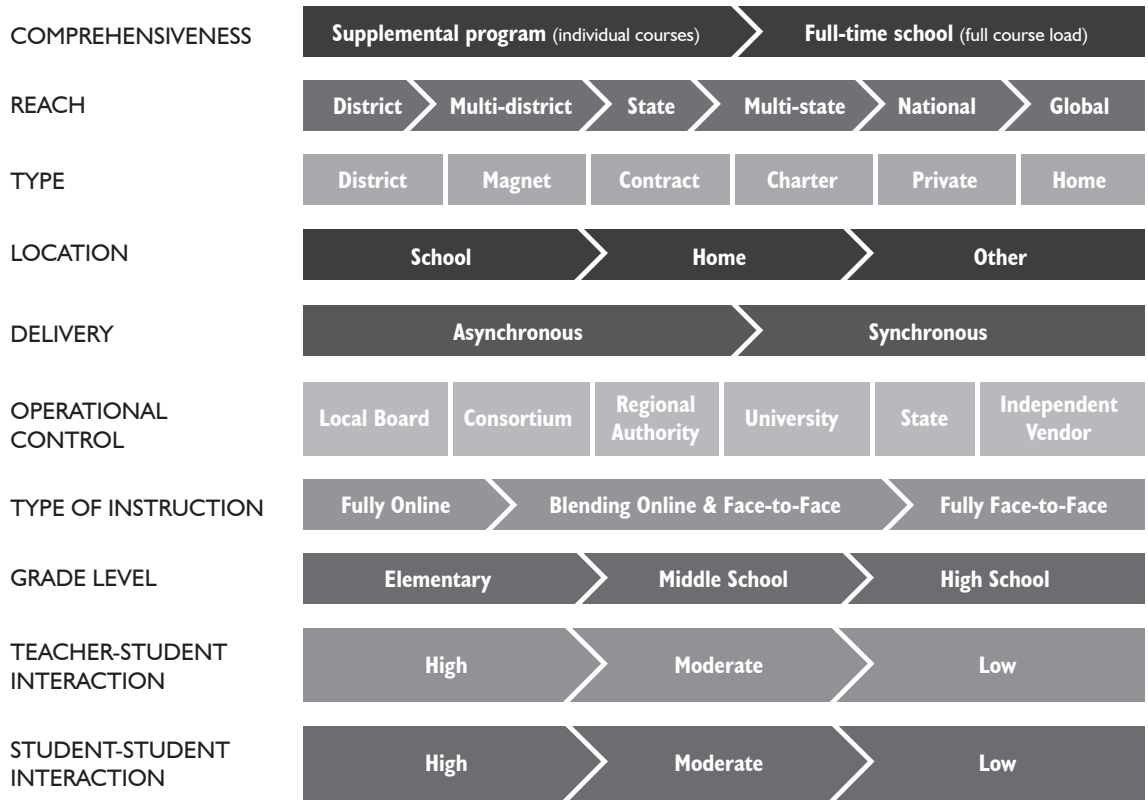


Figure adapted from Gregg Vanourek, *A Primer on Virtual Charter Schools: Mapping the Electronic Frontier*, Issue Brief for National Association of Charter School Authorizers, August 2006.

These various dimensions represent hundreds of thousands of potential online program configurations although in practice there is a much smaller number of likely configurations. Sometimes a program will fall into a single category for a dimension or at least the program can primarily be described by a single category for that dimension (e.g. state virtual schools tend to be supplemental programs), while for other dimensions a program is described by multiple categories (e.g. a program might serve elementary, middle school, and high school students). Finally, for some dimensions, a program might best be described along a continuum of possibilities (e.g. for type of instruction, a blended program may fall close to "fully online" or "fully face-to-face" or some place in the middle).

CASE STUDY SNAPSHOT

Supplemental Online Programs

A supplemental online program is an online program that enrolls students in individual courses as opposed to a full course of study. The online course provides a supplement to the face-to-face courses taken by the student at his/her "regular" school. Some of the biggest supplemental programs are state virtual schools. As of Fall 2010, 30 states were operating state virtual schools. The largest, and one of the oldest of the state virtual schools, is the Florida Virtual School (FLVS) which began offering courses in 1997 and provided 213,296 semester course enrollments to students in grades 6-12 during the 2009-10 school year.

Florida has a very supportive policy environment for online learning. The funding of FLVS is built directly into the state education funding formula. In addition, any student that wishes to take a FLVS online course can't be denied that opportunity by their local school district. The positive policy environment isn't the only reason for Florida's success. The online teacher builds a relationship with each student which is critical for a positive experience. The teacher is available to the students during the afternoon and evenings, in order to accommodate the students' schedules.

While funding for FLVS is part of the state education funding formula, it is different from the formula for a brick-and-mortar Florida school district in two important ways. First, it is performance-based—FLVS only receives funding for a student who successfully completes the course. This leads to the second difference—the formula isn't seat-time-based because successful completion means demonstrated mastery of the content can be accomplished in either less, the same, or more time than the traditional school schedule.

While Florida has had a state virtual school for over a decade, Vermont just opened the Vermont Virtual Learning Cooperative (VTVLC) in 2010. The leadership of the Vermont program took advantage of the fact that there were many supplemental programs already in operation and has combined the best features of existing models to form a program that meets the needs of the students and schools in Vermont. VTVLC has been organized as a consortium of schools. Each of these schools provides an online teacher for one course by releasing a teacher from teaching one face-to-face course. By contributing a teacher, the school gets the benefit of being able to enroll 25 of their own students per term in any VTVLC courses. Vermont schools that don't provide an online teacher are able to purchase any enrollments not used by the schools within the consortium.

Individual school districts are also creating supplemental online programs. For example, the Hamilton County Virtual School in Tennessee has a supplemental program that focuses primarily on credit recovery for high school students during the school year. The district also operates an innovative online reading and math summer program for Title I students grades K-8. The goal of the program is to augment the student's learning so that the student will be better prepared to be successful the following school year.

Recognizing that struggling students enter at different academic achievement levels, the online teachers in the Title I summer program create a personalized learning path for each student based on the student's performance on state assessments. At the end of each week, each student's learning path is adjusted based on their previous week's performance. During the 2010 summer term, 83% of the students succeeded in mastering the content from their individual learning path.

Another supplemental program that provides personalized learning options is the Gifted LearningLinks program offered by Northwestern University. During the 2009-10 academic year, this program served over 1,400 gifted students from around the world. The program ranges from providing honors, Advanced Placement, and university courses for students grades 6-12, to enrichment courses for students grades 3-8, to providing a family enrichment experience for students grades K-2.

The grades 3-8 enrichment program includes the opportunity for students to develop a proposal for an independent study in a subject area of interest. If the proposal is approved, the student is paired with an appropriate mentor allowing for truly remarkable learning opportunities. In one case, a 5th grade student participated in an independent study bio-engineering course. As a result of the course, the student designed and built a fully-functional working prosthesis for his friend. In another case, a group of elementary students organized an architecture club and arranged for weekly presentations from renowned architects all over the world.

The defining dimension approach is very helpful in describing an online program in detail. Of the ten dimensions listed in the figure, four of these dimensions are especially significant:

- **Comprehensiveness (Supplemental Programs vs. Full-time Programs):** One important distinction is whether the online program provides a full set of courses for 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.
- **Reach**: Online programs may operate within a school district, across multiple school districts, across a state, or in a few cases, nationally 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.
- **Delivery (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.
- **Type of Instruction (A Spectrum from Fully Online to Fully Face-to-Face):** While previously most online programs were fully online (both full-time and supplemental programs), many programs are now combining the best aspects of online and classroom instruction to create a variety of blended or hybrid learning experiences.

1.4 Growth of Online Learning

Online learning is growing and evolving rapidly across the United States at all levels of education. The K-12 landscape is constantly changing. The growth is so rapid publications that include specific statistics and data are at risk of being out-of-date before they are published.[2] Although K-12 education lags behind post-secondary in using the Internet to teach, many states and school districts are realizing the benefits of online education which allows students unparalleled equity and access to high quality education unconstrained by time and place.

In one sense, it could be said that in all 50 states online learning options are available to at least some students. However in a few states the online learning options are highly restricted to a very small percentage of the student population that this can be viewed the same as online learning activities not existing in the state. Based on this view, *Keeping Pace* indicates that as of the end of 2010 supplemental or full-time online learning opportunities are available to at least some students in 48 of the 50 states and Washington DC.[3] *Keeping Pace*[4] also indicates:

[2] Since 2004, John Watson of the Evergreen Education Group has led an annual effort to provide the current status of K-12 online learning with the publication of *Keeping Pace with K-12 Online Learning: An Annual Review of Policy and Practice*. The most recent and previous editions of the publication are available for download at http://www.kpk12.com.

[3] Watson, J., et. al. (2010). *Keeping Pace with K-12 Online Learning: An Annual Review of Policy and Practice*. Evergreen Education Group.

[4] Ibid.

- 38 states have state virtual schools or state-led online initiatives, and Alaska is planning to open a statewide online learning network in 2011
- 27 states plus Washington, DC have full-time online schools serving students statewide
- 20 states are providing both supplemental and full-time online learning options statewide

It is clear that the number of students participating in online learning is rapidly growing, but attaining exact numbers can be challenging. The best national data regarding total K-12 students participating in online learning is from the Sloan Consortium[5] which estimated that in 2007-2008, there were 1,030,000 students in the United States enrolled in online or blended learning courses. The Sloan Consortium estimate is based on a survey sent out to a random sample of approximately 10,000 school districts. The enrollment figure represents a 47% increase since their 2005-2006 survey. Based on this level of growth, iNACOL estimates that over 1.5 million K-12 students were engaged in online and blended learning for the 2009-2010 school year.

Additional participation data is available about state virtual schools and virtual charter schools but the data is not complete. Survey data gathered as part of the research for the 2009 Keeping Pace publication shows an estimated 245,000 students enrolled in 24 state programs for the 2008-2009 school year[6]. However, data was not available for 9 additional states with state virtual schools or state-led online initiatives. For full-time programs, as of March 2010 the charter school database from the Center for Education Reform lists 220 virtual charter schools in 26 states with total enrollment of 119,920.[7] While this is the most complete data available, it appears to be missing some virtual charter schools and enrollment figures for specific schools may be several years old. In addition, there are full-time virtual schools that are not charter schools, specifically in Colorado, Florida, and Washington. A somewhat conservative estimate of full-time virtual school enrollments would be 200,000 students from roughly 250 schools in 27 states.

1.5 The cost of online learning

The cost of online learning is not a simple topic. The wide variety of online programs means that not all programs have the same types of costs. For example, full-time programs have costs associated with administering required state assessments, a responsibility that doesn't exist for supplemental programs. Another difference in program costs has to do with the decision for a program to develop its own online courses vs. the decision to license course content. The former will result in some large up-front costs, while the latter will result in higher ongoing operational costs.

An independent study found that the "operating costs of online programs are about the same as the costs of operating brick-and-mortar schools."[8] In general online programs have cost savings due to less need for physical classrooms and other facilities, but these savings are offset by the need for hardware, software, and

[5] Picciano, A., & Seaman, J. (2009). *K-12 Online Learning: A 2008 Follow-up of the Survey of U.S School District Administrators*. Retrieved May 6, 2010 from http://www.sloan-c.org/publications/survey/pdf/k-12_online_learning_2008.pdf

[6] Unpublished survey data from 2009 Keeping Pace with K-12 Online Learning.

[7] Private communication with Alison Consoletti, Director of Research, The Center for Education Reform and data from http://www.charterschoolsearch.com.

[8] Anderson, A., Augenblick, J., DeCesare, D., & Conrad, J. ((2006). *Costs and Funding of Virtual Schools*, Augenblick, Palaich, and Associates. Available for download at: http://www.inacol.org/research/docs/Costs&Funding.pdf.

connectivity for classes, ongoing technical support, comprehensive student support, course development or licensing, and other costs, especially during program start-up.

There are other studies that indicate that online learning is less expensive than traditional forms of education:

- In 2005, the Ohio legislature 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 $5,382 per student, compared to $7,452 for students in brick and mortar charter schools, and $8,437 for students in traditional, non-charter schools. Technology made up 28% of the spending followed by instruction at 23%, administration at 1% and curriculum at 9%. The report concluded that these costs are "reasonable."[9]
- In 2008, Cathy Cavanaugh conducted a survey of 20 directors of full-time virtual schools that showed an average yearly cost for a full-time online student at $4,310[10] compared to the national average 2006-2007 per pupil spending of $9,683.[11]
- In 2010, the Alliance for Excellent Education reported that "the state virtual system in Wisconsin calculates that the average per-pupil cost is $6,500 in the virtual system" compared with the "national average of almost $10,000 per pupil in a traditional system."[12]

While each of these reports indicates that online learning costs less than traditional schools, it is important to note that the funding mechanisms for online learning are different than traditional schools and typically result in lower per pupil funding. If online schools receive less money, it isn't surprising that they spend less money as well. The fact that these online schools are spending less money doesn't automatically mean that they are receiving adequate funding.

Not all benefits of online learning result in an outright reduction of expenses. However, online learning can make the previously unaffordable, possible. Often a traditional school chooses not to offer courses with low demand because it is too expensive to dedicate a teacher and space for only a few students. Online learning makes it affordable to offer these courses because the students no longer have to come from one school or a single geographic area. Students can be pooled to create sufficient demand for the course to be cost effective.

When a student who is enrolled in a traditional school that doesn't offer Advanced Placement® courses[13] is able to take AP® Physics through a supplemental program there is a cost associated with this course. However, this cost is minimal compared to the cost that would be required for the face-to-face school to offer the course. In a similar manner, a cyberschool may be able to offer a course such as Mandarin Chinese because there are enough students from the expanded enrollment area interested in taking the course, thus making the course affordable.

[9] Ohio Legislative Committee on Education Oversight. (2005). *The Operating Costs of Ohio's eCommunity Schools*. Available for download at: http://www.loeo.state.oh.us/reports/PreEleSecPDF/eSchools2_Web.pdf

[10] Cavanaugh, Cathy. (2009). *Getting Students More Learning Time Online*. Center for American Progress, page 12.

[11] National Center for Educational Statistics. (2009). *Fast Facts*. Retrieved June 4, 2010, from http://nces.ed.gov/fastfacts/display.asp?id=372.

[12] Wise, Bob, & Rothman, Robert. (2010). The Online Learning Imperative: A Solution to Three Looming Crises in Education. *Alliance for Excellent Education Issue Brief*.

[13] According to the US Department of Education, over 40% of high schools do not offer any AP® courses. Retrieved June 17, 21010, from http://www2.ed.gov/about/inits/ed/competitiveness/expanding-apip.html.

CASE STUDY SNAPSHOT

Full-Time Online Programs

A full-time online program is a school where students take their entire course of study online. Many full-time online programs are charter schools, although some states such as Washington and Colorado do not allow virtual charter schools but have other policy provisions for full-time online schools.

The nature of online learning allows for a full-time only school to draw from a wider geographic area than a traditional school district. As of the 2010-11 school year, 27 states plus Washington, DC had full-time online schools that are able to draw students from across the state. A large number of these schools are operated by national education management organizations (EMOs) such as Connections Academy, K-12, Inc. and Insight Schools.

Not all full-time online programs have a state-wide scope, either because of state policy restrictions or because the school district has chosen to create a full-time online program with a more local focus. One example of such a school is the Wolf Creek Online High School, a charter school authorized by the Chisago Lakes Schools in Minnesota. While all charter schools in Minnesota do not have geographic boundaries, 47% of Wolf Creek students come from the local school district and another 35% of the students come from a neighboring school district.

The reason for this local focus is that Wolf Creek provides many on-campus program offerings two days a week that can be combined with the online course offerings. While the on-site component is not required, about 70% of their students choose to come on campus at least one day a week. Another advantage of the on-campus presence is that it allows students to participate in traditional high school activities such as sports.

Wolf Creek has a very strong emphasis on personalization. Part of the school's philosophy is that each student, even if he/she has not been successful in a traditional school setting, will make progress. Each student is assigned an advisor, called a Learning Manager, who works with the student and his/her parents to establish an Individual Graduation Plan (IGP). This plan includes decisions on participation in the on-site program offerings. The Learning Manager has an ongoing support role for the student, making sure the student is successful and is obtaining any needed support services.

Wolf Creek has been in operation as a charter school since 2002 and serves approximately 150 students grades 10-12. Prior to being a charter school, they were a "school within a school" in their local school district.

In some cases, school districts may start with supplemental online learning options and then expand to a full-time program. Such is the case with the Los Angeles Unified School District (LAUSD), the second largest school district in the nation. While the district has provided a variety of supplemental online learning programs for a number of years, beginning in 2010 they started operation of a full-time online school called the City of Angels Virtual Academy. LAUSD created their full-time online program based on the strong belief that the district needs to offer a wide variety of educational options so that all students' needs are met.

In its initial year of operation, City of Angels has the capacity to serve up to 650 full time students in the ninth and tenth grades. Each year, the school will add one or two additional grades. Initially, the school will expand to serve students grades 9-12 and then will move on to serving middle school students and finally elementary school students.

Full-time online students are typically considered Independent Study students in California. Since LAUSD had a longstanding Independent Study high school, City of Angels Virtual Academy (COAVA) was embedded into the existing Independent Study high school. This arrangement proved to be an advantage as far as developing online courses for COAVA. The Independent Study high school already had purchased physical textbooks for their existing programs. These textbooks came with an online version, and so there was no additional licensing cost to use this content as the basis for the locally developed online courses. LAUSD works closely with the publishers in the delivery and assures compliance with licensing. In addition, the program uses courses from the University of California College Prep (UCCP) program. If a student has a course need that can't be satisfied through one of those course options, COAVA utilizes content from one of the commercial online course providers used by the district's supplemental programs.

1.6 Common myths about online learning

Because online learning is a relatively new phenomenon beyond the direct experience of many policy-makers and parents, misconceptions abound. The following common myths are from a 2006 iNACOL research project. The presentation of these myths along with the reality are taken from the 2008 Michigan Online Learning Report[14].

MYTH: **Online learning is just a high-tech version of the old correspondence course.**

REALITY: Many online courses are teacher-led, with extensive interaction between teachers and students, and often between students. Online courses also often include video, audio, animation, simulations, and other media elements that provide a very different learning experience than a correspondence course. Online learning also offers immediate access to research sources and supplemental content not available in correspondence courses.

MYTH: **Online students spend all of their time in front of a computer.**

REALITY: Many students take only one or two of their courses online, and have most of their courses in a physical school. For students who do take all their courses online, they usually have many activities that are not online, including reading books or other documents, paper-based homework activities, science labs and field trips.

MYTH: **Online learning is essentially "teacher-less."**

REALITY: Not only are teachers heavily involved in online courses, online teachers report that they know their students better online than in a face-to-face course.

MYTH: **Online courses are easy to pass.**

REALITY: The level of difficulty of online courses varies, in the same way that the level of difficulty of face-to-face classes varies by course, teacher and other variables. Classes such as Advanced Placement® and honors courses are clearly challenging. Students in some online programs' AP® classes have done as well or better than the national average on AP® exams, suggesting that these courses are at least as rigorous as their face-to-face counterparts.

MYTH: **Students are able to cheat easily in online courses.**

REALITY: Most online teachers believe this issue is handled fairly easily through a combination of teacher practice and technology. The teacher may require that quizzes and exams be proctored, and the learning software ensures that a student can't enter an assessment more than once without permission from the teacher. Additional software may be used to compare students' work against resources available on the Internet, to make sure that students aren't plagiarizing easily available resources. Teachers base student grades on a range of assignments and tests, thus ensuring that students do most of the work required in order to pass the class.

[14] Watson, John. (2008). *The Michigan Online Learning Report*, Michigan Virtual University. The Michigan report was adapted from the original version of *A National Primer on K-12 Online Learning*, with a focus on Michigan state-level policies and on the practices of the Michigan Virtual University®.

MYTH: **Online learning is only good for highly motivated, highly able students (or conversely, only for dropouts and students in need of remediation).**

REALITY: Online programs serve a range of students. Some programs focus on high-achieving students, others focus on at-risk or credit recovery students, and many programs serve many different types of students.

MYTH: **Online learning is much cheaper than face-to-face instruction.**

REALITY: Some people expect that because online programs do not require school buildings they will be much less expensive than traditional schools. However, for an online program its technological infrastructure is the equivalent of the school's physical facility, and the hardware and software can be expensive. In addition, many online programs maintain student-teacher ratios similar to the ratios of traditional schools. For these programs, as with physical schools, a major cost is in teachers and other personnel, and these costs increase in a linear fashion with the increase in the number of students.

MYTH: **Online students are isolated from their peers and shortchanged on important socialization skills.**

REALITY: Many online programs are primarily supplemental, meaning that the students take only one or two courses online while receiving the rest of their classes in their physical school. Full-time programs often bring students together for field trips and other activities.

1.7 Issues and challenges

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:

- **Myths and Misconceptions:** As detailed in Section 1.6, common myths regarding online learning still exist. Online learning is new enough that many people still believe the myths, not the realities.
- **The growth in online education has outpaced education policy in many states:** Significant time, effort, and money has been invested by commercial vendors and online programs updating the format, rigor and relevance of content creating some of the most engaging and learning-level appropriate lessons in education today. However, development has outpaced the regulations. Often administrative rules try to make virtual learning fit into a traditional mode creating unnecessary work and stifling scalability. An analysis of the information contained in the 2009 Keeping Pace document indicates that 70% of states had some policies in place that specifically addressed online learning quality. However, there is still significant work to be done at the state level and even beyond the 30% of the states that don't have online learning policy as there is great variance in states that do have policies in place.
- **Funding for online students and programs has not been resolved:** Funding of online education is a complicated and sometimes controversial topic. Key funding issues include:
    - In some cases, most often in virtual charter schools but also in some state virtual schools, funding follows the student. While this concept is not new, virtual schools can draw students

from a wide geographic region and/or the entire state. This creates a new competitive dynamic that has created significant controversy in some states despite the fact that nationwide virtual charter schools only represent 4% of total charter school enrollment.[15]

- In other cases, often in state virtual schools, funding does not follow the student. These programs are normally funded with a fixed appropriation, which ultimately creates a limit on the total number of students that can be served. It has also led to complaints that online students are being double-funded. A few states have implemented a funding model based on the number of students or enrollments provided (FTE or full-time-equivalent based model).

Not only are teachers heavily involved in online courses, online teachers report that they know their students better online than in a face-to-face course.

- Florida pioneered a model where funding was only provided when students were successful. Aspects of this model now appear in other states. These funding models still need to account for the costs involved in serving students that are not successful based on performance.
- School districts may find there are restrictions in obtaining funding for students enrolled in a district online program. Quite a few states require the student to be physically present at the school and under the direct supervision of a school employee in order for that student to be counted in the state education funding formula.[16] Some states have established policies that will allow for exceptions to this funding rule.

- **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 assumed, 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 ensuring that online programs are available to students with disabilities. As online programs become increasingly mainstream, they must continue this commitment.

- **Online learning as educational transformation:** Online learning needs to be more than taking the traditional classroom and putting it online. However, for online learning to realize its potential, schools will need to invest in the necessary professional development and re-think technology policies that interfere or prohibit students from utilizing current technologies. Most students in the 21st century don't think of technology as something separate from daily life. Are schools ready to have technology be fully integrated into the learning process?

[15] Analysis of data obtained on April 24, 2010 from The Center for Education Reform. National Charter School Directory at www.charterschoolsearch.com and National Charter Schools & Enrollment Statistics 2009 at www.edreform.com/_upload/CER_charter_numbers.pdf

[16] This requirement typically doesn't apply to virtual charter schools.

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.

For online learning to realize its potential, schools will need to invest in the necesary professional development and re-think technology policies that interfere or prohibit students from utilizing current technologies.

CASE STUDY

Cook County (Illinois) Sheriff's Department

The largest single site county jail in the United States may not be a location one would associate with an innovative high school online learning program, but the Cook County (Illinois) Sheriff's Department of Community Supervision and Intervention is demonstrating the power of online learning to serve a population that has had very little success in a traditional school setting. In February 2009, the Cook County Sheriff's Department launched their High School Diploma program serving ten students. Since that time the program has grown to 60 students, soon to be expanded to 70 students with the addition of another classroom. In June 2010, the program had its first graduating class of seven students. An eighth student transferred into another online school and also graduated in 2010.

The Cook County Jail is not a youth detention facility but an adult jail. The high school diploma program serves 17 to 21 year olds that have not graduated from high school. (In Illinois, a 17 year old is considered an adult in the criminal justice system and once a person reaches 22, he is no longer able to earn a high school diploma.)

The jail population provides some very unique challenges when it comes to earning a high school diploma (or even credits towards a diploma). In nearly all cases inmates:

- are awaiting trial, so an individual may not remain in the jail for a very long period of time;
- have drug addiction issues;
- have experienced significant physical or emotional trauma; and
- have experienced repeated failure in a traditional school.

Online learning combined with other services has shown promise as a very effective solution to serving this group of students. Each classroom, equipped with Internet-connected computers, is staffed with one or more mentors. The students (maximum of 15/classroom) work on two online courses during their assigned class period lasting between two and three hours, five days a week.

The certified online teachers and the online curriculum are provided by Aventa Learning. Being able to contract for the certified teacher allows the program to offer a much greater variety of courses and especially addresses the problem of finding certified math and science teachers.

By only working on two classes, students are able to complete courses more quickly. The goal is to complete a course in six weeks although students can complete courses more quickly or extend the time if necessary. Rebecca Janowitz, Director of Re-entry Policy stated, "Getting the student to pass his first course is very important. Passing the first course shows the student that he is capable of being academically successful."

Students begin by taking credit-recovery courses in any subject they have previously failed and once they have passed those courses, move on to the other graduation requirements. Every time a student completes a course, that accomplishment is celebrated. In addition to the encouragement and emotional support, additional factors that Janowitz indicates are important for program success include:

- providing other services, such as drug treatment programs, in conjunction with the educational program;
- having the students in an adult dominated environment—it is better for them to be the youngest, not the oldest;
- small settings with mentors that understand how to work with these type of students; and
- the ability for the student to start the program at any time.

The program has also established two off-site classrooms and hopes to add more in the future. The off-site classrooms are able to serve some individuals in the Day Reporting Program by providing an opportunity for additional classroom time in the evening. A potential future use would be to serve students on probation.

2 Teaching, learning, and curriculum in an online environment

2.1 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 learning management system (LMS). The LMS is rarely created by the teacher or online program and usually is a third-party software product.
- Learning management systems[17] 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 and teachers check and respond to email at least once every school 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 resources, including textbooks and hands-on materials, to complement and supplement 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 and collaborative web conferencing 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 and short answer, and matching, as well as project-based and performance-based assessments. Some assessments may be automatically graded by the learning management system using correct answers provided by the teacher, while others require individual assessment and commentary by the teacher.

[17] In some cases, some of the features described below are provided through the integration of the LMS with other software packages. A common example, is integrating a LMS with a web-conferencing package for synchronous communication. For the sake of simplicity, this report refers to all of these features as part of the LMS.

- Some asynchronous courses are self-paced. Students can start and end at any time, and proceed through the course at whatever pace is deemed appropriate by the teacher. Other courses have structured 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 learning management system. However, time online is not equivalent to time in a classroom because it doesn't take into account student activity offline, which may be a substantial part of learning activities. The LMS may also track other information including discussion board posts, emails, and assignments submitted.

2.2 The role of the online teacher

A fairly common misconception about online learning is that in the online environment the teacher is less important than in the classroom. iNACOL has released quality standards specifically related to online teaching that emphasize the importance of the online teacher.[18] These standards were created to provide a set of quality guidelines for online teaching and instructional design and complement the previously issued *National Standards of Quality for Online Courses*.

While teachers remain central to the learning process 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. The nature of learning (and working) is changing 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 just passing information along to developing better thinkers and learners. The role of the teacher, especially at the high school level, is increasingly focused on helping students build 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."[19]

The online teacher's role can be broken down into several categories:

- **Guiding and personalizing learning:** The online teacher is guiding student learning in the online course. There are many ways in which this can be accomplished:
  - assessing student understanding of learning objectives
  - creating and facilitating group discussions
  - developing group projects
  - making constant adjustments to course resources
  - responding to students' questions and concepts that they are finding most challenging

[18] The iNACOL National Standards for Quality Online Teaching as well as the other iNACOL quality standards may be downloaded at http://www.inacol.org/research/nationalstandards/index.php

[19] Pape, Liz. (2005). *High School on the Web*. American School Board Journal. 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.

In most programs there is a face-to-face mentor available to work as a partner with the online teacher on these tasks. 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. Connections Academy uses what it calls the "learning coach" who is often a parent or close relative.[20]

- **Communication:** One of the main roles of the teacher in a student-centered learning environment is to be available regularly and frequently in order to provide guidance. 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 ability of teachers to record everything "said" in class. Disadvantages include the inability of teachers to observe non-verbal cues to determine a student's level of comprehension.

- **Assessing, grading, and promoting:** Both online and traditional classroom teachers are responsible for tasks such as creating 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.

- **Developing the online course content and structure:** The task of developing course content will vary greatly from program to program. Many programs use course content developed by vendors or other online programs. In some cases, this task is completely removed from the online teacher, while in other cases the online teacher still has some of these responsibilities as there is an expectation for the teacher to customize or enhance the course.

  When programs develop their own courses, it is typical for a team of subject matter experts, instructional designers, and web programmers to work together to create the course. The teacher might be one of the subject matter experts involved in course creation or may have no responsibilities related to course development.

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

  - **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. This content is increasingly being developed by publishers, digital content companies, and non-profit organizations.

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

- **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.

2.3 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 further suggests that the skills necessary to successfully teach online often go beyond those required in a traditional classroom. The iNACOL publication, *Professional Development for Virtual Schooling and Online Learning*[21] emphasizes this point by stating that one of the myths related to the professional development required to support online learning is "any regular classroom teacher is qualified to teach online," especially if the quality online content has already been prepared or purchased.

Online programs recognize this myth and most have professional development requirements for their online teachers. In addition, a small number of university teacher preparation programs are beginning to develop certificate programs in online teaching and other continuing education options. Also, the draft 2010 National Education Technology Plan includes "develop a teaching force skilled in online instruction"[22] as one of its recommendations.

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 utilize people who know their technology well, can train teachers before a class starts, and provide ongoing help. The learning management system vendors typically provide teachers in a program with training on their systems, or use a train-the-trainer model where the vendor teaches one person in the program how to use their system and that person becomes the local expert. The technology in a LMS is not difficult to use; teachers with basic computer skills such as web browsing, email, word processing, and presentation 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 electronically. So that teachers experience online education from the student perspective, training is often done online or through a blended or hybrid approach that combines traditional classroom and online learning.

[21] Davis, Niki, Rose, Ray, et.al. (2007). *Professional Development for Virtual Schooling and Online Learning*. iNACOL. Available for download at: http://www.inacol.org/research/docs/NACOL_PDforVSandOlnLrng.pdf

[22] United States Department of Education. (2010, March 15). Draft National Educational Technology Plan: *Transforming American Education: Learning Powered by Technology*. page 50.

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:[23]

- Teachers must develop heightened communication skills, particularly in written communication. In many programs, teachers and students communicate primarily through writing using mechanisms such as email and discussion board postings. Therefore, teachers must "recognize the tone of their writing and pay attention to the nuances of words."
- Teachers must be able to recognize different learning styles and adapt the class to them. To ensure that the course meets all students' needs, 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.
- If teachers have 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 programs employ special education teachers to assist the online teacher.
- 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 multi-media component that requires much more planning than is typical for traditional classrooms.

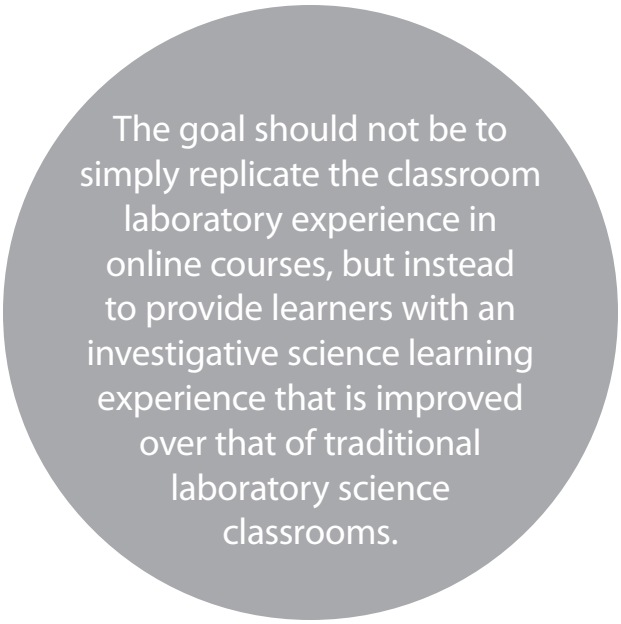
Online teachers are evaluated on many more dimensions than most traditional classroom teachers. This is possible, in part, because of the nature of the learning management system technology which captures teacher-student interactions, class discussions and course content in a way that is not possible in a traditional classroom. The asynchronous nature of a thread discussion makes it easy for a school administrator to "listen" to the conversation, while observing a traditional classroom discussion requires more effort as scheduling and coordination with the classroom teacher is necessary.

[23] 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.

In many online programs, student feedback about instructors is another component of teacher evaluation. This information is typically gathered through anonymous online surveys conducted once or more per term. Even when student feedback is not used as part of the formal evaluation process, it is still normally provided to teachers for use in their self-assessments.

2.4 Science laboratory experiences in online courses

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



While many science courses in a traditional classroom contain hands-on laboratories, that doesn't necessarily mean the laboratory activities contribute meaningfully to the student's scientific understanding. A 2006 report by the National Research Council[24] indicated that "most high school students participate in a limited range of laboratory activities that do not help them to fully understand the scientific process" and concluded that "the quality of current laboratory experiences is poor for most students."

Schools do not always have the funding, physical space, or qualified teachers to offer laboratories for their classroom-based courses. In addition many teachers may not have the necessary certifications to handle chemicals and other laboratory materials.

As stated in the 2008 iNACOL publication, *Goals, Guidelines, and Standards for Student Scientific Investigations*,[25] the goal should not be "to simply replicate the 'classroom laboratory' experience in online courses" but instead to "provide learners with an investigative science learning experience that is improved over that of traditional laboratory science classrooms." This report notes that, "Scientific inquiry, both in traditional courses and online courses, can include a variety of learning experiences, including simulated, virtual, remote, and hands-on experimentation."[26]

Not only can well designed online science courses address the educational goals associated with traditional laboratory experience, virtual and remote lab experiences have some specific advantages:

[24] Singer, S. R., Hilton, M. L., & Schweingruber, H.A. (2006). *America's Lab Report: Investigations in High School Science*. National Research Council Committee on High School Science Laboratories: Role and Vision. Board on Science Education, Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

[25] Jona, K., Adsit, J., & Powell, A. (2008). Goals, Guidelines, and Standards for Student Scientific Investigations. iNACOL. Available for download at: http://www.inacol.org/research/docs/NACOL_ScienceStandards_web.pdf

[26] Ibid. page 6.

- There is no time required for setting up or breaking down laboratory equipment. This time savings allows for more student time on task and more effective use of teacher time.
- Virtual labs can be used when safety concerns would limit the opportunity for hands-on lab experiences.
- Virtual and remote labs allow for access to equipment, materials, and experiments that may not be available in a typical classroom lab setting because of cost, space, or safety issues.

2.5 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 first issue, meeting state learning standards, 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 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.

The second issue, the need for specific online course quality standards, is addressed in iNACOL's *National Standards of Quality for Online Courses*[27] which was published in 2007. After conducting a comprehensive literature review of existing course standards, iNACOL determined that the Southern Regional Education Board's (SREB) *Standards for Quality Online Courses*[28] were the most comprehensive standards available. In addition, they were already in use by 16 states that are part of SREB. The iNACOL standards are a full endorsement of these standards along with an additional standard addressing 21st Century Skills.

The quality standards are comprehensive in nature addressing the following topic areas:

- The **Content** standards address items such as learning objectives being clearly stated, content being aligned to appropriate state and national standards, content having sufficient rigor, incorporation of information literacy in the curriculum, respecting copyright, and addressing issues such as academic integrity and privacy.
- The **Instructional Design** standards focus on appropriate organization of content, level of student engagement, differentiated learning, higher order thinking skills, and appropriate instructor-student and student-student interaction.
- The **Student Assessment** standards identify the need for assessment to be frequent and ongoing, consistent with the course objectives, and helpful to the student in understanding his/her progress in the class.

[27] The iNACOL National Standards for Quality Online Courses as well as the other iNACOL quality standards may be downloaded at http://www.inacol.org/research/nationalstandards/index.php

[28] Available from www.sreb.org

- The **Technology** standards address areas such as ease of navigation, allowing teachers to add content to the course, orienting the student to the environment, technical support, and providing information to students regarding technology requirements.
- The **Course Evaluation and Management** standards look at how feedback is obtained about the effectiveness of the course, how the course is maintained and updated, and does the course provider have appropriate authority to offer the course in the locations served.
- The **21st Century Skills** standard requires the course to emphasize those items the Partnership for 21st Century Skills[29] has identified as important skills for today's society.

iNACOL provides a fee-based course review service where course providers and online programs can have their courses evaluated in regards to the quality standards. The course review service provides a complete report on how the submitted online courses meet the iNACOL quality standards but it is not an accreditation or endorsement of specific courses.

2.6 Assessing students in online courses and programs

As noted previously, 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 specify whether the course was delivered online. 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 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 supplemental 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 required state assessments. 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 to allow online schools to model Virginia's fully web-based, distributed testing online assessment system.

In addition to the challenges for cyberschools, states may be missing an opportunity to increase the effectiveness of testing by requiring the assessments be in physical locations in a paper format. The U.S.

[29] http://www.p21.org

Department of Education noted in a 2004 report, "One of the major requirements for NCLB is annual assessment of students in core subjects beginning with reading and math. [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."[30]

2.7 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.

2.8 Student support

A key challenge for online programs is providing effective support for their students. Support needs include both technical (i.e., issues of accessing the course, problems with computers or software, etc.) and academic (i.e., 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).

[30] United States Department of Education, Office of Educational Technology. (2004). *Helping Practitioners Meet the Goals of No Child Left Behind*.

- Most full-time programs offer a mentor or "learning coach" to help students be successful in the online environment. At the high school level, the mentor is usually a staff member specially trained to assist the students on a daily basis on items such as study skills, social issues, attendance, and school events. At the elementary level, the "learning coach" can be a parent, grandparent or a responsible adult partnering in the education process.
- 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 support options for students with disabilities. Courses and learning management software must be developed to be compliant with the Americans with Disabilities Act (ADA). For example they should address the needs of 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. Additional information on access and equity issues may be found in the iNACOL Research Committee issues brief, *Access and Equity in Online Classes and Virtual Schools*.[31]

2.9 Isolation and socialization issues[32]

Typically concerns about socialization in online learning are focused on full-time virtual students, who may be perceived—correctly or not—to lack contact with their peers and opportunities to participate in extracurricular activities. This concern is not typically raised for supplemental programs because students are taking only one or a small number of courses online, often from a physical school that they are attending. However, the online learning socialization strengths discussed below apply to both full-time and supplemental programs.

[31] The research brief may be accessed at: http://www.inacol.org/research/docs/NACOL_EquityAccess.pdf

[32] Information in this section is primarily from the iNACOL Promising Practices in Online Learning publication, Socialization in Online Programs, published in September, 2008. All reports from the Promising Practices series are available for download at http://www.inacol.org/research/promisingpractices/.

Online learning also allows for a more democratic communication environment. Physical attributes such as gender, ethnicity, or physical disability that often shape our views of others are not immediately apparent in most forms of online communication.

The concern expressed about full-time programs is largely unwarranted. Full-time programs often schedule in-person field trips and full-time and supplemental programs have both created extracurricular activities and clubs for their students. Furthermore, this concern takes a very narrow view of socialization. In the broader sense, sociologists define socialization as "the process by which, through contact with other human beings, one becomes a self-aware, knowledgeable human being, skilled in the ways of a given culture and environment."[33] While for most adults, "contact with other human beings" implies in-person contact, this is not the case for the typical student. Today's middle and high school student has grown up with the Internet and sees online communication such as texting and Facebook as a natural and integral part of their social interactions.

Online learning has the potential to excel in the area of academic-related social interaction. Quality online teaching involves extensive teacher-student communication and quality online courses incorporate significant student-student communication. Furthermore, students learn to utilize a wide variety of communication mechanisms. Through required teacher-student communication and assignments that require peer collaboration, a student may communicate by phone, email, threaded discussion, chat rooms, blogs, wikis, skype, sharing of documents, and journaling. These types of communication mirror the real world in which employees from different offices work together on a project. As a result, online learning is directly preparing students for the modern workplace.

Another method of social interaction utilized in full-time programs and also in some supplemental courses is the virtual classroom utilizing web conferencing systems such as Elluminate, Wimba, or Adobe Connect. These systems allow for multiple simultaneous communication mechanisms including audio (either over the computer or through a phone), text chat, shared white board, desktop video, and computer desktop or application sharing. There are many ways in which the virtual classroom is used to enhance online learning. Some examples include:

- Individual or small group tutoring sessions
- Oral component of a world language course
- Circle time for an early elementary class
- Assemblies, allowing school-wide gatherings and even students from multiple schools to hear a guest speaker

[33] Giddens A., Duneier M., & Appelbaum, R. (2005). Introduction to Sociology, 5th Edition. W. W. Norton & Company, Inc.

- Students in a math course demonstrating problem solving techniques and explaining understanding of underlying mathematical concepts
- Open houses for the parents and guardians of students
- Teacher office hours

Online learning also allows for a more democratic communication environment. Physical attributes such as gender, ethnicity, or physical disability that often shape our views of others are not immediately apparent in most forms of online communication. In a traditional classroom, discussions are frequently dominated by a few students while all students are able to participate in a threaded-discussion board.

Finally, the online classroom is more likely to bring together students from different backgrounds. In a traditional classroom, the students are all from the same community, but in an online classroom students may be enrolled from across a state or even from all over the world. As students communicate with people from different backgrounds, they are exposed to a variety of perspectives and develop communication skills that are important for our global economy.

The following are just a few examples of how both full-time and supplemental programs are providing socialization opportunities for their students:

- Michigan Virtual School, a state virtual school, creates teams of two or four high school students from different schools as part of its Online Scholars Community Advanced Research (OSCAR) program. The students in the program conduct in-depth research on a topic of interest and utilize the Internet and other online tools to conduct and present their research in a collaborative environment.
- Connections Academy utilizes parent volunteers as community coordinators at their full-time virtual schools. These coordinators are responsible for implementing field trips and social activities. Examples of activities include trips to museums and zoos, attending a concert at a symphony and a trip to a water park. Roughly half of the students and families that are enrolled in Connection Academy schools participate in these activities.
- Insight Schools holds a traditional prom every spring in each state where they operate. In addition, they offer the "Elluminate Series" which is a national, online school-wide assembly allowing hundreds of students from the Insight network to meet together on a monthly basis to interact with world-class speakers including rock stars, politicians, Olympic athletes, and a holocaust survivor. Clubs and activities such as yearbook, school paper and student government associations provide a full complement of socialization opportunities for Insight students.
- Aventa Learning programs support both part-time and full-time virtual learning students accessing courses through traditional public school districts. Aventa students participate in weekly synchronous Elluminate sessions and discussion forum activities. Students also have the opportunity to collaborate and develop their writing, multi-media, design, and organizational skills as editors and contributors to a student online literary magazine.

3 Technology for online programs

Technology issues are obviously an important factor 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.

Smartphones have become a viable way to access the Internet and their popularity will likely increase.

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. The software may, with some exceptions, be on its way to becoming a commodity, judging by the vendors' focus on price and services.

However, as school districts begin to increase their use of online and blended learning, some may discover they do not have sufficient computer access for their students or sufficient network capacity to support multiple classrooms of students accessing the Internet. One-to-one computing programs (see section 3.3) may be one way to address this issue. Mobile learning (see section 5.3) has the potential to have a significant impact on what type of hardware is required.

One of the key "technology" issues in online learning is more generational in nature than strictly a technology one. The Millennial generation students in K-12 schools today are children of a digital age. 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."[34] 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.

[34] Levin, Douglas, & Sousan Arafeh. (2002). The Digital Disconnect: *The widening gap between Internet Savvy Students and their Schools*. The Pew Internet & American Life Project.

3.1 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 learning management system (LMS):** As discussed in section 2.1, the 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 LMS 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. It is used 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 with sufficient bandwidth to host the courses. The bandwidth must be sufficient to sustain peak periods of teacher and students' usage without a reduction in performance. Synchronous programs require additional servers and bandwidth to operate the interactive classroom component of the program. Most vendors that provide learning management systems and virtual classroom services also have an option to provide hosting.
- **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 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 superior learning experience. Often students in supplemental programs 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 service.
- **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.

3.2 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.

According to a 2006 report from the National Center for Education Statistics citing 2003 data, "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."[35]

Some online programs address these digital divide issues by loaning computers, printers, and other tools to students and by 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 solutions to these issues.

3.3 Future technology changes

Online education programs are innovators of technology for teaching and learning—lots of people use it for teaching and learning (poorly). They are also 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 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 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 at the same time 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:

[35] DeBell, Matthew, & Chapman, Chris. (2006). *Computer and Internet Use by Students in 2003*. National Center for Education Statistics, United States Department of Education.

- 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, especially laptop computers, continues to drop. The introduction of netbook computers, which still contain sufficient features for online learning, provides an even less expensive option.
- 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.
- Following the path of post-secondary institutions, more teachers will use Internet resources and learning management systems for their traditional classroom classes.
- Schools' administrative technology, such as student information systems, in the era of the common core, will increasingly be standards-based, and connect to instructional functionality.
- Smartphones have become a viable way to access the Internet and their popularity will likely increase. Smartphones have introduced the concept of the phone "app" which, in some cases, provides an alternative to a browser for accessing Internet content. The changes in how students access web content will likely impact how digital content and course materials are presented.

4 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 of teacher communication, student involvement, the quality of material available online, and the academic rigor of many online courses. Still, many ask the question as to whether online learning is equally, more, or less effective than traditional classroom teaching.

While there are still relatively few published research studies on the effectiveness of K-12 online learning, the research conducted so far has generally concluded that online learning is as effective as traditional classroom learning. Furthermore, online learning has shown to be effective with a variety of approaches and types of learners. In 2009, the U.S. Department of Education (DOE) released a meta-analysis of 51 online learning studies[36] which is the most in-depth study to date. The DOE confirmed the lack of K-12 specific studies, with 44 of the 51 studies dealing with older learners. The report does include "findings with implications for K-12 learning" but "caution is required in generalizing to the K-12 population."

Two key findings of the meta-analysis are:

- "Students who took all or part of their class online performed better, on average, than those taking the same course through traditional face-to-face instruction."
- "Instruction combining online and face-to-face elements had a larger advantage relative to purely face-to-face instruction than did purely online instruction."

A summary of this study along with a literature review of 15 other studies on the effectives of online learning conducted between 1989 and 2004 is contained in the iNACOL publication, *A Summary of Research on the Effectiveness of K-12 Online Learning.*[37]

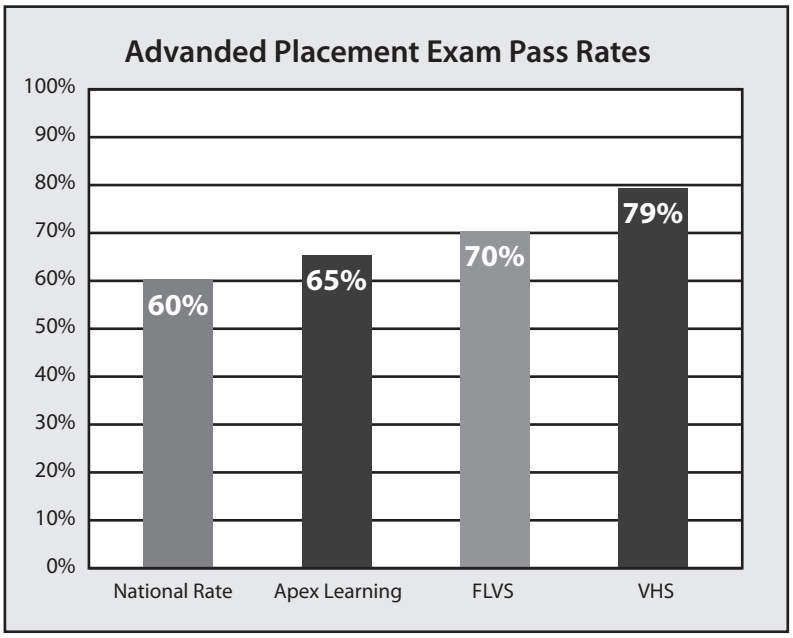
Beyond formal research, individual programs look at a variety of measures as part of ongoing internal program reviews to determine the effectiveness and quality of their program. Full-time online students take state assessments that are required of all public school students, and full-time online schools are subject to state accountability measures and accreditation just like brick-and-mortar schools. Supplemental online

[36] Means, B. Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). *Evaluation of Evidence-Based Practices in Online Learning: a Meta-Analysis and Review of Online Learning Studies,* United States Department of Education, Office of Planning, Evaluation, and Policy Development, Policy and Program Studies Service.

[37] Available at http://www.inacol.org/research/docs/NACOL_ResearchEffectiveness-lr.pdf.

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:[38]

Figure 3: Advanced Placement Exam Pass Rates



While internal program reviews are an important part of improving the effectiveness of individual programs, formal independent external program reviews are equally important. An external program review may be broad in focus, examining the overall quality of the program, or may be narrower in focus, examining a specific part such as the quality of the program's online courses.

iNACOL has released three national quality standards[39] that can be use as benchmarks for the conducting of an external program review:

- *National Standards of Quality for Online Courses* – published September, 2007
- *National Standards for Quality Online Teaching* – published February, 2008
- *National Standards for Quality Online Programs* – published October, 2009

[38] Smith et. al. (2005).

[39] The standards are available for download at: http://www.inacol.org/research/nationalstandards/index.php.

5 Emerging trends

The initial adoption of K-12 online learning began in the late 1990s and early 2000s. Students primarily had two options available to them. One option was to enroll in a full-time cyberschool. These schools were normally charter schools and often initially served students in grades K-8, although over time they expanded to serve students in high school as well. Most often the schools would be available to any student in the state in which they operated, although some states had limitations that prevented state-wide enrollment.

At the same time, other programs began to provide online courses on a supplemental basis. Students would remain enrolled in their local school but could enroll in one (sometimes more) online courses as a supplement and compliment to their existing educational opportunities. Supplemental course offerings were provided primarily through state virtual schools, a few universities, and innovative organizations such as the Virtual High School which created a consortium of schools across multiple states and countries to provide online courses in a cooperative model.

Initially these options were only available to a small percentage of students. By 2001, approximately ten states had state virtual schools and even fewer states had full-time multi-district cyberschools. Even today, whether or not a student has the option to participate in either a supplemental or full-time online program is largely a matter of state policy and laws where the student lives, with a few states providing opportunities for most students, a few states providing almost no opportunities, and most states falling somewhere in the middle.[40] The number of K-12 students participating in online learning in the United States is less than 5% of the total student population.

In his book *Disrupting Class*[41], Clayton Christensen predicts that by 2019 half of all high school classes will be online. This prediction implies that online learning for high school students will grow at an incredible pace over the next decade. Three trends critical in facilitating growth are increases in district programs, blended learning, and mobile learning.

[40] Pages 9-11 of *Keeping Pace (2009)* provide a state-by-state analysis of the supplemental and full-time offerings available to students. The publication is available for download at http://www.kpk12.com.

[41] Christensen, C., Horn. M, & Johnson C. (2008). *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*. McGraw Hill.

5.1 District programs

School districts establishing online learning programs have increased dramatically over the past several years. Three years ago, educators involved in district level programs represented 10% of the attendees at the Virtual School Symposium pre-conference session on *How to Start an Online Program*; at last year's session at least 85% of the attendees were people that had recently started or wanted to start a district level online program. This shift in interest indicates that online learning is becoming more mainstream.

Whether or not a student has the option to participate in either a supplemental or full-time online program is largely a matter of state policy and laws where the student lives.

There is no such thing as a "typical" district level online program. For some school districts their online program consists of having students take courses through one or more external providers such as the state virtual school, universities that deliver K-12 online courses, and commercial entities. In these cases, the external entities are providing both the online instruction and the curriculum with schools frequently providing a mentor to assist the students as necessary.

In other cases, school districts are purchasing the online course but not the online instruction. The instruction is provided through a district teacher teaching online or in a face-to-face classroom as part of a blended learning model (see section 5.2). Sometimes districts purchase online content that is computer-based instruction and thus the district doesn't provide an instructor but instead utilizes a mentor model similar to schools that purchase both online content and instruction. Yet other districts instead develop their own online courses and train teachers to teach online. Of course, there are plenty of districts that mix-and-match these three approaches.

There are examples of both supplemental and full-time district programs. When permitted by state policy, district full-time programs often provide options for students from other districts to enroll in their program. The reasons districts create online programs vary from offering advanced courses, to providing teachers in areas of high need as well as offering credit recovery.

5.2 Blended Learning

Blended learning (sometimes referred to as hybrid learning) refers to the practice of combining traditional and online instructional practices. The percentage of online and traditional instruction can vary providing a wide-range of possible approaches to blended learning.

Heinze and Procter[42] have developed the following definition for blended learning in higher education that is analogous in K-12 education:

> "Blended learning is learning that is facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning, and is based on transparent communication amongst all parties involved with a course."

Susan Patrick, President of iNACOL, explains that the term blended learning is used in many ways in North America and also across the United States. Patrick defines blended learning as having three dimensions that demarcate the concept:

1. **Scope**: defining blended learning as a *blended learning program* or a *blended course*;
2. **Delivery**: blended learning combines two delivery modes of instruction, online and face-to-face; the communication in both modes is enhanced by a learning management system, virtual learning environment and tools.
3. **Teacher-role**: the role of the instructor is critical as this requires a transformation process to that of learning facilitator with increased interaction between student-and-instructor, student-to-content and student-to-student.

For a blended course, the Sloan definition from Allen, Seaman, and Garrett[43] is utilized:

1. **Traditional Course**: 0% of instruction or content delivered online
2. **Web-facilitated Course**: 1-29% of instruction or content delivered online
3. **Blended/hybrid Course**: 30-79% of instruction or content delivered online
4. **Online Course**: 80%-100% of content is delivered online

[42] Heinze, A. & Procter, C. (2004). "*Reflections on the Use of Blended Learning*". Education in a Changing Environment. University of Salford, Salford, Education Development Unit. Available for download at: http://www.ece.salford.ac.uk/proceedings/paper/ah_04.rtf.

[43] Allen, E., Seaman, J. & Garrett, R. (2007). Blending In: The Extent and Promise of Blended Education in the United States. Sloan-C Consortium. Available for download at: http://www.sloan-c.org/publications/survey/pdf/Blending_In.pdf.

Carol Twigg[44] described in *Improving Learning and Reducing Costs: New Models for Online Learning* these descriptions for blended programs:

1. **Buffet Model**: A student takes traditional courses and also enrolls in one or more courses online.
2. **Emporium Model**: Students (often face-to-face) are taking courses that incorporate online curriculum, online courses, online discussions that shift the instructional model, interactions, and teacher role to better individualize and personalize learning and take advantage of the best of both delivery modes, while allowing flexibility in pacing and additional student supports and interventions.

The following are several examples[45]:

- School of One, part of the New York City Department of Education utilizes blended learning as a means of personalizing each student's education. Instead of organizing the school around the traditional class period, each student has a unique schedule which is modified each day based on how the student performed the previous day and the types of lessons that are most likely to be successful for that student.
- Rocketship Education, a non-profit organization is establishing a network of public elementary charter schools using a hybrid model that combines traditional classroom teaching with targeted computer-based learning and intensive tutoring. Their schools have a high percentage of students that qualify for the federal Free and Reduced Lunch Program and English language learners and are dedicated to eliminating the achievement gap and perform at grade-level proficiency by the time they graduate from elementary school.
- VOISE (Virtual Opportunities Inside a School Environment) Academy, a Chicago public high school is located in a traditional high school building but the school is anything but traditional. The school opened for the 2008-2009 school year serving 149 freshmen and is adding an additional class each year. By 2011-2012, the school will serve 600 students in grades 9-12. Many students enter with 3rd to 5th grade reading levels but a combination of additional face-to-face instruction using reading specialists and a fully online curriculum has allowed the students to make significant progress in getting back on track for graduation. Cincinnati Public Schools Virtual High School utilizes the same basic approach. Students work on their online courses in computer labs staffed with two highly qualified teachers in the subject area. The program is designed to serve students requiring credit recovery or have had difficulty in a regular classroom setting.
- Omaha Public Schools provide another example of an online program with credit recovery students accessing online content while at a physical school with in-person teachers. Initially students are required to be physically present on a full-time basis but over time transition to spending some time working on their courses from a distance. With continued demonstration of success, students increase the percentage of time working virtually.

[44] Twigg, C. (2003). Improving Learning and Reducing Costs: New Models for Online Learning. Educause Review. Available for download at: http://net.educause.edu/ir/library/pdf/erm0352.pdf.

[45] Most of the examples in this section are taken from, Watson, John. (2008). Promising Practices in Online Learning: Blended Learning: The Convergence of Online and Face-to-Face Education. iNACOL. Available for download at: http://www.inacol.org/research/promisingpractices/NACOL_PP-BlendedLearning-lr.pdf.

- Odyssey Charter Schools in Clark County Nevada and Chicago Virtual Charter School are full-time cyberschools but each school requires their students to attend class in-person one day a week for four-hours. The on-site presence allows for additional support in the subject area that students find most difficult. The Commonwealth Connections Academy in Pennsylvania uses a similar approach for additional support in a face-to-face setting by creating voluntary drop-in centers where students can work with teachers in person (usually the same teacher the students work with online). The staff uses indicators from the students' performance in their online courses to encourage attendance at the drop-in centers.
- The Community High School of Ann Arbor, Michigan utilizes blended learning in their Community Resources Program. Students are able to take classes in community settings while working with local businesses to gain practical work experience.

5.3 Mobile learning

There are many definitions of mobile learning but a definition that really captures its potential comes from a presentation given by Judy Brown, Founder of the Advanced Academic Distributed Learning (ADL) Co-Lab. "Mobile learning is the art of using mobile technologies to enhance learning experiences."[46]

Mobile learning is a growing trend internationally. Research reports predict that mobile learning will indeed become a significant force. Interestingly, in the United States, mobile learning is in its infancy. A survey of technology and Internet experts conducted by the Pew Internet & American Life Project in late 2007 and early 2008 predicts that the "mobile device will be the primary connection tool to the Internet for most people in the world in 2020."[47] Of course mobile devices do not have to be the primary connection method before mobile learning can have an impact on online learning. The New Media Consortium in its 2009 K-12 edition of the Horizon Report predicts that the use of mobile devices will enter mainstream use in the K-12 educational community within the next two to three years.[48]

Each year Project Tomorrow surveys hundreds of thousands of K-12 students (as well as parents, teachers, and administrators) in their annual Speak-Up survey. Data from the 2009 survey regarding the type of devices students wish to use for learning is telling. The following chart[49] shows the percentage of students that have access to the device **AND** would like to use it for school work:

Personal device	Grades K-2	Grades 3-5	Grades 6-8	Grades 9-12
Laptop	27%	32%	53%	70%
Cell phone	17%	29%	59%	67%
Smartphone	14%	17%	24%	31%

[46] Brown, Judy. (2009). Presentation at the Wisconsin Charter Schools Association. Retrieve June 8, 2010 from http://www.slideshare.net/judyb/wcsa-mobile-learning-k12

[47] Anderson, J. Q., & Rainie, L. (2008). *Future of the Internet III*. Pew Internet & American Life Project. Available for download at: http://www.pewinternet.org/Reports/2008/The-Future-of-the-Internet-III.aspx

[48] Johnson, L., Levine, A., Smith, R., & Smythe, T. (2009). *The 2009 Horizon Report: K-12 Edition*. Austin, Texas: The New Media Consortium. Available for download at http://www.nmc.org/pdf/2009-Horizon-Report-K12.pdf.

[49] Adapted from Evans, Julie. (2010). Presentation given at iNACOL Leadership webinar. Additional findings and data from the Speak Up survey may be found at: http://www.tomorrow.org/speakup/.

While many of the current mobile learning projects exist outside of the United States, there are notable examples of mobile learning activity in the US:

- Project K-Nect, a two-year pilot program was a partnership of the North Carolina Department of Public Instruction, Digital Millennial Consulting and Qualcomm. The program provided 100 smartphones to ninth grades students in four North Carolina schools with the teachers using a curriculum designed to utilize these phones as a supplementary resource for math instruction. Students that participated in the program had previously struggled with math and typically did not have access to the Internet at home. The results from the initial year were quite impressive with students participating in Project K-Nect scoring higher on the state Algebra I exam than those students that were not part of the program. In one of the schools, 100% of the Project K-Nect students earned a proficiency rating on the state exam compared to 70% of students that weren't part of Project K-Nect. Both groups of students were taught by the same teacher.
- St. Marys City Schools in rural Ohio utilizes mobile learning devices for over 800 students and 49 staff members in grades 3-7. The project began in October 2008 as a pilot utilizing 60 devices and has grown dramatically since that time. Students utilize the devices at least half of the school day as well as for homework outside of the school day. The school reports that students are more motivated to learn and have shown more interest in writing, especially elementary aged boys. The positive experience of the school spurred the school to create the Ohio Mobile Learning Technology Conference so that they can share their experiences and expertise with other schools.
- Similar to the previous example, every fifth grade student at Cimarron Elementary School in Katy, Texas has been provided a mobile device which is used at home and over 50% of the time in their academic classes. For the 2009-2010 school year the students scored significantly higher in the state required test in math and science compared to the previous year.

"Mobile learning is the art of using mobile technologies to enhance learning experiences."

– Judy Brown, Founder of the Advanced Academic Distributed Learning (ADL) Co-Lab.

6 Conclusion

As is the case with a primer on any topic, this publication has only been able to provide a basic overview of online learning. iNACOL provides many additional resources for those that wish to go into greater detail. Some of these resources include:

- Publications on a wide variety of online learning topics. Hard copies of many publications can be purchased, and all publications are available for free download on the iNACOL web site.
- Hosting of the annual Virtual School Symposium. This 3-day conference is the only national conference focused solely on K-12 online learning and virtual schools. The conference brings together representatives from national, state, district, private, and other virtual school programs to learn about the latest research, trends, challenges, and opportunities in K-12 online learning.
- Monthly webinars for online program leaders and online teachers.
- The How to Start an Online Learning Program (www.onlineprogramhowto.org website). This website is a comprehensive resource for policy, planning, and implementation issues for starting an online program or school.

Online learning is a powerful force for educational transformation. A survey of education policy insiders conducted by the Whiteboard Advisors consulting organization found that "there is more support in Congress for Supplemental Education Services and online learning than what the conventional wisdom has suggested."[50]

As an organization, iNACOL works to ensure that all students have the opportunity to choose online learning as an option to meet their educational needs. Their position is expressed, in the following statement developed by iNACOL's Advocacy and Issues Committee.

Every Student's Right to Online Learning Opportunity

Online learning is emerging as an essential part of the K-12 education landscape. To meet their educational goals and secure their future as active and productive citizens, K-12 students must have access to quality online learning opportunities in a variety of forms that meet their needs. This imperative is reflected in the U.S. Department of Education's National Education Technology Plan as well as in policy discussions in statehouses across the nation.

[50] Education Insider: ESEA Reauthorizaton. (2010, July 29). Retrieved August 4, 2010 from White Board Advisors web site: http://www.whiteboardadvisors.com/research/education-insider-esea-reauthorization.

Therefore, iNACOL will endeavor through its advocacy and policy activities to ensure that **all students have the opportunity to choose an online learning course or program that meets their needs as part of their K-12 education.**

Further, iNACOL will promote **every student's right to online learning opportunity** through advocacy for:

1. **Responsive state and federal policies** so that a student's choice of online opportunity is facilitated rather than blocked.
2. **Fair and sustainable funding** so that online learning opportunities expand with student demand.
3. **Sensible and responsible oversight** so that each student is guaranteed quality in the online opportunities available.
4. **Modern frameworks for curriculum and instruction** so that each student may be assured of credit for successful online work.
5. **Thoughtful teacher licensure requirements** so a student may always benefit from the best online instructors.
6. **Valid research** so that a student's online opportunities reflect effective best practices.

Appendix: Definitions[51]

Asynchronous communication: Communication that is separated by time. Examples are email, online discussion forums, message boards, blogs, podcasts, etc.

Blended learning[52] (also hybrid learning): Learning that is facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning, and is based on transparent communication amongst all parties involved with a course.

Credit recovery: Refers to a student passing, and receiving credit for, a course that he/she previously attempted but did not succeed in earning academic credit towards graduation.

Cyberschool (also online school and virtual school): A formally constituted organization (public, private, state, charter, etc.) that offers full-time education delivered primarily over the Internet.

Learning Management System (LMS):[53] The technology platform through which online courses are offered. A LMS generally includes software for creating and editing course content, communication tools, assessment tools, and other features for managing the course.

Online course: Any course offered over the Internet.

Online learning[54] (also cyber learning, elearning, and virtual learning): Education in which instruction and content are delivered primarily over the Internet; online learning is a form of distance learning. The term does not include printed-based correspondence education, broadcast television or radio, videocassettes, and stand-alone educational software programs that do not have a significant Internet-based instructional component.

Online teacher: The person who is responsible for instruction in an online course.

State virtual school: An entity created and supported by a state to provide online academic courses to elementary, middle, and high school students using qualified online teachers.

Synchronous communication:[55] Communication in which the participants interact in the same time space. Examples are telephone calls, videoconferencing, chat, and face-to-face communication.

[51] Definitions are taken from an unpublished draft of iNACOL document of official online learning definitions.

[52] Heinze, A. & Procter, C. (2004). *"Reflections on the Use of Blended Learning"*. Education in a Changing Environment. University of Salford, Salford, Education Development Unit.

[53] Adapted from Keeping Pace.

[54] Adapted from Keeping Pace and Evaluation of Evidence-Based Practices in Online Learning.

[55] Adapted from Keeping Pace.