

## Lessons from K-12 Distance Education in the U.S.A., 1986-2008

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Distance education for elementary and secondary school students in North America has grown and evolved over a century from mail-based correspondence courses for small numbers of geographically dispersed learners to the millions of learners now using online courses in virtual schools. This article focuses on effective practices emerging from the modern electronic generation of K-12 distance education programs existing in the United States between 1986 and 2008.

Distance education programs for K-12 students now serve a very wide range of students. Courses are offered from kindergarten through the final year of high school. Programs are designed to address the needs students with disabilities and other learning challenges as well as to address students who are gifted and otherwise accelerated. Distance programs are also implemented to overcome limitations in numbers of qualified teachers available to teach the full range of courses, or to expand the services of a school with a shortage of physical space and resources for specialized courses.

It follows that K-12 distance education programs develop for specific reasons and they operate according to specific teaching and learning models. Each model is based on different beliefs about the roles of teachers, the importance of interaction and other factors including student needs, as shown in Table 1.

Table 1. Common components of distance school models.

<b>Component</b>	<b>Range of approaches</b>	
<b>Role of the teacher</b>	The teacher is not involved in day-to-day instruction, but provides feedback on assignments	The teacher is central to day-to-day instruction as well as providing feedback on performance
<b>Role of the parent</b>	The parent is the primary instructor in daily lessons	The parent is a support in addition to the teacher
<b>Role of a facilitator, mentor, tutor, site facilitator</b>	There is no one in that role	The person in this role works closely with the teacher and is in regular contact with students
<b>Student grouping</b>	Students begin the course together and progress through the course together so student-student interaction is maximized	Students begin the course at any time and progress through the course at their own pace so flexibility is maximized
<b>Pacing of learning activities</b>	Activities are paced according to an academic calendar	Activities are paced according to student needs
<b>Funding</b>	Traditional FTE or tuition for students attending	Rate for students successfully completing
<b>Organizational structure</b>	Independent public, charter, or private school	Online program offered by an established school, district, state or consortium
<b>Purpose of the online courses</b>	As a full-time high school for students not attending a traditional school	As a supplement for students attending a traditional school who need remediation or enrichment

## **Strengths of U.S. Distance Schools**

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Over time, distance education programs for K-12 students in the U.S. have demonstrated several strengths. An education culture that values innovative approaches to educational needs has formed the foundation for distance schools. There is a demand for educational alternatives to serve students whose needs are not met by their local schools. Distance schools have provided a setting in which students with a wide range of needs have been met, including learning disabilities, disruptive behaviors, health limitations, family employment, and many others. Distance schools have succeeded in meeting these needs because they allow students the flexibility to focus on their specific academic needs. Distance teachers are able to give students individualized instruction, an approach that supports mastery learning.

As needs were addressed by innovative distance programs, interest in K-12 distance education has grown steadily among students, parents, teachers, policymakers and others. This interest translated to financial support in many schools, districts and states for developing schools and programs to support strong student enrollments. In addition to public education funding from state and local education agencies, distance school leaders have succeeded in creatively funding new distance school programs through alternate sources including foundations and student tuition. The U.S. now has many distance school funding models in place, enabling many distance school models to thrive and to serve various audiences.

To address doubts about whether children can learn and develop socially in a distance education school, a strong research community has emerged. Now a 10-year history of knowledge and effective practice forms the basis on which to build successful schools. Researchers, working in universities, state education agencies, and national centers, are ready and eager to examine the effectiveness of distance schooling in collaboration with a cadre of school leaders eager to contribute to the literature base. The early and continued reports of researchers have been instrumental in building support for development of distance schools. The US now has an archive of research studies to inform future development in distance schooling (Cavanaugh, Barbour & Clark, 2008).

Among the important research findings are studies showing that levels of classroom interaction are essential to the success of distance schools. Among the hundreds of distance schools in the U.S., many models are in operation using different schedules, pacing, teacher roles, and technology requirements. This wide range of choice assists parents and students in identifying the model that works for them. All models emphasize high levels of interaction between student and teacher; many are built around interaction among students in learning communities.

Technical resources have contributed to the spread of distance schools. A relatively widespread Internet infrastructure makes access to online learning practical for most students and teachers. In regions with a lower saturation rate of high-speed Internet access, broadcast courses have been used. In many cases, distance courses are developed by schools themselves to ease overcrowding in classrooms. The development of distance courses and schools is streamlined through the efforts of a vast network of vendors supplying student data systems, learning management systems, and other systems needed to scale up distance schools in this increasingly competitive sector of the education market. At the instructional level, the technology alleviates teachers from designing materials and frees them to focus on teaching. Learning management systems have led to standardization of the content and assessments given to students and have aided quality control.

## Challenges of Faced by U.S. Distance Schools

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For students to benefit from a distance learning program, they must become aware of the options that are available. Because current and potential students are widely dispersed, disseminating accurate information to potential students is a challenge. Developing trusted professional and community networks lays the foundation for creating communication channels to parents and students.

Once students and their parents select the appropriate distance courses, they may be faced with barriers to accessing the courses. Not all homes and communities have access to functional equipment and technical support. The distance school may need to involve partners such as technical support staff, course facilitators, or charities that provide surplus computers to fill access gaps and ensure equity of educational opportunity regardless of a student's location or family financial resources.

Beyond technical barriers, some students encounter new academic or sensory challenges in the distance environment. Online courses that are heavily dependent on reading and writing skill can tax students' literacy abilities. Some students may need additional language instruction, study skills, or accommodations, in particular if the students have identified learning disabilities. Alternately, if audio and video media are used, students with hearing and visual impairments may need specialized equipment or assistance. In addition, the need for dependable and fast Internet connections increases to support rich media.

Parents may have concerns that students will feel isolated from other students in a distance program. Distance schools have successfully used highly interactive courses, student clubs and activities, teacher mentors, and learning communities as solutions. A related concern is how to effectively monitor students to ensure that they stay on the timeline to complete their courses. The independent nature of online learning leads to a high dependence on parents or tutors. This situation can add to the staffing burden on the school as well as complexity in scheduling. Within the distance course, a source of conflict among students, parents and teachers can be negotiation of deadlines and pacing within the course. Detailed school and teacher policies about timelines and communication are needed to keep students motivated and to keep parents involved.

Policies and practices are needed at the school level to manage the immense amounts of data generated in a distance program. This data has value for informing practice if robust and responsive data systems are available to staff who have the time and talent to create and distribute useful reports. Because of the lack of large-scale standardization of distance school models, it is difficult for schools to share data-management systems and practices. One result is that students who change schools find different services and expectations. Another is that professional skills developed for managing data in one school do not necessarily translate to other schools and systems. No comprehensive standards-setting body has authority to govern the distance education system. The single large-scale outlet for sharing practices is a voluntary professional organization, the North American Council for Online Learning, NACOL. The distance school community needs research and practitioner journals and other mechanisms for sharing.

## Effectiveness Research in K-12 Distance Education

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Several studies have synthesized research focused on the effectiveness of distance learning compared to classroom instruction for audiences ranging from young children to adults. Shachar and Neumann (2003) recently reviewed 86 studies of adult and pre-college learning and found that distance education was slightly more effective. The first synthesis of research of K-12 distance learning located 19 rigorous studies completed between 1986-1997, using email and audio/video conferencing for learning (Cavanaugh, 2001). Effect sizes were more positive for interactive distance education programs that combine an individualized approach with traditional classroom instruction. Programs including instruction delivered through telecommunications, enhancement of classroom learning, and small groups yielded larger effect sizes than programs using videoconferencing, primary instruction through distance, and large groups. Studies of distance education for all academic content areas except foreign language resulted in positive effect sizes.

The next synthesis identified 14 studies completed between 1989 and 2004, using the web for learning (Cavanaugh et al., 2004). No specific factors were found to influence differences in achievement: academic content area, grade level of the students, role of the distance learning program, role of the instructor, length of the program, type of school, frequency of the distance learning experience, pacing of instruction, timing of instruction, instructor preparation and experience in distance education, and the setting of the students.

These comprehensive studies found that online and onground courses can be equally effective for academic achievement, when they are well-planned, well-taught, and matched to student needs.

## Effective Practices in K-12 Distance Education

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"...Effectiveness of distance education appears to have more to do with who is teaching, who is learning, and how that learning is accomplished, and less to do with the medium" (Rice, 2006). Research into effective practices, then, focus on teaching, students, and factors of course and program design and management.

### *Teachers:*

In addition to content expertise and knowledge of pedagogy for the students they teach, distance instructors must be qualified to teach the content using distance environments and they should have experience as distance learners. Professional development programs that prepare K-12 distance teachers should include components associated with effectiveness. Teacher development in technology and the content are likely to increase student perceptions of teacher support and cohesiveness (Hughes, McLeod, Brown, Maeda & Choi, 2005). Teacher development in student-centered teaching, collaboration, problem-based learning, group work, and authentic assessment contribute to improved academic performance. Student-centered teaching such as inquiry learning contributes to improved academic performance and increased academic/engaged student time (Ross & Lowther, 2001).

Distance teacher development programs should serve the needs of teachers at various career stages. Effective online teacher development follows a developmental continuum, as shown in Table 2.

Table 2. Continuum of online teacher development

Role/Continuum	Preservice learning	Induction experiences	Early career development for online education	Master/leader development
VS Teacher	Technical skills according to professional standards	Co-teaching online	Teaching online courses	Mentoring online teachers
	Experience as online learner	Adapting online materials	Creating online materials	Designing online courses and revising and/or designing curricula
	Shadowing online teacher	Participation in professional development	Assisting in planning and delivery of professional development	Delivering professional development
	Viewing online courses, standards and curricula	Maintain currency in their field through professional publications and organizations	Contributing to professional publications or organizations	Leading in professional publications or organizations
	Tutoring an online student			

(Davis & Rose, 2007)

**Students:**

Students who show patterns of success in distance courses are students who enter a course as motivated, independent, and self-directed learners. Students who do not begin a distance course with these characteristics will need support at the least, and ideally explicit instruction, in order to succeed. Motivation is a result of attention, relevance, confidence and satisfaction (Keller, 1987), all of which can be designed in to distance courses and scaffolded in students. In addition, successful distance students generally enjoy technology, have strong language skills, and are visual learners. Courses that integrate reading and writing strategies in the content area, often through a partnership between the content teacher and a reading specialist, assist students who do not bring adequate language skills.

Success factors in distance courses for K-12 students include a positive attitude and a willingness to ask for help. Students may be more comfortable asking for help from a teacher who creates an open and supportive learning community or from a facilitator or technical support professional who works to assist the students. Consistent parent support is another contributor to student success. Parents of students in distance courses may not know specifically how to help their children and often appreciate receiving guidance on learning strategies from the school. Finally, distance school success has been associated with student involvement in non-academic activities. These activities may be community-sponsored or school-sponsored.

**Interaction in courses:**

In an independent learning situation like a distance course, students depend on their instructors being actively involved in the learning process, by guiding students through lessons and clarifying instructions. Generally students are flexible about using the communication tools that will connect them to their teachers and to other students. Effective tools include phone, email, chat, synchronous whiteboard and conferencing applications, blog, wiki, and podcast. Frequent communication, feedback, and scheduled tutoring and skills checks have positive effects on students' time in a distance course, interest in the course, and therefore performance in the course.

Many students in distance courses are still new to electronic group discussions and need structure provided for them. For example, students can be instructed to read--reflect--

respond--respect—react in a threaded discussion of a class topic. While frequent feedback is beneficial, comments made by the teacher merely for “cheerleading” in a discussion forum tend to decrease the richness and depth of student contribution to the discussion (Lowes, 2007). Instead, teacher comments that include specific feedback and extension questions lead to increased student participation.

Several distance course factors are correlated with higher academic performance, including higher levels of student engagement and a stronger sense of community. More time practicing the course content; such as through writing, speaking, listening, reading; correspond to higher achievement. Because novices need to use the skills and tools of experts, simulations, manipulatives, and tutorials that offer student feedback increase performance (Cavanaugh, Bosnick, Hess, Scott, & Gillan, 2005). In order to develop independence as learners, students need to learn strategies in locating and evaluating information, such as those promoted through the 21<sup>st</sup> Century Skills initiative.

**Course design:**

A distance course that is designed for student success will make well-developed organization skills and routines explicit and will be consistently structured. Coherently structured distance courses include such features as clear expectations, concrete deadlines with some flexibility, outlines of course requirements, time sheets and study guides.

Distance courses that improve students’ critical thinking, research, and information skills are courses that provide opportunities for practice with online tools. Courses designed to gradually release responsibility from the teacher and transfer it to the students tend to develop independence. In addition, distance courses should facilitate metacognition and reflection using strategies like journals and portfolios. Table 3 shows tools in distance courses that support interactive and constructive forms of learning.

Table 3. Tools for distance courses

<b>Content format</b> → Access Model ↓	<b>Transmission</b>	<b>Interactive</b>	<b>Co-constructive</b>
<i>Linear, Categorical</i>	Print, video, list, reference	Guided reading, guided research	Data sets
<i>Random</i>	Images	Study guide, database	Manipulatives, media, web pages
<i>Shared</i>	Broadcast	Web cast, podcast	Email, discussion, web authoring, blog
<i>Collaborative</i>			Chat, wiki, synchronous conferencing, collaborative tools

(Schnitz & Azbell, 2004)

***Administrative practices:***

Managers of distance programs for K-12 students have choices to make about optimal uses of resources. Distance education is a complex endeavor requiring the coordination of constellation of support around the students, teachers, and course systems. Distance students in elementary schools and high schools benefit from a network of mentors, on-site support staff, counselors, and technical support assistance. Students who depend on information for their educations perform better in schools with librarians to teach them information literacy skills.

As students, parents and teachers conduct their daily transactions within the learning systems, data are generated. Student performance data should be analyzed on a continual basis so that corrective actions can be taken early. Data that are represented visually will illuminate relationships between activity in courses and student course grades, thereby enabling deeper understanding of effective practices and making all educators reflective practitioners.

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