

Estimated Cost of Operating a Cyberschool in Colorado

**Colorado Cyberschool Association¹
February 2004**

Introduction

The mission of the Colorado Cyberschool Association includes the goal of sharing information about effective online education and program management. It is in this spirit that CCA offers this report which provides estimates of operating costs for cyberschools in Colorado in 2003.

A cyberschool is an education institution in which all teaching and learning occurs “at a distance,” that is, the teachers are located separately from the students. In almost all cases, course content is delivered online. Beyond that basic definition, the characteristics of cyberschools in Colorado vary considerably. Some are public charter schools while others are established by public school districts. They also vary greatly in size, years of operation, and degree of public subsidy.

The purpose of this report is to describe the current cost of operating an *average* cyberschool in Colorado in late 2003. All costs are described on the basis of services to one full time student for one academic year. Given the wide range of cyberschools in this state, these cost figures are estimates for an assumed, or “mythical,” cyberschool as detailed below. Input for these cost estimates were provided by members of the Colorado Cyberschool Association based on the costs of operating their own schools. Although the report is limited in scope owing to limited financial resources, it is CCA’s hope that the information provided will assist cyberschool practitioners, especially in start-up situations, as well as education policy makers in the Colorado General Assembly, the Joint Budget Committee and the Colorado Department of Education.

Definition of Assumed Cyberschool

It is necessary to define an average cyberschool in order to determine estimated costs for its operation. The assumptions are as follows:

- The school has been in operation for at least two years. There are no start-up expenses included.
- The school serves the equivalent of at least 200 full time students.

¹ Written by Lucy Hausner using input from members of the Colorado Cyberschool Association.

- Students of the school are in kindergarten through 12th grade or some portion thereof.
- The quality of education at the school is such that students achieve average scores on the Colorado Student Assessment Program (CSAP) tests.
- All school teachers are certified and both actively and regularly engage their students via telephone, e-mail or online discussion.
- The cyberschool student population comprises primarily youngsters who have not found success in more traditional educational settings. Approximately 30 percent of cyberstudents are at-risk as defined by federal poverty guidelines; another 10 percent qualify for special education.
- The school is multi-district; that is, it is able to serve students anywhere in Colorado that are eligible for cyberschool.

Colorado Cyberschool Cost Factors

This report estimates cyberschool costs per full time student per year in seven categories. The first six of these are the same categories used by John Adsit in his paper, "Funding Online Education: A Report to the Colorado Online Education Programs Study Committee," presented in February 2003 (available at <http://www.cde.state.co.us/edtech/download/osc-fundingonline.pdf>). The two papers differ mainly in that Mr. Adsit's paper based cost estimates on cyberschools outside Colorado while this paper is based on cyberschool costs in Colorado. The seventh category was added by CCA members.

The categories and estimated costs for the assumed cyberschool are as follows:

1. Curriculum/course content Courses for cyberschools must be fully designed and produced ahead of time in order to be placed online for students to access via computer. Online courses must be far more precisely designed than those for traditional classrooms. The cost of securing online courses is affected heavily by the quality of the course and the method by which it is secured, i.e., self-developed, purchased or leased.

The quality and cost of online courses increase as they contain the following features:

- Multimedia such as audio, simulations, animations, video clips, frequent or continuous assessment of student progress with diagnostic feedback to student and instructor.
- Ability to address varying learning styles of students.
- Ability for teachers to continuously observe the online work of individual students and intervene online when appropriate.
- Ability to function on computers of varying bandwidth.

Self-Developed Courses: Many cyberschools – approximately half of those in Colorado – develop their own online courses. This was true especially of schools

that provided online education early on because, at that time, there was a dearth of quality courses available commercially. Florida Virtual School (www.flvs.net) is a case in point. Funded by state appropriations, it spent approximately 80 percent of its annual budget in the first 3-4 years on course development, and estimates that courses cost from \$50,000-\$100,000 each. For the past several years, FLVS has been selling rights to use its courses to other cyberschools.

As this data suggests, self-developed courses require a very substantial up-front investment of both money and time (approximately one year per course) if the goal is high quality courseware that incorporates features such as multimedia, varying learning styles, continuous diagnostic assessment, etc. Such courses maximize the pedagogical advantages of online education. But, in developing courses, schools are faced with a spectrum of quality-cost trade-offs. As schools cut features associated with sophisticated courseware – ranging down to what is sometimes referred to as “text on screen” – then production costs will fall accordingly. Not everyone drives a Cadillac; for many a Chevrolet is fine and for others a Kia is better than what they had before.

Advantages to self-developed courses are that schools may design them to fit their particular student populations. For example, in rural areas, math courses might incorporate real-world problems from agriculture or forestry or range management. Schools can also adjust the cost/quality balance to meet their own budgets, and can adjust the course content as much or as little and as often as they like. Ultimately, self-developers can sell rights to use their courses to others, thus creating a revenue stream.

Most online courses are accompanied by hardcopy supplemental materials such as workbooks, texts, etc. Schools that produce their own courses must produce these items as well for each student. The re-useable items such as text books are required to be returned at the end of the course, but schools find success ranges from 90 percent to zero.

In addition, online courses must be updated regularly, usually annually, and schools that develop their own courses must incur this cost as well. Furthermore, CCA estimates that online courses are useable for only about five years before they must be completely re-designed. In large part, this time frame is caused by the speed of technological developments.

CCA estimates that currently the cost for the assumed Colorado cyberschool to develop average quality online courses comes to between \$40,000 and \$80,000 per full year course. Assuming that a course is useable for five years, then the annual cost of course design is \$8,000 – \$16,000. The cost of updating runs to between five and fifteen percent of the development cost, or between \$2000 and \$12,000 per year. That comes to a total annual cost of between \$10,000 and \$28,000 per year or an average of \$19,000 per course per year. If that number is divided by 125, which is the estimated number of students taking the course

each year (five classes of 25 students each), then the annual cost per student taking the course is \$152. It should be pointed out here that as the number of students taking the same self-developed course increases, the cost per student drops.

Added to that is the cost of supplementary course material which is estimated at between \$60 and \$125 per student per year for an average of \$92. Adding that to the annual per-student cost of design and updating (\$152), the total cost per self-designed course per student per year is \$244.

Purchased Courses: There is an increasingly wide range of courses produced by non-profit entities, such as FLVS, and for-profit companies that cyberschools can purchase outright to use for as long as they wish. With some courses, content can be adjusted by purchasers, for example, to meet their state's academic standards. As with self-development, however, purchase represents a major up-front investment in money. CCA has not estimated the cost of purchasing courseware because price is negotiated individually between the cyberschool and the vendor and is sometimes not disclosed.

Leased Courses: In this situation, the cyberschool pays the vendor every semester or every year for the right to use its courseware, and that payment is based on the number of students using the course. This means that if the number of students taking a course increases, so does the leasing fee. It is in contrast to self-developed courses where the cost per student drops as the number of students taking the course increases.

Leasing avoids the sizeable upfront financial investment required for either self-development or purchase. The lease payment sometimes includes teachers for the course, and sometimes includes the learning management system. In these cases, it is difficult to separate the cost of curriculum/course content from the cost of teaching or the LMS cost. Generally, it is less expensive to lease elementary courses than secondary courses. Estimates range from \$75 to \$180 per student per year for elementary courses, for an average of \$127. For secondary courses, estimates run from \$100 to \$240 per student per year for an average of \$170.

Bringing all of this data together, we have three cost figures for individual students taking individual online courses per year. If the course is self-designed, the estimate is \$244. For leased elementary courses, the figure is \$127. And for leased secondary courses, the figure is \$170. The average of all three figures is \$180 per student taking the course per year. However, a full time cyberstudent at either elementary or secondary level will take six courses per year. So the total cost to a Colorado cyberschool for content/curriculum per full time student is \$180 times six or \$1080.

2. Instruction According to the assumptions for the model school in this report, all cyberschool teachers are certified and work full time. That is, they teach five courses with no more than 25 students in each class. In practice, about half of the Colorado cyberschools use full time teachers and the other half use part time. At least one school uses a combination of master and adjunct teachers. Generally, teachers interact frequently with cyberschool student, their parents, and their home schools for students that are not full time at the cyberschool. Communication is via telephone and instant messaging (i.e., synchronously) or by e-mail and online group discussion (i.e., asynchronously). Teachers are usually available to students during regular school hours.

The cost of cyberschool instruction varies among schools according to a number of factors:

- Some schools, generally those using full time teachers, pay benefits; others do not.
- Some schools make up for lower-cost curriculum or less sophisticated learning management systems with more teacher time per student.
- Professional development costs vary among schools.
- Rates at which teachers are paid vary depending on whether they are full time, part time or adjunct.

In addition to salaries, the cost of instruction must include the cost of supporting their teaching. Thus this category also covers professional development, Internet connection (ISP), benefits, computers and mileage/travel costs. The annual per-student cost of teaching at the assumed cyberschool in Colorado is estimated at \$2400.

3. Learning Management System (LMS) Sometimes called a course management system or platform, the LMS is the software application needed to put a course online and allow students to access it via computer. It also often includes server hardware. Using the LMS, teachers are able to present information about the course, including course description with anticipated outputs, assignments and deadlines. The LMS also includes interactive features that, for example, enable students to submit completed assignments and take tests. Most learning management systems also offer online class discussions (asynchronous), instant messaging (synchronous), reading material that can be downloaded, and links to course-related resources such as online libraries and websites. More sophisticated systems enable teachers to do some course design, monitor each student's work, and maintain records of grades and other student information. For a description of six different levels of LMS, consult Adsit's 2003 report, "Funding Online Education: A Report to the Colorado Online Education Programs Study Committee" at <http://www.cde.state.co.us/edtech/download/osc-fundingonline.pdf>.

The LMS is both a fixed and substantial cost for the cyberschool. It is fixed because the entire system must be purchased regardless of the number of students it serves. Because the LMS is expensive, schools purchase them infrequently. In addition to the LMS software, cyberschools require technical staff (about \$50,000 plus benefits) to keep the LMS and other technology such as servers and computers in working order, and they need the hardware on which the LMS software will operate. In some cases, the LMS cost includes Internet and server service as well as technical support for the school; in far fewer cases it includes course curriculum and even instruction. Overall, the cost of a learning management system for the assumed Colorado cyberschool is estimated at \$750 per student per year.

4. Student Support This cost item is variously defined by individual schools, but for this report it includes technical support for students and parents, academic support (such as tutoring), social worker services, guidance counseling, psychologists and the full range of special education. For some schools, it also includes use of a computer along with Internet service (ISP) and maintenance (about \$250 per student per year). And it includes the cost of long distance telephone services, an important means by which teachers communicate with students, parents and home schools. Some schools use toll-free numbers while others issue phone cards to teachers. If students wish to speak with teachers, they are asked to e-mail them and the teacher returns their call. Finally, it includes the cost of mandatory assessments such as the Colorado Student Assessment Program (CSAP) which is more expensive for cyberschools than for physical schools because the students are spread over a wide geographic region. Colorado cyberschools have already begun to cooperate by clustering their students for CSAP testing and sharing proctored test sites.

Cost of special education becomes a significant issue for Colorado cyberschools since some of them have as many as 25-30 percent of enrolled students in that category. Most cyberschools, especially smaller ones in rural areas, secure special education services through the Board of Cooperative Educational Services (BOCES). BOCES hires specialists in such fields as speech therapy, teachers for deaf or blind students, and English as a second language who travel from school to school providing special education services. There may also be BOCES specialists in staff development, services for gifted and talented students, and migrant education services. However, there remains the difficulty some cyberschools encounter of securing "excess" special education costs from the district in which the special education student resides.

The cost estimate for the assumed Colorado cyberschool to provide student support is \$1,580 per student per year.

5. School Administration Administrative staff for cyberschools is extremely low because there is no physical plant or students to manage. Also, a better quality LMS will handle many administrative functions such as maintaining student records. As a result, this item includes only one principal and two clerical staff. Some other administrative expenses are covered by the district. The school administration cost estimate for the assumed Colorado cyberschool is \$700 per student per year.

6. District Administration Some public school districts require that schools pay an “oversight” fee for every student enrolled for classes in that district. In addition cyberschools pay a fee for BOCES administration, and support the cost of office supplies/equipment and of professional services such as legal and accounting. The estimated cost for the assumed Colorado cyberschool is \$700 per student per year.

7. Reserves Pursuant to the Taxpayers Bill of Rights Act (TABOR), the State of Colorado requires that schools maintain a reserve of 3 percent of the minimum per pupil operating revenue (PPOR) which currently stands at \$5511. In addition, there are other reserves either required by districts or by good management principles that average at about 2 percent of PPOR.

Summary of Colorado Cyberschool Costs

All costs are calculated on the basis of one full time student per year

<i>Curriculum/Content</i>	\$1,080
<i>Instruction</i>	\$2,400
Teachers’ salaries	
Professional development	
Teachers’ benefits	

Teachers' computers/ISP	
Teachers' mileage/travel	
<i>Learning Management System</i>	\$ 750
Software	
Hardware for the software	
Tech support for hardware	
<i>Student Support</i>	\$1,580
Tech support for student and parents	
Mandatory testing	
Computers/printers/maintenance	
Internet connection (ISP)	
Long distance telephone service	
Special education	
Counseling	
Psychologist	
<i>School Administration</i>	\$ 700
Principal	
Clerical staff (two)	
<i>District Administration</i>	\$ 700
BOCES fee	
Professional services	
Office supplies/equipment	
Oversight	
<i>Reserves</i>	\$ 275
TABOR	
Other	
Total	\$7,485

Assessing Cyberschool Costs

Online education in public education is still very new. Florida Virtual School, the earliest of the state-level cyberschools, opened less than seven years ago and spent its first years focused almost entirely on developing courses. It is fair to say, therefore, that virtual education is in its pioneer days working this frontier of using technology to serve students who have, for the most part, not flourished in traditional schools. At the same time, there is pressure from many policy makers to reduce costs based on the galloping rumor that cyberschools are the “silver bullet” for less expensive K-12 education, an important issue in these days of tight public budgets.

So cybereducators are caught in the middle. On the one hand, in this very new field, where schools are often small, there are few vehicles for sharing best practice and little-to-no research on course design, cyberschool administration and pedagogy, educators are struggling to solve problems and provide quality educational services. On the other hand, they are being pressed to do all of this at less cost.

Currently, the cost per cyberstudent is higher than the average for traditional education in Colorado. Per-pupil cost reductions will likely be achieved through research into best practice and some economies of scale. At the same time, however, those reductions may be matched by expenditures on new technology, better quality courseware and better student support leaving the overall cost for cybereducation generally the same.

Potential areas of cost reduction include the following:

- Currently instruction is the largest cost category for virtual education. The model being used is the same as for in-class, i.e., one teacher for every 20-25 students teaching largely from written materials and using written exercises and tests that must be reviewed and graded by teachers. But there are already indications that online pedagogy is best when it is quite different from in-class. The course information (e.g., how to solve quadratic equations) is presented by the courseware, not by the teacher on the blackboard standing in front of a class of students. As a result, the online teacher functions more as a coach, intervening when needed to answer questions, and less a step-by-step instructor. No time is spent on class management. As experience is gained, research conducted, and curriculum improved, it is likely that ways will be found to use this human resource more efficiently and reduce the per-student cost.

Better online courses, that use audio, video, animation, simulation, interactive games, and continuous assessment, will convey the course information and allow students to learn more on their own requiring less intervention by teachers. This is especially true for at-risk and special education students who may be able to learn more independently with courses that are designed for varying learning styles. Cyberschools working together may share specialist teachers in, for example, less common languages and sciences. With experience, training for online teachers will be better informed by best practice and make them able to achieve the same or better performance levels with less time and cost per student.

- Curriculum/content is a classic candidate for economies of scale in virtual education. As the population of full time and part time cyberstudents grows, the cost of course development will be divided among more students and the per-student cost will go down. In addition, with improved

and more user-friendly authoring software, the cost of course development itself will drop. Finally, as cyberschools, especially the smaller ones, cooperate, they will be able to negotiate lower lease or purchase rates for online courses.

- Cyberschools can also cooperate in their negotiations with other vendors such as long distance telephone providers and producers of learning management systems making a larger pool of buyers and leveraging lower prices.
- The cost of administration for each cyberschool is largely fixed, and, especially in small schools, it is underutilized. The per-student cost can be reduced either by growth in a school's cyberstudent population or by schools sharing administrative costs such as financial managers or clerical staff.
- Major savings can be gained by sharing student support personnel. In addition, with experience in serving special student populations, the cost of student support may fall. For example, at-risks students may need less academic support as improved online courses become available.
- The technology of learning management systems, supported largely by demand from the corporate sector, is advancing quickly. And prices are dropping. This trend means not only that the price of this important fixed asset will fall, but also that less expensive learning management systems will take on chores currently done by teachers and administrative personnel, thus reducing those costs as well.

Conclusion

Virtual education represents a revolutionary change in the delivery of educational services that is potentially comparable in magnitude to the shift from horse-powered personal transportation to the automobile. Further, this revolutionary change, based on using technology to reach students who are not successful in traditional classrooms, is still in its infancy. Lack of experience and knowledge, coupled with a still fairly small student population, are the major factors pushing up its cost. Even at that, cost per student is not enormously higher than for in-class students. Over time, cybereducation will become substantially more cost-efficient as best practice is more widely shared, it becomes easier to use technology to adjust pedagogy for learning styles, and research yields advancements both in technology and course design.