



# COLORADO DEPARTMENT OF EDUCATION

---

201 East Colfax Avenue [Central Office 303.866.6600]  
Denver, Colorado 80203-1704 • [www.cde.state.co.us](http://www.cde.state.co.us)

**William J. Moloney**  
Commissioner of Education

**Roscoe Davidson**  
Deputy Commissioner

REPORT TO THE JOINT BUDGET COMMITTEE OF THE  
COLORADO STATE LEGISLATURE  
ON  
THE COST OF ONLINE EDUCATION

FEBRUARY 2004

**Contact:**

Stevan Kalmon  
Colorado Department of Education  
303-866-6977  
[kalmon\\_s@cde.state.co.us](mailto:kalmon_s@cde.state.co.us)

**Lead author:**

John Watson  
Evergreen Consulting Associates  
303-883-6068  
[johnw@evergreenassoc.com](mailto:johnw@evergreenassoc.com)

**Table of Contents**

Executive Summary..... 3

1. Context ..... 4

2. Understanding cost issues in online education..... 5

3. Cost components in online education ..... 6

4. Cost estimate from the Colorado Cyberschool Association..... 7

5. Cost estimates from other states ..... 8

6. Aligning cost estimates ..... 9

7. Conclusion ..... 11

## **Executive Summary**

This report was developed for the Joint Budget Committee (JBC) of the Colorado Legislature to describe costs of K12 online education and make recommendations for per-pupil funding levels for online education programs in Colorado.

Online education represents a very small but rapidly growing segment of education at the K12 level, responding to students who desire or require online courses either to provide a full curriculum, or to augment the curriculum of their physical schools. In addition, brick and mortar schools use supplemental online learning programs to strengthen their capacity for responding to the full range of student needs. Online education programs are new both in Colorado and across the country, thus costs are not yet well known. This is in part due to a lack of formal research into costs, and in part due to the evolving nature of online programs.

Colorado cyberschools receive the minimum per pupil revenue (PPR) for the vast majority of their students; in the 2003-04 school year the minimum PPR is \$5511. To this point, little research has been done into what the funding level for online students should be, or what the cost of educating students online is.

Several assumptions have been made for this report. Costs are estimated assuming that programs have been in operation long enough to have finished paying start-up costs, and that these programs' student demographics—in terms of high-risk students, special education students, and other factors—are roughly equal to the state average. In addition, programs are assumed to include a curriculum that requires student/teacher interaction and makes full use of the instructional benefits associated with computer-assisted instruction, a student/teacher ratio at least similar to the brick and mortar classroom, and a licensed instructor in all courses.

Two cost estimates were compiled, one from members of the Colorado Cyberschool Association (CCA) and one based on examples from other states. The CCA cost estimate is just over \$7,000 per student, while a consensus estimate from programs in other states is slightly above \$5,000. One reason for the difference in cost estimates is that Colorado's online programs lack economies of scale obtained in other states.

Analysis of the cost estimate from members of the Colorado Cyberschool Association, along with cost estimates from programs in other states, suggests that over time, as programs evolve, grow, and achieve some economies of scale, Colorado can fund online programs for less than the state's minimum PPR. Over time the cost might be as low as the state's base PPR level. Reducing PPR funding for online programs, however, would result in changes to these programs that the legislature and Colorado Department of Education cannot anticipate or control. Therefore, if the legislature chooses to lower PPR for online programs, it should do so slowly and create mechanisms for efficient program operation and feedback. This would allow programs to adapt, and allow CDE and the legislature to study the effects of lowering funding on cyber programs.

## 1. Context

This report was developed for the Joint Budget Committee of the Colorado Legislature to describe costs of K12 online education and make recommendations for per-pupil funding levels for online education programs in Colorado.

Online education represents a very small but rapidly growing segment of K12 education, responding to students who desire online courses either to provide an alternative learning environment or to augment the curriculum of their physical schools. In addition, brick and mortar schools use supplemental online learning programs to strengthen their capacity for responding to the full range of student needs.

Online education programs may be classified into several types:

**Supplemental programs:** A supplemental program provides one or a small number of courses to students who are enrolled in another school, usually a physical school. Colorado Online Learning (COL), which provides high school level courses across the state, is one example of a supplemental program. Other supplemental programs are run by districts, including Poudre, Littleton, and Douglas County School Districts, to serve students who attend their brick and mortar schools. Supplemental programs do not enroll students, and per pupil revenue (PPR) does not flow directly to them; accordingly, they are not directly affected by state PPR levels. They are examined in this study, however, because their costs may be instructive in determining appropriate funding levels for other programs. In the case of COL, a fee of \$200 (\$100 for high-poverty/high-need districts) is paid by a student's district for each one-semester course in which the student registers. In the case of single-district programs, the districts fund the programs and receive the same level of PPR that they receive for students who take all their courses in physical classrooms.

**Cyberschools:** Cyberschools provide the predominate portion of online learning in Colorado. Cyberschools may operate within a single district; for example, there are single-district programs in Jefferson County, Poudre, and Colorado Springs School District 11. Cyberschools may also operate across districts. Examples of multi-district cyberschools in Colorado are Colorado Virtual Academy (Colorado's largest cyberschool and the only charter cyberschool thus far in this state), Branson Online, V.I.L.A.S., Monte Vista Virtual Academy, and Connections Academy. Cyberschools enroll students and receive PPR for these students; ascertaining appropriate funding levels for these students is the subject of this report.

Colorado cyberschools receive the minimum PPR (\$5511 in the 2003-04 school year) for the vast majority of their students. (They receive the operating district's standard PPR for students who were enrolled in a Colorado cyberschool during the 2001-02 school year. There were 705 of these students during the 2001-02 school year, but only 143 remain during the 2003-04 school year.)

To this point, little research has been done into what the funding level for online students should be, or what the cost of educating students online is. This report addresses these issues.

## 2. Understanding cost issues in online education

Attempting to address the question of how much online education costs requires making numerous assumptions that greatly influence the answer. An analogous question is “How much does a car cost?” The answer depends on numerous factors; a car that provides basic transportation can cost a few thousand dollars or more than \$30,000. Even if we make some basic assumptions about the car (e.g. the car must be new, must be able to hold five adults, and must have four wheel drive), the range of possible costs can easily be many times more than the low-end estimate.

Education clearly is more complex than a car. One report states

It is difficult to make a precise determination of the costs of cyberschools because of the large number of variables associated with program purpose and delivery... Variables of delivery include curriculum source and design, platform and Internet service, instruction, administration, student support, and other factors that affect funding needs. Variables of curriculum, instruction, and student support have an especially significant impact upon funding.<sup>1</sup>

Another report, analyzing start up costs for cyber charter schools (termed eCommunity Schools) in Ohio, notes

[T]here is great variation in both design and start-up expenditures among eCommunity schools. This variation is generated primarily by the differing decisions made by each school, as well as the opportunities and circumstances each experienced. Further, virtual schools are a relatively new form of K-12 education in the United States, and thus there are no established practices for developing or operating an eCommunity school. As a result, [we are] not able to determine a pattern of expenses that yield a “typical” cost to start an eCommunity school.<sup>2</sup>

Although the Ohio report was addressing start-up costs, and this report focuses on operating costs, the factors that the Ohio report cites as difficulties in estimating a “typical” start-up cost apply to operating costs as well.

For the purposes of this report, several assumptions have been made in order to make an analysis of online program costs. These assumptions are:

- A program has been in operation long enough to have finished paying start-up costs;
- Student demographics in terms of high risk, special education, and other factors are roughly equal to the state average, and;

---

<sup>1</sup> Funding Online Education: A Report to the Colorado Online Education Programs Study Committee, by John Adsit, February 2003. Page 2.

<sup>2</sup> The Start-up Costs of Ohio’s eCommunity Schools, Draft Report for Committee Discussion, Ohio Legislative Office of Education Oversight, January 30, 2004. Page v.

- A program includes the following elements:
  - A curriculum that requires student/teacher interaction and makes full use of the instructional benefits associated with computer-assisted instruction;
  - A student/teacher ratio at least similar to the traditional classroom;
  - A licensed instructor in all courses;
  - Systemic student support, including special education.

### 3. Cost components in online education

**Online education costs can be divided into the following categories:**<sup>3</sup>

- **Curriculum/content:** The cost of online content varies widely, with individual programs reporting course development costs ranging from a low in the neighborhood of ten thousand dollars per course to a high exceeding a quarter of a million dollars. Lower-cost courses tend to be heavily dependent on a teacher and offline materials such as textbooks. Higher-cost courses place a greater percentage of course materials online, often in formats that are expensive to produce (e.g., animations or applets). Content may be developed by the online program or acquired (usually licensed, sometimes purchased) from an outside provider, either a commercial vendor or another program. If developed in-house, course content is often revised annually. For programs that develop their own courses, content development is a very large start-up expense.
- **Instruction:** Instruction is usually the largest ongoing cost for an online program, because most programs maintain student/teacher ratios similar to physical classrooms. For this reason instruction costs grow in proportion to enrollment growth. Some programs contract with part-time teachers, others use full-time teachers, and some use a combination of both. Teachers are also often involved in content creation. The main factor influencing cost of instruction is the student/teacher ratio.
- **Course management system and associated technology:** The course management system (CMS) is the software platform that delivers the content and provides the online tools to allow communication among teachers, students, parents, and other schools regarding students' progress and achievement. Some online programs install CMS software on their servers and run the platform on their own, while others use an application service provider (ASP) who hosts the software. ASP companies usually provide technical support to both students and teachers. Regardless of which method online programs choose, the total CMS costs are similar. Some programs have other technology costs, which may include providing computers and Internet access to students; these programs have substantially greater technology costs.
- **Student support:** Student support is a critical component of online programs. Support can be divided into two categories—technical support and academic support. Technical support is sometimes available through the CMS provider and addresses students' needs in accessing the courses and materials. Academic support includes mentoring and other

---

<sup>3</sup> Categories are adapted from Adsit, 2003.

services designed to help the students succeed in the online courses. Technical support is often provided at a distance, but academic support typically involves a face-to-face component. The level of student support and the associated costs vary significantly among programs. Factors influencing support costs include the geographic distribution of students and student demographics; for example, at-risk students typically require greater support than academically successful students.

- **School administration:** Administrative costs for online programs pay for tasks similar to those in physical schools. These tasks include enrolling students, handling grades, managing teachers, and other aspects of program management and leadership.
- **District administration:** As with physical schools, online programs use district-level administration, and pay districts to cover their costs.

#### 4. Cost estimate from the Colorado Cyberschool Association

Members of the Colorado Cyberschool Association developed a consensus estimate of the per-student cost of full-time online education.<sup>4</sup> The association used the following assumptions:

- The program has been in operation for at least two years.
- The program serves the equivalent of at least 200 full-time students.
- All teachers are state-licensed and both actively and regularly engage the students via telephone, e-mail or online discussion.
- Approximately 30% of students are at-risk, as defined by Federal poverty guidelines, and 10% qualify for special education services.

With these assumptions in place, the CCA members estimated the following costs per student:

- Curriculum/content: \$1080
- Instruction: \$2400
- Course Mgmt/technology \$750
- Student Support \$1580
- School Admin \$700
- District Admin \$700

The estimated total cost per student **\$7210<sup>5</sup>**.

---

<sup>4</sup> Cost information taken from a draft report, “Estimated Cost of Operating a Cyberschool in Colorado,” written by Lucy Hausner using input from members of the Colorado Cyberschool Association, February 2004.

<sup>5</sup> The Colorado Cyberschool Association also includes a budget item for “reserves” estimated at \$275, because “Colorado requires that schools maintain a reserve of 3 percent of the minimum per pupil operating revenue...[and] ...there are other reserves either required by districts or by good management principles that average at about 2 percent of PPOR.” This brings CCA’s estimate per student to \$7485. In order to be consistent with analysis of costs from programs in other states the reserve amount is not included in this report.

## 5. Cost estimates from other states

Several other states have addressed funding of online education programs. While none of these states has exactly the same conditions as pertain to Colorado, some provide valuable insights.

In many states the prominent program is a statewide supplemental online program, similar to Colorado Online Learning. Examples include the Florida Virtual School, Kentucky Virtual School, Idaho Digital Learning Academy, Illinois Virtual High School, and University of California College Prep (UCCP) program. These programs, with the exception of Florida (see below), have not been funded through per-student FTE (in Colorado, PPR) revenues, but instead have been funded through a combination of state legislature appropriations, federal grants and appropriations, private sector grant money, and fees paid by districts. For these programs, measuring costs on a per-pupil level is a misleading approach for at least two reasons. First, all of these programs incurred high start-up costs in areas of administration and course development, among others, most of which were subsidized by the state or through federal grants. Second, in some cases these programs have received funds for specific purposes, such as development of a course with “high production values” (e.g., animations and interactivity); and in other cases these funds and/or projects have been co-developed with other programs, making accounting difficult. In addition, some programs target student populations that inherently entail higher costs than an “average” student in a physical school. UCCP, for example, provides online college preparatory and AP courses to students who otherwise would not have the opportunity to achieve competitive eligibility to leading universities. These students are often rural or low-income students, and delivering online courses and the necessary support to these students can be more expensive than delivering online courses to the general population.

With these caveats in mind, two examples from statewide supplemental programs, along with cyberschool examples from two other states, are useful:

- **Florida Virtual School:**<sup>6</sup> Florida Virtual School (FLVS) is a statewide program whose experience is especially instructive for Colorado, because it is now funded via per-pupil revenue. FLVS was created in the mid-1990s by the state legislature, and funded at a total of about \$25 million over six years in a series of state appropriations. In 2003, however, the funding model for FLVS changed. FLVS is now considered a special school district for funding purposes and is funded according to the state’s per-pupil funding model. The school receives **\$4,820 per FTE** for the 03-04 school year, and is estimating total FTE at 2,250, for estimated funding of \$10.8 million. Also of note is that FLVS receives funding only for course completions,<sup>7</sup> eliminating such issues as seat time, drop out rates, and census dates, while raising a different set of issues around the incentive created by funding tied to successful course completions. FLVS has very few full-time students, so most funding is based on per-course funding equal to 1/6 FTE. Also, unlike other school districts in the state, FLVS does not receive weighted FTE funding for exceptional students, in large part because FLVS does not provide the services to these students that physical schools provide.

---

<sup>6</sup> Florida Virtual School information based on phone interview with Bruce Friend, Chief Academic Officer of Florida Virtual School, January 30, except where otherwise noted.

<sup>7</sup> A “course completion” is defined as the awarding of a course credit, so students completing but failing a course are not considered a completion for funding purposes.

The history of FLVS's costs over time is illustrative, as its per-FTE costs have dropped from \$7757 per student as recently as 2000-2001.<sup>8</sup> Higher per-student costs in Florida Virtual's early years reflect the expense of initial curriculum development; according to FLVS, it wasn't until about two years ago that per-student costs dropped to a level close to what it is now. Lower recent costs reflect a reduced level of course development plus some economies of scale as enrollments have grown. In determining the FTE funding for FLVS, the Florida legislature looked in general terms at areas of costs and cost savings for online learning, with an expectation that online education costs would be similar to costs for physical schools.

- **Illinois Virtual High School:** IVHS estimates instructional costs of \$195 per student per semester, and average technology platform fees and curriculum licensing fees of \$188, for a total average cost of \$383 per student per semester. Multiplying this number by two for a full year, and by six to come up with an FTE, yields a total instructional cost of \$4,596. Assuming that administration accounts for 15% of costs (the assumption used by Adsit in his report on online costs), the total IVHS program cost per student is **\$5,407**.<sup>9</sup>
- **Minnesota and California:** Both Minnesota and California have passed legislation that governs funding for online education programs. In California, the newly passed AB 294 provides for the creation of a pilot program of 40 online "school sites" that will be approved by the California Department of Education. These online programs will receive FTE funding (termed ADA for Average Daily Attendance in California) at the level of the school district's "normal" funding.<sup>10</sup> In Minnesota, legislation distinguishes between cyberstudents who were in public school in the previous year and cyberstudents who were not enrolled in Minnesota public schools previously. The former students receive full FTE funding at the level of the school district. The latter students are funded at a level of about **\$4,600** for students in grades one through six, and **\$6,000** for students in grades seven through twelve. Funding for these students comes from a pool of \$1 million created by the state legislature and total funding is capped at that level.<sup>11</sup> In both cases a charter school receives 88% of the FTE funding and the district receives the remaining 12%.

## 6. Aligning cost estimates

The figures from the Colorado Cyberschool Association (CCA) and other states show a significant difference in cost estimates—with members of CCA estimating a cost of over \$7,000 per student, and a rough average from other states suggesting an approximate cost of \$5,000. The latter estimate is weighted towards the cost for the Florida Virtual School because FLVS is more established than others, and because its funding model provides greater applicability to the circumstances in Colorado.

---

<sup>8</sup> Adsit, page 9.

<sup>9</sup> Adsit, page 9. (Note that Adsit calculates the total instructional cost at \$4,920 per student, yielding a total program cost of \$5,788 per student.)

<sup>10</sup> Personal communication with Wayne Shimizu, California Department of Education, January 21

<sup>11</sup> Personal communication with Glory Kibble, Minnesota Department of Education, January 21

It is important to note the difference in the way these divergent cost estimates were developed. The Cyberschool Association members used a method that *The Adequacy Study for the State of Colorado*,<sup>12</sup> conducted for the Colorado School Finance Project, terms the “professional judgment approach.” This approach entails having educators develop a list of resource needs and attach costs to each, then sum to an estimate of the total. The other states’ estimates are variations on what the Adequacy Study calls the “successful school district approach,” in which the actual funds spent by online programs deemed successful are averaged to develop an approximation of costs.

While the difference between the two estimates may be attributable in part to the difference in cost determination methods, a closer look at the costs suggests another source for much of the difference: The large number of small, individual programs in Colorado means that administrative costs are high and economies of scale are not achieved. Members of the CCA estimate school and district administrative costs at a total of \$1400 per student (\$700 each for school administration and district administration). This \$1400 is equal to 19% of the CCA members’ total cost estimate, and equal to 25% of the \$5511 that the state is paying per student now. In contrast, the average administrative cost for brick and mortar schools in Colorado is 6.4%.<sup>13</sup>

Some cost categories, such as instruction and instructional materials, scale closely with student numbers. If one assumes that student-teacher ratios remain similar to physical classroom ratios, instructional costs will rise in a linear fashion with student numbers. Other costs, however, do not rise in conjunction with student numbers. These include school administration, program infrastructure, and other operations. Although these expenses will increase with rising student numbers, they will increase slowly compared to student numbers, and with a declining rate of increase.

Members of the Colorado Cyberschool Association recognize areas in which they could achieve greater economies of scale. According to CCA and others, opportunities include:

- Group purchases from vendors of goods and services such as telephone services, learning management systems, courseware development, etc.
- Sharing courseware across cyberschools and charging each other minimal rates.
- Lessening duplication of course offerings among cyberschools so that each school need not offer a full range of courses itself.
- Shared administrative functions so that such staff is fully utilized.
- Sharing student support personnel.

The lack of economies of scale in online programs in Colorado has kept per-student costs high. This means that a decision to fund online education at a higher level than the present level would

---

<sup>12</sup> Executive Summary: The “Adequacy Study” for the State of Colorado K12 School Funding. Conducted by Augenblick & Myers, Inc. and the Colorado School Finance Project. January 2003

<sup>13</sup> According to Vody Herman, CDE Director, School Finance, the average per pupil cost associated with General Administration (Superintendent, Board of Ed, Legal, Tax Collection Fees, Auditing, etc) for FY2001-02 was \$109 or 1.2%, and the average per pupil cost associated with School Administration (Principal's Office) was \$485 per pupil or 5.2%.

provide de facto support for the growth of numerous small online programs across the state. A decision to lower the level of per-pupil funding, for example to the base PPR level, might lead to consolidation of online programs and force economy of scale savings—but not necessarily.

How online programs choose to spend their funds is largely up to the individual program. There is little state regulation specific to online programs. Therefore, if per-student funding levels were reduced, the result among at least some programs *could be* not to consolidate administrative functions, but to reduce costs in other areas that directly affect the quality of instruction. Examples include increasing the ratio of students to teachers, lowering course development investment, and reducing student support. This outcome would be more likely to occur if funding were reduced abruptly, because consolidation would be more difficult in a short time period. This outcome would be less likely to occur if a reduction in funding were accomplished gradually and accompanied by some assistance, from either the Colorado Department of Education or a statewide educational entity such as Colorado Online Learning, in centralizing and providing services to online education programs.

## **7. Conclusion**

Analysis of the cost estimate from members of the Colorado Cyberschool Association, along with cost estimates from programs and legislation in other states, suggests that over time, as programs evolve, grow, and achieve some economies of scale, funding can be lower than present levels. Over time the cost might be as low as the state base PPR level, or possibly even lower. Cutting PPR funding to online programs, however, will result in changes to these programs that cannot be predicted with certainty, nor controlled through existing policies and regulatory mechanisms. If the PPR allocation for online programs is reduced, it should be accomplished gradually and accompanied by the establishment of mechanisms for efficient program operation and feedback. This would allow programs to adjust and would provide the legislature with important information about the effects of reduced funding on online learning programs.