The State of Online Learning in California:
A Look at Current K-12 Policies and Practices

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THE STATE OF ONLINE LEARNING IN CALIFORNIA: A LOOK AT CURRENT K-12 POLICIES AND PRACTICES

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K-12 education and online learning in California are at an important crossroads. With online learning rapidly becoming a key component of K-12 instruction across the country, California lags behind, seemingly unsure how to employ this valuable new resource. Florida, Michigan, and other states have already made significant strides, establishing state policies that embrace online learning as part of their state’s educational vision. Michigan’s legislature, for example, recently passed a law requiring that all high school students enroll in some form of online instruction before graduating. Florida and other states have established clear policies that endorse online learning and foster access to a high-quality education regardless of a student’s geographic location or socioeconomic status. These states understand a lesson that our state is still absorbing—in the future, access to a high-quality education will become more and more dependent on educating 21st century learners with 21st century tools and methods.

We can see examples of this in our schools every day. I recently met a young man when I visited a group of students taking an Advanced Placement (AP) physics course online. Sitting next to this student while he completed the lesson, I observed that he wore a long baseball shirt, baggy pants, and colorful sneakers. The backpack at his side was covered with slogans from his favorite music groups and notes written by his friends. A cell phone hung from his right pocket, and a set of headphones poked out of his backpack. I asked if he had a CD player in his backpack. He answered, “That’s old school. I have an iPod with my music collection, pictures of my friends, and a few music videos that I downloaded at a free web site.” I stopped asking silly questions and instead noted that this student was surrounded by technology (cell phone, iPod, and computer) and had a world of information literally at his fingertips.

We have all seen many students like this young man. There’s little doubt that as a result of new technologies that make information easily accessible, students today function differently than students ten or twenty years ago. As educators, we acknowledge our students’ ability to use technology for entertainment and socialization; and we are now seeing that these technologies can be used for educational purposes as well. As modes of learning continue to evolve, this so-called “millennial” generation will increasingly employ the gadgets used for entertainment for their academic studies.

The sooner we embrace the reality that learning happens not only by sitting in a classroom for fifty minutes but also at a laptop or an iPod, the faster we will meet the needs of 21st century learners who are seeking 21st century teaching methods and tools. This millennial generation deserves nothing less than the most modern approaches to learning. After all, from their perspective, anything less is “old school.” What’s more, if the high-tech tools they use in their daily lives continue to outpace the more traditional modes of education offered in the classroom, they may become even more disconnected from their own education.
Soon after talking with this young physics student, I met with a group of educators to discuss the possible uses of online learning in their school. The school’s leaders expressed an interest in having five students take AP environmental science online because they did not have a teacher on-site who could teach the course. Initially, these educators embraced the concept of using online courses to fill a gap in their course offerings. In the process, one teacher also realized the potential of complementing their classroom instruction with online content and resources to increase the sophistication of the course. After viewing the algebra online content, one of the teachers commented, “Often times I just don’t see how else to get a student’s attention; I can see how having access to these interactive courses can increase their interest in the subject matter and also complement my teaching to make it more interesting for my kids.”

The discovery that online learning has the power to fill curriculum gaps in their school stimulated more questions from these teachers and school leaders. They asked questions that we hear frequently in online learning: What about students who don’t have a computer? Who teaches the online course? When do students connect? What does an online course look like? Does online learning work? Is online learning for everyone? What state policies are in place that enable us to implement online learning? Their questions reminded me that educators need some very basic information about online learning if they are to make informed decisions about its use. Unfortunately, there is very little literature produced by state agencies to inform educators about the emerging field of online learning and the policies that exist to ensure that it is meeting education code. This lack of information can prevent educators from using these online resources to provide students with access to high-quality curriculum.

This report, *The State of Online Learning in California: A Look at Current K-12 Policies and Practices*, provides a comprehensive view of online learning by examining the basics—teaching and learning, evaluating academic success, professional development, technology, California attendance guidelines for online education, and topics for future discussion. The ad hoc E-Learning Committee hopes that this report will serve as a tool for educators and policymakers as they seek to understand the basics of online learning in California and to make informed decisions about implementing online learning in a school, a school district, or as part of state educational policy.

Most importantly, we hope the report will be used as an instrument to provide millennial students, whether they are from the most rural or the most urban areas of the state, with access to a high-quality education based on the 21st century tools and teaching methods necessary to prepare them for the challenges and demands of our workforce. This report is a first step that we hope will stimulate future studies and reports examining online learning in greater depth. We believe that the end result of these efforts will be critical to reaching and educating this and future generations, thereby ensuring that students are equipped with the skills needed to succeed in our highly competitive society. We do not want our state to be “old school” when it comes to providing the best quality of education for our youth.

Dr. Moises Torres
Chair, ad hoc E-Learning Committee
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About the Ad Hoc E-Learning Committee
The University of California College Prep Online program commissioned this report along with the following organizations: eScholar Academy, Institute for Computer Technology, Rainbow Advanced Institute for Learning Digital Charter High School, and the California Virtual Academies (hereinafter collectively referred to as “Subgroup”). The aforementioned entities are a subgroup of participants of an informal ad-hoc e-learning group, loosely composed of government education segments and e-learning practitioners, including representatives from the University of California College Prep Online, California Department of Education, county offices of education, school districts, the Charter School Association, the University of California’s Office of the President, and various online schools. The purpose of the ad-hoc committee was the informal exchange of information about online education in California between government and e-learning practitioners.

Disclaimer
The opinions, information, and recommendations contained in this report are entirely those of the Subgroup and are not representative of any other participant of the ad-hoc e-learning group.
Executive Summary

Students in our K-12 schools today are part of the “millennial” generation. They are children of a digital age, and many are far more comfortable with technology than are their parents and teachers. According to Liz Pape, the CEO of Virtual High School, “Students born between 1982 and 2000 spend more time surfing the Web, building websites, communicating through instant messaging, and writing blogs than they do watching television.” This difference is not just in how today’s students use their time; it also reflects how much their technology use differs from that of earlier generations and how deeply technology is integrated into their lives.

Online learning is growing rapidly across the United States, responding in part to the needs of these millennial students, as more and more learners and educators become familiar with the benefits of learning unconstrained by geography and time. Students are finding increased opportunity, flexibility, and convenience; teachers are discovering a new way to reach students, some of whom were not successful in traditional schools and courses; and administrators are exploring ways to offer a wider range of courses to students and professional development opportunities to teachers. In these ways, online learning strengthens public education’s goals of equity and access for all students.

Many examples of K-12 online education programs can be found in California, including the University of California College Prep Online (UCCP) program; district-level programs in Los Angeles, Clovis, and elsewhere; and online charter schools, including the Rainbow Advanced Institute for Learning Digital Charter High School and the California Virtual Academies. The expansion of online education in California mirrors advances across the country, as states from Florida to Washington offer a myriad of online education options for their students.

Far from being correspondence courses for a digital age, quality online courses are highly interactive and rich in digital media and other content. Teachers interact with students in real time via live video and audio or asynchronously through discussion boards and email. Course content is presented through graphics, animations, and simulations. A small but growing body of research demonstrates that online courses can equal classroom-based courses in learning outcomes.

But the dramatic increase in the number of online course options has created concerns, including:

- Lack of comprehensive data and evaluations on the effectiveness of online learning.
- Misunderstanding by parents, educators, and other stakeholders about the benefits of online education.
- Fear that online education may exacerbate the digital divide and existing student achievement gaps.

• Concern that existing educational policies and regulations may need to be revised to ensure a high standard of online education.

• Fear that online programs may take needed funding away from classroom-based programs.

This report addresses these concerns, while identifying a set of outstanding issues for further consideration. These include:

• E-Learning Council: There is a need for the creation of a statewide E-Learning Council made up of educators and other stakeholders. This council would examine both the potential of and concerns about online learning and make recommendations to the State Superintendent of Public Instruction on the growth of online programs and their impact on education issues in California.

• Quality assurance: In order to help ensure high academic performance, several issues could be explored, including tracking course completion rates and STAR scores of students in online programs; requiring that online teachers have received professional development in teaching online; and setting minimum standards for communication between teachers and students in online programs.

• Availability of online learning opportunities: California may want to activate access to online courses for all high school students in the state by using a designated educational agency to approve online courses that meet state standards and a-g requirements. The agency could create an Internet system and infrastructure for schools and students to access and take web-based courses leading to a high school diploma. It could also serve as a clearinghouse to link public entities that offer approved courses with students who need the courses.

• Additional research: Review of the current research shows mixed results (i.e., online charter school outcomes). Because online education is relatively new, it would benefit from additional research in several areas, such as comparing student outcomes in online courses and traditional classroom courses; comparing student outcomes in different types of online courses and a variety of subject areas to determine how online education can be most effective; and analyzing the cost of online programs to determine whether online programs cost more, less, or about the same as physical schools.

• Expansion of course offerings: Investigation of the use of online learning to enable schools to expand their course offerings while meeting the mandates of the federal No Child Left Behind (NCLB) Act. NCLB requires that by the end of the 2005-06 school year all teachers must demonstrate subject matter competence in the core academic subjects they teach. For small secondary schools this requirement presents major challenges. Because teachers may not be able to demonstrate subject matter competence in all core subjects, schools may be unable to offer all courses needed. The federal guidance on meeting these challenges includes suggestions that districts consider using online learning; one paper on the National Education Technology Plan website states, “Educators must embrace e-learning solutions if they want to ensure that every student has a quality educational experience.”

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Introduction

Online learning is growing rapidly across the United States within all levels of education, as more and more learners and educators become familiar with the benefits of learning unconstrained by geography and time. Online K-12 education programs are becoming increasingly common throughout the country, although they still lag in use behind post-secondary institutions and the corporate sector. Across most states and all grade levels, students are finding increased opportunity, flexibility, and convenience; teachers are discovering a new way to reach students, some of whom were not successful in traditional schools and courses; and administrators are exploring ways to offer a wider range of courses to students and professional development opportunities to teachers.

Online courses are also spreading because technology in education is an appropriate, and perhaps necessary, way to educate the students of this digitally oriented generation. For these “millennial” students, technology is integrated into their lives in the ways they find information, communicate, and entertain themselves, and they expect their education to be in line with their technology experience. The rapid expansion of online education presents significant challenges for educators. While these challenges are small compared to the actual and potential successes of online learning, it is clear that online learning must grow carefully and thoughtfully.

The last major publication addressing K-12 online learning specific to California was the California Virtual School Report: National Survey of Virtual Education Practice and Policy with Recommendations for the State of California, commissioned by University of California College Prep Online (UCCP) in 2002. In the four years since that report, rapid growth in online education has taken place both in California and across the country. This new report discusses K-12 and adult online learning in the context of California’s public education system, with a goal of identifying ways to expand learning opportunities for students. It builds on numerous existing resources (including several reports regarding online education at the national level), a number of which are included in the list of resources in Appendix E.

Examples of K-12 online education programs in California include:

• University of California College Prep Online (UCCP) provides online Advanced Placement (AP), college preparatory, and credit recovery courses to students across the state, many of whom would otherwise not have access to these courses due to a lack of qualified teachers in all subject areas and/or small school size. Another university-based online program, Stanford’s Education Program for Gifted Youth, offers courses to students in 28 countries.

• California has a number of district-level online programs, many through a pilot program being administered by the California Department of Education. Two examples are the Los Angeles Unified School District’s Virtual Academy (LAVA), which uses a hybrid delivery model with asynchronous, synchronous, and traditional classroom content to offer Advanced
Placement, credit recovery, and other courses; and the Clovis Unified School District, which has a smaller program with a handful of courses.

- In addition to state-level and district-level programs, there are online charter schools in a number of California school districts, including Capistrano Connections Academy and the California Virtual Academies. Using an online curriculum developed in partnership with Odyssey Ware™ and eScholar Academy, three California charter schools located in Tehama and Shasta counties (eScholar Academy, Shasta Secondary Home School, and Stellar Charter School) are providing a full range of academic courses online for grades 3-12. In addition, Whitmore and Plum Valley Elementary schools in Tehama and Shasta counties are using the program in the classroom to teach math in grades 3-8.

- Two charter schools, the Rainbow Advanced Institute for Learning Digital Charter High School (RAI Digital High) and Choice 2000, are implementing new methodologies that utilize synchronous instruction by certificated staff in real time.

- Three California schools, in Fremont, Vallejo, and Pittsburgh, participate in the national Virtual High School (VHS) program. Schools participating in VHS provide a teacher to create and teach an online course, and in exchange the school can place students in any of the VHS courses. The California schools are providing computer science and American poetry courses online, and their students are able to choose from a wide range of online courses including algebra, young adult literature, nuclear physics, and number theory.

California, of course, is not the only state with K-12 online learning programs. Examples from across the country include:

- In Florida, the Florida Virtual School (FLVS) is the most prominent K-12 online program in the country, providing courses to nearly 50,000 students in 2005-06. FLVS, which has grown steadily since its inception in 1997, has shown the popularity of online learning when students are given the choice of taking online courses, and has also demonstrated the ability of a program to grow rapidly.3

- In Chicago and Detroit, the Illinois Virtual High School and Michigan Virtual High School have partnered with inner-city school systems to bring the benefits of online learning to a range of student populations. In Michigan, the legislature recently passed a law requiring that all high school students take some form of online instruction before graduating.4

- The Louisiana Virtual School is working with local schools that lack a qualified algebra teacher by providing an online algebra course that is taken by students sitting together in a classroom. The students learn from a highly qualified teacher online, and a teacher not certified in math assists in the physical

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3 Findings based on the report Keeping Pace with K-12 Online Learning, published by Learning Point Associates. Keeping Pace is an annual report; the 2005 report is available at www2.learningpt.org/catalog/item.asp?productID=143. The reference to the growth of the Florida Virtual School is from the draft of the 2006 Keeping Pace report, which in turn is based on the Florida Virtual School website at http://www.flvs.net/general/accreditation_information.php, and personal communications with Julie Young, CEO of FLVS.

classroom. This arrangement serves the dual purpose of providing a highly qualified teacher to students, and a mentor to the classroom teacher being trained in algebra.

Online learning faces challenges and, in some states, controversy. These challenges include fitting a new model of learning into existing policies created for physical schools, and also addressing the preconceived notions of some educators, policymakers, and legislators. Controversies in a few states have reinforced concerns about whether online learning is an appropriate way to teach, learn, and use public education funds.
About online learning

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

Online learning as defined and discussed in this report is best understood in the context of distance education. The report A Synthesis of New Research on K-12 Online Learning provides two useful diagrams, reproduced below. The first places online learning among distance education delivery methods, showing the potential for interactivity of each method. This diagram places online learning among audio and video conferencing, telecourses, independent study, and correspondence study, characterizing online learning as the type of distance education with the highest level of interactivity.

A second diagram from the same report places online learning with other types of e-learning, which includes the use of digital technology in the classroom as well as in distance education.

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

2.1 How online learning is being used

Online learning is being used in many ways. The following examples suggest the range of possibilities:

- Addressing the needs of the millennial student.
- Expanding the range of courses available to students, especially in small, rural or inner-city schools, beyond what a single school can offer.
- Providing highly qualified teachers in subjects where qualified teachers are lacking.
- Providing scheduling flexibility to students facing scheduling conflicts.

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5 Smith, Rosina; Clark, Tom; Blomeyer, Robert; A Synthesis of New Research on K-12 Online Learning, Learning Point Associates, October 2005.
• Expanding opportunities for students (such as at-risk students, dropouts, migrant students, young adults, pregnant or incarcerated students, and students who are homebound due to illness or injury), allowing them to continue their studies outside the classroom.

• Teaching technology skills by embedding technology literacy in academic content.

• Providing professional development opportunities for teachers, including mentoring and learning communities.

The ability of online learning to allow schools to expand their course offerings is particularly relevant because of the mandates of the federal No Child Left Behind (NCLB) Act. NCLB required that by the end of the 2005-06 school year, all teachers must demonstrate subject matter competence in the core academic subjects they teach (NCLB lists ten core subjects). For secondary school teachers in very small schools and settings—including independent study programs and in classrooms in small traditional schools and alternative schools—this requirement has presented major challenges. Because one or two teachers may not be able to demonstrate subject matter competence in all core subjects, the result may be that the schools are unable to offer all the courses that their students need. The federal guidance on meeting these challenges includes suggestions that districts consider using online learning; one paper on the National Education Technology Plan website states, “Educators must embrace e-learning solutions if they want to ensure that every student has a quality educational experience.” Another paper provides examples of ways that school districts and other organizations can use e-learning to provide professional development to teachers.

There are many different types of online learning programs at the K-12 level. These include state-level programs that typically provide one or a small number of courses to students enrolled in other schools; diploma-granting programs providing a full curriculum to students, including online charter schools; and programs offered by school districts, which may be supplemental or full-time. These factors are not necessarily exclusive; for example, a program may have both part-time and full-time students.

The differences in online learning at different grade levels are important to consider. Although online courses exist at all K-12 grade levels, the ways in which online learning is used vary at different grade levels. One major way in which online learning varies by grade level is in how much time a student typically spends online. In grades 9-12, students in an online school may spend between one-half and three-quarters of their course time online, while in the lowest grade levels students often spend 1 percent or less of their time online. At the lowest grade levels many programs rely heavily on parents or other learning coaches to help the online student.

<table>
<thead>
<tr>
<th>Grade Levels</th>
<th>% of Time Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>K - 1</td>
<td>15%</td>
</tr>
<tr>
<td>2 - 5</td>
<td>15-25%</td>
</tr>
<tr>
<td>6 - 8</td>
<td>25-50%</td>
</tr>
<tr>
<td>9 - 12</td>
<td>50-75%</td>
</tr>
</tbody>
</table>

At the traditional high school level, many online courses are supplemental, provided to students who are taking most of their courses in classrooms. Most K-6 online programs are for full-time online students. Online programs for middle school students are a mix of full-time and supplemental.

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

9 Based on analysis of programs described in Keeping Pace with K-12 Online Learning, Learning Point Associates, 2005 (www2.learningpt.org/catalog/item.asp?productID=143) and 2006 (forthcoming)
2.2 How many programs and students are online?

No solid and comprehensive figures are available for the number of online programs and students across the country, because there is no systematic tracking of online programs in most states, including California, or at the federal level. While the California Department of Education tracks the number of students in the AB 294 Online Classroom Pilot Program, it does not comprehensively track all online student numbers.

Some useful estimates from across the country include:

- For school year 2002-03, Eduventures estimated 300,000 students were taking one or more online courses based on a survey of online course providers.\(^{10}\)

- For the same school year, the U.S. Department of Education estimated 36 percent of school districts had students taking distance courses (including other types of distance courses, not just online). Of these districts, 59 percent had students taking courses online as one of their distance course mechanisms, suggesting that just over 20 percent of districts had students taking online courses.\(^{11}\)

- Based on these and other numbers, Learning Point Associates estimates that about 600,000 students were taking online courses during 2005 (see the chart below). If accurate, this would represent a bit over 1 percent of all students—a low, but rapidly growing, percentage.\(^{12}\)

- Of these students taking distance education courses (including not only online courses but also video and other types of distance courses), a large percentage is high school level. Sixty-eight percent of students taking online courses were in high schools, 29 percent were in schools that combine elementary and secondary schools, and only 3 percent were in middle or elementary schools. Of the 29 percent in schools combining grade levels, the grade level of students taking online courses was unknown.\(^{13}\)

- The report *Keeping Pace with K-12 Online Learning* counted 21 statewide online programs as of summer 2005, defining statewide programs as those that are funded or run by the state department of education or other state agency. The largest of these, in Florida and Utah, have roughly 50,000 course registrations, defined as one student taking one course. Most of these programs have between 2,000 and 6,000 course registrations.\(^{14}\)

- Sixteen states have online charter schools serving a total of about 31,000 students, and 17 have district-run online programs (these are not exclusive; some states have both).\(^{15,16}\)


\(^{12}\) Smith, Rosina; Clark, Tom; Blomeyer, Robert; *A Synthesis of New Research on K-12 Online Learning*, Learning Point Associates, October 2005. The graph comes from this report as well.

\(^{13}\) Setzer 2005.


• Post-secondary institutions also provide online courses to high school students, and according to one report at least seven independent study programs at post-secondary institutions offer a full high school curriculum online.\(^\text{17}\)

2.3 The cost of online learning

The cost of online learning, compared to the cost of traditional classroom classes, has not been well studied. Some preliminary indicators suggest that the cost of online courses is about the same as that of traditional classroom courses, especially for online programs that are relatively new and small. These indicators include:

• California schools participating in the AB 294 pilot program have been asked to track the cost of offering online courses; all have said that the cost is about the same or greater than traditional classes.\(^\text{18}\)

• The Ohio legislature has studied the cost of its eCommunity Schools, which are online charter schools. The Legislative Committee on Education Oversight looked at five statewide online schools and found that they spent $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 percent of the spending, followed by instruction at 23 percent, administration at 16 percent, and curriculum at 9 percent. The report concluded that these costs are “reasonable.”\(^\text{19}\)

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

2.4 Challenges in online learning

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

• Many parents, administrators, educators, and legislators may not have a common understanding of online education: Online learning remains new enough that many people in administrative decision-making positions, and in the general public, do not understand it. Outdated notions of correspondence courses, although an inaccurate representation of good online courses, remain common. While in fact some online courses are correspondence courses for a digital age, where students read on a computer screen instead of from a book, good online courses are much more. They are highly interactive, highly challenging, and successful in educating students. In California, several efforts have been made to highlight online education issues, including the publication of the *California Virtual School Report* in 2002 and the subsequent Virtual School Symposium, and the formation of the California Consortium of Virtual Educators (CCOVE).

• Online education and equal access: Online courses require, at a minimum, that the student have access to a computer, basic software, and the Internet. For students in affluent areas such access is expected, but for students in poor inner-city and rural areas the hardware and Internet

\(^{17}\) Smith et al 2005

\(^{18}\) California Department of Education, (Date) Report to the Legislature: AB 294 Online Classroom Pilot Program. Web site address

\(^{19}\) Ohio Legislative Committee on Education Oversight, *The Operating Costs of Ohio’s eCommunity Schools*. June 2005. Retrieved February 3, 2006, from http://www.loco.state.oh.us/reports/PreEleSecPDF/eSchools2_Web.pdf
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. Some schools, such as RAI Digital High, are addressing the issue of the digital divide by providing loaner equipment and software for each student who needs one.

- **Online courses must be available to students with disabilities:** By law, a public education must be made available to all students, including students with learning disabilities and physical disabilities. Most schools have been quite diligent about ensuring that online programs are available to students with disabilities; as online programs become increasingly mainstream, they must continue this commitment.

- **There is a need to examine existing policies and regulations to ensure high quality online education:** In many states, online programs are guided and overseen by rules and regulations created for traditional schools. In 2001, the National Association of State Boards of Education, writing about online education, stated, "In the absence of firm policy guidance, the nation is rushing pell-mell toward an ad hoc system of education that exacerbates existing disparities and cannot assure a high standard of education across new models of instruction."²⁰ Five years later, many states are only beginning to address these policy issues. California has been among the states considering some of the many policy issues inherent in online programs through the Online Classroom Pilot Project.

- **Funding for online students and programs has not been resolved:** Funding of online students, and in particular online charter school students, has been controversial in several states. This controversy is due in part to the fact that funding often follows the student, and in some states online schools have marketed across the state in an effort to increase their student numbers. The result is students leaving their ‘home’ school district for the online school, resulting in a drop in funding for that school district. A related issue is that of online schools attracting students who were formerly home-schooled, because when a student goes from home-schooling to a charter school, the state pays the cost of educating that student. At a rough average of $6,000 per student, if 200 students go from being home-schooled to being in a charter school, that creates a cost of $1.2 million to the state, which is significant to the education budgets of some states. Because of this transcendence of geographical boundaries by online schools, the controversy they have created in some states belies their small size; across the country online students in charter schools make up only about 3 percent of all charter school students.²¹ In California many online students are funded via independent study, while others receive ADA funding via the AB 294 Online Classroom Pilot Program.

- **Policies sometimes limit the extent to which online programs can expand:** In California, for example, charter schools chartered by a district may only serve students in that county and contiguous counties. There are also limitations on the number of students that can be served by online schools in adjacent counties when using resource centers; a charter school must operate with at least 50 percent of its students from the county in which the school is chartered if the online school operates regional centers.

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²⁰ National Association of State Boards of Education. (2001). *Any time, any place, any path, any pace: Taking the lead on e-learning policy.*

in adjacent counties. In addition, current law in California, written before the growth of online learning, classifies synchronous instruction as independent study. Some providers of synchronous online learning disagree with this definition, arguing that by its nature synchronous instruction is direct instruction.

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

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

3.1 The online course environment

The teaching and learning environments of online classes vary in the same way that classroom teachers and classes vary. Some similarities and common approaches that many online classes share include:

- Asynchronous courses are delivered via a software package called a course management system (CMS) or learning management system (LMS). The LMS is usually provided by a vendor; the online course environment is rarely created by the teacher or online program. One exception is the for-profit companies that operate charter schools in many states, including California, such as K-12 and Connections Academy, which have created their own LMS. K-12 operates the California Virtual Academies, and Connections operates Capistrano Connections Academy.

- Synchronous courses also use an LMS, but additionally use web-based collaborative software packages that are seamlessly integrated with the LMS to provide for the real-time delivery of instruction and live interaction between the teacher and students, as well as between students. RAI Digital Charter High is an example of a synchronous online program in California.

- Learning management systems share some common features, including:

  - Communication is a combination of synchronous (real time) and asynchronous. Asynchronous communication, done via email and threaded discussions, is more commonly used, but there are programs that use a synchronous approach and have teachers online at the same time as students, communicating via video, audio, text chat, and whiteboard. Some programs 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 for teachers and students. Programs may require that students be in touch with their teachers three times a week or that teachers check email no less than once every school day and respond the same day.
Courses are divided into chapters or sections, with much of the course material offered online. This course content may include text, graphics, video, audio, animations, and other interactive tools.

Many courses use offline materials and/or textbooks to complement the content delivered via the Internet.

The type of course, and teacher preferences, determine to what extent certain features are used. An English course might rely heavily on books; Spanish might rely on audio clips so that students can hear proper pronunciation; a biology course might use animations demonstrating cell division in a way that no textbook can match.

Online assessments include different types of questions such as multiple choice, true/false, long answer, short answer, and matching. Some of these questions can be automatically graded against the correct answers provided by the teacher.

- Some asynchronous courses are self-paced, in which a student starts and ends at any time, and proceeds through the course at whatever pace is deemed appropriate by the teacher. Other courses have start and end dates so that students go through as a cohort, and pass certain milestones together, allowing for class discussions and projects. Synchronous courses are paced at the teacher's discretion much as in a regular site-based classroom.

- Student asynchronous activity online is usually tracked by the LMS. However, time online is not a good proxy for time in a classroom, because it doesn't take into account student activity offline, which may be a substantial part of learning activity. The LMS may also track other information including discussion board posts, emails, and assignments submitted.

- The same is not true for synchronous instructional settings where the teacher provides direct instruction during scheduled class periods much as in a regular classroom. In such settings time online is crucial, as class time is the primary means of learning.

### 3.2 The role of the online teacher

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

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

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

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

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

◇ 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.

◇ Other types of content are available, including pre-developed digital content for many courses. Digital content is increasingly being developed by publishers, and digital content companies and non-profit organizations are also providing course material.

◇ 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 almost all traditional classrooms use.

• Communication: One of the main roles of the teacher in a student-centered learning environment is to be available consistently to provide guidance around material. For this reason many online programs have requirements for how often teachers must log in to their classes and how quickly they must respond to student emails. Some programs also require and/or facilitate communication by telephone or online synchronous methods, such as online office hours.

• Guiding learning: In addition (and along with course creation and communication), the teacher must guide student learning in the online course. There are many ways in which this can be done, from creating and facilitating group discussions, to developing group projects, to constantly adjusting course resources to respond to students’ questions and the concepts that they are finding most challenging. These are in addition to tasks which any traditional classroom teacher would recognize, such as creating, giving, and grading tests, labs, and homework assignments.

3.3 What is effective online pedagogy?

Because the role of the teacher varies by grade level and subject, defining high-quality pedagogy in the online environment also varies. A few general concepts hold across grades and subjects, including:

• Teaching online is generally student-centered, and there is usually a mentor available to the student for traditional classroom help. Capistrano Connections Academy uses what it calls the “learning coach,” who is often a parent or close relative. 22 Statewide 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.

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

23 Connections Academy, Questions and Answers for Policy-Makers about Virtual Public Schools, undated.
• Communication is critically important. Online teachers recognize the potential communication advantages and drawbacks of the online environment. The advantages include the fact that some students will feel more comfortable taking part in an online discussion board than they might in a classroom; and the teacher has a record of everything “said” in class. Disadvantages include the teacher’s inability to use non-verbal cues to determine if a student understands the course material. In a synchronous environment, the teacher and student may talk in real time over an Internet connection, and teachers can use a variety of online checks for understanding that alleviate some of these challenges.

3.4 Student-teacher ratios

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

Under Education Code Section 51745.6 (b), only those units of ADA for independent study that reflect a pupil-teacher ratio that does not exceed the ratio of other programs in the district shall be eligible for apportionment.

CCR, Title 5, Section 11704 applies this provision to charter schools by specifying that the comparison ratio applicable to charter schools is the largest unified school district in the county or counties in which the charter school operates. In 2005, the California State Board of Education modified these regulations to add a fixed pupil-teacher ratio of 25 to 1 as another option for establishing a charter school’s ratio and provided a definition of a full-time certificated employee. In a charter school, for the purposes of Education Code Section 51745.6, the ratio of average daily attendance for all independent study pupils, regardless of age, to full-time equivalent (FTE) certificated employees responsible for independent study shall not exceed a pupil-teacher ratio of 25:1 or the equivalent ratio of pupils to full-time equivalent certificated employees for all other educational programs operated by the largest unified school district in the county or counties in which the charter school operates. The 2005 regulations also allow an online charter school to have an unspecified pupil-teacher ratio if the school has and maintains an 8 or above on its statewide or similar schools ranking, and has no less than a 6 in the other of these two rankings.

No studies have been done to look into whether teachers can or should have more or fewer students online than teachers in physical classrooms.

3.5 What does an online course look like?

The best way to understand an online course is to review one, or better yet to take a course online. A few screenshots may provide the sense that a good online course is much more than text on a screen.

Elements of note from the following screenshot from an AP Biology course offered by UC College Prep include:
• The course content in this screenshot is being delivered via a series of slides that diagram the concepts, with an audio recording accompanying the slides.
• The course is structured into units (seen on the right), with each unit made up of several chapters. The course structure follows the structure of a traditional classroom class and a textbook.

• A link for online resources is provided along with the course unit structure. Many online courses integrate extensive Internet-based resources into their content.

Much class discussion takes place through the use of discussion boards. The following screenshot shows the discussion topics scheduled for this class (an actual discussion can’t be shown because of student privacy issues).

The screenshots above are from an asynchronous course. Synchronous classes may utilize models similar to those above, but additionally use a “white board” when the teacher and students are online at the same time. The teacher may use similar images to demonstrate concepts, and in this case would be lecturing live instead of having pre-recorded the audio. Students are able to ask questions in real time via two-way audio or text chat. The screen shot below is a sample of the teacher's view of a biology class offered through RAI Digital Charter High. Students see only the white board; the chat area in the bottom (which can be disabled by the teacher if desired); and the students in the class in the bottom right. Both the teacher and students can write on the white board, and sample problems can be displayed and worked on by students and teachers. The audio button in the bottom controls the voice components. Students can click on the “hand” button in the bottom right to indicate that they have a question, much as they would do by raising their hands in a regular classroom.

Online courses are highly flexible in how they can be structured, how course content can be delivered, how teachers and students communicate, and how students work together on group projects. The screenshots above are intended to provide just a small snapshot of the possibilities.

3.6 Simulated laboratories in online courses

Many science courses in physical classrooms include a laboratory component as a key element of the course. This laboratory component presents both an opportunity and a challenge for online learning.

The opportunity exists because there is a gap in the ability of many schools to offer laboratories for their classroom-based courses. Many rural and high-poverty schools don’t have the personnel and funding to run wet labs, and teachers may not have the necessary certifications to handle chemicals. This leaves some schools unable to offer courses that require a lab, and an online simulated lab can be a viable alternative.

The challenge is in creating online lab simulations that are sufficiently rigorous. Although the potential to create appropriate lab simulations certainly exists, questions remain about the ability of a simulation to teach concepts in a manner similar to a lab. The University of California, for
example, does not accept online lab courses for its a-g requirements, stating, “Online lab science courses will not be approved unless they include a supervised wet lab component. Since UC has not seen computer software that adequately replicates the laboratory experience, computer simulated labs will not be acceptable.” However, in fall 2006 UC will pilot virtual labs with UCCP and evaluate the results of that pilot to provide options for schools that otherwise could not offer a lab.

Recent studies suggest that simulated labs, including online simulations, can be effective. In one example, comparing a simulation to a physical lab in an introductory university-level physics class, the researchers found that, “Students who used the simulated equipment outperformed their counterparts both on a conceptual survey of the domain and in the coordinated tasks…” A review of 31 studies researching the use of computer and Internet-based simulations found, “it appears that computer simulations can be effectively implemented across a broad range of grade levels. Successful learning outcomes have been demonstrated for elementary…and high school students.”

Online simulations are able to demonstrate key concepts to achieve learning outcomes. Online labs may include video of an instructor demonstrating a procedure, explanations of equipment that would be used to run the lab, and options for students to manipulate variables in order to show lab results.

3.7 Additional online resources

Online courses use some online resources and often some materials that are not online, such as paper textbooks. State-adopted textbooks are also available in an electronic format. The degree to which a course or program uses online or paper resources varies by program and by course, and many courses still require paper textbooks. Online courses, however, tend to use resources beyond those used in physical classrooms. These include:

- The Internet and specific websites: Although many traditional classroom courses expect students to use the web as a resource, online courses tend to stress the use of the Internet. Websites may be integrated into course content for students to review, or students may be expected to search for, analyze, and synthesize information. The latter approach is valuable as it teaches a skill that is increasingly important in an age and economy where the importance of information gathering and assessment continues to increase.

- Animations, audio and video: Some courses are able to use audio and video clips to supplement written materials; in courses such as foreign languages, audio clips are instrumental to learning. Some courses, such as those offered by University of California College Prep, include animations that provide learning opportunities far beyond what is possible in physical classrooms and from paper textbooks. Animations that show, for example, the way cells divide are able to illustrate complex concepts in ways that go beyond chalkboard and textbooks.

24  http://www.ucop.edu/a-gGuide/ag/faq.html#C81
• Communication and interaction: Although not a resource per se, the ability of an online course to have students interact with peers from around the state, and in other states and countries, is another potential advantage to online learning.

### 3.8 Comparing online and classroom-based learning

It is difficult to compare online and classroom-based teaching and learning because of the tremendous variability in both types of education. The Internet provides a learning environment and tools that are used in many ways by teachers and students. Just as one traditional classroom teacher may prefer creating classroom discussions while another focuses on group projects, one online teacher may use threaded discussions extensively while another uses videos and animations. The subject of a course also partially dictates the best approaches to teaching and learning; a biology course taught in the traditional classroom and a biology course taught online may share more in common than the online biology course and an online Spanish class.

Within this variability, some general comparisons between online and traditional classroom learning tend to hold true:

- Asynchronous online learning can be more individualized than learning in physical classrooms. In an asynchronous course, students have more control than in most physical classrooms. They decide when to go online, within parameters set by the teacher (such as a requirement that each student must log in to the course once every two days). There is more opportunity for students to learn at their own pace; at the same time there is more opportunity for students to fall behind or become distracted.

- Synchronous online learning provides direct instruction during regularly scheduled periods much as in a regular physical classroom.

- Many teachers report that there is more, not less, communication with students in online courses. Students who might be shy about raising their hands in class may be more willing to email the teacher or other students. In an English class, for example, it may be difficult for a teacher to get twenty students to participate meaningfully in a classroom discussion when the class only lasts an hour. In the online environment, however, the teacher can require that students participate in the threaded discussion, and students know that their comments can be easily reviewed by the teacher.

- Teachers need to be proactive in communicating with students. Unlike in a physical classroom, teachers can’t tell that a student is confused by her body language, nor can a teacher tell that a student is not engaged by the bored look on his face. Because these traditional ways of monitoring student comprehension are not available online, teachers must be more proactive with some students. For example, teachers can establish chat rooms to share questions or concerns, or call students on a weekly basis to discuss their progress.

### 3.9 Online content and standards

Issues relating to standards for online courses fall into two categories: the need for online courses to meet state standards and the overall need for quality online course standards.
The state learning standards issue is straightforward. In California, online courses must meet state learning standards in the same way other courses do. Online programs develop courses based on these learning standards in the same way that physical schools do. Indeed, 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 quality standards for online courses, is recognized by many practitioners. There is no universally accepted set of standards, but several organizations have published recommendations for quality online courses. These include the Southern Regional Education Board's Essential Principles of Quality: Guidelines for Web-based Courses for Middle and High Schools\(^27\) and the Guide to Online High School Courses\(^28\) developed by the National Education Association and Virtual High School, among others. Recommendations from these and other publications include many that are relevant for any course, online or not, and some that are specific to online courses:

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

At least one non-profit organization is evaluating online courses from a variety of sources and making the best courses available for licensing by other programs. The Monterey Institute for Technology and Education\(^29\) has worked with UCCP, among other organizations, to develop and evaluate high-quality online courses. The Online Course Evaluation Project (OCEP) provides course evaluations at a website called EduTools, which also evaluates learning management systems. OCEP evaluates Advanced Placement courses as well as courses being used in post-secondary institutions, so it is not applicable to a wide range of K-12 online courses. Its evaluation criteria, however, can be applied to many online courses. Courses that meet Monterey Institute standards are sometimes made available through the National Repository of Online Courses.\(^30\)

### 3.10 Student support

One key challenge for online programs is providing support to their students. This support varies by type of program, and in most cases must include both technical support (including course access and problems with computers or software) and academic support (issues related to the course content). The following are some ways that programs provide student support:

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\(^{27}\) Available from www.sreb.org/main/Publications

\(^{28}\) Available from www.nea.org/technology/onlinecourseguide.html

\(^{29}\) Information on the Monterey Institute for Technology and Education is available at http://www.montereyinstitute.org/; and OCEP is located at http://ocep.edutools.info/.

\(^{30}\) http://www.montereyinstitute.org/nroc.html
• Most programs provide some sort of technical support to students that is separate from academic support. There are two reasons for this. First, teachers may not be able to address all technical needs, which can range from lost passwords to software downloads. Second, because an asynchronous online course is always available (and this time flexibility may be one of the reasons the student is taking an online course), technical support should be available 24/7, or at least offer a far quicker response time than a teacher would be able to provide. Technical support may be via phone, email, or both.

• Technical support for synchronous schools is crucial as a student can miss critical instructional time if the system is down or a student has hardware issues. The technical support staff is available during the regular school day and may be provided through phone, email, or through peer-to-peer connections or home repair visits.

• 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 for the student. This mentor often provides both technical and academic support.

• Full-time programs often identify a mentor or learning coach to support the student. Because full-time students are not attending a physical school, this mentor is often a parent.

• Online programs typically provide an orientation course to guide a first-time student in taking an online course.

• In a synchronous environment the need for academic support is reduced because the student and teacher interact in real time on a regular schedule. Teachers have the opportunity to identify any technical issues or problems with course material, and can respond accordingly.

In considering support options, online programs must follow federal and state laws regarding service to students with disabilities. Courses and learning management software must be developed to be compliant with the Americans with Disabilities Act (ADA), most often addressing visually impaired or hearing impaired students through well-thought-out course design and technology solutions such as screen readers.

3.11 Isolation issues

A concern often raised about full-time online students is the potential for isolation and a lack of socialization because students are not interacting with peers as they do in traditional classrooms. A related issue is the perceived lack of extracurricular activities that enrich students’ experiences beyond classroom learning.

These concerns are valid, and some providers of full-time online programs address them by providing field trips, student clubs, and other extracurricular activities. Florida Virtual School, for example, offers a science club, Latin club, and newspaper club. The science club competes in state and national competitions, and the newspaper club produces two newspapers per month. These clubs meet online most of the time; for example, in preparing for competitions, the science club often does not meet in a traditional classroom until the actual competition, doing all planning and preparation through the Internet. FLVS notes that this is similar to the real world, where companies often have employees from different offices collaborating on projects.

While these clubs provide learning experiences outside the classroom, they don’t necessarily address the need for traditional classroom interaction among students. For supplemental programs

this is not an issue, because students are taking only one or a small number of courses online, often from a physical school that they are attending. For online charter schools and other full-time programs, however, potential isolation and lack of physical world interaction is a concern. At RAI Digital High, for example, the parent-teacher organization provides local community coordinators that organize field trips for students within a region. At the Oregon Connections Academy, local community coordinators organize regional field trips for students; for example, the Portland community coordinator set up field trips to the city’s science museum, among other outings.

It is clear that a few field trips are not sufficient to fully address this issue. The preceding examples demonstrate that some online programs recognize these issues and are taking steps to address them. However, additional research and efforts to address isolation issues are needed.

3.12 Reaching alternative student populations

Many online learning programs across the country reach student populations who are not well served by existing schools. These are often students on the upper or lower ends of the achievement spectrum; most students in the middle are fairly well served by traditional schools. Students on the upper end of achievement often desire Advanced Placement, honors, or other advanced courses that are not available in their schools due to a lack of resources or teachers. At-risk students and others at the lower end of achievement are not responding well to physical schools, and in some cases an online option is better for them. Other populations that may be served by online learning include adult learners, families that travel often, home school learners, military families that are frequently redeployed, incarcerated students, English learners, training athletes, and performing actors. Because California has large numbers of students in several of these populations, the potential for online education to reach alternative student populations is especially great.

3.12.1 Adult learners in California

In California, adult schools can offer distance learning via legislation referred to as the Innovation and Alternative Instructional Delivery Program (Education Code 52522). The vast majority of adult basic education distance learning, including English as a second language, is provided via the video checkout model. Using this model, the student, based on a placement assignment: (1) checks out a video and workbook or study packet; (2) views the video; (3) completes the work assignment; (4) meets with the instructor to review and discuss the work; and (5) is given the next video and work materials. Of the 50,000 adult students engaged in distance learning in 2003-04, the California Distance Learning Project staff estimate that some 44,000 were served in this fashion.

Any adult school wishing to request authorization to claim state apportionment funds for distance learning submits an annual application to the California Department of Education Adult Education Office. Authorized programs are required to submit an annual report outlining budget information, student activities, learners served, accomplishments, the alternative instructional delivery design, average daily attendance (ADA) accounting procedures, and how the program is evaluated and continuously improved. In fiscal year 2004-05, 90 adult schools requested approvals for Innovation Programs totaling more than $23,385,000 with an approximate average of $280,340 per adult school.

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32 This section is based on information provided by Dennis Porter, Project Director of the California Distance Learning Project, a CDE Adult Education Leadership Project under contract with the California State University Dominguez Hills College of Extended and International Education and the Sacramento County Office of Education.
California adult school distance learning is subject to ADA “seat time” accounting practices. In making an annual Innovation Program application, the adult school describes how instruction is cross referenced with ADA. Several models have been developed and followed by many adult schools. The delivery follows the independent study approach of creating an informal contract between the teacher and learner that determines roles and responsibilities. Research suggests that the success of distance learning among California adult students is very high, especially in English as a second language instruction.35

There are signs that the Internet is increasingly being used as a delivery mechanism for adult schools. In program year 2005-06 there are 106 adult school Innovation Program classes identified as using online instruction. Unfortunately, data on the number of students served are not available.

The California Department of Education’s Adult Education Office and the California Distance Learning Project are pilot testing the delivery of online high school subjects for adults. This pilot test is being refined and will be based on a memorandum of understanding (MOU) with the University of California College Prep Online (UCCP) program. The pilot test will include experimentation with a virtual school approach in which a credentialed teacher from one adult school can serve students from other adult schools requesting the online course.

There are three major constraints preventing the wider adoption of online learning in California adult education programs.

- Teacher Preparation: Adult education, like K-12 education, must be delivered locally by a credentialed teacher employed by the school district. This means that the teacher must be familiar with online instruction, the learning management system, the communications tools, and the course content. There are few incentives for teachers to take on these additional responsibilities.

- Costs: The cost of utilizing packaged online courses is often prohibitive for adult schools. On average California adult schools receive about one-third of the per-student revenue provided to K-12 systems.

- Limited Course-Length Materials: There is a limited set of course-length online materials in the English as a second language, adult basic education, GED, and adult secondary education (ASE) program areas. Online use will grow as more inexpensive and open source materials become available. For example the popular multimedia English for All web site (http://www.myefa.org) had over 213,000 visitors last year, of whom 65,319 were unique. They viewed over 18.5 million web pages.

3.12.2 English language learners in California

California faces challenges in educating English language learners, many of whom are highly mobile. Approximately 25 percent of public school students in California are not proficient in English,34 representing about 1.5 million students.36 Although the California Department of Education tracks over 50 languages spoken by K-12 students, Spanish speakers represent about 85 percent of the total. Because a substantial number of the Spanish speaking students are highly mobile, they may also face challenges in attending school.

Online courses may be an option for helping some of these students achieve English proficiency and graduate from high school on a college path. UCCP has begun an initiative to translate some of its courses into Spanish, providing the opportunity for students to take college prep courses online while attending intensive English acquisition courses. This effort is part of a larger four-part initiative between UCCP and Mexican education agencies to meet the needs of English language learners in California.

33 See for example the annual reviews of the distance learning programs at http://www.cdponline.org/fivepercent.htm.
34 Pacific Research Institute, http://www.pacificresearch.org/pub/sab/educat/03_ed_index/03_ell.html
35 http://www.cde.ca.gov/ds/sd/lc/ellang01s.asp; his number is as of 2002.
Evaluating academic success in online programs

The many educators, students and parents who have been pleased with the student outcomes of online courses and programs have no doubt that online learning can be effective. Indeed, many people who question the effectiveness of online learning do so out of misunderstanding: they do not realize the extent to which teachers are involved with and communicate with students, the quality of material available online, and the academic rigor of many online courses.

One reason for this lack of understanding is the diverse range of online programs. Programs may be full-time or supplemental, be synchronous or asynchronous, and offer courses that are self-paced or run in cohorts. Dr. Susan Lowes, of Columbia Teachers College, has suggested a valuable distinction between what she calls virtual courses and virtual classrooms.6

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

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

The online programs in California discussed in this report fall into the categories of virtual courses with ongoing, one-on-one teacher-student interaction, or virtual classrooms that have both teacher-student and student-student interaction. They do not have courses that include minimal teacher involvement and are similar to correspondence courses.

4.1 Is online learning effective?37

Still, the question remains whether online learning is equally, more, or less effective than traditional classroom teaching. Online programs track several measures that show effectiveness of online learning. Most are internal, such as course completion rates, while a few compare students in online

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36 This analysis is adapted from Dr. Susan Lowes’ chapter, “Professional Development for Online Teachers,” in the forthcoming book What Works in K-12 Online Learning, an edited volume with 19 chapters exploring elements of success in online learning. Cathy Cavanaugh and Robert Blomeyer, editors, International Society for Technology in Education.

37 Much of this section, except where otherwise noted, is based on Smith et al 2005. The figure on AP Exam pass rates is from this source.
courses to students in traditional classroom courses. For example, a report from Learning Point Associates provides 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, showing the online programs exceeding national averages for exam results:

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

“In reviewing these five meta-analyses related to K-12 online learning, it appears that different applications of meta-analytic methods may yield somewhat differing results. Based on these available findings, one conclusion seems clear: On average, students seem to perform equally well or better academically in online learning. Because of the very small number of high-quality quantitative studies available for review and synthesis (only 14 studies were completed between 1999 and 2004), this conclusion should be described as showing promise, but with the realization that we cannot have real “confidence” in these conclusions until there is much more support available from high-quality quantitative research.”

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

4.2 Evaluating student success in California online programs

The California Standardized Testing and Reporting Program (STAR) is the main method of evaluating student success in California K-12 education. For a full-time program, the best way to track outcomes is to use this existing state assessment. This is challenging because both state and federal guidelines require a 95 percent participation rate by students, yet in California parents are allowed to opt-out of STAR, and under state law schools cannot compel their students to take the assessment. Online programs, with students scattered across many counties, typically set up one or more locations where their students can take the test with proctors. Because getting to the location is a burden for students and their families, participation rates are lower than for physical schools. Eventually online programs might be able to determine a way for students to take an online version of the state assessment from their homes, but so far concerns about cheating have negated this approach across all states.

For single courses, some teachers use a portfolio assessment approach to grading student work, in part to alleviate concerns about academic dishonesty. While the concern about ensuring that students are doing their own work is commonly raised regarding online courses, online teachers generally feel that this issue is handled fairly easily, simply because teachers and students are in such close communication. Most teachers ensure that student grades are based on a range of assignments and tests, and not heavily weighted to a small number of large tests, thus ensuring that students do most of the work required in order to pass the class. In addition, some online programs require exams to be proctored to ensure that students are taking the exam unaided.
Professional development for online teachers

The discussion of professional development and online learning has two aspects, both of which are reviewed in this section. First is the issue of helping teachers to teach effectively online. What must teachers know, what skills must they have, and how do online programs ensure that online teachers are effective? The second issue is the promise that online education holds for providing professional development opportunities to classroom teachers.

5.1 Helping teachers teach online

The discussion of teaching online in the sections above should make it clear that teachers are an integral part of learning online, and may further suggest that the skills needed to teach online are not exactly the same skills needed to be a successful teacher in the classroom. Online programs recognize this, and most have professional development requirements for their online teachers. There is, however, no state requirement that online teachers receive any training in teaching online.

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

The second element of teaching online, developing good online pedagogy, is much more complex. As discussed in section 3, teaching online is substantially different from teaching in a classroom in several ways. At a simple level, consider the difference between technically knowing how to use a discussion board, versus understanding how to use a discussion board to create a lively, educational class discussion. The first is almost trivially easy; the second is far more difficult. The UCCP and RAI Digital High professional development programs for online teachers, for example, spend time helping teachers understand how to motivate learners; enhance student interaction and understanding without visual cues; jointly develop interactive lessons; reach students who aren’t responding well; and address concerns about cheating and similar issues.
Online teachers and researchers studying online learning report several key skills that should be enhanced through professional development opportunities:

- Proficiency in communicating online: In many programs, teachers and students are communicating primarily through writing; therefore teachers must “recognize the tone of their writing and pay attention to the nuances of words.”
- In asynchronous programs, time management skills are critical for teachers (and students) because they can be online at any time.
- In synchronous programs, teacher planning is an issue, as the lessons have a multi-media component that requires much more planning than traditional classrooms.
- Teachers must be able to recognize different learning styles and adapt the class to them, despite limitations in communication. Some online teachers pay special attention to gaining an understanding of each student’s skills and challenges in the early days of an online course to ensure that the course meets all students’ needs.
- If teachers have any students with disabilities, they must know how to adapt course content and teaching to these students’ needs. Reaching visually impaired, hearing impaired, or learning disabled students online can be quite different than in a physical classroom.

Some online programs evaluate their teachers to a greater extent than most physical schools. This is possible in part because of the nature of the learning management system technology, which captures class discussions and course content in a way that is not possible in a traditional classroom class. A school administrator can drop in to a threaded discussion much more easily than a classroom discussion. Also, many online programs survey students at least once per semester, and may ask for the students’ feedback on their teachers.

5.2 Online professional development for classroom teachers

The subject of using online courses for professional development of teachers is slightly outside the scope of this report, so is reviewed only briefly here. Many school districts around the country are increasingly interested in developing and implementing online professional development programs, in large part responding to the shortage of qualified teachers and the “highly qualified teacher” requirements of the No Child Left Behind Act. The Southern Regional Education Board report “Online Professional Development: Why SREB States Should Use It” provides numerous reasons why online learning can meet schools’ and teachers’ needs for professional development. These include the ability to transcend barriers of time and place; reduced travel time and expense; the scalability of online courses, enabling them to reach a large number of teachers in a short time; and the potential for online professional teaching and learning communities that enable teachers to continue to learn and share ideas after the professional development course has ended.

There is potential overlap between teachers’ professional development needs and students learning needs. The Louisiana Virtual School offers an online algebra course that is taught by an online math-certified teacher to students who take the course in a physical classroom during a scheduled class period. The physical classroom is supervised by a teacher who is not certified in math. The course meets dual goals of providing an algebra course to students from a highly qualified algebra teacher, while providing professional development towards math certification for the classroom teacher.

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38 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.
39 Available at http://www.sreb.org/programs/EdTech/pubs/PDF/OnlineProfessionalDevelopment.asp
40 See, for example, the application from the Louisiana Department of Education for schools interested in participating in the program, available at http://www.louisianavirtualschool.net/documents/alg0607letter.pdf.
Technology for online programs

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

Although technology is important to online learning, it is important not to overstate its role. We should not lose sight of the fact that in the online environment teachers and students are still the primary players; the technology plays a supporting role. Another reason not to overstate the importance of the technology is that the basic technological components in online education are fairly simple. The hardware that is required is available in most schools in California, and the software is sold by several vendors whose focus on price and services suggest that, with some exceptions, much of the technology is increasingly seen as a commodity. While some of the cutting-edge educational technology tools hold great promise for online learning—and indeed classroom-based learning as well—the technology being successfully used for online courses is fairly simple.

One of the key “technology” issues, in fact, is more of a generational issue. Students in our K-12 schools today are part of the “millennial” generation; they are children of a digital age, and many are far more comfortable with technology than their parents and teachers. According to Liz Pape, CEO of Virtual High School, “Students born between 1982 and 2000 spend more time surfing the Web, building websites, communicating through instant messaging, and writing blogs than they do watching television.”

This difference is not just about what today’s students do with their time, but also reflects a much different use of technology than in previous generations and indicates how deeply technology is integrated into their lives. This difference is clear to anyone who has watched teenagers use cell phones to send text messages, using their thumbs to type faster than many of us can type on a computer keyboard.

6.1 Software and hardware necessary for online programs

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

Software includes:

• The course management system (CMS) or learning management system (LMS). As discussed in section 3.1, the CMS or LMS is the software system that packages the course content, com-

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7  “Course management system” (CMS) and “learning management system” (LMS) are terms that are increasingly being used interchangeably in part because of convergence of features. Software used to support online courses, with the features described above, was originally called a CMS. LMS was originally software to track registrations, course completions, and similar administrative functions in a corporate training setting. Over time CMS and LMS software have converged as each has added features of the other. Adding to the confusion is the fact that many people use the terms interchangeably.
munication tools, grade book, and other elements of the course. While most CMS options offer both asynchronous and synchronous tools, they are focused on asynchronous delivery of courses. Examples of commercial CMS products commonly used in K-12 online programs are Blackboard, eClassroom (the K-12 division of eCollege), Angel, and WebCT (which recently merged with Blackboard). While most online programs use one or more of these commercial products, some schools that are part of nationwide companies use a CMS developed by the company. Capistrano Connections Academy and California Virtual Academies are examples of this.

Programs that are primarily synchronous use web-based collaborative software, in addition to management systems, with features that include real-time audio, video, and chat. This software is provided by vendors such as Horizon Wimba or Centra, among others, and is sometimes used by online programs that are primarily asynchronous but use real-time communication for an occasional class, presentation, or meeting.

- Audio and video plug-ins: Teachers and students will usually need a media player such as Windows Media Player or Real Player for viewing video and audio.

- Basic 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.

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

- Servers and bandwidth: An online program needs a server that hosts the courses and the bandwidth to deliver them. Most vendors that provide course management systems also have an option to provide hosting. Synchronous programs further require servers to operate the interactive component of the program, with additional bandwidth needs. Online programs of schools and districts often use the district’s hardware, creating some confusion about actual technology costs.

- Computers and Internet access: The need for computers for all teachers and students is a significant issue for online programs, in part because of the cost, and in part because of the potential to exacerbate issues of inequality (see discussion of the digital divide in section 7.3). Supplemental programs often expect the student’s school to provide access to a computer lab so that the student can access courses from the school. This approach works reasonably well, although some poorer schools face constraints such as older computers and software. Programs that serve full-time students sometimes provide computers on loan to their students as part of their service.

Internet access is another digital divide issue. While most programs attempt to make their courses accessible for dial-up access, broadband Internet access provides a far better learning experience. Some courses have elements that require broadband access, and others that technically don’t require broadband are almost impossible with dial-up (for example, try watching a video on dial-up).

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

6.2 Technology status in California

Two programs have helped bring hardware and connectivity to California schools: the federal eRate program, and the K-12 California High Speed Network, formerly called the Digital California
Project. eRate was authorized by the federal Telecommunications Act of 1996 to provide affordable Internet connectivity to schools and libraries across the nation. The program has paid out over $10 billion since its inception to help schools receive as much as 90 percent of the cost of access and hardware.\textsuperscript{43} The California High Speed Network is a state program that provides network connectivity, Internet services, teaching and learning application coordination, and videoconferencing coordination and support for California’s K-12 community.\textsuperscript{44}

Annual technology reports by the California Department of Education and the California Technology Assistance Project show the extent to which schools are connected to the Internet and offer computer access for students. The last annual report, from 2003, provides extensive data on computer and Internet access in California schools:\textsuperscript{45}

A second table provides a snapshot of computer and Internet access across schools by percentage of students eligible for free and reduced price lunch:

These data suggest that although technology access remains a concern—especially related to the digital divide issues explored in the next section—computer and Internet access in schools is high and growing. Technology is part of the challenge of delivering online courses, but is not a major barrier.

### 6.3 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. Although 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.

\textsuperscript{43} [http://www.eschoolnews.com/resources/reports/erate/](http://www.eschoolnews.com/resources/reports/erate/)

\textsuperscript{44} [http://www.K-12hsn.org/about/](http://www.K-12hsn.org/about/)

\textsuperscript{45} Summary of Year 2003 School Technology Survey Findings, California Technology Assistance Project and California Department of Education, [http://www.cde.ca.gov/ls/et/rs/documents/castsreport03.pdf](http://www.cde.ca.gov/ls/et/rs/documents/castsreport03.pdf)
At least one recent study⁶ suggests that the digital divide is real, persistent, and perhaps more serious among students than adults. The study, by an economics professor at UC Santa Cruz, found that about half of Latino and African American children have a computer at home, while 85 percent of white children have a computer at home. The gap in Internet access is similar: 40 percent of Latino and African American children have Internet access, while over three-quarters of white children have access. The study also found that teens with a home computer are six to eight percentage points more likely to graduate from high school than teens without a home computer, even after accounting for other parent and family factors that would influence graduation rates. The University of California College Prep Online was created in response to disparities between students in availability of Advanced Placement courses; UCCP is therefore highly aware of digital divide issues.

Other online programs generally recognize digital divide issues as well. Some online programs, such as RAI Digital High, address these issues by loaning computers, printers, utility software tools, and other needed multi-media tools to students, and providing a place for students to go to work. Other programs work with local schools to provide computer and Internet access. The digital divide is likely to persist, however, and online programs must remain aware of and focused on these issues.

### 6.4 Future technology changes

Online education programs are at the cutting edge of using technology for teaching and learning, although they are constrained by the need to keep their programs accessible to a wide variety of students—both students who are very comfortable with technology and those who aren’t, and students on dial-up Internet access from rural areas as well as those with a fast broadband connection. In thinking about the future of online education programs, therefore, it is worth considering how the technology will change over time.

The overarching track of technology, 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 listen to 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 that 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, which go far beyond the scope of this report. A few of the major changes and implications are:

- One-to-one computing programs, in which each student and the teacher have a computer, are likely to become more common as the price of computers continues to drop.
- The cost of broadband access will continue to drop and broadband access will increase. The result will be a smaller number of students left behind on the wrong side of the digital divide, but a greater loss for those students as they fall behind their wired counterparts.
- Greater use of Internet technology in the classroom, and a blending of online and classroom-based classes. More teachers will use Internet resources and course management systems for their traditional classroom classes, following the path of post-secondary institutions.
- Schools administrative technology, such as student information systems, will increasingly tie in to instructional functions.

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⁶ The study, by Robert Fairlie, associate professor of economics at UCSC, was reported in *eSchool News*, December 12, 2005, [http://www.eschoolnews.com/news/showStory.cfm?ArticleID=5999](http://www.eschoolnews.com/news/showStory.cfm?ArticleID=5999)
• There will be an increase in the types of devices that can access the Internet, and a convergence of capabilities of these devices. Consider the ways in which cell phones are now used as digital cameras and for text messaging, or the advent of video iPods and “podcasting.” In the relatively near future K-12 students may be seeing and hearing courses on their iPods.

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

6.5 Adaptive learning

Adaptive learning is often discussed in the context of future technology advances. Adaptive learning is an educational approach that uses technology to deliver content to different students at different rates, and via different paths. For example, students might take a pre-test to identify the concepts they know and the concepts they have not yet learned, and would then be guided through just the parts of the course that they need to learn.

Adaptive learning is a hot topic in educational technology, especially in corporate training. However, it is especially suited to learning that requires the student to master knowledge—facts, figures, and how to accomplish set, discrete tasks. This model works well for corporate training, where an employee must learn rules and regulations or master a process.

Education at the K-12 level, however, is less about teaching facts and more about teaching students how to think, analyze, and creatively solve problems, often as part of a group. These tasks require communication with a teacher and other students, and while the learning may be student-centered, the technology does not and cannot replace the teacher. Adaptive learning technologies do, in fact, seek in part to take the place of the instructor or corporate trainer who makes decisions about what and how employees are learning. In K-12 education, the guidance inherent in adaptive learning may be most useful in supplemental instruction and interventions.
California Attendance Accounting for Online Education

The California Education Code gives all school districts the authority to provide online classes. Online curriculum may be presented either in a classroom setting or through independent study, as explained in sections 8.2 and 8.3. The appropriate method of attendance accounting for such classes is dependent upon the instructional setting utilized, not on the curriculum itself. There are two additional sets of regulations that govern some online programs. Online charter schools are regulated by the provisions of SB 740 explained in section 8.4, and the online pilot program established by AB 294 is reviewed in section 8.5.

7.1 Online education in a classroom
Some schools provide an online curriculum in a classroom setting similar to all other class periods. In this case, subdivision (a) of Education Code Section 46300 is the relevant code:

“In computing average daily attendance of a school district or county office of education, there shall be included the attendance of pupils while engaged in educational activities required of those pupils under the immediate supervision and control of an employee of the district or county office who possessed a valid certification document, registered as required by law.”

Note that the code requires that students be under the “immediate supervision and control” of a certificated employee. In some online classes the certificated employee acts as a tutor or facilitator, rather than as an instructor. In this setting, a daily period attendance form identical to that used in the other class periods is the appropriate attendance accounting document.

7.2 Online education provided through independent study
Many online programs do not take the approach of having students under direct control of a certificated employee; these programs use independent study as an alternative instructional strategy. Under independent study rules, apportionment credit is made on the basis of the student’s “product” (study or academic work), assessed by a competent, certificated employee of the district. Districts that opt to use the independent study strategy for providing online courses should familiarize themselves with the requirements for independent study.

7.3 Combining classroom and independent study
Individual student’s programs may consist of part classroom-based study and part independent study. Education Code sections 46110 and 46141 limit elementary and most secondary students to one day of apportionment credit in any calendar day. District procedures must prevent the claiming of any combination of classroom and independent study credits that would exceed one day of apportionment credit per day of instruction in the school’s calendar. In addition, if the student is scheduled for at least the minimum day (in most instances, 240 instructional minutes) of

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47 Independent study is governed by Education Code sections 51745-51749.3
48 Education Code sections 51747, et.seq.
classroom-based study or independent study, then the attendance accounting for apportionment purposes can be determined solely from that predominant instructional setting.

In 2000, legislation was implemented that established an Online Classroom Pilot Program. The pupils who participate in part-time online instruction in the 40 schools that participate in the pilot project are able to count 60 minutes of online instruction to match the 180 minutes of attendance in traditional in-classroom setting, versus 240 minutes in traditional class structure for non-pilot schools.

7.4 Provisions of SB 740

Online charter schools are also governed by *Education Code* sections that were revised by the passage of SB 740 in 2001 to address concerns about independent study programs potentially misusing funds. The law requires, among other provisions, that to receive full funding, a charter school must:

- Spend 80 percent or more of total revenues on instruction.
- Spend 40 percent or more of public revenues on certificated staff salaries and benefits.
- Have a pupil-teacher ratio equal or lower than 25:1 or equal to or lower than the pupil-teacher ratio in the largest school district in the county or counties in which the school operates.

In 2005, new regulations were created that allow online charter schools to avoid the pupil-teacher ratio provisions of the law if the school “has and maintains an 8 or above Academic Performance Index (API) rank in either its statewide or similar schools ranking and has no less than a 6 in the other of these two rankings.” In this case the school must spend at least 85 percent of its budget on instruction, and a subset of this expenditure must be on “technology that directly benefits students and teachers and results in improved student achievement.” Other elements of the law include:

- Instruction must include “standards-based guided lessons, lesson plans, initial testing of [and] periodic assessment of student achievement…”
- Each student must have an individualized learning plan that is “based on initial testing of the students and that is monitored…by the teacher to evaluate student progress.”
- All students must be given “access to a computer, Internet service, printer, monitor, and standards-aligned materials based on State Board adopted academic content standards for each grade level and for each subject studied.”
- All students eligible for special education services must receive these services, and the charter school must recruit a student population with ethnic and racial representation similar to the counties served by the program.

7.5 The Online Classroom Pilot Program

The Online Classroom Pilot Program was established through the passage of AB 294 in 2003 “to utilize technology to help address issues of equity of access such as providing courses in hard-to-staff subject areas, meeting the needs of diverse learners, and providing student access to advanced

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50 Information in this section taken from California Department of Education, Report to the Legislature: AB 294 Online Classroom Pilot Program.
placement courses.” The executive summary of a report from the California Department of Education to the legislature that evaluated the pilot program explains succinctly:

“[CDE] accepted 40 school sites from 11 districts for the Online Classroom Pilot Program. Status reports indicated that 63 teachers and over 1,700 students participated in the program. Districts implemented a variety of program delivery options to meet learner needs. An AB 294 Working Group was established pursuant to legislation. Districts were required to complete an AB 294 Classroom required to complete an AB 294 Classroom Pilot Project Review to collect data and written feedback concerning online program statistics, program benefits, program barriers and proposed program modifications.

Program benefits included providing schedule flexibility and equity of access, preparing students for success in the college environment, providing motivating technology-enriched curriculum that engaged every student in active and responsible learning, and embedding technology literacy with academic content. Successful implementation was slowed by lack of funds for start-up costs needed to successfully implement an online program, and no funds for the data collection and evaluation components required by legislation. Report results support allowing additional schools and students to participate in this program.

Districts maintain fiscal records for audit that verify the cost of online program implementation. Districts indicated that running an online class was either about the same or more expensive than running a traditional class. An initial investment must be made for the necessary equipment, infrastructure, online content and training. Although the development cost will go down after initial implementation, there are recurring costs associated with online content delivery (as there are recurring costs with traditional content delivery).”

7.6 Online education policy in development

Several bills are being considered in the state legislature related to online learning; one of these, AB 1985 (Daucher) would lift the restriction on the number of school sites that could take part in the online classroom program. In addition, the University of California is in the process of developing its policies for which online courses meet the a-g requirements. At this time UC has articulated the online courses provided by UC College Prep and PASS/Cyber High. It honors other online courses only if the high school principal certifies that the online course is comparable to other college prep courses at the school.

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51 For an explanation of the a-g requirements please see http://www.ucop.edu/a-gGuide/ag/welcome.html.
Topics for future discussion

Online learning is increasingly demonstrating its value to students and educators across California. The flexibility of online learning is meeting students’ needs in many ways, from the UC College Prep for high school students, to RAI Digital Charter High’s innovative use of synchronous instruction, to the pilot programs implemented through AB 294, and the online charter schools offering courses to students in earlier grades.

There are several outstanding issues that educators in California might consider in order to increase the availability of online courses and programs to a greater number of students, with a goal of ensuring that online programs are consistent with public education’s ideals of equity and access. Many of these issues are related to expanding the range of courses available to students, especially in rural or inner-city areas, beyond what a single school can offer, and providing highly qualified teachers in subjects where qualified teachers are lacking. These two points are connected, in that some small schools are unable to offer a wider range of courses because of the No Child Left Behind requirements that all teachers demonstrate subject matter competence in all core subjects they teach.

These topics fall into several categories. They are explored below in order to generate discussion among educators and stakeholders throughout California.

8.1 Growth of online programs
A critical next step for the future of online education in California is the creation of a statewide E-Learning Council. The council would include educators and stakeholders appointed by the state superintendent to examine the growth of K-12 online programs and related issues in California and to make appropriate recommendations. The work of the council would build on the findings of this report and would include policy and legislative recommendations to help ensure the sustainable, long-term growth of online education programs in California and to extend the benefits of online learning to more students across the state.

8.2 Quality assurance
In order to help promote the sustainability of online education programs while ensuring high academic standards and performance, several issues should be explored, including:

- Tracking course completion rates and STAR scores of students in online programs in order to have a measure of quality of online programs.
- Assuring the integrity of tests and other assessments for students who are distance learners. Requiring that online teachers have received professional development in teaching online, focusing not just on the online course management tools but, more importantly, on good online pedagogy.
Setting minimum standards for communication between teachers and students in online programs.

Setting expectations for interactivity in online courses, and for including elements other than text such as audio, video, and group discussions.

Working with the University of California to guide the development of online programs in meeting the a-g requirements and wet lab requirements.

8.3 Availability of online learning opportunities in California

Issues for discussion include:

- Facilitate equitable access to online courses for all high school students in the state by using a designated educational agency to approve online courses that meet state standards and a-g requirements. The agency could create an internet system and infrastructure for school and students to access and take web-based courses leading to a high school diploma. It could serve as a clearinghouse to link together public entities that offer approved courses and students who need the courses to meet high school graduation requirements.

- California could explore an approach similar to that used in other states to increase students’ understanding of technology, while ensuring that the availability of online programs reach high school students across the state.

- Implementing the AB 294 pilot program and evaluating pending legislation (AB 1985) that offer additional opportunities to expand online learning.

8.4 Additional research

Online education is relatively new and data are often not available to substantiate the many and differing opinions on how it should be implemented in public schools. Educators and stakeholders would benefit greatly from additional research into several key areas. California might consider sponsoring research that analyzes and compares:

- Student outcomes in online courses and traditional courses.
- Student outcomes in different types of online courses and different subject areas to determine how online education can be most effective.
- The cost of online programs, to determine whether online programs cost more, less, or about the same as physical schools.

8.5 Expansion of online course offerings

More work needs to be done to investigate the ability of online learning to allow schools to expand their course offerings while meeting the mandates of the federal No Child Left Behind (NCLB) Act, which requires that by the end of the 2005-06 school year, all teachers must demonstrate subject matter competence in the core academic subjects they teach. For small secondary schools this requirement presents major challenges. Because teachers may not be able to demonstrate subject matter competence in all core subjects, schools may be unable to offer all courses needed. The NCLB guidance includes suggestions that districts may consider using online learning, stating that, “highly qualified teachers may teach ‘virtual’ classes through distance learning.”

The list of issues for consideration given above serves as a starting point for discussion. It will grow and evolve over time, as technology changes and online programs grow. The most important point is that these issues are addressed by the state. The growth of online, K-12 education program in California has great potential to benefit millions of students throughout the state by providing greater equity and access for all students.

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APPENDIX A:
PUBLIC K-12 ONLINE LEARNING PROGRAMS IN CALIFORNIA

Following is a partial list of K-12 online programs in California. The list is not meant to be comprehensive, but rather
to provide a sense of the breadth of online program offerings across the state.

University of California College Prep Online (UCCP)
www.uccp.org
The UC College Prep Online (UCCP) is a University of California academic initiative to develop and deliver quality
online courses, test prep and academic support services to students across the nation and beyond. UCCP also provides
online content for classroom use and teacher training in educational technology. UCCP was created in 1999 to equalize
access to college preparatory courses and materials by providing students and schools with curricula that may not be
available otherwise.

RAI Digital High School
www.RAIdigitalhigh.net
RAI Digital High is a charter school that utilizes advanced technologies to deliver a high-quality educational program
for students in grades 6-12 in a synchronous environment. Highly qualified and appropriately credentialed teachers in-
struct students daily in their core academic courses. Instructional lessons, resource materials, and testing are available to
students online in real time. Advanced technologies are used to enhance learning while eliminating schedule, distance,
busing, and location issues. RAI is fully accredited by the Western Association of Schools and Colleges.

California Virtual Academies
www.caliva.org
The California Virtual Academies are a network of online charter schools affiliated with the private company K-12 Inc.
The schools, in San Diego, Kern, Kings, Jamestown, Sonoma, Sutter, and San Mateo, currently serve students in grades
K-9 in 2005-2006, with plans to expand to grades 10-12.

Capistrano Connections Academy
www.connectionsacademy.com/state/about.asp?sid=ca
Capistrano Connections Academy (CapoCA) is an online charter school serving Orange, San Diego, Los Angeles, San
Bernardino, and Riverside counties. CapoCA opened in fall 2004 and currently serves students in grades K-9, and
expects to expand its grade range by adding one high school grade per year. The teaching center is located in Laguna
Niguel, in south Orange County.

Choice 2000
www.choice2000.org
Choice 2000 is an online charter school available to students in grades 7-12 in Riverside, San Bernardino, San Diego,
Imperial, and Orange counties. The school uses real-time online classes and is accredited by the Western Association of
Schools and Colleges.

eScholar Academy
www.eScholaracademy.net
eScholar Academy provides students with a full range of academic courses online for students grades 3-12. The school
uses the Odyssey Ware Online™ curriculum. The curriculum is open entry open exit. Each course is divided into
instructional units. Units are made up of lessons, projects, quizzes and tests. Certificated teachers monitor student prog-
ress and grade students work on a daily basis. Student success is based on mastery of the subject area.
Los Angeles Virtual Academy
lava.lausd.net

The Los Angeles Virtual Academy is a virtual high school program that offers students access to high quality, standards-based, content-driven learning experiences that meet their learning needs and expand the boundaries of the classroom. LAVA utilizes a hybrid or blended delivery model to provide instruction to students. This model utilizes asynchronous, synchronous, and traditional classroom content delivery methods. LAVA currently offers Advanced Placement courses, credit recovery, and other learning opportunities. The Los Angeles Virtual Academy has been in existence for two years and in that time has grown to serve approximately 800 student enrollments annually.

Pacific Coast High School
http://www.pchs.K-12.ca.us

Pacific Coast High School is an alternative high school with about 485 full-time students, based in Orange County and serving students in Orange and adjacent counties. Many of the school’s courses are offered online, some with an on-campus component.

Online Classroom Pilot Program Districts
AB 294 established a pilot program of school sites offering online courses. The California Department of Education reports the following information regarding districts’ involvement in the program:

<table>
<thead>
<tr>
<th>District</th>
<th>Total number of participating students</th>
<th>Total number of participating teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capistrano</td>
<td>70</td>
<td>2</td>
</tr>
<tr>
<td>Clovis</td>
<td>120</td>
<td>4</td>
</tr>
<tr>
<td>Folsom-Cordova</td>
<td>36</td>
<td>2</td>
</tr>
<tr>
<td>Grossmont</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>729</td>
<td>37</td>
</tr>
<tr>
<td>Orange</td>
<td>174</td>
<td>4</td>
</tr>
<tr>
<td>Santa Ana</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Victor Valley</td>
<td>249</td>
<td>6</td>
</tr>
<tr>
<td>Wm. S. Hart</td>
<td>362</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1755</td>
<td>63</td>
</tr>
</tbody>
</table>
Appendix B: Definitions

**Average daily attendance (ADA):** ADA is “(i) the aggregate number of days of attendance of all students during a school year; divided by (ii) the number of days school is in session during such school year.” (U.S. Department of Education, 2002)

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

**Cyber charter school:** Similar to a brick-and-mortar charter school but instruction is primarily delivered over the Internet.

**Cyberschool (virtual school):** An online learning program in which students enroll and earn credit towards academic advancement (or graduation) based on successful completion of the courses (or other designated learning opportunities) provided by the school.

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

**Distance learning:** Instruction in which the pupil and instructor are in different locations and interact through the use of computer and communications technology.

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

**Independent study:** An alternative instructional strategy that enables students to work independently according to a written agreement and under the general supervision of a credentialed teacher. Apportionment is generated based on the teacher’s determination of the time value of completed student work.

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

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

**Seat time:** The actual physical presence of a student in a brick-and-mortar school setting.

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

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

**Virtual school (cyberschool):** An online learning program in which students enroll and earn credit towards academic advancement (or graduation) based on successful completion of the courses (or other designated learning opportunities) provided by the school.

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54 California Education Code Section 51865
Appendix C: Education Code definition and description of distance education

California Education Code Section 51865

(a) It is the intent of the Legislature that legislation be enacted to implement the policy objectives set forth in this section with regard to distance learning. For purposes of this article, «distance learning» means instruction in which the pupil and instructor are in different locations and interact through the use of computer and communications technology. Distance learning may include video or audio instruction in which the primary mode of communication between pupil and instructor is instructional television, video, telecourses, or any other instruction that relies on computer or communications technology.

(b) Distance learning should be utilized by the state to achieve the following educational goals:

(1) Equity in education, which requires that every pupil in California's public schools, and every adult in the state, have equal access to educational opportunities, regardless of where he or she lives or how small a school the pupil attends.

(2) Quality in education, which would be enhanced through the creative application of telecommunications, as pupils are given the opportunity to interact with pupils from other cultures and geographical locations, and with outstanding educators from other educational institutions.

(3) Diversity among educational institutions, which has been recognized in California through the support of various types of public educational institutions as well as of independent and private colleges and universities. Distance learning technology permits greater diversity in the means of instruction and in the delivery of educational and training services to an adult population that is more and more likely to seek education outside of the traditional baccalaureate program designed for four consecutive years on a full-time basis shortly after graduating from high school.

(4) Efficiency and accountability, which receive increasing emphasis as state budget resources become increasingly restricted. Distance learning technologies can be effective only through the cooperative efforts of individuals from different institutions, a collaboration that has the potential to reduce costs and increase efficiency. A technology-integrated educational delivery system would allow for the electronic transmittal of files and reports, thus providing the information needed for accountability more rapidly and at a lower cost, and for video teleconferencing for state and local education and other government agencies, thereby diminishing travel requirements.

(c) To the extent that funding is made available for this purpose, a coordinated distance learning system should be developed to serve the following high priority education needs:

(1) The enhancement of work force skills and competency in the adult population.

(2) The expansion of adult education classes in English as a second language, in response to the growing level of unmet need for that instruction.

(3) The enhancement of curriculum to meet the needs of high-risk pupils who would be likely to drop out of traditional classroom programs.

(4) The expansion of course offerings in subjects that include, but are not limited to, foreign languages, science, and mathematics, to rural and inner-city secondary schools that are unable to provide the college preparatory and enrichment courses that their pupils require and that other secondary schools provide.

(5) The expansion of course offerings at community colleges and off-campus centers to better serve students in all parts of the state. This expansion should include university-level courses, to better serve community college students who seek a university-level education but do not have the financial resources to transfer to a university.
(6) The establishment of staff development courses for elementary school, secondary school, and community college teachers who otherwise might be unable to participate in training opportunities.

(7) The enhancement of curriculum through an increased communication capability on the part of schools, colleges, and universities, providing the opportunity for those institutions to receive various types of supplementary educational programs, conduct exchanges with business, industry, and government, participate in live lectures and conferences on special topics, and increase cooperation and communication with other educational institutions.

d) The state should encourage the use of multiple technologies in distance learning education, including microwave, satellite, and public/private switched network delivery systems. Priority in this regard should be placed upon interconnecting the various delivery systems, while providing educators with the opportunity to experiment with each alternative distance learning technology.

e) The state shall recognize the value of regional networks serving regional needs, as well as the value of a statewide network.

f) In expanding the use of distance learning technology, the state should emphasize the delivery of education and training services to populations currently not receiving those services, the ease of access by educational institutions to the technology, and the lower cost over time of providing instruction through distance learning rather than on site.

g) The state should employ incentives, rather than requirements, to induce educational institutions to expand their utilization of distance learning technologies.

h) The state should ensure that the same standards are applied to distance learning for course and program quality, course content, pupil achievement levels, and coherence of curriculum that are currently applied for those purposes to traditional classroom instruction at public educational institutions.

i) The state should encourage collaboration between the private sector and educational institutions in the use of technology, both to enhance the quality of education in the classroom and to expand the delivery of educational services to the worksite.
Appendix D: Letter from California Department of Education clarifying attendance accounting for online courses

April 24, 2001
To: County and District Superintendent
Attention: County and District Chief Business Officers and Directors of Curriculum
From: Janet Sterling, Director School Fiscal Services Division
Subject: Attendance Accounting for Online Classes

Teachers need a wide variety of options to develop a curriculum that appeals to students while expanding their knowledge, increasing their competencies, and simultaneously meeting traditional goals. Recent advancements in technology present exciting opportunities for innovative curriculum as well as new instructional mediums. Furthermore, the use of technology provides an alternative for districts that might not otherwise have the resources to provide coursework in specific subject areas.

In recent months, the California Department of Education (CDE) has received numerous questions regarding the use of online curriculum, including the eligibility of online programs for apportionment credit. This letter summarizes CDE’s understanding of the instructional settings in which online classes may be provided, as well as details the attendance accounting requirements thereof.

Online curriculum may be presented either in a classroom setting or through independent study. The appropriate method of attendance accounting for such classes is dependent upon the instructional setting utilized, not on the curriculum itself.

Subdivision (a) of Education Code Section 46300 provides, in part:

“In computing average daily attendance of a school district or county office of education, there shall be included the attendance of pupils while engaged in educational activities required of those pupils under the immediate supervision and control of an employee of the district or county office who possessed a valid certification document, registered as required by law.”

Many schools provide an online curriculum in a classroom setting similar to all other class periods, except that, in some instances, the certificated employee acts as a “tutor” or “facilitator,” rather than as an “instructor.” In this setting, a daily “period” attendance form identical to that used in the other class periods is the appropriate attendance accounting document.

Independent study is an alternative instructional strategy that may also be utilized to implement instruction through an online course. It is important to note that Education Code sections 51747, et seq. provide that the apportionment credit for independent study is made on the basis of the student’s “product” (study or academic work), assessed by a competent, certificated employee of the district.

Districts that opt to use the independent study strategy are advised to familiarize themselves with the requirements for independent study. These requirements are complex and district compliance is rigorously audited in the annual audit required pursuant to Education Code Section 41020. Additional information on requirements for independent study can be found at http://www.cde.ca.gov/spbranch/essdiv/is_index.htm or by calling the Educational Options Office at (916) 322-5012. Copies of the Independent Study Operations Manual (2000 Edition) may be purchased from the CDE Press (found in its catalog, Educational Resources 2001, page 22, Item No. 1500). Copies can also be ordered by telephoning 1-800-995-4009, or by submitting a district purchase order via FAX to (916) 323-0823.

It may be that individual students’ programs consist of part classroom-based study and part independent study. Education Code sections 46110 and 46140 limit elementary and most secondary students to one day of apportionment credit in any calendar day. District procedures must prevent the claiming of any combination of classroom and independent study credits that would exceed one day of apportionment credit per day of instruction in the school’s calendar. In addition, if the student is scheduled for at least the minimum day (in most instances, 240 minutes) of classroom-based study, or is assigned at least the minimum day’s worth of instruction through independent study, then the attendance accounting for apportionment purposes can be determined solely from that predominant instructional setting.

The advent of new technologies presents fascinating opportunities for students to learn. When properly accounted for, the instructional time for online courses may be used in the calculations of instructional minutes and minimum day attendance. For further information or clarification regarding attendance accounting or other apportionment-related issues for online classes, please contact the School Fiscal Services Division, Fiscal Policy Office, at (916) 323-8068.
Appendix E: Additional resources

ORGANIZATIONS

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

North Central Regional Education Lab (NCREL)
http://www.ncrel.org/
NCREL is one of 10 federal regional education labs. Each regional education lab has a national focus in one topic area, and for NCREL the topic is education technology. NCREL has led several research initiatives into the effectiveness of K-12 online education.

California Consortium of Virtual Educators (CCOVE)
http://dr.leland.dragonangel.net/ccove/moodle/
CCOVE is a membership organization that promotes and supports the use of virtual schooling in K-12 schools in California.

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

PUBLISHED REPORTS

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

Keeping Pace with K-12 Online Learning: A Review of State-Level Policy and Practice
Learning Point Associates, October 2005
http://www.ncrel.org/tech/pace2/

University of California College Prep Initiative, 2002

Essential Principles of Quality: Guidelines for Web-based Courses for Middle and High Schools
Southern Region Education Board, 2001

*Essential Principles of High Quality Online Teaching: Guidelines for Evaluating K-12 Online Teachers*
Southern Region Education Board, 2003

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