Models of Virtual Schooling

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Executive Summary
The Internet is changing everything, from personal communications to the pervasive use of e-business. Virtual schooling, remote delivery of educational services that augment learning opportunities using information and communications technology (ICT), brings these changes to education. We explore two models of virtual schooling: the Out-of-School model primarily serving home-schooled and home-bound students, or students seeking service outside traditional school boundaries; and the complementary In-School model that expands course offerings, student learning opportunities and teacher development programs. Virtual schooling is not limited to the United States and other technology-rich countries. Developing countries recognize the impact of virtual schooling and their governments are funding widespread projects. This White Paper illustrates each model by describing a diploma-granting collaboration between two Florida counties and business partners including the IBM Corporation; IBM Learning Village™, which uses technology to enhance school-community connections; and professional development and educational equity examples.

The Internet Changes Everything
Every professional environment has changed so significantly over the past hundred years that if the workers of a century ago were transported to their workplaces of today, few would recognize the settings and tools of their trade—except teachers. Only now, with the advent of information and communications technology, have schools begun to see the present and potential transformation already affecting other industries. The Internet is altering the roles, functions and focus of teaching and learning.

Over the last two decades, instructional computing introduced algorithmically based procedures and information-processing tools such as word processing and spreadsheets to enhance learning. The Internet adds communications, connectivity and collaboration. Schooling is no longer bound by a specific location offering a set curriculum limited by economic and personnel realities. Internet use changes the core relationship between teacher, learner and material, making guided and self-directed mediated distance learning fully actualized. The Internet opens the door to virtual schooling, an educational innovation that can approach, rival and sometimes exceed the best practices of traditional education.
We present two distinct yet complementary models of virtual schooling: the Out-of-School Model, serving students in need of alternative educational opportunities: home-schooled, home-bound, transient and working students, or those pursuing a GED; and the In-School Model, offering additional courses, teacher and student support, and fresh content.

**World Trends**
Internet use is increasing exponentially worldwide. While the predominant number of users (90 percent) remain in the world's most technologically advanced countries, these statistics are rapidly changing (UNESCO 1999). In India, users are expected to increase by one million before the end of the year 2000. Africa already has close to one million users. Russian use is doubling each year. Latin American usage is expected to triple before 2001 (UNESCO 1999: p. 3).

UNESCO (1999) reports 80 percent of all Slovenian schools are Internet connected. The United Kingdom is 43 percent connected. By the year 2000, some 15,000 Italian schools will install computers and multimedia. Almost 94 percent of Japanese schools have computers and all their schools will have Internet connections by 2003. Chile and other Latin American countries are anticipating substantial school-Internet hook-ups by the end of 2000 (p. 4). New models of virtual delivery are emerging rapidly (Farrell 1999; www.col.org/virtualed/index.htm).

Recognizing how technology is changing education, the American Association of School Administrators (AASA) presents findings that include:

- The definition of school, teacher and learner is being reshaped by a digitized world
- Teachers and administrators need to be prepared effectively for the global knowledge/information age
- Students, school systems and communities need to be connected around the clock with each other and with the world through information rich, interactive technology (Withrow et al. 1999; pp. 4-5).

There is clearly a need for educators and educational policy-makers to catch up, keep up and move ahead with technology. Yet this reality often clashes with traditional modes of educational presentation and delivery. Even older technologies are not capable of addressing and serving this expanding population.
Re-examining Educational Technology

Traditional educational practice has focused on the delivery of instructional content by the expert teacher to the novice student. Often referred to as the “Sage on the Stage,” this model, questioned since the 1960s educational reform movement, was further challenged two decades later when computer technology in schools provided alternative means for organizing and delivering content.

Figure 1 shows how technology in schools has changed and what the impact is on the locus of control and upon educational practice. It offers future directions and consequences based on trends already in evidence.
Section 1: Hosted Technology
Hosted technologies facilitated the distribution of information over school computer systems. Distribution, however, was authority-centered—administration to teacher, teacher to student.

Section 2: Interactive Technology
The introduction of client-server technologies heralded an important shift in locus of control. Although early interactivity was restricted, it did permit the user to exert some choice over content, interaction and process.

Section 3: Collaborative Technology
With the advent of the Internet, HTML and groupware, ICT capabilities significantly influenced both teaching and learning. Communications could now link virtual teams, which simultaneously sought content and developed process, thus blurring roles between teacher and learner.

Section 4: Pervasive Technology
Computer technology is becoming small enough to embed in multifunctional devices. Soon Internet access and communications will be generally available to all people. Lou V. Gerstner, CEO of IBM highlighted this point in testimony to the United States Senate Commission on High Technology when he said:

“We are witnessing nothing less than the rise of a new economy — a digital economy that will be the single most important driver of business, economic and social change in the coming century. It will alter the way we teach our sons and daughters. . . .” (June 14, 1999)
Virtual Schooling

As Internet technology capability has grown, so have technological applications for delivery of educational services. Time and place no longer control information access and use, giving “the student and teacher the ability to control, manipulate, and contribute to the information environment. But much more is possible” (UNESCO 1999; p. 6).

That possibility is virtual schooling.

There are two primary models of virtual schooling. Out-of-School focuses educational services beyond the traditional school environment. This approach is fundamentally an alternative to an academic program provided on-site serving people who, for various reasons, are outside the system. The In-School Model addresses educational services primarily delivered inside a school.

Levels of Internet Functionality

- **Transactions – Dynamic Interaction**
  - “Inputs due for Friday’s student review.”

- **Self-Service – Accessing Custom Data**
  - “Let me see my child’s latest writing assignment and mentor comments.”

- **Original Publication – Static Information**
  - “See our Web page for today’s research findings.”

- **Republication – Static Information**
  - “Let’s post our numeracy policies on the Web for parents to view.”
Out-of-School Model
The populations intended to serve include:

- home-schooled students
- home-bound students
- working students
- school dropouts, transient students, GED candidates

The Out-of-School Model provides an alternative academic program to that offered in school. Benefits include content expertise support for parents who educate their children at home, a growing trend; support for students temporarily confined to their homes; students who need to work during school hours or cannot get required classes because of scheduling conflicts; and students seeking alternatives to obtaining high school certification. Examples are:

1. A comprehensive public high school online

2. A comprehensive private high school competing with public education for students
   — The Independent Study High School of the University of Nebraska and the CLASS™ Project, http://class.unl.edu/final_web/Intro.htm

3. Support and transition programs for students temporarily unable to attend school

4. Target programs leading to testing and certification such as (but are not limited to) AP classes, SAT preparation, GED classes and technical certification.
Florida High School: The Out-of-School Model in Action

By mid-year 1999, there were 19 different Out-of-School Virtual Schooling Models in the U.S. alone. Florida High School (fhs.net), chartered by the State of Florida, exemplifies this model. Now in its second full year, FHS provides a range of online virtual educational services.

The concept of delivering online instruction throughout the state originated independently with two county school districts. In Orange County, an effort called WebSchool began in 1996. At the same time, Alachua County became interested in designing a comprehensive online high school as a multidistrict educational initiative. Each shared a goal to provide alternatives for an expanding, diverse student population, and both sought to provide a technological learning environment to prepare students for the 21st century workplace. In 1996, the Florida State Department of Education (DOE), recognizing the synergy, encouraged a partnership and awarded a grant to finance the initial effort.

In 1997-98, six courses were created and launched with an initial enrollment of 200. At first, FHS offered students in traditional high schools a way to enhance or accelerate their education. FHS will develop into a complete diploma-granting institution. By the first full year, 1,000 students from 43 districts enrolled in 22 courses. By the second year, enrollment will reach around 2,000 students, covering 49 courses (core, honors, electives and advanced placement) and serving 60 districts.

Educators and administrators realized that the ongoing acceptance and growth of FHS were dependent on high quality courses. The following are some of their considerations and processes.

First, the FHS faculty consists entirely of certified classroom teachers who learned the craft of online curriculum development and instructional delivery. They build and deliver their own content. This requires a clear understanding of online instruction, different from in-class instruction in both assessment and instructional support.
• Assessment: Students have to demonstrate performance online, and instruction must be geared to enabling measurable performance.

• Instructional support: Online instruction must anticipate the problems students may encounter and build support into the original courseware rather than wait for feedback and reaction. Because there is no class situation for the teacher to use as a means of drawing connections, connections, links and real world applications must be designed directly into the curriculum.

FHS realized that curriculum development would have to follow a more rigorous process for online instruction then common in traditional classrooms. All course development is subject to review by peers, outside experts and Advisory Board members.

Second, all development had to be tied to Florida State Standards. National standards were linked where appropriate.

Third, the differences between online and classroom instruction had to be addressed. Each course used a Course Metaphor, an organizing principle, conveying linkages and meaning to students. For example, courses like American Government were organized around a virtual tour of Washington, D.C.; Chemistry was taught by examining work environments requiring chemistry.

Fourth, recognition of student divergence had to be built in through multiple means of acquiring information and responding to assignments. Each course had to provide for a final assessment that would take place in person for assurance that the student had, indeed, performed the work submitted during the course.

In-School Model
The populations intended to serve include:

• Administrators seeking additional course offerings
• Administrators seeking support for teachers teaching “out of subject”
• Administrators seeking process and communications improvement
• Teachers seeking instructional content and planning support
• Students seeking content and expert support and/or advice
• Parents seeking participation in their children’s education
The In-School model provides expanded opportunities for content delivery, instructional support, professional training and instructional transformation. Benefits include improved course offerings in small and rural venues; just-in-time professional development; consultation support; access to aggregated high quality content; and mentoring. This model takes on the following forms:

• Online course cooperatives, where schools pool their individually limited development capacities to generate an aggregate of course options
  — The Concord Consortium, www.concord.org

• Mentor courses, where teachers teaching out of subject are paired with online mentors who co-teach a course
  — The Open Learning Agency, http://www.ola.bc.ca/resources/oscar.html

• Core course augmentation for schools that cannot offer the full complement of college prep materials

• Homework support programs
  — Infonautics
  — World Book

• Lesson planning tools

• Professional training cooperatives
  — Tapped In, http://www.tappedin.org

• Content access support
  — Copernicus, http://www.copernicusnet.com
IBM Learning Village: The In-School Model in Action

IBM Learning Village, an online platform providing templates and databases, supports home to school communications and provides opportunity for mentoring, instructional and assessment planning, and collaboration. It illustrates how the In-School model is evolving. Virtual schooling, through the IBM Learning Village In-School model, connects school, teachers and students to the resources of the wider community (www.solutions.ibm.com/k12/learningvillage/tools.html). The following are examples:

Home-School Communication
Charlotte-Mecklenburg School District, North Carolina, is representative of communities where parents want to stay involved, yet their time is limited. Through virtual schooling, parents can examine their children's completed and evaluated assignments, conference with teachers at convenient times and gauge how their child is performing against academic standards. Students can work electronically on team assignments. This model extends the classroom through online discussions with approved mentors and tutors from the community, reinforcing that learning is part of life, not just a classroom event (Dede 1998). During the two years IBM Learning Village has been in use, parents have been communicating with teachers more regularly.

In the Harlem School District outside Rockford, Illinois, teacher-built Web pages keep parents, even those sharing parenting responsibilities from as far away as California, abreast of activities and teacher policies on homework and grading. Working Mother Magazine has recognized this model program for excellence (www.workingmother.com/schools/super.html).

Course Content Augmentation
An Internet connection alone is not enough to make a school, a district, and in the case of West Virginia, a state, wired. Internet resources are only useful if tied to instructional approaches with specific academic goals. In West Virginia, the In-School model merges the worlds inside and outside the classroom. IBM and the West Virginia Department of Education designed and implemented instructional activities using the Internet to prepare high school students to meet, simultaneously, academic graduation requirements and job readiness. Students master skills such as managing resources, teamwork, customer service, negotiating, evaluating data and solving problems while applying standards-based skills and knowledge in traditional core subjects.
Professional Development/Educational Equity

The In-School Model enhances teacher development. AASA notes that technology will be the preferred staff development delivery model in the forthcoming century (Withrow 1999). As states tighten standards for teacher certification and recertification, virtual schooling provides needed professional development. The In-School Model opens access to colleagues worldwide who can serve as mentors. Teachers teaching out of subject can be coached by more experienced teachers. Technology can expand the reach of a professional development program (Koufman-Frederick et al. 1999). Facilitated by virtual schooling, Philadelphia teachers are participating in a Continuous Progress Model where they gain insights electronically as they rotate through experiences teaching special needs and bilingual students. Master teachers and mentors in San Jose, California use the In-School model to guide and support newly graduated teachers through their first teaching experiences.

Virtual schooling allows even the remote schoolhouse to access resources and expertise once only available in more populous or richer communities (Farrell 1999; p. 5). The Concord Consortium in Hudson, Massachusetts, in 1997-98, offered “29 Internet-based, credit bearing courses to about 500 students located in 10 states” (UNESCO 1999; p. 16). The Star Schools Project (www.ed.gov/prog_info/StarSchools) funded by the United States Government encourages educational equity (Farrell 1999). “For most students served, distance learning is their only access to science, math, foreign language, and advanced placement courses” (Farrell 1999; p. 36). The California Distant Learning Program is one of the few U.S. virtual learning programs addressing the K-8 population.

The Reality of Virtual Schooling

Virtual schooling enhances and expands educational delivery and student-teacher-community interaction in ways never before possible. It transforms the dynamic between teacher and student, making education an ongoing, not ancillary, part of life. The reality of virtual schooling is the promise of an educated, global society.

1 The words virtual, distance and distributed are often used interchangeably in discussions of the technological delivery of education and/or information. For the purpose of this paper, we have adopted the definition used by the Commonwealth of Learning (1999) and added a salient factor. Farrell defines a virtual educational institution as one that “is involved as a direct provider of learning opportunities to students using information and communications to deliver its programmes and courses...” (Introduction, p. 11). We add that virtual schooling augments, not replaces, the role of traditional schooling.

2 Portions of this section are derived from Cindy Bigbie et al., The Florida High School Evaluation: Mid-Year Report for the Florida Department of Education, Florida State University College of Education Center for the Study of Teaching and Learning, 1999.
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Author Biographies

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