

# **Literature Review Virtual Schools**

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# LITERATURE REVIEW VIRTUAL SCHOOLS

## At a Glance

*The majority of school districts in the U.S. are providing some form of online learning for their students. In the past, virtual schools primarily targeted advanced students who didn't have access to certain courses in their regular schools. Recently, however, many virtual schools have shifted their focus to credit recovery as a way to provide failing or at-risk students with an alternative to traditional credit recovery courses. This Literature Review summarizes research conducted on the impact of virtual schools on students' achievement, course retention rates, and levels of satisfaction. Studies conducted on the cost effectiveness of virtual schools are also reviewed. Strategies to increase the effectiveness of online learning programs are discussed and a brief description of virtual schools within the state of Florida, including the Miami-Dade Virtual School, is provided. Finally, model programs operating around the U.S. are summarized.*

Virtual schools have become one of the fastest growing trends in education, with states and school districts increasingly turning to online strategies as a way to introduce educational reforms. The majority of U.S. school districts are providing some form of online learning for their students. Watson and Gemin (2008) reported that 57 percent of U.S. public secondary schools offer students access to online learning. A nationwide survey of school districts conducted by Picciano and Seaman (2009) revealed that 70 percent of school districts stated they had at least one student who had taken an online course during the 2007-08 school year. An additional 12 percent of districts that did not have any students enrolled in online courses indicated that they planned to have at least one student enrolled within the next three years. Approximately 70 percent of the students enrolled in online courses are at the high school level, 17 percent of students are at the middle school level (grades 6-8), and 14 percent of students are at the elementary level (grades K-5) (Picciano & Seaman, 2009; Christensen & Horn, 2008).

Researchers estimate that K-12 online enrollments grew from 45,000 nationwide in 2000 to approximately one million in 2008 (International Association for K-12 Online Learning, 2009; Watson & Gemin, 2008). Picciano and Seaman (2009) estimated that by 2016, online enrollments might easily increase to between five and six million K-12 students.

In 2008, online courses represented one percent of all courses taken by students. Researchers predict that by 2014, 10 percent of all K-12 courses will be delivered online and by 2019, 50 percent of K-12 courses will be delivered online (International Association for K-12 Online Learning, 2009; Arnoldy, 2008; Christensen & Horn, 2008; Watson & Gemin, 2008; Smith et al., 2005).

Virtual schools appeal to students from both ends of the achievement spectrum. The self-paced nature of online courses provides remedial alternatives to students who have failed in traditional courses, but also enables advanced students to accelerate their studies according to their own abilities (Bonner, 2008; Roblyer & Davis, 2008; Watson & Gemin, 2008; Greenway & Vanourek, 2006). In the past, online schools primarily targeted advanced students who didn't have access to certain courses in their regular schools. Recently, however, more and more schools are using virtual classes to offer rapid remediation and credit recovery. Targeted students in need of remediation include late enrollees, transient or highly mobile students, students who are repeating

a class they previously failed, students requiring summer school, credit-deficient students, students needing one-on-one support, or any student who is behind in his or her educational progress for any reason (Bonner, 2008; Wisconsin Virtual School, 2008; Tucker, 2007). National surveys indicate that although the most common reason students give for enrolling in virtual schools is unavailability of a desired course, the second most frequently cited reason is the opportunity to receive extra help (Watson & Gemin, 2008).

Credit recovery is defined as the opportunity for students to earn academic credits they have lost, or are about to lose, by failing a regular course. Credit recovery differs from first time credit in that students have already satisfied seat time requirements for the course and can focus on earning credit based on competency of the content standards. Goals related to credit recovery vary with each online program, but often include helping students make up credits to meet graduation requirements; meeting graduation deadlines; preparing students for state exams; and getting dropouts back in school (Watson & Gemin, 2008; Wisconsin Virtual School, 2008).

In the past, schools had few resources outside of summer school to help students who failed a course. Susan Patrick, President and CEO of the International Association for K-12 Online Learning, stated:

“When students have completed the attendance requirement in a course, and were unsuccessful, the options for earning credit towards graduation are often limited to using the same book, often with the same teacher, within the same seat time approach. Is this really the best way to invest resources of time and money in helping students succeed?” (Watson & Gemin, 2008).

Statistics on the number of students taking credit recovery courses at virtual schools are difficult to obtain because many course providers don't ask students why they are enrolling in their courses. The Florida Virtual School reported that 17 percent of its in-state high school students enrolled in courses for credit recovery purposes (Trotter, 2008).

## **Research on Virtual Schools**

### **Student Achievement**

Little research has been conducted on the performance of students enrolled specifically in credit recovery courses. However, Watson and Gemin (2008) compared passing rates of students who reported they were enrolled in credit recovery courses at the Florida Virtual School (FLVS) to the passing rates of all FLVS students. They found that success rates for students recovering credit were similar to those of the entire FLVS student population. During the 2006-07 school year, FLVS students who reported taking courses for credit recovery had a passing rate of 90.2 percent, compared to a 92.1 percent passing rate for the overall FLVS student population.

Florida Tax Watch (2007), an independent, nonpartisan, nonprofit research institute, conducted an extensive analysis of the performance of students attending the Florida Virtual School (FLVS). The analysis was based on students enrolled in all types of FLVS classes, including credit recovery, advanced placement, core content, and elective courses. Researchers compared the FCAT scores of FLVS students and students attending public schools in Florida. As can be seen in Tables 1 and 2, FLVS students consistently outperformed their public school counterparts on both the Reading and Mathematics sections of the FCAT.

Table 1. Percent of Students Scoring at FCAT Reading Level 3 or Higher, 2006

	<b>FLVS Students</b>	<b>Florida Public School Students</b>
<b>Grade 6</b>	80%	64%
<b>Grade 7</b>	83%	61%
<b>Grade 8</b>	81%	46%
<b>Grade 9</b>	74%	40%
<b>Grade 10</b>	49%	32%

Table 2. Percent of Students Scoring at FCAT Mathematics Level 3 or Higher, 2006

	<b>FLVS Students</b>	<b>Florida Public School Students</b>
<b>Grade 6</b>	70%	53%
<b>Grade 7</b>	79%	55%
<b>Grade 8</b>	87%	60%
<b>Grade 9</b>	86%	59%
<b>Grade 10</b>	82%	65%

Florida Tax Watch (2007) also reported that FLVS students posted higher advanced placement exam scores than Florida public school students (Table 3). In the 2005-06 school year, FLVS students' average advanced placement exam score was 3.05, compared to 2.49 for Florida public school students. In addition, FLVS students' average advanced placement exam score increased from 2004-05 to 2005-06, while public school students' average score decreased.

Table 3. Average Advanced Placement Exam Scores, 2004-05 and 2005-06

	<b>FLVS Students</b>	<b>Florida Public School Students</b>
2004-05	2.89	2.54
2005-06	3.05	2.49
Difference	+0.16	-0.05

Florida Tax Watch's (2007) analysis found that the more times a student logged into their FLVS course, the higher the final grade they were likely to receive. The researchers suggested that students with higher participation rates may have worked harder than students who logged into their courses less frequently. Florida Tax Watch's analyses also revealed that the longer a student took to complete a course, the lower the resulting grade for that course tended to be. The average number of active weeks for a grade of "A" was 18.62, while the average number of active weeks for a grade of "F" was 42.32. The researchers hypothesized that students who took longer to complete their courses needed more time and assistance to understand the course content and materials.

In general, most studies have found that distance instruction is as effective as traditional classroom instruction and in some cases, even more effective. A brief summary of some of the other studies that have compared the achievement of students enrolled in distance learning to the achievement of those attending traditional schools is provided below.

- Bernard and associates (2004) conducted a meta-analysis of 232 studies that compared the effect of distance education and traditional classroom-based instruction on K-12 and postsecondary student achievement. They found a small, but significant effect favoring distance education; however, there was extreme variability in effect size, depending on the program being studied, suggesting that distance education was successful in some cases and unsuccessful in other cases. This wide variability led the researchers to conclude that a number of distance education programs led to higher levels of student achievement than their classroom counterparts, while a number resulted in lower levels of achievement.
- Confirming Bernard and colleagues (2004) meta-analytic findings, Dickson (2005) found large variability in the performance of students attending the Michigan Virtual High School (MVHS). A cluster of students enrolled in MVHS received high final test scores, while a second cluster of students received low, failing scores. Dickson concluded that this bimodal distribution of scores resulted in a middle-range average test score that did not accurately represent the true pattern (either very high or very low) of results.
- Cavanaugh and colleagues (2004) conducted a meta-analysis of 14 web-based distance education programs for students in grades 3-12. Analyses found an overall effect size not significantly different from zero, indicating that students in distance education programs performed as well as students in classroom-based programs. Similar to the findings of Bernard and associates (2004) and Dickson (2005), this meta-analysis also found considerable variation in effect sizes, with some programs appearing to produce much higher levels of achievement than traditional classroom instruction and others much lower levels of achievement. However, differences in achievement could not be attributed to specific course factors, such as instructor preparation and experience, length of the program, or pacing of instruction. The researchers concluded that the effectiveness of online learning was more closely related to the quality of the program, rather than the medium in which it was delivered.
- Barker (2001) compared the academic performance of students enrolled in one traditional and two virtual schools in three Canadian provinces. She found considerable inconsistency between schools and provinces, but no overall significant differences between the provincial exam scores of students enrolled in virtual schools and students attending conventional schools. Barker did find, however, that students enrolled in virtual schools showed less improvement in listening and speaking skills than students attending traditional schools, but greater improvement in the areas of critical thinking, researching, computer usage, problem solving, independent learning, and time management.
- Shachar and Neumann (2003) conducted a meta-analysis of 86 studies comparing online courses and traditional classroom instruction in K-12 and postsecondary settings. They found a significant positive effect for distance learning programs, noting that in two thirds of the cases, students enrolled in online courses outperformed students in traditional classes.
- Cavanaugh (2001) conducted a meta-analysis of 19 studies that compared distance education programs and traditional classroom instruction for K-12 students. Overall, the distance programs and programs that blended distance and traditional learning formats resulted in slightly higher, but not significant, achievement than exclusively classroom-based programs. Programs that

were delivered through online technologies (such as the Internet and email) and centered on small groups of students yielded larger effect sizes than programs utilizing videoconferencing with large groups of students.

- Ferdig, DiPietro, and Papanastasiou (2005) compared students taking courses at two Wisconsin online charter schools to students attending traditional high schools. Students were enrolled in Algebra, Geometry, Health-Life Management Skills, and Personal Financial Management courses. Some of the students were taking classes to accelerate their learning; others were taking classes for remedial purposes, to repeat a class they had failed, or to fulfill graduation requirements. The researchers found no significant difference between the end-of-course assessment scores of the two groups of students.
- Kleiman and colleagues (2005) studied the effectiveness of the Louisiana Algebra I Online Project. The study included students from 31 public, charter, and private schools in six different school districts. In comparing online and traditional Algebra I students, the researchers found an advantage for online learning in three different analyses: online students received significantly higher posttest scores; online students posted significantly higher gains from pretest to posttest; and when pretest scores were statistically held constant, group membership was a significant predictor of students' posttest scores, with online students scoring higher than students enrolled in traditional courses. The researchers concluded that students in the Louisiana Online Algebra I Project demonstrated, on average, achievement gains that equaled or exceeded the gains of students in traditional classrooms. Examination of test items indicated that students in traditional classrooms scored significantly higher than the online group on items that assessed their ability to simplify and solve equations, while online students tended to score higher on word problems and problems presented with a graph or pattern.
- Ryan (1996) compared the advanced mathematics performance of students enrolled in traditional and virtual high schools in two Canadian provinces. He found no significant difference at the conclusion of the school year in the achievement levels of students who studied advanced mathematics through a virtual school and those who studied advanced mathematics in a traditional classroom. Follow-up surveys administered to the same sample of students found no significant differences between virtual school graduates and traditional graduates in the number of calculus courses taken in their postsecondary studies or in the passing rates of their first postsecondary calculus course.
- Karp and Woods (2003) compared the performance of high school students taking fitness and nutrition courses through the Idaho Virtual Campus and in traditional classroom settings. Administrations of pretests and posttests showed a significant gain in knowledge for both groups of students. No significant difference was found between the two groups' knowledge at the end of the unit, leading the researchers to conclude there was no significant difference in the performance of students taking classes in virtual and traditional formats.

### **Retention Rates**

Research findings have confirmed that dropout rates tend to be higher in online courses than in traditional courses. Studies have found that the reasons students are most likely to drop out of online courses are related to either technological problems or feelings of isolation and disconnectedness (Bocchi et al., 2004; Santovec, 2004; Willging & Johnson, 2004; Frankola, 2001). Researchers have reported dropout rates at virtual schools ranging from 40-70 percent, although some established schools claim dropout rates of only 10-20 percent (Roblyer & Davis, 2008). One factor that accounts for these discrepancies is how and when dropout rates are calculated. For

example, some virtual programs include in their dropout figures any student who signs up for a course but never completes it; other programs offer a penalty-free drop period of from two to five weeks and count only students who drop out after that period (Roblyer, 2006). Following is a brief summary of two studies that compared retention outcomes in online and traditional courses.

- Bernard and associates (2004) conducted a meta-analysis of 232 studies that compared retention rates in K-12 and postsecondary distance education to retention rates in traditional classrooms. They found a small but significant effect in favor of classroom instruction, indicating that students enrolled in distance education courses were more likely to drop out of their classes. However, there was wide variability in outcomes between programs, with some traditional classrooms having higher retention rates than their online counterparts and others actually having lower retention rates. This wide variability in retention outcomes led the researchers to conclude that retention rates may depend on the specific program in which students are enrolled.
- Kozma and colleagues (2000) compared the retention rates of students enrolled in the Virtual High School (VHS) and students attending traditional schools. The evaluation focused on modern classics, photographic vision, pre-engineering, and advanced placement statistics courses. The researchers found that dropout rates were low for both sets of courses, but lower for traditional courses than for VHS courses.

### **Student Satisfaction with Online Courses**

Most studies have found that students in virtual classrooms report similar or slightly lower levels of satisfaction with their courses than students in traditional classrooms. Several studies that examined students' levels of satisfaction with their online courses are summarized below.

- Bernard and associates (2004) conducted a meta-analysis of 232 studies that compared student attitudes in K-12 and postsecondary virtual classes with the attitudes of students attending traditional classes. They found that students enrolled in traditional courses tended to have more positive attitudes than those enrolled in online courses. However, the wide variability in attitude outcomes among programs led the researchers to conclude that attitudes may depend more on the specific program in which the student is enrolled, rather than the format in which the course is taught.
- Karp and Woods' (2003) study of students enrolled at the Idaho Virtual Campus included two sets of focus group interviews with online students. Interview responses revealed that the major perceived benefit of online courses was that students were able to learn at their own pace and review materials whenever they wanted. Visual learners preferred virtual learning, but those who liked to work in groups or learn by listening reported that the virtual learning format became boring or made it hard to remember content. Commonly perceived difficulties associated with online courses included learning to use the system and the organization and design of the modules. In addition, students did not feel they could ask their teachers questions when they needed information. Many students stated they would prefer a combination of online and face-to-face learning, rather than the exclusive use of only one format.
- Barker (2001) studied nine traditional and virtual secondary schools in three Canadian provinces. Questionnaires and interviews with students and parents revealed that the most common reason for selecting a virtual school was dissatisfaction with conventional schooling. Advantages to virtual schooling most frequently cited by students and parents included: independent learning; individualization; increased personal responsibility; flexible scheduling; fewer distractions; equal opportunities to participate; development of technological competencies; and quick feedback and instant work rewards.



- Zucker (2005) studied students enrolled in online courses at the Virtual High School (VHS). Over 90 percent of students responding to a survey agreed or strongly agreed that participation in the VHS course had been a valuable experience and 90 percent of students reported that they were somewhat or very satisfied with their courses. Twenty-nine percent of students indicated that VHS courses were of higher quality than face-to-face courses, 21 percent indicated that VHS courses were of lower quality than face-to-face courses, and 50 percent believed the two types of courses were of equal quality.

### **Cost Effectiveness**

Studies on the cost effectiveness of virtual schools are limited. Although some research has concluded that virtual schools can educate students at a lower cost than traditional brick-and-mortar schools, more studies are needed before definitive cost determinations can be made. A brief summary of studies that compared the costs associated with virtual schools and traditional schools is provided below.

- Florida Tax Watch (2007), an independent, nonpartisan, nonprofit research institute, concluded that the Florida Virtual School (FLVS) offered online instruction at a lower per student cost than traditional schools, stating that education through FLVS was a “bargain for Florida taxpayers.” The 2006-07 total state and local funding per weighted FTE for Florida public schools was \$6,291; the total state and local funding per weighted FTE for FLVS students was \$5,243, translating into \$1,048 (17 percent) less per FLVS student. Other costs further increased the cost of traditional schools relative to FLVS. For example, in 2006-07, over \$242 million was spent on new school construction and almost \$483 million was spent on student transportation for Florida school districts, but none of that money was spent directly on FLVS.
- Similarly, the Idaho Virtual Academy, a statewide charter school, estimated that their costs are 35 percent lower than those of traditional schools (Arnoldy, 2008). Christensen and Horn (2008) reported that online learning programs have significant economic advantages compared to traditional schools. They found that the cost to virtual providers ranged from \$200 to \$600 per course, much less expensive than the cost of providing an education at brick-and-mortar schools.
- A cost study on virtual schooling, commissioned by the BellSouth Foundation, found that “the costs of operating a virtual school are about the same as those of a regular brick-and-mortar school.” The study estimated the average startup costs for an online school at \$1.6 million. Although virtual schools do not incur building and transportation costs, quality teachers remain essential for personalized instruction. While a traditional school typically spends 70-80 percent of its budget on personnel, a virtual school’s expenditures in this area may be even higher, given the costs, in addition to teacher salaries, of personnel needed for online course development and technological support. Virtual schools must also pay for learning management software and other technology costs, mobile phones or long distance service for teachers to contact students and parents, and technical training for staff. However, the BellSouth study found that, over time, there may be the potential for significant cost efficiencies in virtual schools. As opposed to physical schools, one virtual school can serve tens of thousands of students. Virtual schools can copy and re-use course materials and per student hardware and software costs tend to decline with scale. The study concluded that the true costs of high quality virtual schooling and potential economies of scale are not yet clear (Tucker, 2007).
- Greenway and Vanourek (2006) cautioned that online programs can’t simply load lessons developed for the traditional classroom directly onto the Web without making adjustments for the new delivery methods. Sizable capital expenditures are required for computers and servers;

instructional design that coordinates different media; content and course management systems (for organizing and facilitating collaboration of documents and courses); course-authoring platforms (allowing educators to post their courses on the Internet); and beta and usability testing (for eliminating bugs and ensuring ease of use).

## **Research Summary**

In general, research has demonstrated that virtual learning is as effective as traditional classroom learning and in some cases, even more effective. However, there are wide variations in the quality of K-12 virtual programs. Differences in the design and delivery of distance learning courses may explain much of the variance in student performance. Therefore, the effectiveness of online learning appears to be more a function of the quality of the program than the medium through which it is delivered (Roblyer & Davis, 2008; Tucker, 2007; Cavanaugh et al., 2004).

Studies have confirmed that online courses tend to have lower rates of retention than traditional courses. Most studies have also found that students in virtual classrooms report similar or slightly lower levels of satisfaction with their courses, compared to students in traditional classrooms. Although some research has concluded that virtual schools can educate students at a lower cost than traditional brick-and-mortar schools, more studies are needed before definitive cost determinations can be made.

Researchers have identified several barriers that limit the conclusions that can be drawn from the existing empirical literature:

- Studies have not specified which types of programs, circumstances, and supports are needed for student success (Tucker, 2007). Greenway and Vanourek (2006) stated: “The question about the comparative effectiveness of virtual schooling may be too blunt. We should ask which *types* of virtual schools work, under what *conditions*, with which *students*, which *teachers*, and with what *training*.”
- Basic statistics on student performance and course enrollments in virtual schools are difficult to obtain. In many cases, the virtual school is not the school of record and does not have access to their students’ files (Tucker, 2007; Smith et al., 2005).
- Most virtual schools don’t have mandated statewide assessments that can be used to study the academic progress of online students. In most studies, student achievement in online courses is therefore assessed by course grades or end-of-course tests, which usually don’t have the same level of reliability or validity as standardized assessments (Watson et al., 2008; Smith et al., 2005).
- Virtual schooling is never completely random, as students self-select or are enrolled by parents or school personnel. In addition, the many different reasons why students enroll in virtual courses (from advanced coursework to credit recovery) often lead to wide variations in student outcomes (Dickson, 2005; Smith et al., 2005).
- A significant number of online schools serve students who are underachieving. When the achievement outcomes of virtual schools serving at-risk or remedial students are compared to state or national averages, they are often identified as failing to achieve educational success. Even when these schools raise students’ test scores, they may still lag behind state or national averages (Watson, 2008; Roblyer, 2006).

## Strategies for Increasing the Effectiveness of Online Learning Programs

Researchers have identified the following strategies to increase the effectiveness of online learning programs:

- **Design effective pedagogical approaches.** The design and delivery of the instruction provided to distance learners is probably the most significant determinant of learning outcomes (Smith et al., 2005; Thomas, 2003; Simonson, 2002). Simonson (2002) stated that “well-designed and developed instructional experiences are required in order for the distance instruction to be successful. In other words, it is not the fact that instruction is delivered in a traditional face-to-face environment or at a distance that predicts learning.”

Researchers have suggested that effective online courses include the following features (Cavanaugh, 2008; Patrick, 2008; International Association for K-12 Online Learning, 2007a; Roblyer, 2006; Smith et al., 2005; Bernard et al., 2004; Cavanaugh et al., 2004):

- problem-based learning;
- student-centered teaching;
- clear expectations;
- concrete deadlines with some flexibility;
- outlines of course requirements;
- a variety of technological approaches, including simulations, manipulatives, and tutorials;
- lessons divided into short mastery sequences so students can progress in stages;
- age appropriate developmental activities, building on students’ accomplishments in and through the cognitive stages;
- a variety of ways through which students can demonstrate mastery of the content;
- sufficient opportunities for practice until mastery is achieved;
- collaboration among students;
- authentic, meaningful activities;
- away-from-the-computer activities; and
- performance-based assessment.

Watson and Gemin (2008) stated that online learning is particularly well suited for students recovering credit because it allows for individualized instruction, both by the teacher and through the use of course management technology. In addition, the flexible and self-paced nature of online courses can help motivate credit-deficient students, while removing the social stigma of credit recovery. Watson and Gemin (2008) recommended that online credit recovery courses include diagnostic testing so teachers can determine which parts of a subject students have already mastered and which parts they still need to master in order to pass the course.

- **Identify students who are most likely to succeed in the online environment.** Virtual schools serve a more bimodal range of students than traditional schools, attracting large proportions of students who are academically advanced as well as students who have not been successful in traditional courses. Studies have identified a variety of student characteristics that contribute to success in online courses, but no one set of characteristics has emerged as dominant and no studies have identified a way to accurately predict which students will succeed in online courses (Roblyer & Davis, 2008; International Association for K-12 Online Learning, 2007a). In general, research has indicated that the following attributes increase the likelihood that students will succeed in online courses (Picciano & Seaman, 2009; Christensen & Horn, 2008; Wisconsin Virtual School, 2008; Smith et al., 2005; Smith, 2001):

- self-motivation;
  - independent learning skills;
  - self-direction;
  - self-discipline;
  - ability to work well without the structure of a conventional classroom;
  - ability to learn from visual materials;
  - strong written communication skills;
  - personal commitment to learn;
  - computer literate;
  - reading and writing at grade level;
  - skilled in time management;
  - consistent parent support and guidance;
  - comfortable asking for help;
  - positive attitude; and
  - involvement in extracurricular activities and hobbies.
- **Prepare students for the online course experience.** Many students who register for online courses mistakenly believe they will be easier and faster than traditional courses. Effective virtual programs anticipate these misconceptions by letting students know exactly what to expect before they begin an online course. Some virtual programs offer no-credit orientation sessions to prepare students for online courses. Studies have found that orientation sessions can contribute significantly to online learners' success. Orientations that specifically address how to organize and work in online environments appear to be especially useful to at-risk students. Other programs have an extended drop period of as long as five weeks that takes the place of an online orientation. Students can try virtual learning and if they don't like it, they can drop out with no penalty during this time (Roblyer & Davis, 2008; Roblyer, 2006; Smith et al., 2005).
  - **Determine how learning activities will be paced.** Online courses can pace learning activities according to an academic calendar or according to students' needs. When online courses teach a group of students together at a specified time, as in a traditional class but without a shared physical presence, students have the opportunity to interact with other students. Conversely, when students access class instruction, materials, and assignments at their own convenience, they are provided with few if any opportunities for interaction with other students. Pacing content according to student needs allows those who have mastered a skill to advance, while struggling students can work on a topic until they have fully grasped the content. Unlimited, flexible access to curriculum and instruction also permits students to work on learning activities and access materials at any time (Cavanaugh, 2008; Patrick, 2008; Wilhoit & Schlosser, 2008; Tucker, 2007; National Forum on Education Statistics, 2006; Hassel & Terrell, 2004).

When a group of students learn the same material at the same time (for example, through synchronized chat functions, shared whiteboards, Web-based seminars, and audio and video conferencing), it is referred to as synchronous learning. Asynchronous learning occurs when students are learning at different points in time. Asynchronous learning allows students to complete their coursework whenever they please and is facilitated by media such as email, pre-recorded lectures, and discussion boards. Although most studies indicate that asynchronous learning leads to higher levels of student achievement, increased flexibility in the course calendar provides fewer opportunities for students to interact with each other. Studies have found that interaction between students increases collegiality, cohesion, collaboration, and a sense of community. Based on these findings, most researchers recommend that online courses provide at least some opportunities for interaction among students by combining

asynchronous learning with periodic synchronous activities (National Forum on Education Statistics, 2006; Roblyer, 2006; Ferdig et al., 2005; Hughes et al., 2005; Bernard et al., 2004; Weiner, 2003; Simonson, 2002; Kozma et al., 2000).

- **Encourage student-teacher interaction.** The most unique feature of online instruction is that teachers and students rarely, if ever, see each other. Yet, communication with and feedback from instructors has been identified as a valuable part of the online course experience. Studies have found that students are more likely to succeed when they have higher levels of interaction with their online teachers (Cavanaugh, 2008; International Association for K-12 Online Learning, 2007a; Kleiman et al., 2005; Cavanaugh et al., 2004; Thomas, 2003). Weiner (2003) reported that online teachers who interacted with their students and responded immediately to student emails created a positive learning environment in which students felt successful. Students who had limited contact with their teachers were often frustrated and disillusioned with distance education. Students who had to wait longer than two days for their teachers to respond to their questions reported feeling an increased sense of anonymity.
- **Provide students with adequate technical support.** There are still many students who don't have access to a computer at home, which makes it difficult to keep up with assignments. Old computers, incompatible programs, lost work, not being able to download programs, or the need to wait while information downloads are all serious issues that can hinder students' success in online courses. High quality virtual programs provide all students with technical assistance and ensure that students have the resources needed to access all online programs and services (Roblyer, 2006; Weiner, 2003; Simonson, 2002).
- **Provide teachers with professional development.** Online teachers need strategies to promote student success in their online courses. Researchers agree that participation in appropriate professional development experiences should be required before teachers are assigned duties as online instructors (Roblyer 2006; Smith et al., 2005; Thomas, 2003). Studies have found, however, that most teachers have had very little formal preparation to address the unique nature of online instruction and very little time to develop their expertise as online instructors (Smith et al., 2005; Cavanaugh et al., 2004). Most states still have no requirement for online teachers to receive professional development beyond what is required for all classroom teachers, although a few states, such as Alabama, Hawaii, South Dakota, Texas, and Wisconsin, are moving in that direction (Watson et al., 2008). In addition, teacher training institutions are beginning to offer courses as well as certificate and degree programs that include full preparation for online teaching (Patrick, 2008).

Professional development programs for online teachers should provide a balance of content knowledge, online teaching strategies, and technological skills. Each program should have its own rigorous and extensive training, tailored to its specific classroom methods, (Cavanaugh, 2008; Watson et al., 2008). In addition, Smith, Clark, and Blomeyer (2005) suggested that all new online teachers be provided with mentoring by an experienced online teacher. Researchers suggest that professional development incorporate the following skill areas (Watson, 2008; Wilhoit & Schlosser, 2008; Greenway & Vanourek, 2006; Cavanaugh et al., 2004):

- using instructional strategies that facilitate online learning;
- tailoring instruction to particular learning styles;
- helping children acquire the skills of autonomous learning;
- motivating students;
- promoting effective communication strategies;
- enhancing student interaction and understanding without visual cues; and

- learning a variety of software applications and basic hardware maintenance.
- **Select high quality teachers.** Districts and schools must ensure that every virtual course is taught by a high quality teacher. Smith, Clark, and Blomeyer (2005) stated that “the difference between the teaching demands of the conventional school teacher and the online teacher is that the latter is required, along with all of the other teaching demands, to keep up with the constantly changing technology that is required of this delivery system.”

Essential qualities of online teachers include (Cavanaugh, 2008; International Association for K-12 Online Learning, 2007b; Thomas, 2003):

- meet the professional teaching standards established by the state licensing agency or have academic credentials in the field in which they are teaching;
- have the prerequisite technology skills to teach online;
- demonstrate high quality written communication skills;
- create a welcoming online environment; and
- have a recognizable online personality.

Every online teacher should engage in the following activities (Cavanaugh, 2008; International Association for K-12 Online Learning, 2007b; Thomas, 2003):

- assess each student’s background and content knowledge before beginning instruction;
- assist students in understanding course requirements and procedures for working online;
- plan, design, and incorporate strategies to encourage active learning, interaction, participation, and collaboration in the online environment;
- use appropriate technology and online resources to teach the course successfully;
- make clear to students their availability and willingness to support them;
- provide students with regular feedback, prompt responses, and clear expectations;
- use fair and appropriate methods to assess students’ mastery of content;
- provide and enforce appropriate standards for student behavior;
- guide and monitor students’ management of their time; and
- maintain regular contact with key people at students’ schools and with their parents.

### **On a Local Note**

In July 2008, the Florida Legislature passed a law requiring each individual Florida school district to provide virtual learning programs “to make online and distance learning instruction available to full-time virtual students in grades kindergarten through grade 8 by 2009-2010.” The School District Virtual Instructional Program (K-8) will be funded based on successful completion of courses (as determined by promotion to a higher grade for K-8 students and credit completions for grades 9-12 students). The new state law offers school districts the choice of setting up their own programs or contracting out with the Florida Virtual School, the Florida Virtual Academy, the Florida Connections Academy, or other approved private online providers (Florida Department of Education, 2008; Watson et al. 2008).

Districts are currently required to provide Florida Virtual School as an option to middle and high school students, but will now be required to offer their own online courses to students in grades 9-12 in certain areas, including Department of Juvenile Justice programs, dropout prevention programs, and career and vocational programs. Districts are required to offer these programs beginning in the 2009-10 school year (Florida Department of Education, 2008; Watson et al., 2008).

Florida has the largest supplemental online program in the United States. Online programs offered in Florida include:

The **Florida Virtual School (FLVS)** is a supplemental online program serving public, private, and home-schooled students throughout Florida and around the world. FLVS enrolls students in grades 6-12 and is currently in the process of developing curricula to serve K-5 students. Opened in 1997, FLVS is now the largest K-12 online learning program in the country, having served 71,000 students in 213,540 half-credit enrollments in 2007-08 (including summer 2007 and summer 2008). FLVS offers more than 90 courses. The school serves a wide spectrum of students, from struggling learners to academically advanced students. FLVS students who are recovering credit are not segregated into special class sections and in many cases, instructors are not aware the students are enrolled in the course for credit recovery. Courses begin at different times of the year, with students setting their own pace as they proceed through the course. Florida-certified instructors guide the lessons, assess student work, and provide constructive feedback. The school operates as an independent school district and serves the entire state. It is funded through public FTE dollars, with full funding contingent upon student success. There is no charge to Florida students for FLVS courses (Christensen & Horn, 2008; Florida Department of Education, 2008; Florida Virtual School, 2008; Watson et al., 2008).

FLVS partners with eight school districts that operate their own FLVS-franchised virtual schools, including Miami-Dade and Broward. The online curriculum at each of the franchised schools is delivered by local school district instructors. Individual districts retain FTE funding for the students. Other counties with FLVS franchises are Hillsborough, Marion, Okaloosa, Palm Beach, Polk, and St. John's (Florida Virtual School, 2008; Watson et al., 2008). The Miami-Dade Virtual School is discussed in greater detail below.

**Florida's K-8 Virtual School Pilot Program** consists of two full-time schools: Florida Virtual Academy and Florida Connections Academy. The schools have operated since 2003 when the Florida Legislature first funded the K-8 Virtual School Pilot Program. Both schools are run by private companies. Students study at home under the supervision of their parents but have access to the schools' curriculum and certified teachers. During the 2007-08 school year, each school was funded for and enrolled 940 students. The program is provided free of charge to students who are Florida residents. Students are required to take the FCAT and both schools received a performance grade of "A" for the 2007-08 school year. In July 2008, the Florida Legislature passed a new law requiring individual school districts to provide virtual learning programs to students in K-8 by the 2009-10 school year. Therefore, during the 2008-09 school year, only returning students were funded for the state-level K-8 Virtual School Pilot Program (Florida Department of Education, 2008; Watson et al., 2008).

**Volusia County Schools** has operated an online credit recovery program since 1992 to support at-risk students across the district. The initial targets of the program were students who had dropped out of school, but today the programs supports all nine high schools and alternative education sites in the district. The online program uses its own teachers who work with students on a one-on-one basis to create individualized learning plans, provide tutoring and coaching, and track their academic progress. The program is expanding to give students such as single mothers the opportunity to complete assignments from home. The district uses a commercially produced curriculum (Apex Learning) for most of the program's courses, but utilizes other content as well and reviews the program regularly, changing providers when staff feel it is necessary (Trotter, 2008; Watson & Gemin, 2008).

**Miami-Dade Virtual School (M-DVS)** began operation in 2003 as a franchise of the Florida Virtual School. The school currently serves approximately 675 students in grades 9-12. Students are enrolled in approximately 750 half-credit courses. Courses are offered in language arts, mathematics, science, social studies, foreign language, health, and physical education. Students

take courses for a variety of reasons, including credit recovery, acceleration, and scheduling conflicts. All courses are staffed by certified teachers. M-DVS is funded primarily by the Enhancing Education Through Technology grant and operated through the district's Office of Instructional Technology. Although courses were previously offered on a year-round basis, M-DVS will not be open during summer 2009 due to a lack of funding.

As part of its franchise agreement with the Florida Virtual School, M-DVS students are surveyed annually to gather information about the strengths and weaknesses of the program. The 2006-07 Virtual School Student Survey indicated that M-DVS students were very satisfied with their online experience. M-DVS clearly appears to be filling a need for students who require an alternative to traditional school courses. Eighty-four percent of students "strongly agreed" or "agreed" that they would recommend M-DVS to other students. Eighty-five percent of students indicated that the quality of their online course was "equal to" or "better than" a traditional high school course. Results of the M-DVS Student Survey are available at [http://www.flvs.net/educators/documents/franchise-evals/Miami\\_Student\\_2007consensed.pdf](http://www.flvs.net/educators/documents/franchise-evals/Miami_Student_2007consensed.pdf).

## Summary

Virtual schools have become one of the fastest growing trends in education, with states and school districts increasingly turning to online strategies as a way to introduce educational reforms. In the past, online schools primarily targeted advanced students who didn't have access to certain courses in their regular schools. Recently, however, more and more schools are using virtual classes to offer rapid remediation and credit recovery to students who have failed traditional courses.

Research has demonstrated that virtual learning is as effective as traditional classroom learning and in some cases, even more effective. However, wide variations in the quality of virtual programs have led many researchers to conclude that the effectiveness of online programs is more a function of the quality of their instructional design and delivery than the medium through which they are delivered. Studies have confirmed that, compared to traditional courses, online courses tend to have lower retention rates. Most studies have also found that students in virtual classrooms report similar or slightly lower levels of satisfaction with their courses than students in traditional courses. Although some research has concluded that virtual schools can educate students at a lower cost than traditional brick-and-mortar schools, more studies are needed before definitive cost determinations can be made.

Strategies designed to increase the effectiveness of online learning programs, such as determining how learning activities will be paced, encouraging student-teacher interaction, and providing students with adequate technical support, were summarized. A brief description of online programs offered within the state of Florida, including the Miami-Dade Virtual School, was provided in this report. Administration of surveys to Miami-Dade Virtual School students found high levels of satisfaction with their online course experiences. Finally, profiles of some of the model online programs operating around the country are provided below.

### Model Programs

The 2008 annual *Keeping Pace with K-12 Online Learning* report (Watson et al., 2008) found that as of fall 2008, 44 states offered significant full-time or supplemental online learning opportunities for students. More than half of the states also offered K-8 online learning on either a full-time or part-time basis. The size of online programs varied widely,



from under 1,000 to over 10,000 course registrations. Following are profiles of some of the model online programs operating around the country.

**Virtual High School (VHS)** is an educational nonprofit organization that partners with schools to provide online courses. Founded in 1996, VHS is now a collaborative of over 500 schools in 28 states and 35 countries. Member schools contribute one of their classroom teachers to teach an online VHS class and provide a site coordinator to oversee student participation at their school. In return, these schools' students are eligible to take online classes through VHS. Course fees range from \$1,500 to \$6,500, depending on factors such as the length of the course and the the number of students enrolled in the course. In 2007-08, VHS had more than 10,000 course registrations in over 140 middle and high school courses, including advanced placement, core curriculum, elective, and credit recovery courses. VHS offers four-week and eight-week credit recovery summer school sessions each year. An evaluation of VHS summer credit recovery courses reported that 88 percent of students passed and received credit for the course in which they were enrolled (Virtual High School, 2009; Watson et al., 2008; Tucker, 2007).

### **State Programs**

The **Georgia Virtual School (GAVS)** was established in 2005 and offers a wide variety of courses to Georgia public, private, and home-schooled middle and high school students. Currently, over 175 schools from 86 Georgia public school districts are participating in the GAVS Credit Recovery Program. Georgia public school students who previously took a course but were unsuccessful in earning credit toward graduation in that course are eligible to take an online course through the Credit Recovery Program. The courses are offered on a flexible schedule and are not facilitated by a teacher. The program, funded by the Georgia Department of Education's Office of School Improvement, is free to Georgia public high school students. During the 2007-08 school year, the Credit Recovery Program was funded for 10,000 half-credit students (or 5,000 one-credit students) (Georgia Virtual School, 2008; Watson et al., 2008).

**Kentucky Virtual Schools (KYVS)** allow middle and high school students from throughout Kentucky to take online classes, including advanced placement, credit recovery, core curriculum, foreign language, and elective courses. All classes meet state and national curriculum standards and are taught by Kentucky-certified teachers. KYVS served approximately 2,500 students in the 2007-08 school year. KYVS' nine-week Credit Recovery program charges course fees ranging from \$100 to \$300. In most cases, the student's school district pays for courses when the credit earned will be counted towards high school graduation (Kentucky Department of Education, 2009; Kentucky Virtual Schools, 2009; Watson et al., 2008).

The **Michigan Virtual School (MVS)** was funded by the Michigan Legislature in 2000 and is operated by Michigan Virtual University, a private, nonprofit Michigan corporation. During the 2007-08 school year, MVS had over 11,000 course registrations. The school offers a broad range of core academic courses aligned with state standards, college equivalent courses, world language courses, and credit recovery courses (Michigan Virtual School, 2009; Watson et al., 2008).

**Missouri Virtual Instruction Program (MoVIP)** is one of the most comprehensive state-led programs in the country. The program, administered by the Missouri Department of

Elementary and Secondary Education and the Missouri State Board of Education, serves public, private, and home-schooled students in grades K-12. All 115 counties in Missouri have full-time or part-time students participating in the online program. Outside vendors are hired to provide courses and teachers, although all instructors are Missouri-certified. There is no cost to the district if state-funded seats are available. (The number of state-funded free seats is determined on an annual basis by the Missouri Legislature; in 2008-09, the legislature appropriated approximately 15,500 semester classes.) In addition to core curriculum, elective, and advanced placement courses, the program offers courses to credit-deficient students, remedial students requiring one-on-one support, and alternative or at-risk students (Missouri Virtual Instruction Program, 2008; Watson et al., 2008).

**North Carolina Virtual Public School (NCVPS)** offers online courses, such as test preparation, credit recovery, and advanced placement, to North Carolina middle and high school students. Credit recovery courses are offered in English, mathematics, science, and social studies. In 2008, total enrollment surpassed 25,000 (North Carolina Virtual Public School, 2008).

**Utah Electronic High School** has been in operation since 1994 and provides a wide variety of courses to Utah students. All Utah public, private, and home-schooled students are eligible to take classes at the Electronic High School. Courses are free to Utah students. During the 2007-08 school year, one-third of Utah high school seniors had taken a class online. Courses are offered in core curriculum areas, in addition to world languages, computer education, and fine art. A Basic Skills Competency course is designed to help students prepare for the Utah Basic Skills Competency exam (Christensen & Horn, 2008; Utah Electronic High School, 2008).

**Wisconsin Virtual School (WVS)** partners with school districts throughout the state to offer online courses to middle and high school students. WVS provides the content, teachers, technical support, and training, while districts retain control over policy decisions and enrollment. WVS offers core content, elective, credit recovery, and advanced placement courses and custom fits programs to districts' needs. WVS credit recovery classes from Aventa Learning are self-directed so students can work at their own pace, repeating difficult lessons as needed and skipping those that are not needed. Credit recovery courses are offered in English, mathematics, science, and social studies (Wisconsin Virtual School, 2008).

### **Single-District Programs**

Single-district programs serve students who reside within the district that is providing the online courses. Most single-district programs are supplemental and primarily serve the high school grades. The majority of school districts report using multiple providers to deliver online content and courses, including the district's central office staff, other school districts, state virtual schools, independent vendors, and postsecondary institutions. Researchers have suggested that the use of content from multiple sources allows districts to be most flexible in meeting the specific needs of their students (Picciano & Seaman, 2009; Patrick, 2008; Watson et al., 2008).

**Aldine Independent Schools** in Texas developed an online program to provide at-risk students with an alternative to the traditional classroom for credit recovery. Master teachers

from across the district were hired to collaborate on course and curriculum development. Provisions were also made for students to receive one-on-one tutoring by National Honor Society students. The online program began in 2000, when only 700 half-credits were recovered through the district's traditional remedial program. In 2007, the online learning program generated approximately 4,500 half-credits for at-risk and dropout students (Watson & Gemin, 2008).

In 2008, **Chicago Public Schools (CPS)** offered an online summer credit recovery program for freshmen who had failed their classes during the previous school year. The program was attended by over 600 freshmen from 19 city high schools. Online courses were available to freshmen who had not earned 4 credits in their first year of high school. Students earned one-half credit for 60 hours of online class time. Classes were offered in English, mathematics, science, and social studies. Thirty CPS mentors facilitated the courses. Online credit recovery classes had previously been available to CPS students during the school year, but the online credit recovery program had never been used as a summer school program nor had it specifically targeted ninth graders (Bowker, 2008; Catalyst Chicago, 2008; Chicago Defender, 2008). According to a report in the Catalyst Chicago (2008), Chicago Public Schools data shows that credit recovery is most effective in students' freshman year. Freshmen earning four of six possible credits by the end of the year were found to have only a 24 percent chance of graduating high school; however, when students recovered just one of those credits by the end of their freshman year, their chances of graduating high school increased to 45 percent; if freshmen reached a total of six credits, their chances of graduating increased to 68 percent.

The **Los Angeles Unified School District's** Online Learning Program (formerly called the Los Angeles Virtual Academy) offers core content, life skills courses, and credit recovery courses in an environment that combines face-to-face interaction with fully online curriculum and instruction. Students progress through the content at their own pace. The program works in partnership with the district's schools to develop online courses that are relevant to their learning communities. Participation in the program is based on student need, as determined by each individual school site. Approximately 500 students enrolled in online courses through the program during the 2006-07 school year. Professional development and teacher training focus on content development, online instructional methodologies, and advanced use of online tools (Los Angeles Online Learning Programs, 2008; Watson et al., 2008).

**Salem-Keizer Public Schools** in Oregon operates the Bridge Program, an online high school credit recovery program for students who are at-risk or have dropped out of school. The program combines online instruction with classrooms and computer labs staffed by teachers and instructional assistants. Students take one course at a time, working to complete six to eight half-credit courses in succession during a semester. In 2007, 365 students were enrolled in the Bridge Program, with over 100 students earning diplomas. The program is proving to be financially self-sustaining as well. Approximately 800 students drop out of the Salem-Keizer Public Schools each year and approximately 460 students are re-enrolled through the Bridge Program annually. By re-enrolling these students, the program brings over \$2.7 million dollars in funding to the district tied to these students. In addition, by keeping at-risk students in school, the district maintains the funding for those students (Watson & Gemin, 2008).

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