



**Helping Practitioners
Meet the Goals of
*No Child Left Behind***

No Child
LEFT BEHINDSM

**U.S. Department of Education
Office of Educational Technology**

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September 2004

U.S. Department of Education
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Secretary

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September 2004

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THE SECRETARY OF EDUCATION
WASHINGTON, DC 20002

September 2004

Dear Practitioner:

The rigorous assessment and accountability provisions in the landmark *No Child Left Behind Act* are challenging us as educators to explore new ways to improve instruction in our nation's schools. One powerful tool in this transformation is technology.

During the last decade, schools were connected to the Internet, and computers were put in classrooms. We now must learn how to use this technology more effectively to improve instruction and transform education as we know it.

To generate and share ideas on how technology can assist educators, I convened two technology summits to which I invited technology experts and education practitioners. As part of the summits, I commissioned a number of white papers on a range of topics. I am pleased to share the compilation of these papers with you in *Helping Practitioners Meet the Goals of No Child Left Behind*.

This resource is designed to provide school leaders and policymakers with information on ways e-learning can help schools meet the goals of the *No Child Left Behind Act*. While the ideas expressed in this resource are those of the individual authors and do not represent the official views or positions of the U.S. Department of Education, I think you will find the resource to be useful. I offer these white papers for your consideration as you work to find better ways to incorporate technology to prepare students for success in this 21st century.

Schools are making tremendous progress under the historic reforms in *No Child Left Behind*, and student achievement is improving. Teachers and students are transforming what can be done in schools by using technology to access primary sources, expose students to a variety of perspectives, and enhance the learning experience with media, simulations, and interactive software. In many cases, we are revolutionizing education and creating learning environments that equip teachers with new tools to individualize instruction; engage students in ways never before possible; empower teachers, parents, and students with real-time data on student performance; and expand access to resources.

Too many schools, however, have simply applied technology to existing ways of teaching and learning, rather than reinventing themselves around the possibilities technology offers. The results in many cases have been marginal. The goal now is to explore and more clearly understand how technology can improve instruction and transform what we think of as education.

I want to thank the thousands of educators and visionaries involved in spearheading the progress in education under the *No Child Left Behind Act*. Your leadership is a beacon toward a new era of educational excellence in America that will leave no child behind.

Sincerely,

Rod Paige

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Section I: Empowering Accountability and Assessment Using Technology

Overview

States and districts need to manage data resulting from the implementation of *No Child Left Behind*. At the center of accountability systems and empowerment initiatives are a variety of technology tools and services. These systems go by a variety of names—business intelligence, data mining, data warehousing, decision-support systems, data-based or evidence-based decision-making—but the essential idea is the same. They pull together a variety of student demographic and performance indicators for detailed analysis. Leaders can explore relationships between indicators and identify trends across time or “drill down” into a series of indicators from the district level through the class and individual student levels. Essentially, these systems take individual pieces of data and convert them into information reports that are useful in guiding decisions and instruction.

The priority given to student testing in the *No Child Left Behind Act of 2001* requires states to rethink their existing strategies for measuring student performance. The costs involved in implementing testing, coupled with the changing notion of the utility of the tests themselves, have caused a fundamental shift in how states measure student performance. Computer-based, technology-based, or online assessments hold the possibility of revolutionizing both how assessments are implemented and how student data inform teaching and learning. In addition, these systems can be used by teachers to routinely diagnose a student’s mastery of academic standards, providing teachers with the information they need to adjust instructional strategies leading up to state-administered tests. School, district and state administrators need timely and accurate assessment and accountability data. Teachers and students need on-demand access to academic diagnostic and performance data.

This section helps practitioners with:

- Identifying technology tools and resources that are available to support the accountability, student information and data requirements of *No Child Left Behind*;
- Demonstrating how to use data to inform decisions;
- Illustrating how to correlate both data and decision-making to achieve the requirements and intent of *No Child Left Behind*;
- Promoting state educational agencies’ collaboration on joint development or procurement of system components;
- Promoting the benefits of online assessment for implementing *No Child Left Behind* requirements;
- Demonstrating how online assessments can improve and strengthen assessments;
- Providing guidance on how a state can implement an online assessment statewide;
- Exploring opportunities for multi-state consortia to foster collaboration on the development of policies to move toward a system for computer-based assessment;
- Illustrating how online assessments can inform instruction at the classroom level (diagnostic tests, real-time reporting, performance-based, etc.); and
- Focusing on strategies to make assessment results useful.

The papers and diagrams in this section are designed to provide school leaders and policymakers with information and recommendations with which to help design and implement systemic reforms for meeting the requirements of *No Child Left Behind*.

NCLB Leadership Summit White Paper

**A Technology Framework to Support Accountability and Assessment
How States Can Evaluate Their Status for *No Child Left Behind***

Glynn D. Ligon, Ph.D.
President, ESP Solutions Group





A Technology Framework to Support Accountability and Assessment How States Can Evaluate Their Status for *No Child Left Behind*

Glynn D. Ligon, Ph.D.
President, ESP Solutions Group

Overview

The chief state school officer needs the right assessment and accountability data, right now—and the data better be right. Teachers and students need academic diagnostic data—on demand. How does the chief know if the state has the **information technology** in place to accomplish both goals? (Information technology is defined as the tools and systems used to share information, e.g., hardware, software, networks, and the processes to manage them.)

Each state's technology implementation can be unique. Each state can design the education information system best suited to its own requirements. Individual schools and districts can make personal choices of vendors and software applications. Even with this individuality across schools, districts, and states, each one can be aligned to meet their state's accountability and assessment requirements as well as those of *No Child Left Behind*. There is not one technology solution that fits all schools, district, and states.

States struggle with the “Education Technology Local Control Conundrum,” which is: How can local decision making about technology coexist with the requirements of a standardized state and national accountability system? The answer is adopting data and technology standards developed to enable **interoperability**. Interoperability is being able to share data electronically across different software applications, different hardware configurations, and different operating systems.

Each state's assessment and accountability systems will be judged on whether or not they provide data that yield maximum value. Every datum in these systems must be evaluated to ensure that it is worth the effort to get it and that it does the job it was collected to do.

Assessment and accountability systems cannot be successful without extensive technology support. Technology to support assessment and accountability requires a comprehensive, standards-based data exchange process (interoperability). There must be a smooth, timely movement of data from schools to districts to states, and on to the U.S. Department of Education (ED) with appropriate public access at each point. In December 2003, ED's **Performance Based Data Management Initiative (PBDMI)** successfully piloted a process for electronic state-to-federal data exchange. (See www.espsolutionsgroup.com/PBDMI.) PBDMI was developed using requirements described by the states themselves—requirements that leverage the capacity of each state to report data to the federal government or to efforts such as the Broad Foundation's partnership with USED (School Information Partnership, SIP).

To maximize data driven decision making (D3M), every state's mandated assessments must be administered, scored, reported, and acted upon within a **cycle time** of weeks contrasted with the months states took for less comprehensive assessment programs in the past. Mandated accountability reports must be compiled and published in an even shorter time to allow parents to make informed school choices, districts to make decisions on school improvements, and states to make school ratings.

All this must be accomplished with better data than states had before *No Child Left Behind*. The technology for all this is ready to be put into action.

A state must apply resources to technology-based solutions, because there is no other alternative that can deliver assessment and accountability reports on time. This makes technology's role in assessment and accountability that of providing the tools and the infrastructure through which data can flow quickly, accurately, and securely.

Technology and improved information systems will not make all this happen. People will make this happen with the intelligent use of technology. Today's technology tools can help solve a district or state's toughest information challenges. These challenges are described here very simply as getting the right data, in the right way, right away, and getting them right in the process. The right data management makes this happen.

States will not be held accountable for the technology they apply to *No Child Left Behind*. States will be held accountable for deliverables (e.g., adequate yearly progress determinations, annual report cards, diagnostic assessments aligned with academic standards and linked to the state's assessments, etc.) that are dependent upon the efficient use of information technology.

To assess a state's status in acquiring and applying technology to the necessary assessment and accountability components, the correct questions must be posed, measures that yield valid scores must be used, trends across time must be tracked, and benchmarks across states must be established. ED's PBDMI and its data resource, the **Education Data Exchange Network (EDEN)**, will be necessary resources. Emergent national standards for education data exchange (e.g., **Schools Interoperability Framework (SIF)**) will make the flow of data efficient. With these standards, states will be able to maintain their individualities and still be able to participate in the nationwide improvement of education data for assessment and accountability.

This paper will not leave states with only this 30,000 foot view of an ideal. Specific components for a state's information system, based upon best practices across all states, are described along with implementation benchmarks aligned with three familiar sounding "performance levels" (basic, proficient, and advanced).

The Vision for Our Data

Burden, redundancy, expense, lost productivity, lack of comparability, distrust, late reporting and other negatives have characterized education data for decades. Today's goal is to achieve **Max Yield Data**. Max Yield Data simply means data that everyone agrees are worth the effort. Imagine teachers, school administrators, program managers, and central office staff all agreeing that a required report yields such useful information that all the effort put into the collection and reporting of the data is worthwhile. Max Yield Data have been standardized, collected, and presented such that the maximum use can be made of them for decision making and reporting mandates. Reaching this goal demands high quality, managed accessibility, certification (sign-off that the data are correct and ready to use), interoperability, utility, affordability, and granularity (a level of detail that allows analysis and interpretation). (Ligon, 2003, *Best Practice for a State's Education Information System*, presented to chief state school officers, Lake Tahoe, NV.)

The mantra of reformers in the education data world as characterized by the members of the Council of Chief State School Officer's (CCSSO) Education Information Advisory Committee (EIAC) has been "collect the data once and use them many times, by many people, for many purposes." This has been the objective of states' and ED's efforts to automate data collections and to build data repositories.

The Steps

States have followed four steps to successful implementation of significant improvements in their technology supporting assessment and accountability information systems.

1. **Evaluate the Current Status:** A framework for this evaluation has been defined based upon direct involvement with and documentation of major efforts by states. Among the pioneers are Florida, Nevada, and Texas. In the latest generation with some new ideas are Iowa, Massachusetts, Mississippi, Oklahoma, Nebraska, Virginia, Wisconsin, Wyoming, and others. A self-assessment may be a good start, but tapping expertise beyond a single state education agency has been the typical approach. The National Center for Education Statistics sponsors a personnel exchange that has helped states share their expertise. A common approach has been to hire professional consulting firms for formal, independent evaluations.
2. **Identify the Gaps:** The difference between the findings of the evaluation and the benchmarks established through documentation of best practices across states provides a roadmap for improvement. This analysis should include a formal study of the requirements for a state's unique solution.
3. **Develop a Plan:** From the requirements study, a formal plan with timelines, budgets, and implementation benchmarks should be developed.
4. **Implement the Plan:** This may require a challenging commitment of resources, continual updates, and careful monitoring.

The Basics

There are five basic technology-based principles for achieving the Max Yield Data supportive of a state's assessment and accountability requirements. These can be viewed as the technology performance standards for supporting successful assessment and accountability systems.

1. *Get the right data.* Validity in an accountability system and specifically in an assessment program begins with a precise definition of what is to be measured and what method of measuring it is the most appropriate. *No Child Left Behind* requires a state's accountability system to be both valid and reliable. In the data world, this means creating common definitions for data elements (e.g., a **data dictionary**) to ensure that all providers of data report comparable data (same definitions, codes, and periodicity). Getting the right data begins at the school for most education data. Otherwise, nonstandard data (i.e., different definitions, incorrect entry, etc.) can be passed faithfully along throughout the information system, perpetuating the problem.
2. *Get the data right.* Data quality includes but goes beyond accuracy. As just stated, the data must be right from the beginning. All along the way, the data must be correctly exchanged. The proven

way to monitor this is with a set of business rules that describe the format, acceptable values, missing data options, and logical comparisons to prior reports. Automated processes that verify data upon entry contribute significantly to accuracy. (*Reducing Cycle Time and Increasing Data Quality for Student Assessments*, www.EducationAdvisor.info, Category: Data Driven Decision Making.)

On the other end, access to data and formal reports must protect the confidentiality of individuals and be statistically reliable. (Confidentiality and Reliability Rules for AYP in NCLB , www.EducationAdvisor.info, Category: NCLB Requirements.)

3. *Get the data right away.* The lag time between testing and availability of the data limits the benefits of assessments and is an Achilles heel for assessments and *No Child Left Behind*. For any data to be useful and used for decision making, they must be current and timely. This is a major new accountability requirement for many state assessment programs. Cycle times of months to over a year were common prior to *No Child Left Behind*. Current assessment programs in which steps are linear and sequential (finish testing everyone, clean everyone's data before proceeding, then score all tests at the same time, then analyze results, then report statewide simultaneously, then publish all reports together, etc.) may not be the best model for today.

On-line, web-based testing is an effective best practice. The initiatives in progress in leading states should be watched to learn how to take on-line testing to the scale required for widespread implementation.

A major focus is replacing dissemination with access—making results available on demand rather than pushing them out to everyone at the same time. (*Implications for Collecting, Storing, Retrieving, and Disseminating National Data for Education*, Ligon, in U.S. Department of Education, National Center for Education Statistics, *From Data to Information: New Directions for the National Center for Education Statistics*, NCES 96-901, 1996.)

4. *Get the data the right way.* The right way to get data these days is through an automated process. Automated processes can verify data quality and ensure standards are met before data are accepted into the state's information system. States must understand that information exchange processes involve complex systems. For example, examining the complete process flow for student assessments clarifies that schools, districts, states, vendors, delivery services, printers, and web designers all have crucial roles in the process. Improvements at any single point in the flow may not be possible without coordination with other participants. (*The Supply Chain of State Assessments and Reducing Cycle Time*, www.EducationAdvisor.info, Category: Data Driven Decision Making.)
5. *Get the right data management.* The assessment and accountability systems must be managed well to achieve maximum yield from the data. Data management encompasses a broad range of administrative activities, infrastructure components, and policy commitments. A long-range plan for exchanging data should include policies, funding, human resources, enabling legislation, hardware, software, and networking. A policy advisory committee, a data provider group (user group), and an internal agency coordination group should oversee data management.

Defining Best Practice

Many states are managing many processes very well. Only a few are beginning to manage some of the more difficult processes well (e.g., reducing cycle time for reporting assessment scores). Even though there are 52 very different state-level education agencies mandated to follow *No Child Left Behind*, there is an **Education Information Technology Framework** with 10 **components** (necessary pieces of the infrastructure) that has been identified as representing best practices for a state. In the summer of 2004, visits to all 52 state-level education agencies documented their readiness for PBDMI and provided insights into each state's status on key components. (www.espsolutionsgroup.com/PBDMI)

These components had been identified in 2000 and 2002, when ED's Office of the Chief Information Officer sponsored a series of eight regional and national meetings to define the requirements for education information from the school to the district to the state to ED. Exploring how data move from the school secretary to the Secretary of Education, these meetings helped build a framework for describing a state's implementation of necessary components for accountability. (www.EducationAdvisor.info, Category: Data Quality and Best Practices.)

These 10 Education Information Technology Framework components can be used as a checklist for a state's self-assessment or as a starting point for a more formal, independent audit process. In the tables that follow, each component is defined and illustrated.

1. **Academic and Other Performance Standards:** Standards should describe in measurable terms the outcomes by which academic performance will be measured. Other areas (e.g., human resources, finance, support services, etc.) should also be held accountable using adopted standards and aligned measures. (Figure 1)
2. **Data Systems:** All required data should be included in the state's data systems. Statewide identifiers for students, employees, courses, facilities, programs, finance categories, etc. should be assigned. (Figure 1)
3. **Data Standards:** A comprehensive data dictionary should document definitions, codes, and formats to be followed statewide. (Figure 2)
4. **Data Quality:** Formal processes should verify the quality of data each time they are exchanged. (Figure 2)
5. **Aligned Assessments and Other Measures:** Assessments and other measures of outcomes should be aligned with the academic and other standards adopted. (Figure 3)
6. **Automated Data Systems:** Data should be collected, stored, and accessed using automated systems (e.g., directories, student/school management [student information system, SIS], discipline, program management, food services, transportation, library, finance, human resources, student performance [assessments], D3M [data driven decision making using a decision support system], instructional management). (Figure 3)
7. **Data Consolidation and Access:** Timely and easy access to data and reports should replace dissemination of reports. (Figure 3)

8. **Electronic Exchange of Records:** Records and data should be exchanged electronically among automated systems. Electronic systems should be interoperable rather than requiring translations at each step. (Figure 4)
9. **Network Connectivity:** Schools, districts, intermediate units, and state education agencies should be connected for fast and large data exchanges. (Figure 4)
10. **Technology Infrastructure:** Assessment and accountability systems should be supported by a technology infrastructure built on adequate resources and policy support. (Figure 5)

NOTE: NCES has published several documents that provide technical assistance to districts and states on best practice. Data definitions (Handbooks Online) are available at <http://nces.ed.gov/programs/handbook/>. Others include:

- U.S. Department of Education, National Center for Education Statistics. (2001). *Technology @ your fingertips: A Guide to Implementing Technology Solutions for Education Agencies and Institutions*, NCES 98-293. Washington, DC: Author. [Available at <http://www.nces.ed.gov/pubsearch/pubsinfo.asp?pubid=98293>]
- National Forum on Education Statistics. (2000). *Building an Automated Statewide Student Record System*, NCES 2000324. Washington, DC: U.S. Government Printing Office. [Available at <http://www.nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000324>]
- U.S. Department of Education, National Center for Education Statistics. (1995). *A Pilot Standard National Course Classification System for Secondary Education*, NCES 95-480. Washington, DC: U.S. Government Printing Office. [Available at <http://www.nces.ed.gov/pubsearch/pubsinfo.asp?pubid=95480>]
- U.S. Department of Education, National Center for Education Statistics. (1997). *Protecting the Privacy of Student Records: Guidelines for Education Agencies*, NCES 97-527, by Oona Cheung, Barbara Clements, and Ellen Pechman. Washington, DC: U.S. Government Printing Office. [Available at <http://www.nces.ed.gov/pubs97/p97527/index.html>]
- U.S. Department of Education, National Center for Education Statistics. (1998). *Safeguarding your technology: Practical guidelines for electronic education information security*. Washington, DC: Author. [Available at <http://www.nces.ed.gov/pubsearch/pubsinfo.asp?pubid=98297>]

Profiles of Prototypical States

Figures 1-5 use the accountability language of *No Child Left Behind* to describe implementation performance levels for each of the 10 Education Information Technology Framework components. The characteristics of various levels of successful implementation are categorized as **basic** (the legacy of a paper-based information world with separate information systems for every purpose; inadequate for a state's current assessment and accountability systems), **proficient** (the state of best practice needed to support assessment and accountability), and **advanced** (a higher level supportive of data driven decision making and enhanced support for students, teachers, administrators, and policy makers).

These checklists provide a framework for taking Step 1: Evaluate the Current Status of Technology Supporting Assessment and Accountability Systems.

Conclusion

Accountability is a process. Improvements will come from not only upgrading each of the 10 individual components of the Education Information Technology Framework, but also from changing how those components work together as an overall system.

Technology can be used to improve the processes within each of these 10 components. In fact, without technology, these processes cannot be fast enough or accurate enough to satisfy the requirements of a state's assessment system, a state's accountability system, or *No Child Left Behind*.

Four steps for achieving the technology support required for assessment and accountability systems have been defined. They are:

- Step 1. Evaluate the current status of your state's information technology for the support of assessment and accountability systems.
- Step 2. Identify the gaps between the current status and best practice as defined by the successes across all states.
- Step 3. Develop a plan to close the gaps then to reach advanced levels of implementation.
- Step 4. Implement the plan with the best data management practices.

The framework detailed in the 10 components within this paper provides the starting point for Step 1. The benchmarks established through the review of best practices across states provide the starting point for Step 2. Peer states can be an excellent resource for Steps 3 and 4.

Information technology processes and policies can be implemented in a unique way within each state. Sharing and using the lessons already learned across all states contributes to the best implementation for each state.



FIGURE 1 Performance Standard 1: Get the right data.

Component 1. Academic and Other Performance Standards

Basic Implementation

1.a. Performance standards have not been developed and adopted, or there are significant gaps in the standards.

1.b. Other areas do not have goals and objectives that are monitored and reported.

Proficient Implementation

1.a. Academic standards describe the skills and knowledge, and the performance targets for students. Performance standards have been developed and adopted for all academic areas. Standards are published and readily available.

1.b. Goals and objectives for all areas (students, staff, finance, support services) describe the non-academic outcomes targeted by the accountability system. Management processes may be different across areas and programs.

Advanced Implementation

1.a. An instructional management system links standards and detailed instructional targets with instructional resources and activities.

1.b. Management plans link resources, target dates, and dependencies. Plans are monitored and formal reports are published.

Component 2. Data Systems

Basic Implementation

2. Data systems are in separate “stovepipes” using different file standards without the capacity to share data across areas, offices, and programs. Decisions about which data to collect are made independently by districts, programs, departments, etc.

Proficient Implementation

2. A comprehensive process has been implemented to ensure that all required data are collected. Automated systems are implemented and aligned to collect and manage the data. Data systems are available for the full range of content areas (e.g., course data, program participation data, enrollment data, graduate follow-up data, assessments (statewide, diagnostic, college entrance, etc.), background and demographic data, staff data, financial data, etc.) Statewide identifiers for students, employees, courses, facilities, programs, finance categories, etc. should be assigned.

Advanced Implementation

2. A data driven decision making (D3M) system ensures that the data required are collected, stored, and accessible when needed for all approved purposes.



Figure 2 Performance Standard 2: Get the data right.

Component 3. Data Standards

Basic Implementation

3. Individual programs and offices determine the data element definitions and code sets they use.

Proficient Implementation

3. Data standards are adopted to establish a common definition for all data collected and reported.

3.a. A data dictionary is published to inform everyone of the up-to-date standards. All programs and offices comply or can crosswalk to it.

3.b. Alignment with national standards and federal requirements ensures that when the data are reported to other entities that they are comparable and usable.

Advanced Implementation

3.a. The state's data standards are available on the web in an electronic format that can be downloaded and imported into databases and applications.

3.b. Every database application has the capacity to meet data exchange standards (e.g., SIF)

Component 4. Data Quality

Basic Implementation

4. Data quality is not examined formally. Schools, districts, programs, and the state accept the data which are available as the best that can be provided with minimal feedback on the quality.

Proficient Implementation

4. Data quality is clearly defined, monitored, and required. Data quality is the responsibility of everyone at all levels of the education enterprise. Edit checks are performed each time data are exchanged.

Advanced Implementation

4. Data driven decision making is practiced with confidence in the data and reliance upon the data. Providers of the data rely upon them and ensure their quality.



Figure 3 Performance Standard 3: Get the data the right way.

Component 5. Aligned Assessments and Other Measures

Basic Implementation	Proficient Implementation	Advanced Implementation
<p>7.a. Student performance measures predate adoption of standards or are not customized to the state's standards.</p> <p>7.b. Other areas do not have formal performance measures.</p> <p>7.c. Reporting requirements for grants, federal funding, etc. are met at a minimal level, possibly with whatever data are available already.</p>	<p>7. Assessments and other measures are aligned with the accountability measures implemented.</p> <p>7.a. Items and objectives in the state assessments are mapped to the state academic standards.</p> <p>7.b. Performance measures for other areas (e.g., staff, finance, support services) are aligned with the goals and objectives targeted by the accountability system. Other areas have formal performance measures.</p> <p>7.c. Performance measures for grants, federal funding, etc. are met using data directly from statewide performance measures or from measures aligned directly with the requirements.</p>	<p>7.a. State assessments measure the instructional targets within the academic standards with established validity and reliability.</p> <p>7.b. Performance targets for other areas are sufficient to evaluate success and to support program improvement.</p> <p>7.c. Requirements for grants, federal funding, etc. are fully met with data sufficient to evaluate success and to support program improvement.</p>

Component 6. Automated Data Systems

Basic Implementation	Proficient Implementation	Advanced Implementation
<p>8.a. Paper forms are used to collect aggregate statistics. Forms converted to the web are not redesigned for efficiency. Validation of entries is minimal.</p> <p>8.b. "Stovepipe" data files are used.</p>	<p>8. Automated data systems collect and share the data efficiently.</p> <p>8.a. Collection systems are electronic, typically networked (on-line).</p> <p>i. The periodicity (as-of dates and time periods represented) of the data are clear.</p> <p>ii. Longitudinal data points are available for describing trends.</p> <p>iii. Entries are verified and error messages provided.</p> <p>8.b. The systems and their data are interoperable (i.e., capable of moving from one system to another without translation).</p> <p>8.c. Permanent, unique identifiers are assigned to students and staff to ensure matching of records.</p>	<p>8.a. Individual student and staff records are exchanged with the state where statistics are calculated. Web-based reports provide reports to districts and schools.</p> <p>8.b. Programs and offices at the state level access the data they need and are authorized to use. Automated updates of their files occurs as data are verified from schools and districts.</p>



Component 7. Data Consolidation and Access

Basic Implementation	Proficient Implementation	Advanced Implementation
<p>9.a. “Stovepipe” data files exist.</p> <p>9.b. Aggregate statistics are compiled by schools and districts and reported.</p> <p>9.c. Individual programs and offices manage their own data. A comprehensive data access and use policy is not adopted.</p>	<p>9. Data consolidation and access are efficient.</p> <p>9.a. A data repository, warehouse, etc. consolidates the data in a format that is well-documented.</p> <p>9.b. Linkable individual/unit records (e.g., students, staff, finance, programs) with unique, permanent identifiers allow separate pieces of data for the same individual to be linked and for related individuals’ data to be correlated.</p> <p>9.c. Access to the data is managed carefully.</p> <p>i. Authority to access data and reports is defined for individual users related to specific data.</p> <p>ii. Reports meet the varied needs of the users (e.g., actionable accountability reports, diagnostic reports, ad hoc queries)</p>	<p>9. National standards and best practice across the states have been incorporated into the state’s information system. Longitudinal analyses are possible using individual IDs, common course numbers, and standard directory data elements across years and files.</p>



Figure 4 Performance Standard 4: Get the data right away.

Component 8. Electronic Exchange of Records

Basic Implementation

- 5.a. Schools and districts assign local student IDs if they choose.
- 5.b. Schools contact prior schools by mail, phone, or e-mail to request transcripts, which are faxed or mailed. Mobile students are retested or services delayed until records arrive.
- 5.c. Data are entered separately into each software application (or paper records). Changes are made multiple times to each application.

Proficient Implementation

- 5. Electronic exchange of records avoids printing and/or re-entry of data across systems.
- 5.a. A student locator function allows schools to look up records for new students to find prior education records and student IDs. A unique, permanent student ID is assigned to all students and used in all data exchanges.
- 5.b. Student records (transcripts) move electronically between schools to speed placement and avoid re-assessment of mobile students.
- 5.c. The interoperability of systems allows for the immediate electronic exchange of data in all systems whenever updates are entered into one system.

Advanced Implementation

- 5.a. A web-based look-up application allows new students to be assigned IDs and mobile students' IDs to be verified.
- 5.b. A system is in place to move student records upon request from one school's database to another's. A statewide course numbering system is implemented.
- 5.c. Software applications are interoperable (by SIF or a custom exchange system) so each entry is shared across all systems.

Component 9. Network Connectivity

Basic Implementation

- 6. Schools and districts have disparate wide area network capability, some with dial-up or under-sized capacity.

Proficient Implementation

- 6. All schools and districts have network connectivity to each other and the state at speeds and capacity adequate for their normal work load.

Advanced Implementation

- 6. Schools, districts, intermediate units, and the state are all connected to the Internet (or private network) with T1 or better speed adequate for their peak work loads.



Figure 5 Performance Standard 5: Get the right data management.

Component 10. Technology Infrastructure

Basic Implementation	Proficient Implementation	Advanced Implementation
<p>10. The technology infrastructure is aging. Plans for required upgrades either have not been adopted or have not been implemented.</p>	<p>10. The technology infrastructure (the architecture and management of hardware, software, network, and data) is adequate.</p> <p>10.a. The technology infrastructure has adequate capacity for storage, compilation, and transfer of data.</p> <p>10.b. Confidentiality and security are ensured through both physical and process controls.</p> <p>10.c. The technology infrastructure is supported by the necessary policy, funding, human resources, and security.</p> <p>10.d. The state's legislature, education board, and education agency leadership have adopted the goals, enabling legislation, and funding.</p>	<p>10. The state's education agency leadership and staff have developed a long-range plan for information technology and architecture. This plan ensures that changes in requirements and technology are addressed on an on-going basis. The plan is fully implemented. Policy and user advisory groups actively monitor and support the data management processes.</p>

NCLB Leadership Summit White Paper

How States Can Use Information Technology to Support School Improvement Under NCLB

Chrys Dougherty, Ph.D.

Director of Research, National Center for Educational Accountability



How States Can Use Information Technology to Support School Improvement Under NCLB

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The *No Child Left Behind Act's* assessment and reporting provisions cast a spotlight on the value of information for school improvement. At the same time, the law's accountability provisions push schools and districts to accelerate the pace of improvement. This calls for policy leaders to shift the state education agency's primary mission from compliance monitoring to that of a *State Education Information and Improvement Agency*. To make this happen, the state's political leadership must be willing to change budgetary and staffing priorities to give the agency the capacity to support its expanded data collection, analysis, and reporting responsibilities.

The discussion of information technology should begin with the products to be created. By collecting the right data, state agencies can promote the creation of three basic information products:

School performance reports that identify effective schools and highlight the improvement opportunities that these schools demonstrate. Educators serving the disadvantaged often believe that they are producing the best results reasonably possible with those students. Highlighting schools that are doing better with similar or more disadvantaged students can change those perceptions. Those reports can also point parents, educators, and community leaders to the schools whose practices they should learn more about.¹

Best practices reports that examine how the practices of consistently high-performing schools differ from those of average- and low-performing schools. These reports use surveys, site visits, and collection of documentary evidence and artifacts to examine what is going on in schools. They answer the question, "What are the high-performing schools doing to get their results? How is that different from what is happening in average- and low-performing schools?"

Diagnostic reports for educators on each student's mastery of specific skills and on which teachers have been most successful at getting their students to master those skills.

While the desirability of these three kinds of reports may seem obvious, what is less obvious is the critical role of state data collection in making these reports possible. Consider that:

¹ For example, the Just for the Kids Opportunity Gap Charts show the difference between a school's performance in each grade and subject and that of the highest-performing schools serving equally or more disadvantaged student populations. These charts are available on the U.S. Department of Education-sponsored Web site www.schoolresults.org and on the Just for the Kids Web site www.just4kids.org. The Just for the Kids site also contains Best Practices information and reports showing the accomplishments of schools that have been consistently high-performing in multiple grades, subjects, and years. The Education Trust's Dispelling the Myth charts on www.edtrust.org are another excellent example of this type of report.

- 1) Good best practice investigations depend on accurate identification of consistently high-performing schools.
- 2) Accurate identification of high-performing schools requires a longitudinal student information system that can follow the academic progress of students over time and identify how long each student has been enrolled in the school.²
- 3) When students change schools and districts, diagnostic information should follow the student.

In other words, the foundation of complete school reports, best practices investigations and diagnostic information for mobile students is a statewide longitudinal student information system.³

To assist in the creation of the three kinds of reports, a *State Education Information and Improvement Agency* can take the following three actions:

1. Create a statewide longitudinal student information system;
2. Convene a task force on investigation and dissemination of best practices; and
3. Make diagnostic information available to educators.

1. Create a Statewide Longitudinal Student Information System

A complete longitudinal student achievement information system should have at least nine components:⁴

- **A statewide student identifier** that makes it possible to match individual student records across databases and years, converting “snapshot” to longitudinal information.
- **Student-level enrollment, demographic, and program participation information** collected at a different time from the state test so the focus at the time of collection is on getting the student information right, not on test administration and security.
- **Student-level test data** that is stored permanently by the state so that it can be matched with later test results of the same students.

² Without information on the same students' prior test scores, the “value-added” components of a school or program cannot be assessed. When comparing schools' achievement levels, it is also important to know how long students have been enrolled in the same school. Otherwise the analysis may be based on students whose achievement is mostly the product of other schools. See Robert Meyer, Value-Added Indicators of School Performance: A Primer. *Economics of Education Review*, 16(3), 1997.

³ Section 1111(b) of the *No Child Left Behind Act* says that states “may incorporate the data from the assessments under this paragraph into a State-developed longitudinal data system that links student test scores, length of enrollment, and graduation records over time.”

⁴ Chrys Dougherty, “Nine Essential Elements of Statewide Data-Collection Systems,” Education Commission of the States, 2003, available for download on www.nc4ea.org.



- **Information on untested students**—a *No Child Left Behind* requirement that requires accurate accounting for all students enrolled in tested grades at the time of the test. Absent and exempt students should be accounted for along with the reason for each student's exemption so that trends in test participation of different student populations can be tracked over time.
- **Student-level course completion information** to see how many students are taking challenging academic courses in middle and high school.
- **Student-level SAT, ACT, and AP exam results** to show how many students from different backgrounds are participating in these exams and demonstrating readiness for college.
- **Student-level dropout and graduation information** that flags students who leave the state's public education system and accounts, as well as possible, for where these students went.
- **Ability to connect K-12 and college records** to see how the state's high school graduates fare in college.
- **A state data audit system** that uses both statistical checks and occasional site visits to review school district records.

School districts can develop longitudinal student information systems with all of these elements, but without a similar system at the state level they lose the advantage of statewide comparisons. Who wants to be limited to a single school district in finding the most successful schools?⁵

Given the cost of developing such a system, state policy leaders must be prepared to explain the benefits. Those benefits include:

- **Parents** can have better information on students' academic progress and can distinguish high "value added" schools from those that coast on the success of entering students. Parents of a new sixth-grade student, for example, can have access to better reports on the success of the school's sixth grade.
- **Educators** can learn from the practices of the most successful schools in the state. Educators in schools with highly disadvantaged or mobile student populations can be shown where others have succeeded with similar students. Reports on the academic achievement of continuously enrolled students can erase the perception that low test scores are explained by the performance of students who just showed up. Middle and high school educators can assess how their schools perform with students who enter at different levels of academic preparation. For example, how does our high school do with students who were proficient on the state's eighth grade exam? How successful are we compared to other high schools when working with students who had failed the eighth grade exam?

⁵ Direct nationwide comparisons are not possible because states give different tests. However, a multi-state directory of high-performing schools can be created once these schools are identified in each state.

- **School district leaders** can analyze the success of their schools based on the academic preparation of entering students.
- **Researchers** can evaluate schools and programs based on student academic growth and the length of student enrollment. They can assess strategies that work well with mobile student populations. They can follow students from one level of education to the next to evaluate the schools' long-term success.
- **State policy leaders** can have better information on which policies are working.

A longitudinal student information system relieves school districts of having to reconstruct, every time students are tested, all of the background information on every student: each student's ethnicity, economic disadvantaged status, English Language Learner status, special education participation, migrant status, and gifted and talented enrollment. For previously enrolled students that information needs only to be updated. The inaccuracies resulting from having to rebuild all of the information from scratch are well known.⁶ Inaccurate information on student membership in disaggregated groups can lead to faulty identification of which schools made Adequate Yearly Progress (AYP).

2. Convene a Task Force on Investigation and Dissemination of Best Practices

The *State Education Information and Improvement Agency* should work with other entities in the state—nonprofit research organizations, universities, and business-education alliances—to organize the process by which effective practices are researched and disseminated.

“Best practices” has sometimes been used by advocates as a label to market their favorite educational philosophies. What distinguishes the practices discussed here is that they are validated by empirical research or data in one of two ways: either they are found by experimental research to be effective, or they are found to be present in high-performing schools at much greater frequency than in average- or low-performing schools.⁷

The new generation of best practices reports are distinguished by four additional features. First, in states with longitudinal student information systems, the reports are grounded in better data on high-performing schools. Second, the reports are based on a conceptual framework that provides the following information on each practice:

- Nature of the practice.
- Level of the practice: district, school, or classroom. (For example, each level may have different responsibilities in developing and implementing the practice.)

⁶ These inaccuracies are discussed in Chrys Dougherty, “States Must Improve Data for No Child Left Behind,” *Education Assessment Advisor*, August 2002, available under “Data Collection” on the Web site www.nc4ea.org.

⁷ The latter approach to best practice research is more common since true experimental research is rare in education.

- Evidence that the practice is more commonly found in high- than in average- or low-performing schools, districts, or classrooms.
- Supporting conditions that make it more likely for the practice to be implemented and succeed. For example, a relatively clear set of state academic standards can facilitate the development of a clear and specific curriculum at the district level.

Third, the reports are designed to be easily usable by practitioners, providing examples of what these practices look like in specific high-performing schools.⁸ Finally, the reports are accompanied by self-audit tools that enable educators or involved laypersons to assess the extent to which each practice is present in their own classroom, school, or district.⁹

3. Make Diagnostic Information Available to Educators

The increase in state testing is providing information on the specific academic skills mastered by each student. This information should be supplemented by local assessments that cover more skills than a state test of reasonable length can address. These local assessments can be given during the course of the school year so that teachers pinpoint their students' academic strengths and weaknesses in a timely manner and can intervene quickly. This rich set of diagnostic information on the achievement of each student can be organized into a database that provides teachers and school administrators detailed information on which students need additional assistance.¹⁰

The student diagnostic information can be organized by classroom in two ways:

1. By the student's classroom in the *tested* year, so that teachers and school administrators can monitor student progress and see which teachers are doing the best job of teaching which academic skills. For example, if Mrs. Jones does a better job teaching fractions than Mrs. Smith, then perhaps Mrs. Smith can be paired up with Mrs. Jones to learn what she is doing. Mrs. Smith can reciprocate if there is an area of teaching in which she is stronger than Mrs. Jones.
2. By the student's classroom at the beginning of the *following* school year, so that teachers get a detailed picture of the academic skills of their incoming students and can plan instruction accordingly.

The state agency can assist in the design of a common architecture for these databases so that software written for one district can serve the needs of another. In addition, the state can write software to put its own test results into that database and supply the information to the districts.

⁸ For example, if "High-Performing Schools do Frequent Diagnostic Assessments," the reports provide examples of what these assessments look like in specific districts and schools and a detailed discussion of how the assessments are used by principals and teachers in collaborative efforts to assist students who are having difficulty.

⁹ The Web site www.just4kids.org contains a set of best practices reports that have all of the features described here.

¹⁰ The database can also show which students have mastered the curriculum early and are ready to move on so that advanced students can receive appropriate instruction at their level. The Northwest Evaluation Association (www.nwca.org) has specialized in developing computerized diagnostic testing systems that assess the skills and academic growth of students, including those who are performing well above or below grade level. They have a large item bank from which assessments aligned with a specific state's standards can be built.

Finally, the state may wish to have a common set of data analysis software written for all of the districts so that everyone is able to cut their data in the same ways, and a teacher or administrator moving between districts does not have to learn an entirely new data system.

Questions for State Education Policy Leaders

1. How do the state education agency's mission statement, staffing patterns, and budgetary priorities reflect its new mission as a state education information agency?
2. How do the agency's staffing patterns and budgetary priorities enable the agency to carry out the three specific activities—collect the right information, promote best practices, and make diagnostic data available to educators—that have a significant potential to help schools meet the ambitious improvement goals established under the *No Child Left Behind Act*?
3. When is the Web-based state school report card available to the public for the previous spring's testing? What constraints are delaying the availability of this information to parents, educators, and the public?
4. How are the policy leaders in the state supporting the state agency's capacity to collect the right information, make timely diagnostic information available to educators, and make timely school reports available to the public?
5. What process exists in your state to evaluate the usefulness of the state's Web-based school reports to educators, parents, and other members of the public?
6. What infrastructure exists in your state for investigating and disseminating best practices and assisting low performing schools in implementing these practices?
7. What infrastructure exists in your state to make diagnostic information available to educators? Who is working on a solution to this problem?

Web sites

State Data Collection

www.nc4ea.org

<http://evalsoft07.evalsoft.com/pbdmi>

School Reports

www.schoolresults.org

www.just4kids.org

www.edtrust.org

Best Practices Reports

www.just4kids.org

Diagnostic Testing Systems

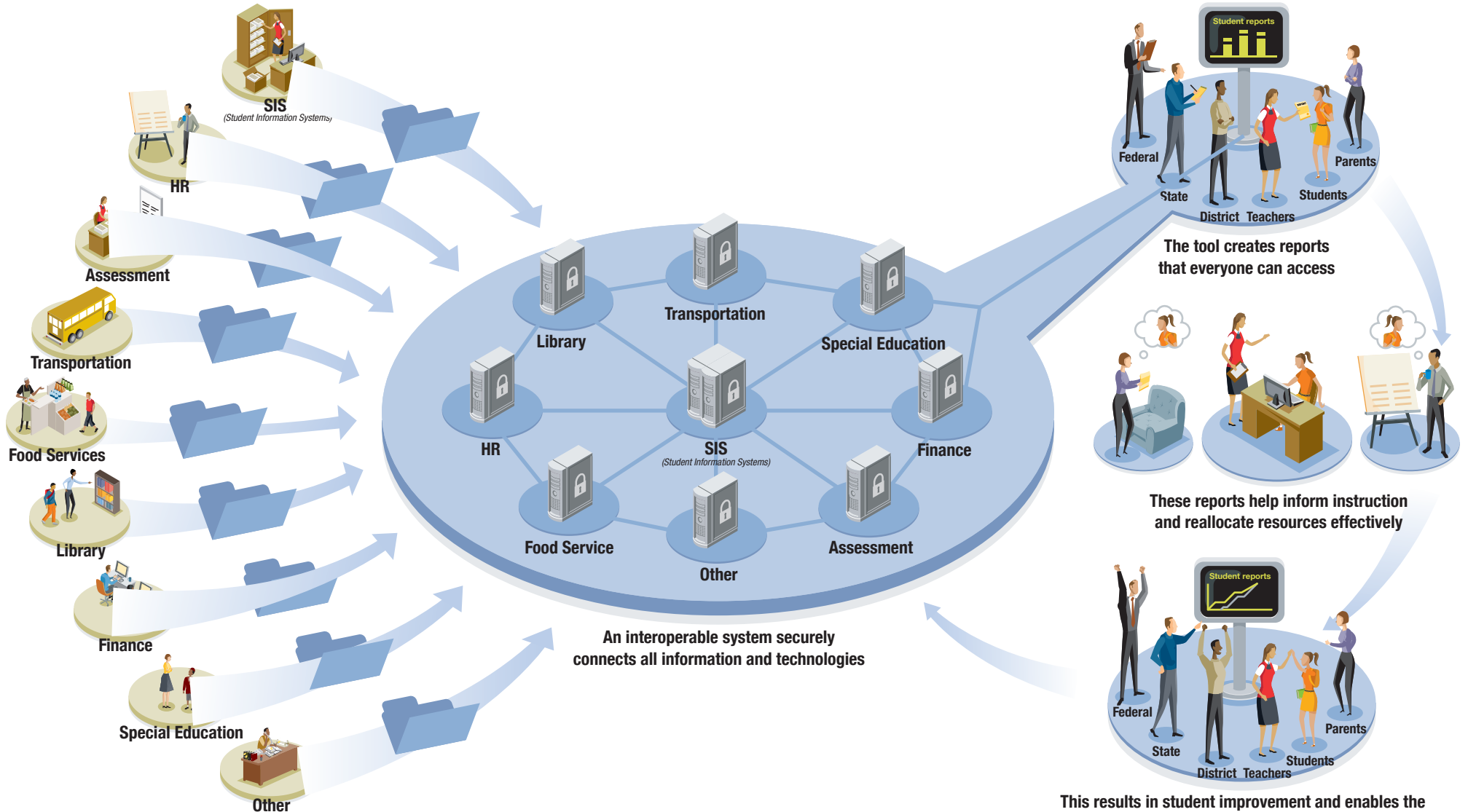
www.nwea.org

On average, there is little aggregation of student data in today's school systems. Information is siloed, redundant and difficult to share. The technologies used — if any — are aging and frequently incompatible. An ideal state has complete aggregation and alignment. It is easier to ensure that students meet challenging standards, teachers target instruction, parents know teachers are helping their children, school districts know how to allocate resources effectively and the government knows how schools are doing.

1. The average state: Isolated silos of information prevent everyone from seeing the 'Big Picture.'

2. The ideal state: A Total Information Management Tool (Data Warehousing) will aggregate previously siloed data and create a variety of reports for any audience.

3. The result: These reports inform instruction, resulting in continuous student improvement.



Steps for Ensuring Data Quality

Data quality is more than accuracy and reliability. High levels of data quality are achieved when information is valid for the use to which it is applied and when decisionmakers have confidence in and rely upon the data. Implement these steps organization-wide to increase and maintain data quality.

START

4 Is process well implemented?

5 Are data verified and compared?

6 Are data appropriately analyzed and reported?

- ✓ Disclose all conditions affecting interpretation of the data.
- ✓ Present conclusions fairly within a context for interpretation.
- ✓ Review data with those who have a stake in the results.
- ✓ Run audit reports for review by experts with knowledge of reasonableness.
- ✓ Compare data to past runs, standards, or similar groups.
- ✓ Ensure analysis techniques meet the requirements for proper use.
- ✓ Protect FERPA confidentiality rights.
- ✓ Publish technical reports or make available files with detailed data for verification.
- ✓ Check data exchanges, crosswalks, and translations for integrity.
- ✓ Verify all calculations and conditional rules.

This student group needs...



3 Is process well documented and communicated?

2 Is process well designed?

1 Are requirements known?

- ✓ Use checklists and signoffs for key steps.
- ✓ Run sample data and verify.
- ✓ Conduct on-site reviews during the process.
- ✓ Ensure all requirements are available (e.g., computer hardware, software, network, etc.).
- ✓ Provide documentation for data providers and data processors.
- ✓ Provide a data dictionary and format specifications.
- ✓ Provide training and certification for data providers and all new staff.
- ✓ Provide immediate help for data providers.
- ✓ Review design by peers, agencies, and staff.
- ✓ Preprint all available data. Limit times data are entered.
- ✓ Ensure target dates are reasonable and clear.
- ✓ Use most automated/validated level of data entry possible (e.g., codes in an automated application vs. paper forms).
- ✓ Automate entry verification at the earliest levels (e.g., upon key stroke vs. from printed audit report).
- ✓ Use random checks during production.
- ✓ Run maintenance before all production. Verify off-hour maintenance and staff availability.
- ✓ Compare policy, regulation, and procedures with instructions given to data providers, collection forms, and code in computer programs.
- ✓ Ensure all personnel are knowledgeable, certified, and trained for their assigned tasks.
- ✓ Include data providers and data processors in decisions to establish what is feasible.
- ✓ Follow an established change-management process.
- ✓ Comply with professional standards for data collection, analysis, and reporting.



Data-driven decisions made with confidence

Comparable data; interpretable beyond local context

5 Quality

Valid data consistent with construct being described

Reliable data independent of collector

Accurate data consistent with definitions

4 Valid

Accuracy achieved for decision making

Designation of official data for decision making

Periodicity established for collection and reporting

3 Official

Data combined, aggregated, analyzed, summarized

Data collected by some at some times

2 Available

Inconsistent forms of measurement

Data unavailable

1 Data Defined

Bad data

-1 Invalid

The Hierarchy of Data Quality

As stages are completed, data quality and usability increase. How do your data measure up?

Want to learn how to improve your data quality?

ESP Solutions Group conducts comprehensive **data quality audits** for local, state, and federal education agencies. We can assess your data processes, identify your strengths and weaknesses, and make practical recommendations on how to improve the data quality across your entire organization. For more information on ESP's data quality services, visit www.espsolutionsgroup.com/dataquality.



A Technology Framework for *No Child Left Behind* Success

Each state can create a powerful technology infrastructure through the successful implementation of these ten components. You need the right data supporting the right goals captured the right way. How does your framework currently rank? Check the status of your state's implementation within each component. The path is clear — more advanced technology will ensure better success with *No Child Left Behind*.

■ Basic Implementation ■ Proficient Implementation ■ Advanced Implementation

Data Systems

Disparate data systems, file standards, and data-collection

Data systems implemented and aligned around required content areas

Data driven decision making (D3M) system implemented

Management plans linked to standards, instruction, and resources

Your State Department of Education



Academic / Other Performance Standards



Standards not developed or adopted

Standards and management processes developed, adopted, and published

Long-range plans, long-range vision by education agency leaders, and involvement of policy and user groups

Adequate infrastructure: storage capacity, security controls, and support (policy, funding, and human resources)

Aging infrastructure: no plans to upgrade

Technology Infrastructure

(architecture and management of hardware, software, network, and data)

Data Standards

Each office with unique definitions and codes

Standards and definitions published in system-wide data dictionary

Data standards electronically exchanged and adopted by all applications

Data Dictionary

www

D3M

Data Quality

Data quality not monitored

Data quality is clearly defined, monitored, and required

D3M practiced confidently; data providers monitor and rely on quality data

I can trust this.

I accept this as accurate.

I'll check it!

Get the data right

Get the right data

Get the right data management

Get the data right away

Get the data the right way pushed ahead

NO CHILD LEFT BEHIND

D.O.E.

PBDM/EDEN Readiness... Data Driven Decision Making

0100100110101010

SIF

WAN

Electronic records follow students, SIF standards, application interoperability

Electronic exchange of records; system interoperability

Data keyed from paper records

Electronic Exchange of Records

Network Connectivity

24/7, fast connections

Constant, adequate speed connections

Inconsistent access; dial-up or under-sized capacity

Aligned Assessments / Measures

Standards

Performance measures predate standards

Assessments aligned with up-to-date standards

Assessments measure targets reliably

Effective School

Automated Data Systems

Individual-level statistics calculated and shared via web-based reports

Automated systems collect and share data for clearly defined timeperiods

Collection via paper forms generates "isolated" data files

National standards incorporated into repository; longitudinal analysis enabled by standards

Data repository consolidates data; security is managed at user and specific data level

Aggregate statistics compiled by schools and districts; no data usage/access policy

Data Consolidation, Security, and Access

Hacker

Want to learn how your SEA can move from one level to the next? ESP Solutions Group can provide your SEA with extraordinary insight into K-12 education data systems and psychometrics. Our team is comprised of industry experts who helped pioneer the concept of "data driven decision making." ESP personnel have advised all 52 state education agencies as well as the U.S. Department of Education on the practice of K-12 school data management. We are regarded as leading experts in understanding the data and technology implications of the *No Child Left Behind Act* (NCLB), Performance Based Data Management Initiative (PBDMI), and the Schools Interoperability Framework (SIF). Get your free copy of the accompanying whitepaper at www.espsolutionsgroup.com/sea

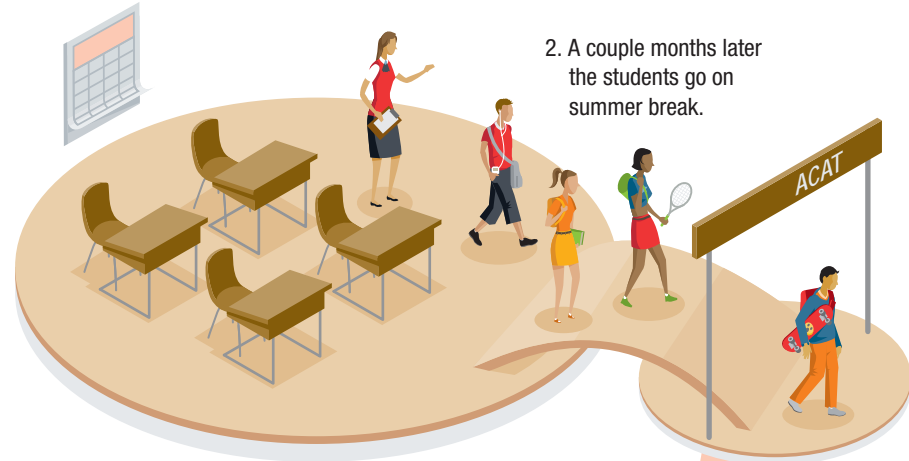
Paper-based testing: Slow, expensive, not useful for instruction

One of the major requirements for NCLB is annual assessment of students in core subjects beginning with reading and math. However, the traditional paper-based approach has several downsides — including untimely feedback which takes 4-6 months to generate results, high costs associated with administrative overhead and use of multiple resources to duplicate, administer, collect, collate, code, score and analyze the data.

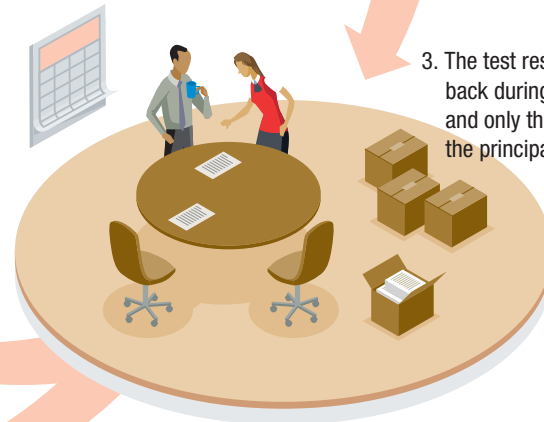
1. Teacher hands out tests and packages them for scoring after completion.



2. A couple months later the students go on summer break.



3. The test results come back during the summer and only the teacher and the principal see them.



4a. Parents receive their children's test results from last school year.






4b. Teacher files away test results from last year's students.



5. The new teacher has no information about the students, causing the teacher to start fresh.



<p>Total time to test results:</p>  <p>4+ Months</p>	<p>Informing instruction:</p>  <p>None</p>	<p>Transport, security, paper costs:</p>  <p>Expensive</p>
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Bottom Line: Costly

Online testing: Fast, inexpensive, useful for instruction

By taking a web-based approach, states and schools use tests to focus on improved instruction through rapid assessment and feedback — not only to meet annual accountability requirements but also to improve daily instruction. Everyone benefits. Teachers tailor lessons around child needs. Parents know their child's strengths and the areas needing improvement.

Starting the transition from traditional to online



1. Technology is analyzed to check for sufficient hardware, level of technology and bandwidth



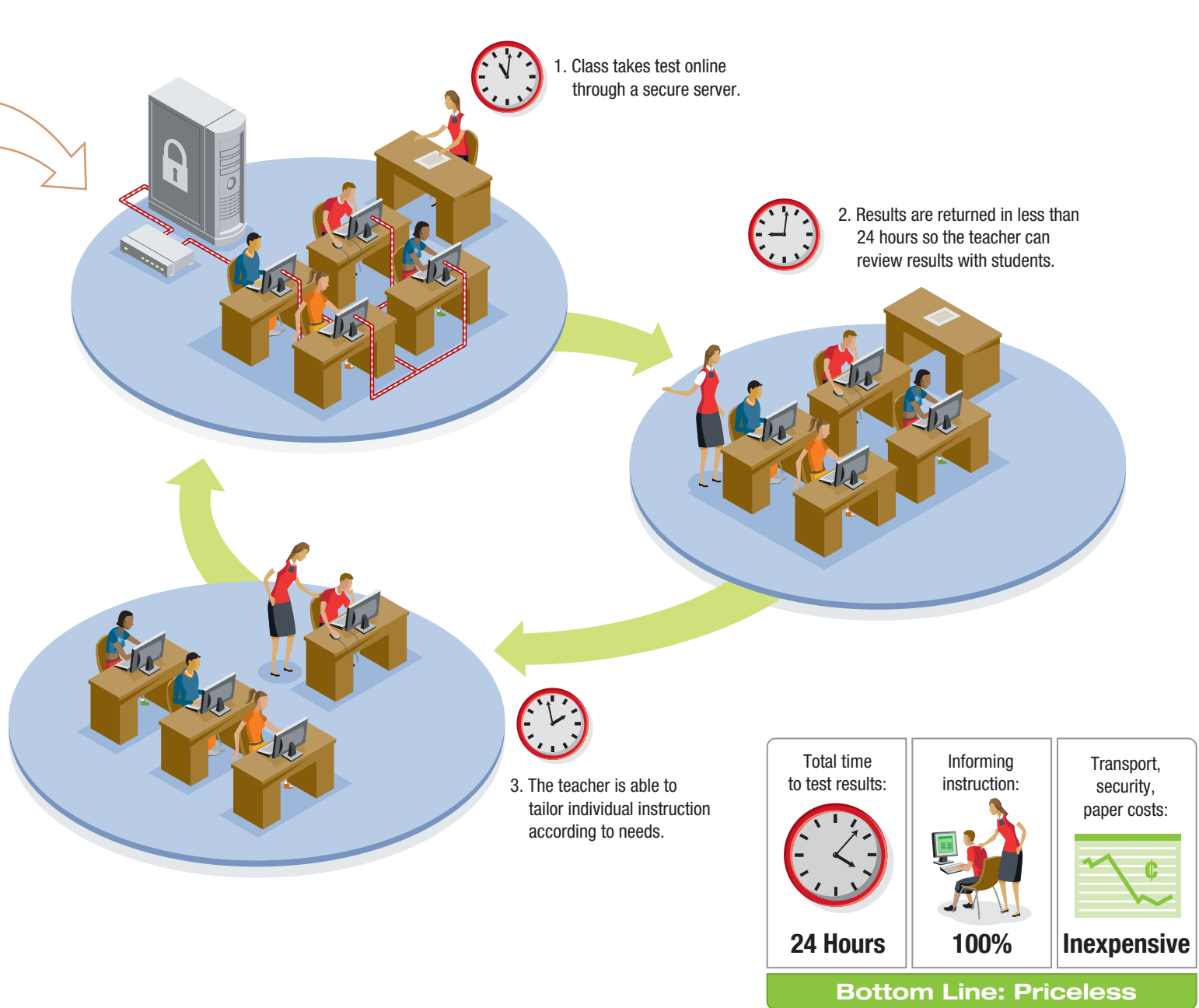
2. Any necessary upgrades are made



3. Internal training begins. Teachers and administration are shown how applications work and how results can be utilized



4. Students instructed on how to use test tools and begin testing online



Traditional IEP

IEPs are designed to create the best educational environment for special needs children. And yet, the traditional IEP is wrought with excessive paperwork. Here is a look at where some of the problems occur:

Special educators spend at least 10% of their time on paperwork, away from individualized instruction. Multiple copies must be filled out and mailed to the IEP team. Inaccuracy is common.

Many of these forms take two days to complete, so they are not updated frequently.

The IEP is reviewed annually by the IEP team to test the child's progress. Boxes of forms must be reviewed. Once again, inaccuracy is inevitable.



Expensive	Time-intensive	Lots of paperwork
Traditional IEP is inefficient		

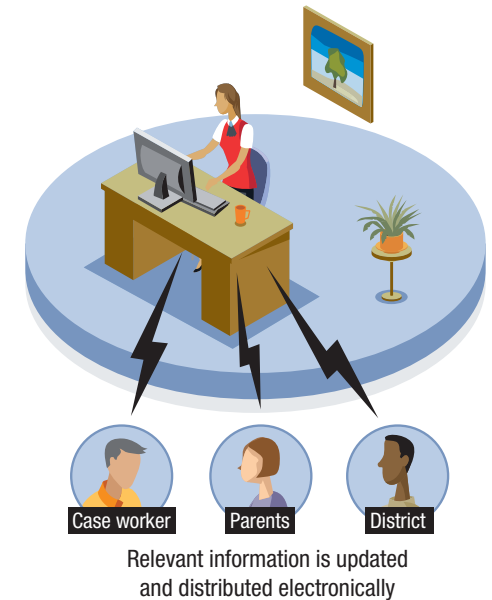
Online IEP

By moving to a web-based IEP, paperwork decreases and focus on the child increases. Special educators stay in the field instead of being lost to other less paper-intensive positions.

Online IEP requires 50% of the time previously spent on paperwork, allowing special educators to focus on a child's instructional needs. Accuracy is also greatly improved through online applications.

Student information is tracked in a shared database: Notices are prepared and sent online, multiples are eliminated, reports are simple to create and students are easily transferred to different schools when necessary.

Accurate information is quickly, easily accessed during IEP reviews.



Cost-effective	Time-effective	Reduced paperwork
Online IEP is efficient		

Section II: Increasing Options Through e-Learning

Overview

E-learning is a broad term reflecting a wide range of educational courses and supplementary digital materials delivered anytime and anyplace using technologies. The major difference between a traditional course and an online course is the physical and temporal separation between the student and the teacher, and often among members of the class.

E-learning enables educational and professional development opportunities to occur any-time, anyplace, and can supplement and enhance a school's ability to deliver quality educational experiences for all students across a broad spectrum of needs.

Because e-learning leverages the power and flexibility of digital tools, and the timeliness and immersive and adaptive capacity of digital materials, it can be used to create personalized learning opportunities all along the instructional continuum. From enhancing face-to-face classrooms to providing complete virtual degree programs, e-learning can allow teachers to reach students regardless of distance, disability, medical conditions or time constraints. E-learning opportunities are increasing in elementary, middle and high schools, as well as in higher education, as there is growing consensus that quality e-learning opportunities should be made available to all learners.

This section helps practitioners with:

- Providing states with virtual school policy frameworks and models;
- Providing assistance on how e-learning supports provisions in *No Child Left Behind* on choice, supplemental services, professional development and training;
- Promoting virtual schools as a viable opportunity for students; and
- Demonstrating examples and best practices for schools in transforming education using e-learning.

e-Learning Frameworks for NCLB

Susan R. Collins, KCH Strategies

Educators must embrace e-learning solutions if they want to ensure that every student has a quality educational experience. But before e-learning can achieve widespread acceptance in public schools, educators and policy makers must expand their notion of education to include online courses and digital materials used to enhance classroom instruction.

The No Child Left Behind (NCLB) Act requires a rigorous academic curriculum and highly qualified teachers—and it holds public schools and teachers accountable for student success. E-learning solutions can supplement and enhance a school’s ability to deliver a quality educational experience for all students.

This paper will describe e-learning solutions to common problems facing educators, outline current barriers to the widespread use of e-learning, and describe characteristics of an “ideal” state environment for e-learning.

PART 1: Understanding the power of e-learning

The following scenarios describe real problems from the education trenches and the e-learning solutions that resolved them.

Rural Pennsylvania. The German language teacher resigned in June. In mid-August, despite the principal’s best efforts, there’s still no teacher for German II. How can the class’s 15 seniors meet their foreign language graduation requirement?

An online German II class solved the problem. The students “attended class” in the computer lab, submitted their homework and took exams online, and participated in online discussions. With a staff member acting as a mentor, the students kept up with their studies and continued learning. At the end of the year, staff and students judged the replacement class a success—thanks to the students’ efforts, the quality of their online course, the skill of their online instructor, and the support of their in-school mentor.

Small-town Texas. Each year there are a few math students who really should be taking Advanced Placement Calculus—but never enough to warrant offering the class. How can the math department continue to challenge its best students?

An online Advanced Placement class solved the problem. The students who needed the challenge of an academically rigorous mathematics curriculum took the AP course online, completed it successfully, and went on to pass the AP exam. By arranging for the online course, the school expanded the students’ learning opportunities and also improved their chances of meeting college entrance requirements.

All over the country. The seventh-grade social studies curriculum is ambitious and the teacher is highly capable. As in most classes, however, the students represent a wide range of academic preparation and educational ability. How can the teacher help every student succeed?

A variety of digital materials helped the teacher provide additional opportunities for individualized learning. Online assessment solutions gave her ongoing indications of student progress. Interactive products, both basal and

supplementary, augmented classroom lessons with targeted curricula focused on student outcomes. Reference materials at various levels, both online and static, enabled the students to conduct research matched to their abilities. And multimedia applications brought history to life.

In an increasing number of schools, educators are using e-learning solutions to expand the course catalog or supplement the existing instructional material. Similar in many ways to their traditional counterparts, e-learning solutions are not difficult for schools to use.

Most online courses are regular courses whose content follows a standard scope and sequence. Although the delivery methods are different from those used in traditional courses, online courses are typically taught by certified teachers and follow specific curricula. Students read textbooks, write papers, take quizzes and exams, and participate in discussions—just like they do in traditional courses. The major difference between a traditional course and an online course is the physical and temporal separation between the class and the teacher—and often between members of the class.

Instructional material in digital form offers resources in a new way, often with the added advantage of temporal currency or interactivity. For example, students using one e-learning application might be able to watch a graph be instantaneously redrawn when the parameters are changed. Students using another might be able to see the impact of changing an experimental variable or get up-to-date access to the latest vote in the Senate. Digital materials may also provide additional resources on demand, such as pronunciations, definitions, or background information.

In the examples above, educators were able to resolve their problems because they had already integrated e-learning solutions into their education planning. So the online courses—in German and AP Calculus—were considered to be part of the school’s catalog of offerings. And the digital materials in the seventh-grade classroom were treated no differently than traditional textbooks, workbooks, or other supplementary materials.

Thanks to investments at the federal, state, and local levels over the past 10 years, tremendous progress has been made to put the technology in place to support these solutions. During the past decade—according to

Quality Education Data, Inc.—an estimated \$59 billion has been invested in desktop computers, networking, Internet connectivity, and professional development. States have made deep investments in building the technology infrastructures of their schools. And communities nationwide have approved local bonds and levies to fund the hardware, software, connections, and training needed to level the technology playing field for their students. But despite these investments, and the benefits of e-learning, there is still more to do to ensure that children and teachers everywhere can take advantage of e-learning solutions.

Many schools currently face obstacles as they try to use e-learning solutions. If they want to supplement their catalog with online courses or use locally delivered digital content, they face policy or funding barriers—or both. The schools may find that the online courses they want to offer do not meet current regulations regarding provider accreditation, teacher credentials, grading, or transcripts. They may not have the funds to pay for online courses. Or they may fear losing ADA-based funding when students “attend” courses online. In addition, when they want to supplement classroom resources with digital content, they may discover that textbook dollars are not available. By recognizing these obstacles, we can address them—and thus move closer to creating e-learning-friendly environments.

PART 2: Recognizing the obstacles associated with e-learning solutions

For the most part, the obstacles to using e-learning solutions fall into the following three categories:

- Policy (including issues of certification, teacher of record, credit, provider accreditation, and attendance)
- Quality (including materials, instruction, and implementation of online courses as well as digital materials used in the classroom)
- Funding (including sources of money to purchase online courses and digital material)

Online instruction, particularly in hard-to-staff subjects like foreign languages and advanced science and math

courses, is one way to ensure that students have access to the courses they need for college and life—regardless of teacher resources in their own school districts. However, state lines often stand in the way of teachers providing online instruction to students in states other than where they are certified—regardless of their academic qualifications. Other related obstacles involve regulations determining who can be the “teacher of record” for a course and what institution can grant credit. Definitions of attendance can pose problems if students taking online courses are off-site while “attending” class. Finally, because accreditation has traditionally been done on a regional basis, regional variations, such as in the number of annual school days, can pose problems.

Questions about quality frequently arise (“How do we know it’s any good?”) when schools begin considering online courses or digital material. When discussing quality, it’s important to address the differences between traditional and digital content as well as the delivery mechanism for digital material.

Funding is another problem area. In some instances, state educational regulations allow students to earn credit from an online course, but per-seat funding formulas cause the school district to lose corresponding funding. In addition, e-learning solutions, particularly supplemental digital content, have no consistent budget.

PART 3: Removing the barriers to e-learning

The responsibility for creating e-learning–friendly environments lies with all of us involved in education in the United States—federal and state education agencies, state and local policy makers, and business. Here’s what we need to do as a start.

- Establish a national research and development agenda for evaluating the ways that technology improves teaching and learning—and for creating a policy and funding environment that facilitates the use of technology for education.
- Evaluate program regulations and change those that impede student access to expanded educational opportunities.

- Shift funding priorities and eliminate budgetary restrictions that prevent the purchase of online courses or digital content.
- Design online courses that meet nationally recognized content standards and staff the courses with fully qualified instructors.

With regard to policy, quality, and funding, states that have e-learning–friendly environments have all—or most—of the following characteristics.

Policy

1. Teacher certification

At present, each state has its own process and requirements for obtaining a teaching credential. Organizations such as the National Board for Professional Teaching Standards have established standards for national board certification. To date, 35 states have approved processes to recognize this kind of national certification.

In an e-learning–friendly state:

- All teacher certification meets the requirements of the Highly Qualified Teacher component of NCLB.
- New teaching methodology standards, such as those of the National Association of Teacher Standards, have been developed for online teaching.
- Additional requirements for teaching online are included in the certification process.
- Teacher certification includes the requirement that all teachers understand e-learning solutions and be able to use them effectively.
- State-level certification reciprocity is enacted.

2. Teacher of record

The teacher of record is the person responsible for assigning student grades and authorizing course credit. Typically, the teacher of record is the certified teacher at the school who is teaching the course.

In an e-learning–friendly state:

- State and local policies allow the online teacher to be considered the official teacher of record.

- School districts that offer online courses as part of the standard course catalog accept the qualifications of the online teacher as the teacher of record.

3. Credit

The local school or district is traditionally the legal credit-granting institution for all students in attendance. Since online teachers are not members of the local faculty, some schools and local school districts are prevented by district or state policy from granting credit for an online course. In addition, attendance—as measured by seat time—has been the most common indicator of eligibility for credit. When students take online courses in non-school settings, such as libraries or at home, seat time may not be measurable.

In an e-learning–friendly state:

- State laws and policies allow local schools or districts to grant credit for any online course that is provided as a part of the school’s standard program.
- School districts accept grades issued for an online course—on transcripts, for graduation requirements, and in calculating grade–point averages.
- School districts accept successful completion of an online course (replacing seat time) for the purposes of granting credit.

4. Provider accreditation

Traditional schools are accredited by one of several regional accrediting agencies. Through organizations such as the Commission of International and Trans-Regional Accreditation (CITA), many large regional accrediting commissions maintain a common protocol, ensure standards, and conduct evaluations of distance learning providers. All protocol and standards for distance education schools have been enacted and are now operational.

In an e-learning–friendly state:

- The regional accreditation agency has standards for evaluating providers of online courses. These standards are comparable to those used to evaluate traditional schools, but recognize the differences in delivery methods.

- Evaluation standards for curriculum and instruction are equivalent to traditional school requirements. In addition, online course providers are evaluated on the use of available online technologies, instructional strategies, and online resources as well as on their appropriate use in enriching the student experience.

- Public school districts use accredited providers.

5. Attendance

Accounting for student attendance is mandatory in traditional schools. However, a student may “attend” an online course outside the school building or outside normal school hours.

In an e-learning–friendly state:

- An attendance policy for online courses recognizes that successful completion of a course is equivalent to attendance for the period of the course.
- When a student takes an online course during an assigned class period, attendance is taken as if the student were in a locally taught class. However when a student takes the course with a flexible schedule or location, appropriate successful progress through the course is used as a measure of attendance.

Comment: Basic education funding is traditionally based on student attendance, with Average Daily Attendance (ADA) or Full Time Equivalent (FTE) being the most common measure. In an e-learning–friendly state, schools maintain their basic education funding even if their students are taking an online courses instead of a traditional one.

Quality of the student experience

1. The quality of online courses

To ensure the quality of online courses, three components must be evaluated: materials (curriculum and assessment), instruction, and implementation. To evaluate materials and instruction, educators apply existing evaluation tools and processes in a new arena. Although the materials and teachers may be off-site, current processes can still work.

Evaluating implementation requires a different approach. In traditional courses, educators use classroom observation, quizzes, and tests to determine how well their students are learning. They also take note of at-

tendance and class participation. When students are at a distance, ongoing monitoring is more difficult, so schools have to be proactive in checking the effectiveness of online courses for their students. Selection of students, determination of how and where students participate, parental support, in-school support, and support from the online course providers are all issues that can impact a student's chance for success.

Many models can be used to provide an environment that is successful for students. In an e-learning-friendly state, some or all of the following critical factors are in place.

Critical factors for curriculum and assessment materials in online courses

- The online curriculum meets appropriate curriculum standards.
- The content is appropriate for the grade level and age of students.
- The use of technology enhances the curriculum.
- The assessment content and methodology is appropriate to online courses.

Critical factors for instruction in online courses

- Teachers are certified and highly qualified to teach the course that they are teaching.
- Teachers are proficient in teaching in an online environment.
- Online teachers, like traditional teachers, are evaluated annually.
- Online course providers provide qualification documentation to their client schools or districts.
- Appropriate metrics, such as for the teacher response time to students, are established.
- Feedback to students is provided through appropriate communication vehicles.

Critical factors for implementation of online courses

- Students are selected to participate in online courses based on their potential for success: independence, motivation, academic preparation, and access to appropriate technology.

- Every student has an on-site mentor to address problems that may interfere with the educational process.
- Mentors receive information to help them be effective in supporting online students.
- Mentors are responsible for the student's learning space and technology.
- Mentors communicate—about student progress and any problems that arise—with the course provider, the student, and the parent.
- Every student in an online course that replaces a regular course is assigned a class period for the online course.
- Online teachers hold regular office hours in which students can communicate with them.
- Students, parents, and school personnel have access to current student reports.
- Parents receive information to use in supporting their online students.
- Schools and course providers have a workable feedback mechanism.
- Standards that support student success, such as response time for technical support and guidelines for the delivery of student work, are established by the online course provider.

Comment: Schools can use existing online course evaluation tools to determine which online courses and implementation models best fits their students' needs.

2. The quality of digital instructional materials

Educators already use an instructional materials selection process to evaluate traditional materials, like textbooks and supplementary print materials. Digital material should meet the same kind of educational standards with recognition of the differences in delivery mechanisms.

In an e-learning-friendly state:

- The instructional materials process and guidelines include standards that incorporate critical elements

for e-learning materials, such as the appropriate use of technology to support instruction.

- Online course materials are evaluated using an instructional materials process that is appropriate for digital materials.
- Classroom e-learning solutions are evaluated with whatever instructional guidelines and processes are appropriate for their use.

Funding

1. Funding for online courses

Local administrators have the legal responsibility for providing an education program that best serves students in their school. Today, public schools are funded on a per-student basis. Funding calculations are based on average daily attendance or other site-based measures of student presence. Since online courses separate the physical presence of students and the educational process, they do not meet the conventional funding criteria.

In most states today, online courses are not supported in the normal ADA/FTE funding process. The use of a financing methodology that fully funds students, regardless of whether they take in-class courses or online courses, will eliminate educators' fear of losing their basic education funding.

In an e-learning–friendly state:

- Financing formulas allow schools to use basic education funding to pay for e-learning solutions, both online courses and digital content.
- Title I regulations allow low-performing schools to use the Supplementary Education Services funds to purchase online courses and other e-learning solutions.
- Policy makers have enacted funding formulas that provide fair reimbursement for e-learning solutions that are used to provide core instruction.

Comment: Many states have elected to fund online learning through mechanisms such as state-funded virtual schools that have free or reduced tuition. In fact, 15 states have done so, with an additional 7 states having cyber charter schools (Education Week, Technology Counts, 2004). Other funding mechanisms include extraordinary funding where the state compensates a

virtual school for students who successfully complete an online course. However, that particular model removes funding from the local school that would have had the student as ADA/FTE.

2. Funding for other e-learning solutions

With current definitions of textbooks, most e-learning solutions (basal or supplementary) have to be purchased with supplementary materials funding or technology funding. Current resource allocation methods perpetuate the separation of traditional instructional materials and digital content.

In an e-learning–friendly state:

- The definition of ‘textbooks’ has been expanded to include both online course materials and digital content.
- The textbook adoption process has been expanded to include digital content and online course materials—and provides appropriate guidelines and timelines for selection, purchase, and implementation.
- Certain processes, like book-depository requirements, have been amended to support the adoption of digital content and online courses materials.

Call to action

An e-learning–friendly environment is necessary for schools to provide a 21st Century education and can help them meet the goals of NCLB. To achieve such an environment, federal, state, and local educational agencies must create a long-term policy agenda that includes the normalized use of e-learning solutions. Policy makers must revisit the traditional standards and policies for delivering educational opportunities to students. They must also address the lack of flexibility in educational spending and the unyielding budget calendar that prevents local educators from providing the best educational opportunities for all students.

The comments and scenarios in this paper reflect an urgent need. Today's students, accustomed to revolutionary technology, are leaving the public schools to obtain faster, customized, and interactive online education from other sources. When local administrators have the power to make effective use of e-learning solu-

tions, public schools may again be able to provide the education these students are seeking.

An e-learning-friendly state has solved policy, funding, and quality problems. If your state is not yet e-learning friendly, the ideas in this paper can serve as guidelines for change.

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The Role of Educational Technology in Meeting the Promise of Supplemental Educational Services

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Introduction

The supplemental educational services (SES) provision of the *No Child Left Behind* (NCLB) Act of 2001 establishes a significant new opportunity for families to *choose*, educators to *provide*, and eligible low-income children to *receive* effective, out-of-school academic support services. According to NCLB, supplemental educational services—essentially tutoring services provided *free* of charge to students—**must** be offered to eligible students from low-income families who attend Title I schools that have been identified by their states as *needing improvement*—generally, by failing to make adequate yearly progress (AYP) for at least three years.¹

The SES provision expands options for parents of low-income children by enabling them to seek out these free, effective tutoring services. These services provide students extra help in academic sub-

jects such as reading, language arts, and mathematics. They are generally delivered outside the regular school day—before or after school, on weekends, or in the summer. In addition to providing expanded choice to parents, SES offers educators another potentially effective way to boost the academic achievement of traditionally underserved youth. Finally, these mandated services provide policymakers an important accountability tool and support mechanism to make sure that all children receive the academic help they need.

In 2004, this program will offer increased choice of supplemental services and educational opportunities to thousands of students in Title I schools throughout the country.² Official estimates of the potential scope and impact of SES are not yet available. However, some observers estimate that SES ultimately may benefit as many as 1.5 million students

¹ The services are to be paid for by districts, generally from their existing Title I, Part A allocations. Additional U.S. Department of Education information regarding these funding requirements is provided on pages 29-38 of the *Supplemental Educational Services Non-Regulatory Guidance* (August 22, 2003), available at www.ed.gov/policy/elsec/guid/suppsvcsguid.doc. The U.S. Department of Education's definitions of key terms in SES (eligible child, eligible school, provider, supplemental educational services) are provided in Appendix A to this paper.

² Currently, national figures are not available to permit accurate estimates of the total number of identified schools and eligible students. This is because some states post lists of schools that have not made adequate yearly progress that do not clearly indicate which of these schools are required to provide SES. As of June 2004, the Supplemental Educational Services Quality (SESQ) Center (www.tutorsforkids.org) has identified 29 states that have posted clear lists of schools not making AYP, thereby allowing for an accurate count. In these states, more than 2,000 schools are required to provide SES in 2004.

and create a marketplace for these services worth more than \$2 billion annually.³ Although the long-term goal of the program is to reduce the need to provide SES, many more students may be eligible to receive the services in the short term. As of June 2004, nationwide nearly 1,400 SES providers have been approved by the states.⁴

Similar to other large-scale education improvement initiatives, in the end, the committed and careful implementation of SES is likely to prove key to its success in meeting the needs of students. In this regard, state policymakers and administrators have a crucial role to play. This paper summarizes the SES provision, outlines key challenges to the successful implementation of the program, reviews the role that educational technology may play in improving the delivery of supplemental services, and offers ideas to turn the current implementation challenges into opportunities to help eligible children benefit from SES.

SES: The Basics

The SES provision engages a multiplicity of actors in its implementation: state policymakers and administrators, district and school leaders and staff, SES providers, families and parents, and ultimately, the students who receive the services. As an integral part of NCLB, the SES provision is put in motion after each **state** sets its own definition of adequate yearly progress (AYP), the minimum improvement that districts and schools must reach

every year on state achievement tests and other measures (see Table 1). The law specifies that Title I schools that do not show AYP for three years or more must offer SES to students.⁵ Each state is charged with identifying schools that do not make AYP for at least three years.

The states also must develop a process that results in a list of approved SES **providers**. States are supposed to identify providers that offer high-quality, research-based tutoring services in line with state standards. Each state creates its own application and establishes criteria for approving providers. At a minimum, states must require a program to demonstrate that it:

- has a proven track record of raising student achievement in academic subjects (such as reading and math);
- offers high-quality, research-based instruction focused on improving student academic achievement;
- offers services that are in line with state standards;
- is financially sound; and
- complies with federal, state, and local health, safety, and civil rights laws.

States set their own application timelines but must give providers an opportunity to apply for state approval at least once a year. When reviewing provider applications, states can work to include input from district representatives, parents, teachers, and business and community partners. Once a state reviews applications, it must publish a list of approved providers, broken down by

³ Siobhan Gorman, a journalist who published a paper on the emerging SES marketplace in January 2004, cites these estimates. Steve Pines, executive director of the Education Industry Association, provides similar figures.

⁴ Estimates of the number of state-approved providers vary, with the resulting total ranging from approximately 1,400 to 1,800 providers. The SESQ Center derived the figure of 1,400 by counting each approved provider only once in each state. Thus, a national provider of services with several approved local branch offices was counted only once in our tally. As a result, the maximum number of times that a provider can be approved in the count is 52—all 50 states, the District of Columbia, and Puerto Rico.

⁵ For further details concerning the NCLB requirements regarding SES, see the U.S. Department of Education's *Supplemental Educational Services Non-Regulatory Guidance* at www.ed.gov/policy/elsec/guid/suppsvcsguid.doc.



Table 1: NCLB School Improvement and Choice Options

School Yr 1	Doesn't make AYP	
School Yr 2	Doesn't make AYP	
School Yr 3	1 st Yr of "school improvement"	<ul style="list-style-type: none"> • Technical assistance • Public school choice
School Yr 4	2 nd Yr of "school improvement"	<ul style="list-style-type: none"> • Technical assistance • Public school choice • SES

Source: U.S. Department of Education, Office of Innovation and Improvement, *Innovations in Education: Creating Strong Supplemental Educational Services Programs*, Washington, D.C., 2004

district. This list should at least indicate for each provider:

- subject areas (such as reading or math) and grade levels covered;
- provider's track record in raising student achievement;
- qualifications of the tutoring staff;
- where and when the services are offered;
- provider's ability to meet the needs of students with disabilities or who are English language learners; and
- provider's contact information.

A variety of public and private entities may offer the services, including non-profit groups; for-profit companies; local community programs; colleges or universities; national organizations; faith-based groups; private and charter schools; and public schools and districts that have achieved AYP. Approved providers may offer these services through a variety of means. Many providers are

offering "hands on" tutoring by trained instructors. Others are providing Internet-based or computer-based instruction and academic support that students can access in a school, at a community center, or at home. The same state approval criteria apply to all applicants, including educational technology-based SES providers.

In turn, each **district** with schools that fail to make AYP determines which students in its schools are eligible for the services.⁶ SES is available to low-income students in the school—generally, those students who are eligible for free or reduced-price lunch.

⁶ If a Title I school does not make AYP for two years, it must offer all students in that school the opportunity to transfer to another public school that is not in need of improvement. Additional information regarding the "choice options" provided by NCLB are available on the U.S. Department of Education's website at www.ed.gov/about/offices/list/oii/about/choice.html.

Once the district determines which students are eligible, it notifies **families** that their children qualify for SES. The district must also provide information about SES providers available locally, to help families make their selection. If families ask for assistance, a district must help them choose an SES provider. Once a family chooses a provider, the district enters into a contract with the provider and pays for tutoring services. If more eligible families request SES than existing funds can support, districts must give priority to the lowest-achieving low-income students. After a family chooses, the provider, the school, and the district meet with the family to agree on performance goals for the child and a schedule for services.

The **state** and **district** both play a significant quality assurance role. The state has the overall responsibility for the management of the program, including the approval and monitoring of SES providers. Under NCLB, **states** are to:

- Monitor and report on the performance of the approved providers,
- Provide a least annual opportunities for additional providers to join the approved list, and
- Remove from the state list any provider that has failed to help students improve their academic achievement for two or more years.

Districts play an important role in ensuring the smooth functioning of the program at the local level. They notify parents and facilitate choice, work with schools to coordinate services, enter into contracts with providers, and administer operational and financial details of the program. **States**, in particular, have an opportunity to expand the number of effective SES providers, and assure quality implementation of the program. Suggestions on how they may do so are provided below.

Potential Role of Educational Technology in SES

Although there are many applications of educational technology in the SES field, this paper concentrates on describing the promise of providers who use either computer-based instruction (CBI) or online tutoring as a primary component of their programs. In practice, individual providers currently offer CBI that may or may not be accompanied by a significant in-person tutoring or supervision component, and may be used as a core or supplemental instructional tool. Computer-based instruction may be used online or on-site, and to teach new content and skills or to provide additional review or practice. Similarly, there is variety in the delivery of online tutoring. For example, services may be offered live and 24 hours a day or at set times, and through a structured curriculum or more free-flowing student-tutor interaction. Finally, even more “traditional” providers that rely on on-site tutors may use a significant technology component to supplement instruction via CBI, or to track and report on student progress.

Douglas A. Levin, an educational technology expert at the American Institutes for Research, points that that for over thirty years, one of the most common uses of the computer in education has been to instruct and tutor students on challenging academic content and skills. He explains that, “when used as a tutor, the computer presents material, evaluates responses, determines what to present next, and keeps records of progress (Kulik, 1994). Students receiving tutoring with the aid of a high-quality computer tutor are provided with a structured path through a problem set, supported by some combination of visual, verbal, and symbolic cues that serve to improve student comprehension of challenging material (Sivin-Kachala and Bialo, 2000).”⁷

⁷ Personal communication to the author (June 6, 2004).



Table 2: SES Overview

	Step 1: Determine who is eligible	Step 2: Identify providers	Step 3: Review options	Step 4: Make choices and begin services	Step 5: Monitor and expand provider options
States <i>must:</i>	<ul style="list-style-type: none"> ▪ Determine which schools need improvement because they did not make “adequate yearly progress” (AYP) ▪ Identify schools that must provide SES because they have not made AYP for three years 	<ul style="list-style-type: none"> ▪ Encourage organizations to apply to be SES providers ▪ Request applications from providers ▪ Review applications and approve providers ▪ Give districts a list of approved providers in their area 	<ul style="list-style-type: none"> ▪ <i>Optional:</i> Provide districts with sample materials for communicating with eligible families about SES and contracting with providers 	<ul style="list-style-type: none"> ▪ Monitor the performance of approved providers and report results ▪ Encourage more providers to apply for state approval at least once a year 	<ul style="list-style-type: none"> ▪ Monitor the performance of approved providers and report results ▪ Allow more providers to apply for state approval at least once a year ▪ Remove from the state list any provider that has not helped students improve their achievement for two or more years
Districts <i>must:</i>	<ul style="list-style-type: none"> ▪ Identify students who are eligible for SES who attend schools that did not make AYP for three years ▪ Determine which students get priority if demand exceeds available funding 	<ul style="list-style-type: none"> ▪ <i>Optional:</i> Encourage local groups to apply to be SES providers 	<ul style="list-style-type: none"> ▪ Tell parents whether their child is eligible for SES ▪ Provide parents with clear, complete, consistent information about local provider options ▪ Tell parents how to sign up for SES 	<ul style="list-style-type: none"> ▪ Help families pick a provider, if requested ▪ Enter into contracts with the providers that families choose ▪ Pay providers ▪ Work with each student’s provider, school and families to set goals for each student 	<ul style="list-style-type: none"> ▪ Provide the state with information to help monitor the performance of approved providers
Families <i>can:</i>	<ul style="list-style-type: none"> ▪ Find out whether your child’s school made AYP by contacting his or her school, district, or state 		<ul style="list-style-type: none"> ▪ Find out whether your child is eligible for SES by contacting school, district or community group ▪ Review provider options ▪ Select a provider 	<ul style="list-style-type: none"> ▪ Work with your chosen provider, your child’s school, and the district to set goals for your child 	<ul style="list-style-type: none"> ▪ Monitor your child’s progress with the provider and provide feedback to the provider, school, district, and state
Providers <i>can:</i>	<ul style="list-style-type: none"> ▪ Determine whether your program has the capacity to serve students in regions where schools are required to provide SES 	<ul style="list-style-type: none"> ▪ Find and review the state SES provider application ▪ Complete and submit the application 	<ul style="list-style-type: none"> ▪ If approved, contact the school(s) and district(s) to establish a relationship and provide staff with information for families about your program 	<ul style="list-style-type: none"> ▪ Provide clear information to families and schools about your services ▪ Enter into contracts with the district(s) if students sign up for your program ▪ Work with your student’s family, school, and district to set goals for each student who signs up for your program 	<ul style="list-style-type: none"> ▪ Provide clear information to each student’s family, school, and district about his or her progress in your program

Source: SESQ Center 2004

Before examining the promise of SES, and technology-based provision of these services, it is important to point out that as an innovative policy initiative, SES does *not yet* have scientifically based outcome evidence regarding its effectiveness. Nevertheless, prior research regarding the benefits that students similar to those targeted for support by this program *can* receive from tutoring and other out-of-school support services suggests that, if implemented well, SES will achieve its intended outcomes.⁸ Potential benefits established by prior research include:

- **Improved student achievement and work habits** that are accomplished by building on learning that takes place during the school day.
- **Individual instruction focused on specific student needs** that permits students who may not learn well in traditional classrooms to learn in different, perhaps more effective ways.
- **Reduced incidence of delinquent or risky behavior** achieved by providing students a safe, supportive, and engaging environment outside of school.

Specifically regarding the effectiveness of educational technology, Levin points out that within the last five to seven years, innovations in computer-based tutoring have allowed specially trained educators, supported by a suite of instructional and communication tools, to provide real-time tutoring to students near and far via the Internet. He argues that such approaches have the potential to offer additional instructional flexibility and personalization in assisting students to master challenging academic content. Levin points out that research on the effectiveness of computer-based tutoring for students has been conducted across a wide variety of subject areas, including read-

⁸ For a review of this promising evidence, see Supplemental Educational Services Quality Center, *Implementing Supplemental Educational Services: Opportunities and Challenges* at www.tutorsforkids.org/docs/PolicyBrief52004.pdf.

ing/language arts, mathematics, and science. In these studies:

- Students usually **learn more** in classes in which they receive computer-based instruction and have more positive attitudes toward the subject matter being studied (Fletcher, 2003; Kulik, 1994; Kulik, 2003).
- Students **learn their lessons in less time** with computer-based instruction (Fletcher, 2003; Kulik 1994).
- The **cost is reduced** to provide such instruction versus comparably effective approaches (Fletcher, 2003; Levin, 1987; Solomon, 1999).

Further, there is *some* promising research concerning the effectiveness of educational technology solutions in raising student achievement for disadvantaged youth, i.e., those most likely to be served by SES. However, Professor Steven M. Ross, a leading researcher on educational technology, points out that so far this evidence is still “mixed.”⁹ Despite this, Dr. Ross contends that, “well designed educational technology programs can be *highly effective*.”

According to Ross, educational technology merely represents a potentially effective delivery vehicle for instruction and support. He suggests that to determine whether an education technology-based SES program is potentially effective consumers will need to review the quality of the instruction and support offered, the curriculum that is used, and how well the program has met the needs of similar children in the past. Ross argues that *all* SES programs should be

⁹ Personal interview (June 4, 2004). Dr. Ross is a professor of educational psychology and the director of the Center for Research in Education Policy at the University of Memphis. In addition, he is the longtime research editor of a leading academic journal on educational technology (*Educational Technology Research and Development*), a member of editorial boards of several other educational research journals, and an advisor to a number of states on SES implementation.



held to the same standards, regardless of whether they are technology-based or not.

That said, Dr. Ross and others who have studied this emerging field note that education technology-based SES providers may offer significant benefits to policymakers and end users.¹⁰ In her recent review of the emerging SES marketplace of providers, journalist Siobhan Gorman points out that those who are providing online services “could fill an important niche in serving students who don’t want to or can’t get to a site-based provider.”¹¹ Educational-technology solutions offer ways to address a number of implementation challenges—giving parents another significant choice of providers and educators another support to meet their students’ academic needs goals—because they:

- **Can be cost-effective to deliver.** The actual amount that is provided for each student to receive SES is set based on the district-level Title I per-pupil allocation, which generally ranges from \$750 to \$1,900. Providers in local marketplaces are free to determine whether to offer services based on these costs. In some locales where there are few students at an individual site (urban or suburban areas) or where students are hard to reach (remote or rural areas) SES providers who use distance learning technologies may have a financial incentive based on lower operating costs, and an operational advantage in delivering services. Indeed, they *may* represent the only available providers. Thus, states that have many eligible students in “hard to reach” areas may have a special incentive to promote the entry of educational technology-based SES providers into the market.

¹⁰ Additional information regarding the research evidence base for educational technology is available from the Center for Applied Research in Educational Technology (<http://caret.iste.org>).

¹¹ Siobhan Gorman. *The Invisible Hand of No Child Left Behind?* American Enterprise Institute (AEI), January 15, 2004. Available online at www.aei.org/publications/pubID.19730,filter.all/pub_detail.asp.

- **May be more convenient and engaging to use than some “traditional” tutoring services.** As with other applications of educational technology, SES services can be accessed from a variety of locations and at different times. This allows for great flexibility in the delivery and access of services, and may be particularly attractive to older students, who might otherwise not participate. In this regard, it is useful to note that some online providers, such as SMARTTHINKING—which was already providing similar tutoring services live, online and 24 hours a day to college students when the SES provision was launched—have entered the new marketplace because of its perceived growth opportunities. In addition, the novel approaches employed by a number of online and computer-based instructional services may offer students new and more engaging opportunities to master academic material.
- **When well designed, technology-based programs or online services can provide great consistency of instruction.** Dr. Ross points out that because of their software design, and structured interactions technology-based providers may be able to overcome some of the major challenges posed to “traditional” tutoring services, particularly those of recruiting, training, and assuring the availability of large numbers of high quality tutors. Providers who rely on software for primary instruction, or on online tutors who can interact with students in various locations, may help to meet some of the early implementation challenges that SES faces.
- **Offer an opportunity to collect student performance data efficiently to track provider effectiveness.** Many of the technology-based SES providers have automated their assessment, attendance, and reporting, providing an opportunity to have accurate and ongoing evaluation and sharing of student progress. This can be a great advantage in terms of coordinating services with schools, reporting to parents, and providing the basis to monitor and judge provider effectiveness.

Given the growing evidence base regarding their potential effectiveness, and the promise that education technology-based SES providers hold, state policymakers will need to find ways to facilitate their entry into the market, and to assure their quality once they begin to offer services.

Current Status of Educational Technology Providers of SES

It is difficult to determine the exact number and describe the activities of technology-based SES providers currently offering services. Estimates regarding the number of active education technology-based providers of SES range from about 15 to 50.¹² An accurate count is hard to derive since states do not currently report this information consistently, and it may not be clear from each provider's description how much of their service is technology-based. Nevertheless, it is interesting to note that of the 15 most widely approved providers by the states (Table 3), at least six take an approach that employs a significant educational technology component (Table 4). Unfortunately, at present is impossible to estimate the number of students served by SES as a whole, or by any single provider.

While well-known "traditional" tutoring providers such as Kaplan, Sylvan, Princeton Review, and Huntington Learning Centers currently seem to dominate the market, and may incorporate technology into their services, it appears that others are leading the introduction of online or computer-based instruction and academic support. Some frequently approved educational technology-based providers, such as Failure Free Reading, Kaplan, and Lightspan employ computer-based instruction on-site and online, often

¹² Siobhan Gorman estimates on the low end, and several industry representatives provided the author figures ranging from 20 to 50. However, all these are estimates based on limited evidence. All the experts consulted for this paper predicted a growth for this sector in the coming years. The SESQ Center is currently researching all approved providers to develop an accurate count. When complete, this information will be provided at www.tutorsforkids.org/state.asp.

supported by live instructors. Others, such as Babage Net School serve as "virtual schools." Finally, providers such as Brainfuse, Tutor.com, and SMARTHINKING deliver a variety of online tutoring and academic support services. What unites these providers as a group is that they require access to computers and reliable online connections for the success of their services.

According to industry representatives and other observers, *access*—to students, schools, and necessary equipment and connectivity—is the key limiting factor in the growth of education technology-based SES providers.¹³ As Christopher Gergen, one of SMARTHINKING's founders and now a vice president at K12 puts it, "Getting approved is one-eighth of the battle." The big challenge according to Gergen is getting into the schools, or to the students to deliver services. While in a sense, this is a challenge for all SES providers, Mark Schneiderman of the Software and Information Industry Association observes that, "Perhaps a unique online SES issue is simply getting students access to an online computer with sufficient bandwidth." Education technology-based SES providers face at least two major challenges in terms of access:

¹³ In preparation for this paper, the author communicated with the following education technology industry representatives: Christopher Gergen, Vice President for New Markets at K12, a leading provider of online curriculum and instructional tools to schools and homeschooling families (www.k12.com) and a founding partner of SMARTHINKING (www.smarthinking.com); Steven Pines, Executive Director of the Education Industry Association (EIA), a professional network of more than 800 educators and education businesses dedicated to delivering and advancing the education of children and youth (www.educationindustry.org); and Mark Schneiderman, Director of Education Policy at the Software and Information Industry Association, the principal trade association of the software and digital content industries (www.siiia.net). Policy statements regarding SES implementation by EIA and SIIA addressed to leaders of the U.S. Department of Education were also reviewed. These documents are available on the websites of the respective organizations.



Table 3: Most Frequently Approved SES Providers

Provider Name	Website	Number of States in which Approved
Kaplan K12 Learning Services	http://www.kaplan.com	37
Sylvan Learning Systems, Inc.	http://www.sylvanlearning.com	33
Kumon Math and Reading Centers	http://www.kumon.com	32
The Princeton Review, Inc.	http://www.review.com	27
Huntington Learning Centers, Inc.	http://www.huntingtonlearning.com	27
Lightspan, Inc.	http://www.lightspan.com	24
HOSTS	http://www.hosts.com	23
Club Z! In Home Tutoring Services	http://www.clubztutoring.com	22
Babbage Net School	http://www.babbagenetschool.com	21
Brainfuse Online Instruction	http://www.brainfuse.com	20
I CAN Learn Education Systems	http://www.icanlearn.com	20
Tutor.com, Inc.	http://www.tutor.com	19
EdSolutions, Inc.	http://www.edsolutionsinc.com	18
Lindamood-Bell Learning Processes	http://www.lindamoodbell.com	17
Smarthinking, Inc.	http://www.smarthinking.com	16

Source: SESQ Center 2004

- Some districts and schools are reluctant to make their computer facilities available to outside providers.** While districts have a host of legitimate concerns—particularly about security, wear and tear on equipment, and other costs associated with keeping computer labs open for extra hours—providers often complain that schools are either denying access to them outright or are charging exorbitant fees for the use of facilities. In some cases this lack of access to schools, currently the most convenient location for eligible students to receive services, seems to limit the benefits that might be derived from SES.
- Although education technology providers offer services that may be available “any-time, anywhere,” students may have limited access to those services outside of the school day.** Currently, most online services require individual, extended access to a computer, often equipped with sophisticated software and hardware. Students served by SES may not have access to this equipment or connectivity outside of school, or even at the schools some attend. In addition, given transportation issues, students living at a distance from school, including those living in rural or remote areas, may not be able to receive services at school because of scheduling constraints.

Table 4: Examples of Frequently Approved Technology-Based SES Providers

Provider	States in Which Approved
Kaplan K12 Learning Services http://www.kaplan.com Approved in 37 states	AL, AZ, AR, CA, CT, DE, DC, FL, GA, ID, IL, IN, IA, KY, MD, MA, MI, MN, MS, NE, NV, NH, NJ, NY, ND, OH, OK, OR, PA, RI, SD, TN, TX, VT, VA, WV, WI
Kaplan's program helps students academically by providing live instruction from highly qualified instructors, or on-line instruction through multimedia Internet-based courses developed by educators. All of Kaplan's programs include research-based curriculum.	
Lightspan, Inc. http://www.lightspan.com Approved in 24 states	AL, AR, CA, CO, DC, ID, IN, IA, KS, KY, MN, MS, MO, MT, NV, NH, NJ, NM, PA, SC, TN, TX, VA, WI
Lightspan, Inc. includes interactive software, school and home learning activities, teacher materials, on-site and technology-based professional development, and student assessment. It is research-based and aligns to individual state standards, textbooks, standardized tests, and professional association standards.	
Babbage Net School http://www.babbagenetschool.com Approved in 21 states	AL, CA, GA, ID, IL, IN, KY, MI, MN, MO, MT, NJ, NY, ND, OH, OK, PA, SD, VA, WA, WV
The Babbage Net School is a virtual school offering on-line, interactive courses in English, Math, Science, Social Studies, SAT, Foreign Language, Advanced Placement, Music, and Art. These courses are taught by certified teachers in a virtual classroom featuring interactive audio, synchronized web browsing and a shared whiteboard.	
Brainfuse Online Instruction http://www.brainfuse.com Approved in 20 states	AR, CA, CO, DE, FL, GA, IL, IN, KY, MA, MO, MT, NH, NJ, OH, OK, SD, TX, VT, WI
Brainfuse provides instant, unlimited access to tutors. With Brainfuse, students and teachers communicate by drawing on a virtual blackboard, typing instant messages and even speaking through online audio.	
Tutor.com, Inc. http://www.tutor.com Approved in 19 states	AL, AR, CA, DE, GA, IN, KY, MI, MS, NV, NH, NJ, NM, NY, OH, OK, PA, VT, WV
Tutor.com is an on-line service that offers students help with their homework. It is typically offered through local and school libraries and is available seven days a week. The students are connected with a tutor who assists by walking through the student's homework.	
Smarthinking, Inc. http://www.smarthinking.com Approved in 16 states	AL, CA, CO, GA, HI, KS, KY, MI, NV, NJ, OK, TX, VT, VA, WV, WI
Smarthinking, Inc. provides people, technology and training to help secondary and post-secondary institutions offer their students online tutoring and academic support. Schools, colleges, universities, government agencies, textbook publishers and other education providers work with Smarthinking to increase student achievement and enhance learning by connecting students to qualified educators anytime, from any Internet connection.	
Failure Free Reading http://www.failurefree.com Approved in 13 states	AL, AR, FL, GA, MA, MS, NJ, NC, OH, PA, TN, TX, VA
Failure Free Reading's materials include a combination of print, talking software, and teacher directed lessons. Software includes spelling, listening comprehension, story books, language development activities and more. Software also has Spanish resources for teaching English to Spanish speaking students.	

Source: SESQ Center 2004

Note: These provider descriptions are drawn from each organization's promotional literature. The table does not represent an endorsement of the selected programs, but rather demonstrates the range of services provided by widely adopted providers. Of the most frequently approved providers, there are several that seem to use education technology in their program or method of delivery. The providers listed above use either computer-assisted instruction or online services as a core aspect of their tutoring and academic support.



Other challenges exist to the effective delivery of SES by education technology-based providers. While these providers have some potential advantage in reaching students once they have signed up, the fact that they may not have an “on the ground” presence in many communities makes their initial marketing job more difficult. Many “traditional” tutoring organizations—whether large “national” or small “mom and pop” operations—will likely be better known in the community or in schools, and be able to build on established relationships. Marketing is expensive, and as one online provider commented, “It’s just not cost-effective to do outreach in a rural county.”¹⁴ Thus, although online providers may offer one of the few alternatives in “hard to reach” areas, they may restrict their services in these because of cost considerations. As well, these providers may not be able to offer services to all the types of students eligible for services, because of language, physical, or other barriers. Finally, consumers of SES may be wary of technology-based services, since they may be less familiar with them and the services may seem unproven in meeting the needs of their children. This wariness may have some basis. As Dr. Steven Ross observes, more research needs to be done regarding the potential effectiveness of SES technology-based services, especially for children whose lack of success is in part due to the fact that they have not yet developed the skills to be independent learners—a quality that may be key to the success of a number of technology-based programs.

Prospects for SES: Creating Opportunities

Despite the challenges faced by technology-based SES providers, they offer great promise in helping to assure that all eligible students are provided effective tutoring and academic support services. Some SES implementation challenges are specific to technology-based providers (for example, greater access), but many other general challenges apply to them as well (greater participation, im-

proved provider quantity and quality). Thus, for SES to succeed, over the next few years, **states, districts, and providers** must work together to:

- Increase access to SES, including educational technology-based services, in hard to reach areas (whether urban, suburban, or rural).
- Improve the information available to consumers regarding their SES options, including educational technology-based services.
- Expand the number of high quality educational technology-based SES providers.
- Conduct additional research and evaluation of all providers, including educational technology-based SES providers.

The following suggestions regarding how districts, states, and providers can cooperate to accomplish these goals are based on recent SES reports and policy briefs as well as on extensive interviews and conversations with program providers, researchers, state and district officials, and representatives of community organizations.

A recent study, issued by the Office of Innovation and Improvement of the U.S. Department of Education, highlights some early examples of effective SES implementation practices drawn from five **districts** and points out the key role that they can play in assuring the program’s success.¹⁵ According to the report, for SES to succeed, districts must (a) embrace the spirit of SES, (b) build relationships with providers, (c) reach out to inform parents, and (d) set clear goals and track progress. Given the innovative and challenging nature of SES implementation, districts must early on move from a “compliance mode” to one that sets a positive tone, seeks out solutions, and plans for success. Key to this is seeing SES as a significant new opportunity. As one district administrator in the

¹⁴ Gorman, *The Invisible Hand of No Child Left Behind*.

¹⁵ U.S. Department of Education, Office of Innovation and Improvement. *Creating Strong Supplemental Educational Services Programs*. Washington, DC, 2004. www.ed.gov/admins/comm/suppsvcs/sesprograms

study points out, “The turning point for us come when we began to see supplemental services as a great way to give extra support to the kids who needed the most help.”

Furthermore, although states set many of the policies that govern the operation of the program and the approval and monitoring of providers, districts have a significant opportunity to improve services by building strong working relationships with providers. The OII study provides a number of examples and suggestions on how districts can:

- **Find out about, and create accurate profiles of providers who will work in the district.** A number of districts in the study have provided families more extensive program information than is currently available through the state approval procedure. This raises awareness among parents of their options and promotes better choices. It also allows district to get to know their providers and to establish a closer working relationship.
- **Work out reasonable provider access to facilities.** This is *the* major complaint heard from program providers using technology-based approaches, although many other providers share the same concern. Some districts have not only encouraged the use of school site space, but also worked with community organizations to identify additional convenient sites to deliver services.
- **Use contracts that specify clear expectations for all parties and follow procedures that establish a fair competitive environment.** A contract that specifies responsibilities regarding attendance, billing, reporting, and performance is key to protecting families, students, schools and providers alike. The OII study points out that “districts must strive to be impartial brokers in dealing with and communicating about SES providers.” Further, it cautions that if the “district itself is also an SES provider, it is especially important that it not inadvertently set up a system giving it an unfair competitive advantage over other providers.”

- **Increase communication and coordination between providers and schools.** Key to the success of SES is a careful coordination of in-school and out-of-school instruction. For instance, several districts in the OII study encourage their teacher to share student data with providers to support the development of individual SES student learning plans.
- **Expand the number and type of providers in the district.** Although most of the work in expanding the provider base for SES will fall to states, districts should be alert to opportunities to encourage potential local providers—tutoring organizations, community and faith based organizations, and others—to apply for state approval. In “hard to reach” areas, the district may want to partner with these organizations to make sure that all eligible students have an opportunity to receive services.

A recent Supplemental Educational Services Quality (SESQ) Center policy brief suggests additional steps that districts and states can take to improve SES implementation by sharing information and coordinating activities.¹⁶ For example, **districts** can help states by:

- **Offering input about the criteria and process for approving providers.** While states are charged with the provider approval process, and need to play close attention to the SES provisions outlined in NCLB and the U.S. Department of Education’s *Supplemental Educational Services Non-Regulatory Guidance*, they should also seek out the advice of districts that are working hard to implement the program. This will help to make sure

¹⁶ The Supplemental Educational Services Quality (SESQ) Center—a project funded through a grant from the U.S. Department of Education—is working with a number of organizations to provide sample materials, networking opportunities, training, and other assistance to help states, districts, and providers improve the implementation of the SES program. The policy paper is available at www.tutorsforkids.org/docs/policybrief6804final.pdf.

that as far as is feasible district concerns are incorporated into state actions.

- **Giving materials developed by the district to state officials to help other districts implement SES.** States can play an important role in identifying and sharing useful materials and practices of “early implementing” districts that can act as exemplars to guide other districts as they begin to provide SES.
- **Sharing feedback and data about provider effectiveness with state officials responsible for evaluating providers.** Districts are likely to collect much of the data and some performance information needed to judge the quality and effectiveness of SES providers. Therefore states and districts must work together closely to help states determine which providers should continue to offer services, and which should be dropped from the state list. Additionally, this information can help states develop technical assistance that promotes the entrance of more high quality providers into the market.

Similarly, **states** can support districts by:

- **Coordinating the timing of notification about eligible schools and approved providers to correspond with district timelines.** Many eligible families are concerned that they do not receive enough time to learn about and select SES providers. States can help districts do their job better by providing “early warning” about which schools are *likely* to have to offer SES in the future, and by adopting a “rolling” application process for SES provider approval to assure a steady stream of providers in all eligible districts.
- **Developing sample materials for communicating with eligible families and contracting with providers.** Many of these materials are likely to be applicable statewide. States can help assure effective and consistent implementation if they provide districts these supporting tools. States should consider expanding their guidance to families on how to make effective SES choices for their children, including how to se-

lect from among education technology-based providers.¹⁷

- **Providing guidance regarding contracting with technology-based providers.** Districts may benefit from state guidance in the development of contracts that recognize the unique feature of online providers in terms of service delivery. The standard performance measures for service delivery—e.g., number, length, and frequency of sessions, and “attendance”—may not accurately describe the design or measure the effective delivery of online services. States should consider working with districts and online providers to determine fair, accurate measures that allow districts to assure effective and consistent delivery of services, while at the same time recognizing that technology-based services may need to be measured in differently.
- **Creating opportunities for officials from different districts to exchange information and materials on SES.** Sharing of information at events such as state SES “summits” for district leaders can build further support for the program and promote a valuable knowledge exchange. The creation of regular emails or newsletters can support this sharing of best practices.
- **Providing technical assistance to potential district-based SES providers.** States can encourage the growth of choice at the district level by making the SES application process widely known, encouraging “non-traditional” applicants such as local community or faith based organizations to apply, and providing local organizations support in the application and start-up process.

¹⁷ Unfortunately, specific consumer information on choosing effective online providers does not exist. However, the SESQ Center provides guiding questions for parents to ask SES providers in general at www.tutorsforkids.org/families/infoforfamilies.asp.

- **Developing an effective evaluation plan to monitor the quality of SES providers.**¹⁸ This is perhaps *the* major challenge facing states that have implemented SES over the past two years. While states continue to explore the standards and evidence that will be applied in the provider re-approval process, they should consider the ways to develop a statewide technology-based evidence gathering and analysis system that will provide the accurate and comparable data needed to assure long-run program quality. As well, states need to develop effective approaches for measuring the impact of technology-based SES providers.

Providers can also do their part to support states and district implementation. To accomplish this:

- **Providers or their industry associations should consider adopting “codes of conduct” or “practice standards” that will promote consumer confidence in their services.** For example, the Education Industry Association, in cooperation with the Better Business Bureau, has developed standards for education services providers of tutoring services.¹⁹
- **Industry associations should provide support and guidance to their members so that they can produce solid evidence that they are offering effective services.** For example, the Software and Information Industry Association provides its member a *Scientifically Based Re-*

search: A Guide for Education Publishers & Developers, in support of members’ efforts to improve the evaluation of their products.²⁰

- **Developers should work with districts to provide consumers accurate information on SES.** Providers that team with districts and develop a solid working relationship can be highly effective in spreading the word about the value and availability of supplemental services.

Finally, while this paper has concentrated on the “supply side” issue of improving the quantity and quality of technology-based SES providers, the “demand” side should not be overlooked. Nearly every report on early implementation of SES notes the generally low level of demand for these services from families. While this is the case, as Siobhan Gorman points out, as the SES program matures “the issues it will face are likely to be less about participation and more about access and quality.” As a result of state and district level efforts, and those of local and national community organizations and technical assistance providers, families are likely to receive more and better information about available SES choices.²¹ Nevertheless, states, districts, and providers should continue to work together to make sure that **families** know what supplemental services are available and how to use them, have sufficient time to decide whether to take advantage of SES, and receive solid guidance so that they can make the best choices in the interests of their children.

¹⁸ The Council of Chief State School Officers provides some initial guidance on the state approval and evaluation process in its *SEA Toolkit on Supplemental Services*, available at www.ccsso.org/content/pdfs/SSPToolkit.pdf.

¹⁹ See www.educationindustry.org/newsletter/newsletter.php?id=89. Several years ago, the American Association of School Administrators worked with a standards development panel that included education technology industry representatives to issue *Standards for Web-Based Education Products and Services: Guidelines for K-12 Educators*. The guide may be downloaded at www.aasa.org/issues_and_insights/technology/Ed.com_brochure.pdf.

Conclusion

In her report on early implementation, Siobhan Gorman observes that the “supplemental services program is perhaps the federal government’s largest free-market experiment going on in education.” The “marketplace” for SES is still being

²⁰ See www.siiia.net/education.

²¹ The SESQ Center provides links to a number of resources in support of SES at www.tutorsforkids.org/resources.asp.



created. Many consumers are just learning about the services and how to use them. A variety of providers are still testing the market, or just finding out about the opportunity to offer services. Finally, the market's regulators and administrators are still working to develop a set of ground rules that assure a high quality supply of services.

The emerging SES marketplace presents clear and promising prospects. SES expands access to high quality tutoring programs by giving low-income families the chance to choose free, quality services for their children. This program is an unprecedented opportunity to benefit hundreds of thousands of students currently struggling academically. Providers have a significant opportunity to use educational technology to improve the services that students receive. Finally, state policymakers and of-

ficials can make key contributions to assure that the promise of SES is turned into effective academic support for our nation's children.

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Websites:

Center for Applied Research in Educational Technology (<http://caret.iste.org>). CARET works to bridge education technology research to practice by offering research-based answers to critical questions regarding the uses and effectiveness of educational technology.

Office of Innovation and Improvement (OII). U.S. Department of Education. OII makes strategic investments in innovative educational practices through two dozen discretionary grant programs and coordinates the public school choice and supplemental educational services provisions of the Elementary and Secondary Education Act as amended by No Child Left Behind. www.ed.gov/about/offices/list/oii/index.html

Education Industry Association. EIA is a professional network of small and large education businesses dedicated to delivering and advancing the education of all learners by promoting education reform through entrepreneurship. It's newsletter reports regularly on education industry developments in the field of supplemental services. www.educationindustry.org

Supplemental Educational Services Quality (SESQ) Center. The Supplemental Educational Services Quality (SESQ) Center helps low-income families take advantage of a new opportunity provided by the No Child Left Behind Act to get their children free tutoring and extra academic help they may need. The Center was established through a grant to the American Institutes for Research from the Office of Innovation and Improvement of the U.S. Department of Education. www.tutorsforkids.org

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Appendix A: Supplemental Educational Services Definitions

Source: U.S. Department of Education. Supplemental Educational Services Non-Regulatory Guidance (August 22, 2003). p. 39. Available at www.ed.gov/policy/elsec/guid/suppsvcsguid.pdf.

Appendix A: Definitions

Eligible Child: Eligible students are students from low-income families who attend Title I schools that are in their second year of school improvement, in corrective action, or in restructuring. Eligibility is thus determined by whether a student is from a low-income family and the improvement status of the school the student attends [Section 1116(e)(12)(A)].

Eligible School: A Title I school that must provide supplemental educational services. This includes (1) a Title I school that does not make adequate yearly progress by the end of the first full school year after having been identified as a school in need of improvement [Section 1116(b)(5)]; (2) a Title I school that is in corrective action [Section 1116(b)(7)]; and (3) a Title I school identified for restructuring [Section 1116(b)(8)].

Provider: A provider of supplemental educational services may be a public or private (non-profit or for-profit) entity that meets the State's criteria for approval. Potential providers include public schools (including charter schools), private schools, LEAs, educational service agencies, institutions of higher education, faith- and community-based organizations, and private businesses. A provider (1) has a demonstrated record of effectiveness in increasing student academic achievement; (2) can document that its instructional strategies are of high quality, based upon research, and designed to increase student academic achievement; (3) is capable of providing supplemental educational services that are consistent with the instructional program of the LEA and State academic content standards, (4) is financially sound, and (5) abides by all applicable Federal, State, and local health, safety, and civil rights laws [Section 1116(e)(12)(B) and Section 1116(e)(5)(C)].

Supplemental Educational Services: Supplemental educational services are additional academic instruction designed to increase the academic achievement of low-income students in low-performing schools. These services may include academic assistance such as tutoring, remediation and other educational interventions, provided that such approaches are consistent with the content and instruction used by the local educational agency and are aligned with the State's academic content standards. Supplemental educational services must be provided outside of the regular school day. Supplemental educational services must be high quality, research-based, and specifically designed to increase the academic achievement of eligible students. [Section 1116(e)(12)(C)].



How Can Virtual Schools Be a Vibrant Part of Meeting the Choice Provisions of the No Child Left Behind Act?

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Choice and the No Child Left Behind Act

School Choice: Requirements and Benefits

The accountability provisions of the No Child Left Behind Act of 2001 (NCLB) expand school choice opportunities for those attending public schools that are not meeting their state's expectations. Local school districts are required to provide children enrolled in low-performing Title I schools—identified as not making "adequate yearly progress (AYP)" for two or more consecutive years—the opportunity to attend an adequately performing public school while the original school is undergoing improvement. Choice must be offered to families in an eligible Title I school until the school is no longer identified for improvement.¹

All students in a school identified for improvement must be given the opportunity to transfer to another public school, with priority given to the lowest-achieving children from low-income families. For example, if not all students can attend their first choice of schools, priority in assigning spaces would be allocated to the low-achieving low-income students. The types of educational choice options permitted by the legislation include transfers to higher-performing public schools within the district, charter schools, and virtual schools (as long as they are not Title I schools identified for improvement, corrective action or restructuring or identified by the state as persistently dangerous). If more than one eligible school is available, the LEA must offer more than one choice to eligible students.

While NCLB's requirements are one impetus for districts to offer more choices, the drive to increase options pre-dates the law. It rests on the accumulating evidence that school choice can deliver important benefits for children – especially disadvantaged children. Wealthy and middle class families have long exercised school choice, either by sending their children to private schools or buying into communities with better public schools. But the choice option is now becoming available to low-income families stuck in schools in need of improvement.

Research is beginning to show that school choice can be a very useful tool in improving educational opportunities for all, and particularly for disadvantaged public school children. One line of research focuses on gains made in choice systems that allow private school enrollment as part of the choice menu (e.g. scholarships and vouchers). Taken together, these studies suggest positive effects of choice for low-income African-American students.² Studies of choice among *public* school options have also shown benefits to children, including the children who "stay behind."³ Since NCLB's choice requirements are so new, there is less research specifically on its effects. But one recent study found that students in Chicago who transferred to higher-performing public schools saw much stronger achievement gains overall during the first year in their new schools than the year before.⁴

Challenges to Meeting Requirements

While most districts are complying to some degree with the law, many districts have not been able to meet the demand for transfers. In a recent report about the early implementation of the public school choice provisions in NCLB, researchers found that while parents express a strong interest in transferring their children to better-performing schools, many districts use the lack of school capacity to deny families choices of some or all higher performing schools.⁵

Capacity issues continue to be a challenge for many districts. Though that exemption was eliminated in 2002, capacity issues continue to be a defense of many districts. Some districts simply deny NCLB transfers outright because of lack of capacity, while others put parents on notice that lack of capacity might cause their transfer requests to be denied.⁶ In many cases, these capacity and supply issues are real, particularly in rural districts, districts with limited transportation options, and districts with many schools in need of improvement and few high-performing ones. As a result, it is imperative to consider new ways to supply better options for children seeking transfers.

Virtual Schools as a Solution to Capacity and Supply Challenges

Online learning grew quickly over the past decade in universities and corporations, and more recently has become increasingly available to K-12 learners. While the exact number of virtual schools that are operating is unclear, a new brief from the Education Commission of the States about cyber schools presents the following statistics:

- The Southern Regional Education Board estimates that over 100,000 students were enrolled in online courses during the 2002-03 school year.
- Fifty-seven cyber charter schools were operating during the 2002-03 school year.
- The Washington State Office of Public Instruction found that 25% of Washington secondary schools had students enrolled in online courses

during the 2001-02 school year and expected that number to triple by 2008.⁷

- Almost a third of school district leaders in a 2002 survey predicted that more than one in five of their students would be receiving a "substantial portion" of their daily instruction online by 2005.⁸

The main differences between online learning and a traditional classroom are location and accessibility. Online learning—simply defined as the use of multimedia technologies and the Internet for educational content—can take on many forms. It can be purely online, with no face-to-face meetings, or provide blended learning, a combination of online and face-to-face learning. It can be synchronous (students working together and/or with instructors “live”) or asynchronous (students working largely on their own). Instruction can be provided by a subject matter expert, or a teacher guide, through collaborative exploration or largely through self-directed study. Instruction can also be facilitated by a “learning coach,” often the role played by lab attendants in virtual high school classes and parents in K-8 settings, who provides the face-to-face counterpart for a virtual teacher.

One subset of online learning options is the “virtual school” or “cyber school.” While “online learning” could involve a single course or even a single lesson or project, a virtual school is a complete educational institution that delivers its instruction primarily through online means. To fulfill the choice requirements of NCLB, a district must allow students to enroll in other *schools*. Supplementing their current school’s work with online enrichment, though potentially valuable, would not meet that requirement. As a result, the remainder of this paper focuses specifically on virtual *schools* as an approach to providing options under NCLB. Districts that truly suffer from lack of capacity and supply may find that virtual schools are a viable solution for meeting the choice requirements of NCLB.

Forms of Public Virtual Schools

Virtual schools serving K-12 public students generally fall into one of the following categories:



- **Schools operated by regional agencies and consortia of educational entities, nonprofit and for-profit organizations**

At least eight virtual schools that serve multiple states are in operation across the nation. The Virtual High School⁹ in Massachusetts allows 6,000 students from around the country to participate in high school coursework in a self-paced environment. It offers full-year and semester-length courses, summer school courses for enrichment or credit recovery, and dual credit courses. Class size is limited to no more than 25 students and “memberships” are offered to districts, collections of schools, individual schools and individual students. Member schools offer one or more faculty members to join the network of teachers to provide instruction, and in exchange for each teacher released by the school to teach a VHS course, the school is able to register 25 students per semester to choose from VHS’s catalog of courses. Each school must also identify a site coordinator who is trained to act as an advisor and administrative contact for VHS students in their school.

- **Schools operated by state education agencies**

At least 15 states are operating virtual schools. Typically, state-run virtual schools provide advanced coursework or supplementary services to middle and high school students. An example is the Illinois Virtual High School¹⁰ which is designed to provide Illinois students enrolled in state public high schools increased equity and access to high-quality educational opportunities no matter where they live. The IVHS courses are aligned with the Illinois Learning Standards. Any Illinois high school student enrolled in a public, nonpublic or home school can participate with approval from a local participating school IVHS Building Administrator. Students can take semester-length courses, summer term courses, Advanced Placement (AP) review courses, and ACT preparation courses.

Nearly all virtual schools target middle and high school students. Florida, however, has embarked on a pilot program to see if full-time virtual schools are adequate for the younger population

and currently is funding two virtual elementary schools. The Florida Connections Academy¹¹ and the Florida Virtual Academy¹² each serve approximately 500 K-8 students under contract with the state department of education. For every student enrolled, the companies providing the educational program get a \$4,800 voucher. Students get a loaned computer and free Internet access, and the schools send them supplies and books. They speak with a teacher over the telephone for progress reports, but parents or guardians serve as the primary instructors.

- **Schools operated by universities**

At least seven universities are providing online learning opportunities to K-12 students. The University of California Online College Prep Initiative (UCCP)¹³ receives university and state funding to provide online college preparatory courses that are aligned to California content standards, and fulfill admission requirements to the University of California. The initiative offers AP and honors courses, plus tutoring and AP Exam Review to over 2,500 students at California high schools where college preparatory curricula are underdeveloped. One of the initiative’s primary goals is to provide opportunities to rural and low-income students to help them compete effectively for admission to leading universities.

- **Schools that are operated by local public school districts and other local education agencies**

At least 36 districts are operating virtual schools. These include the Evergreen Internet Academy (EIA)¹⁴ which has been in operation for five years as an alternative education opportunity in the Evergreen School District. For the first three years, teachers in the 7-12 grade school provided both online and traditional classroom instruction, but now full virtual instruction is provided, with courses offered to students beyond the boundaries of the district. The school serves large numbers of students who were formerly home schooled, as well as students in need of an alternative to the traditional brick-and-mortar program. Students can receive di-

plomas issued by the district or a Washington state diploma. Those outside the state of Washington or enrolled in another school full-time can attend if they pay tuition.

- **Schools that receive a charter from a local district, state board, university or other sponsor**

The cyber charter school model of online learning is the most prolific in the nation. At least ninety cyber charters are in operation, with Arizona, Ohio, and Pennsylvania leading other states in the number of virtual charter schools authorized. The 21st Century Cyber Charter School¹⁵ is chartered through the West Chester Area School District in Pennsylvania (but established through the cooperative efforts of the school districts in Bucks, Chester, Delaware and Montgomery counties). This school has performed particularly well, exceeding averages on state tests in more than half of their tested grades.

Virtual Schools Are a Legitimate Option Under NCLB

In February 2004, the U.S. Department of Education issued guidance specifically defining virtual schools as a legally acceptable way to create additional capacity for students wishing to transfer.¹⁶ The Department views virtual education as a powerful technology innovation expanding opportunities for “learning any time, any place” in support of the No Child Left Behind Act. As long as the virtual school is a public elementary or secondary school (as defined by state law) and has not been identified for school improvement, corrective action, or restructuring, a district may offer it to students eligible to transfer from schools in need of improvement. If a virtual school is not operated by the district, the legislation allows the district to enter into a cooperative agreement with the school so that its students can enroll.

Possible Benefits of Online Learning

There are numerous hypothetical benefits of online learning. Some have been researched well, while others need further exploration. Among the benefits most commonly touted by online education advocates are:

- **Enhanced communication among students and between students and teachers**

Because of the increased anonymity and the different ways to communicate (discussion boards, instant messaging, emails, online presentations, etc), there may be increased communication between class members and teachers. Students may feel more empowered to share their ideas and less afraid to pose questions. There may be a leveling of the playing field, as students interact with less regard to others gender, race, dress, and other factors.

- **Accommodation of different learning styles**

Materials can be presented in different ways (example: online notes and slides for the visual learner and teleconferencing for the auditory learner). Students with attention deficit disorder and anxious students can benefit from having the additional time to attend to and reflect on the subject matter before responding. Students may get more one-on-one attention and work in smaller groups than in the traditional classroom.

- **Unlimited, flexible, access to curriculum and instruction (any time, any place)**

Students who are learning off-site can download materials and work on the curricula at any time. Continual access to course documents lets students obtain materials at any time.

- **Frequent assessment**

Some online learning programs allow for daily assessment of how well as student has learned course content. Immediate feedback allows instructors to change their delivery of the content, as well as highlight weaknesses and strengths for students.

- **Increasing the supply of teachers**

Online learning allows students in different locations to “share” top instructors, rather than limiting those instructors’ benefits to one place. In addition, teachers who have left the traditional system may find working in an online learning situation to be particularly desirable due to scheduling, health issues, or work style.

A 2001 survey of virtual schools found that access to an expanded curriculum was one of the most



frequently stated objectives of virtual school programs.¹⁷ Virtual schools were found to have the capability to extend equitable access to high quality education to students from high-need urban and rural districts, low-achieving students, and students with learning challenges.

Other research has produced similar findings. A 2001 cyber charter review prepared by KPMG Consulting for the Pennsylvania Department of Education suggested that virtual charter schools are able to provide an education to children who have been historically under-served by traditional school environments and programs.¹⁸ The nation's first publicly-funded Virtual High School (originally known as the Concord Virtual High School), a national consortium of high schools offering online courses taught and designed by cooperating teachers who are accredited in their respective states, has been seen as fostering independent learning and leveling the playing field for minorities, low-income students, and those in low-income areas.¹⁹

Harnessing Online Learning Options to Meet Choice Requirements of NCLB: Three Models

How would a district actually offer its students virtual school options? We present three models of how this could work in practice and adequately meet the choice requirements of the legislation.

Off-site Online Learning

The first model is the more “traditional” off-site virtual school, where students access educational materials and instruction online from sites of their own choosing. This works particularly well for high school students who can work well without supervision. However, it does present problems for elementary-age school children who are from families where parents are working outside the home and cannot supervise their children, and for students who do not have ready access to the Internet or a quiet place to work.

On-site Virtual School: Distinct “School Within A School”

The second model creates a new school, which is housed within the old school building— a virtual school within a physical school. The old school could provide services such as the cafeteria, gym

classes and other non-academic coursework. Students would continue to get on buses in their neighborhoods, eat lunch with their friends, and join their peers in art and music classes, etc., but core academic instruction would be provided online in a different room or structure located on the school site. This model is allowed by the NCLB legislation as long as it is a distinct school with its own governance structure.²⁰

“Third Place” Virtual School

In between those ideas is a type of online learning based not at a school or at home, but at an offsite facility in conjunction with a nonprofit organization, such as a community center. A teacher or administrator would be onsite to help monitor students; however, most instruction would be online. The energy and perhaps funding of the nonprofit organization could be tapped, possibly beyond just the provision of the facility.

Any of these three models could serve as an allowable option for students under No Child Left Behind. Integrating them into a district choice program, however, could present numerous challenges for state, LEA, and federal policymakers.

Challenges and Possible Solutions for Districts and States Using Virtual Schools to Fulfill NCLB Choice Requirements

While online learning is an emerging approach for K-12 instruction, few states and districts have made the effort to develop and enforce policies that address the issues that are unique to virtual schools. States and districts interested in pursuing this option should first conduct a thorough analysis of existing policies to see if they support the implementation of virtual schools. If they do not, then new policies should be developed and adopted quickly.

District and state policymakers and planners have numerous factors to consider in creating and operating virtual schools, particularly under the framework of the NCLB legislation. These components include:



- supply and capacity;
- funding;
- housing;
- enrollment boundaries;
- teachers; and,
- accountability.

Supply and Capacity

For a virtual school to be eligible to receive students under NCLB's choice provisions, it must be a duly authorized public school under the laws and policies of the state and/or district. While the number of virtual public schools has grown in recent years, overall very few of them exist, especially those that provide a full instructional program. In addition, many existing virtual programs target secondary students. More elementary programs would be needed in order to meet the needs of younger students seeking transfers. Districts and states seeking to offer virtual school options therefore will need to attend to "supply": ensuring that there are enough spaces in virtual schools to meet the likely demand.

Broadly speaking, there are two ways supply could arise. First, virtual schools could be created new. Second, pre-existing virtual schools could be authorized as legitimate public school options within the state or district.

New Virtual Schools

A district or state could create new virtual schools itself. Alternately, it could issue a Request-for-Proposals (RFP) inviting nonprofits, universities, groups of teachers, or other potential providers to submit applications to create new virtual schools. These could be charter schools, if the state's charter law was hospitable to such schools, or they could operate under some kind of charter-like contract with the district or state. Either approach would require substantial investments on the part of the state or district. In the case of starting schools itself, the district or state would need to invest significant resources and develop the expertise necessary to create virtual schools. In the case of an RFP process, the district or state would need to develop criteria for selection and a review process. If these were already in place for a charter

schools program, the challenge would be reduced, but the existing mechanisms might need to be adapted for the specific context of virtual schools.

Pre-Existing Virtual Schools

A district or state could also enact a process by which it authorizes existing virtual schools to become legitimate public school options. For example, a private virtual school could become a public school option if it contracted or chartered with a district or state, agreeing to abide by critical public school laws and regulations. Or, a public virtual school serving another district or state could become an authorized public school for a given jurisdiction. As with new-school creation, this authorization process would require the establishment of an RFP, along with selection criteria and a review process.

Recommendations to SEAs

It is addressing the supply and capacity issue where states can take on the greatest leadership role. In particular:

- States can ensure that the legal processes exist for the creation of new virtual schools and the authorization of existing virtual schools as eligible public school options. This could involve enacting a charter school law, amending a charter law to ensure that it allows virtual schools, or enacting or amending policies that allow the state and districts to contract with outside entities to manage public schools.
- Districts could benefit by state education departments' providing technical expertise in designing a program or providing guidance to district officials in choosing "ready made" programs that would work well with local student populations and within their budget. State department officials could provide assistance with grant-seeking for districts seeking start-up funds or ongoing operation funding.

Recommendations to LEAs

- Districts can begin by assessing the likely demand for virtual school spaces in their community. Such a needs assessment can then inform supply-creation efforts.

- A critical decision for the LEA is whether to provide virtual schooling directly, to rely on outside providers, or to utilize some combination of in-house and outside supply. The key factors in this decision are the district's expertise in online learning (or access to such expertise), the resources available to develop in-house capacity, and the viability of potential outside providers.

Funding

Determining who funds online learning programs and at what level is a key challenge for districts considering online learning program choices. One of the touted benefits of online learning is that it can be less expensive than providing instruction in “brick-and-mortar” structures. Virtual schools, for example, do not typically have the same costs in areas of transportation and facilities. The cost structure of virtual schooling would depend upon the particular model in use. All of the models would involve costs including computer and internet provision, instructor salaries and benefits, technology support, and per pupil licenses for any commercial products. An administrative staff, which could be headed by a lead teacher, a district or state official, or another designated individual, would need to be responsible for shaping policy, hiring/monitoring/firing teachers, ensuring that content meets local, state, and federal requirements, making sure that delivery is high-quality, managing students (registering, scheduling, ensuring that they are participating, etc), ensuring that any technological problems are remedied quickly, and making themselves available (sometimes for extended hours) to deal with day-to-day issues. The “third place” model would also involve some facility expense. The onsite “school within a school” model could involve additional facility expense, unless existing space could be reconfigured to accommodate the virtual program. The school-within-a-school would also incur additional costs, such as the resources (human and financial) required to provide food service, non-core classwork, etc.

Some educators point out that start-up costs (developing curriculum, learning the systems, and integrating the program) is the area where most virtual school planners can be overly optimistic about their

capacity. Others point out that virtual learning does not necessarily decrease overall costs, rather expenses just are shifted to different areas.

It is unclear how much funding is required to run a virtual school. A 2001 study of virtual schools suggested that state-run online learning costs an average of \$3,000 per student a year.²¹ K12, a for-profit organization that provides a virtual curriculum to homeschoolers and cyber charters, however estimates that approximately \$4,800 to \$5,000 per student needs to be allocated to adequately support virtual schools.²²

Typically, virtual schools run by states receive funding based on enrollments, but many states are still working through average daily attendance (“seat-time”) issues as they relate to virtual schools. State appropriations and state grants are a common funding source for state-sanctioned, state-level virtual schools, and districts can also tap into such funds if available by state legislation. State, federal and foundation grants, and funding from districts receiving services, are also common. External funders often support virtual schools in order to promote equitable access to key curricula. “Barter” methods are used by some regional networks or consortia, where members may trade a teacher-led course for student enrollments, and share consortium costs.

Recommendation to SEAs and LEAs

- Consider funding implications early on, including the level and funding mechanisms required by each of the three models presented. Per-pupil funding levels must reflect real costs of a quality non-classroom-based model.
- Ensure that the costs of special education services to students who require them, including IEP modifications for the virtual environment and contracting expenses of any required face-to-face services are considered in the funding model.
- Seek to identify as early as possible the most sustainable funding mechanisms for the program.

Housing

A primary challenge to districts required to provide another public school choice to students is where to place them physically. The models presented in this paper offer three housing options: online instruction in the home (or other location arranged by the student's family); online instruction in an area set aside in the old school; or, online instruction in a third-party structure.

The onsite online learning program allows districts to use existing space if available. Districts do not have to rethink transportation provision and other student services. The third place online learning program, though requiring negotiation with another organization, can access additional space if facilities are limited at the old school, and can bring the added benefit of partnership with a community organization. The offsite online learning program can tap into "free" support from parents and eliminate all costs associated with a facility, but presents a major challenge to children who do not have parents or guardians at home during the school-day.

Recommendations to SEAs and LEAs

- Consider how best to deliver instruction to the specific population. Several questions must be addressed, including: If students are to receive instruction on their computers at home, how are elementary students to be cared for in families with both parents work outside the home? If students are to receive instruction at a "third place" facility, will a bus be provided to carry students there? Will the district provide virtual school students additional services, beyond core academic programs? If students go to school off-site or at a "third place," will they be free to return to school for additional programs?

Enrollment Boundaries

Virtual schools often serve students from a wide geographic area, crossing districts, spanning across the state, and even multi-state areas. This can present confusion as to who is ultimately responsible for oversight and per-pupil payment flow with the expanded enrollment boundaries.

Another issue that arises is that previously homeschooled students may want to enroll in the new virtual school. These students would not have been counted previously as students by the district and would not have received funding. If these students enroll, then the state needs to ensure that adequate funding is available to educate them.

Recommendations to SEAs and LEAs

- Determine enrollment boundaries for any virtual schools. If district-run and funded, would there be benefits in opening up the online learning program to additional students from outside the district? Could the district earn revenue (from fees and tuition) from such outside enrollment?
- Develop policies, based in law, that clearly spell out who may be enrolled in the program and who is responsible for monitoring and funding the program.
- For schools serving students in multiple states, clarify how individual state standards, accountability provisions, and teaching quality requirements will be handled.

Teachers

The delivery of the educational program online can be significantly different from teaching in a typical K-12 classroom. The instructor's role switches from presenting content and providing in-person instruction, to engaging in communication through a variety of instruments, ongoing assessment, and feedback. Critics of online learning programs for K-12 students rightly are concerned that competency and accountability of online faculty can be worrisome. The NCLB requirement that, by 2005-06, all public school teachers be "highly qualified" can help to allay those worries, as these requirements would also affect online instructors.²³ At the same time, these requirements can pose challenges of their own. State certification systems were built around the assumption of the teacher providing instruction to an identified group of students in a particular location. Do these adequately measure the competencies needed to teach in an online environment? Do they impose

restrictions that make little sense in such a setting (such as requirements that make it difficult to become certified in multiple states?)

Another challenge is that districts, particularly small or rural ones, may find difficulty in accessing local teachers to provide online instruction in any of the three models we present. Virtual schools could, however, make it easier for these districts to hire teachers from anywhere in the state and, if state law allows, from anywhere in the country or world.

Recommendations to SEAs and LEAs

- In addition, to ensuring that online instructors meet the NCLB requirements of being “highly-qualified,” LEAs and SEAs should consider implementing policies that require new online teachers to complete an approved professional development curriculum ensuring their competency as online instructors prior to teaching students online and require experienced online teachers to demonstrate that they have the design and implementation knowledge necessary to deliver quality instruction to students in the new school. Personnel policies should take into account the need for administrators of virtual schools to have a specific skill set and professional development training which includes leading a teaching staff that may itself be completely virtual.
- SEAs could also inventory their teacher licensure requirements to ensure they do not impose restrictions that would constrain virtual schools in ways not related to teaching quality. For example, states could reconsider policies that make it difficult for a teacher certified in another state to teach local students, since virtual schools may want to employ out-of-state teachers.
- Use the new instructional delivery model as a way to tap into labor pools that otherwise might not be available. Sources could include retired teachers and other teachers who are out of the system, possibly because they have young children, are pregnant, or live in locations that do not have job openings in their subject areas. Consider if trained paraprofessionals could pro-

vide face-to-face supervision for students and assistance to virtual teachers in the “onsite” and “third place” models.

Accountability

Beyond meeting the requirements of NCLB, LEAs and SEAs will need to determine the accountability requirements of the virtual schools. Because the teachers, instructional delivery method, and housing of an online learning program may be completely different than the district’s traditional schools, traditional accountability standards may not work smoothly. For example, a system that relies on site visits and classroom observations to gather data about schools would need to be adapted to the online context. A system of enrollment counts may need to be adjusted for the fact that a school’s students will not all be sitting in the same room in a certain day in October. An online learning charter school might be freed from many rules and regulations to which district schools would adhere, but the model that stays within the district may need to adhere to many of the same rules and regulations. How would compliance accountability work in this new setting? How would state testing work? Virtual schools often have much more individual student performance data than traditional schools – easy to document time on task, lesson completion, ongoing feedback, etc. Virtual schools, however, may need to arrange for face-to-face, proctored exam settings for state assessments, until the state system is more comfortable with online administration of standardized tests.

Recommendations to SEAs and LEAs

- Develop and implement a contract that spells out all expected educational, operational, and financial expectations, and provides a specific process and consequence for failing to meet the agreed upon goals.
- Consider identifying additional assessment methods or adapting existing methods so that they are appropriate to the online learning setting.
- SEAs may choose to take on a supporting role and developing a list of goals so that all online

learning in the state is held to the same level of scrutiny.

Recommendations for Federal Policymakers

The federal government could also play important roles in making virtual schooling work as an NCLB choice option, including:

- Using non-regulatory guidance to describe what counts as a “virtual school” (for purposes of NCLB choice). This definition is especially important in the onsite online model, in which the district is offering a virtual school-within-a-school. Without clear guidance about requirements for separate faculty and separate governance of the virtual school, this model could easily degenerate into something other than a real choice for families. For example, giving students the chance to spend an hour a day in a computer lab working unsupervised on Internet research would not constitute a “virtual school.” But in less extreme cases, the line would be more difficult to draw. Federal guidance would help.²⁴
- Provide start-up funds for new virtual schools.²⁵ These new online learning programs may experience many of the same challenges experienced by start-up charter schools. The federal government should consider developing start-up grants for online learning programs that helps the school to plan and launch its inaugural year. For virtual charter schools, federal public charter school funds are already available for this purpose. Federal officials could review other existing federal programs to determine whether starting up virtual schools would be an eligible use of these funds.
- Serve as an information-clearinghouse on solutions to the challenges discussed above. As states and districts develop solutions to problems such as those related to supply, funding, housing, teaching quality, and accountability, the federal government could play an important role in gathering and disseminating promising prac-

tices, as it has already with district choice and supplemental services programs more generally.

Conclusion

Virtual schools are an acceptable, legal option for districts and states seeking to increase their capacity to meet the choice requirements of the No Child Left Behind Act. Research demonstrates that they can offer high-quality instruction to K-12 learners regardless of location, family income, background, or learning differences. While this research is too new and tentative to warrant any kind of large-scale shift to virtual schooling, it is strong enough to suggest that districts and states should be experimenting to a much greater degree with virtual schools.

If districts and states decide to use virtual schools to meet NCLB’s choice requirements, however, they need to address a panoply of issues related to the implementation of this option. Ideally, virtual schools would be part of a coherent districtwide or statewide choice program. According to a U.S. Department of Education’s publication, promising practices in district choice programs include: competent leaders and staff, a true partnership with parents and the community, the perspective that accountability and competition are positive, and a strong strategy with appropriate resource allocation, strong infrastructure, and proactive communication.²⁶



Key Terms

Asynchronous communication: Communication in which students and instructors interact at various times (examples include e-mail, threaded online discussions, and homework message boards).

Brick-and-mortar school: An educational organization that enrolls students primarily in classroom-based courses located in a school facility.

Online learning: Instruction and content delivered primarily via the Internet.

Online learning program: An educational organization that develops and offers online instruction and content. An online learning program may be a virtual school, or it may provide only supplementary services for students enrolled in brick-and-mortar schools or virtual schools.

Supplemental online program: A part-time online learning program that offers courses or other learning opportunities to students who are otherwise enrolled in brick-and-mortar schools or virtual schools; credit for successful completion of these learning opportunities is awarded by the brick-and-mortar school or virtual school in which the student is enrolled.

Synchronous communication: Communication in which students and instructors interact at the same time (via instant message, telephone calls, face-to-face meetings, chatrooms, videoconferencing).

Virtual school or cyber school: An online learning program in which students enroll and earn credit towards academic advancement (or graduation) based on successful completion of the courses provided by the school. Credit for successful completion of these learning opportunities is awarded by the virtual school.

Online Resources

Any Time, Any Place, Any Path, Any Pace:

Taking the Lead on Online Learning Policy

National Association of State Boards of Education, October 2001

www.nasbe.org/Educational_Issues/Reports/e_learning.pdf

Beyond Brick and Mortar: Cyber Charters Revolutionizing Education.

Center for Education Reform, January 2002.
www.edreform.com/index.cfm?fuseAction=document&documentID=1001

Choosing Better Schools: A Report on Student Transfers Under the No Child Left Behind Act
Citizens' Commission on Civil Rights, May 2004
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¹ Students whose original school is no longer identified as in need of improvement, as well as students who change schools and then move out of the attendance zone served by a school in improvement status, must be permitted to continue attending their new school until they have completed the highest grade in that school. Transportation, however, in these situations, is not required to be provided by the LEA.

² Brian P. Gill, P. Michael Timpane, Karen E. Ross, and Dominic J. Brewer, *Rhetoric Versus Reality: What We Know and What We Need to Know About Vouchers and Charter Schools*, Santa Monica, CA: RAND Education, 2001.

³ Hoxby, Caroline Minter. *School Choice and School Productivity (Or Could School Choice Be A Tide That Lifts All Boats?)*, National Bureau for Economic Research, February 2001

⁴ Robelyn, Eric. *Chicago Data Suggest Transfer Students Gain*, Education Week, May 5, 2004. http://edweek.com/ew/ew_printstory.cfm?slug=34Transfer.h23 (Note: The Chicago analysis, first reported by the Chicago Sun-Times on April 25, used the Iowa Tests of Basic Skills to gauge how much academic improvement some students showed during the 2001-02 school year compared with 2002-03. In 2001-02, the transfer students studied averaged 24 percent below the expected gain in reading, and 17 percent below the expected gain in math, when compared with the national average on the Iowa tests. But, when tested a year later at the higher-performing school, those students showed gains of 8 percentage points above the national average in both subjects.)



⁵ Brown, Cynthia. Choosing Better Schools: A Report on Student Transfers Under the No Child Left Behind, Citizens' Commission on Civil Rights, May 2004, page 62, <http://www.cccr.org/ChoosingBetterSchools.pdf> (Note: The Citizens' Commission on Civil Rights is a bipartisan organization established in 1982 to monitor the civil rights policies and practices of the federal government and to seek ways to accelerate progress in the area of race relations and on other civil rights issues. For this study, the Commission's researchers collected and analyzed transfer data from 47 states and 137 school districts to determine what effect NCLB has had on student transfers, how school districts are enforcing and implementing the provision, and the level of parental interest in the provision.)

⁶ Brown, Cynthia. Choosing Better Schools: A Report on Student Transfers Under the No Child Left Behind, Citizens' Commission on Civil Rights, page 62.

⁷ Long, Arika. Cyber Schools. State Notes: Technology. Education Commission of the States, April 2004. <http://www.ecs.org/clearinghouse/51/01/5101.doc>

⁸ Are We There Yet? National School Boards Association, June 2002. <http://www.nsbj.org/theyet/online.htm>

⁹ Virtual High School website, <http://www.govhs.org/website.nsf>

¹⁰ Illinois Virtual High School website, <http://www.ivhs.org/index.learn?action=other>

¹¹ Florida Connections Academy website, <http://www.connectionsacademy.com/state/home.asp?sid=fl>

¹² Florida Virtual Academy website, <http://www.flva.org/>

¹³ University of California Prep Initiative website, <http://www.uccp.org/>

¹⁴ Evergreen Internet Academy, <http://eia.egreen.wednet.edu/>

¹⁵ 21st Century Cyber Charter School, <http://www.21stcenturycyber.org/>

¹⁶ Public School Choice: Draft Non-Regulatory Guidance. U.S. Department of Education, February 2004. <http://www.ed.gov/policy/elsec/guid/schoolchoiceguid.pdf>

¹⁷ Clark, Tom and Zane Berge. Virtual Schools and eLearning: Planning for Success. Paper presented at the 19th Annual Conference on Distance Teaching and Learning, July 2003.

¹⁸ Cyber Charter Schools Review. Prepared by KPMG Consulting for the Pennsylvania Department of Education, October 2003. http://www.pde.state.pa.us/charter_schools/cwp/view.asp?a=3&Q=75169

¹⁹ Hayes, K. Paying to Take Online Classes. The Boston Globe, November 2004, p. B11

²⁰ Public School Choice: Draft Non-Regulatory Guidance. U.S. Department of Education, February 2004. <http://www.ed.gov/policy/elsec/guid/schoolchoiceguid.pdf>

²¹ Clark, Thomas. Virtual Schools Trends and Issues: A Study of Virtual Schools in the United States. Distance Learning Resource Network, WestEd, October 2001.

²² Virtual School Costs Under Siege. Wired News, April 1, 2004. <http://www.wired.com/news/politics/0,1283,62890,00.html>

²³ The NCLB Act requires that by 2005-06, every public school teacher in the nation who teaches a core academic subject be "highly qualified." A "highly qualified" teacher is one who: (1) has obtained full state certification as a teacher or passed the state teacher licensing examination and holds a license to teach in the state, and does not have certification or licensure requirements waived on an emergency, temporary or provisional basis; (2) holds a minimum of a bachelor's degree; (3) and, has demonstrated subject-area competence in each of the academic subjects in which the teacher teaches, in a manner determined by the state. For charter schools, including cyber charter schools, NCLB defers to state charter school legislation when it comes to certification. (If the state charter school law exempts charters from teacher certification requirements, then charter teachers do not have to be certified in order to be "highly qualified" under NCLB.) However, there is no exception for charter schools for the requirements that a teacher must hold a bachelor's degree and demonstrate subject-matter competence.

²⁴ Note: this concern applies more generally to any use of "schools within schools" to create choice options, not just virtual schools.

²⁵ The federal government may want to encourage districts and states not to reinvent the wheel. Not every virtual school will have to create all of its own curriculum from scratch-- customization may make more sense in many cases.

²⁶ Creating Strong District Choice Programs. Office of Innovation and Improvement, U.S. Department of Education, May 2004. <http://www.ed.gov/admins/comm/choice/choiceprograms/index.html>

Meeting the Need for High Quality Teachers: e-Learning Solutions

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Educators, researchers, policymakers, and parents all agree that high quality teachers are the most important factor in a child's education. Rice (2003) reports that the relevant research shows the following:

- the single most important factor affecting student achievement is teachers, and the effects of teachers on student achievement are both additive and cumulative;
- an analysis of 400,000 students in 3,000 schools concluded that while school quality is an important determinant of student achievement, the most important predictor is teacher quality;
- the estimated difference between having a good teacher and having a bad teacher can exceed one grade-level equivalent in annual achievement growth;
- measures of teacher preparation and certification are by far the strongest correlates of student achievement in reading and mathematics, both before and after controlling for student poverty and language status;
- lower achieving students are the most likely to benefit from increases in teacher effectiveness.

Our nation's investment in teachers is enormous; there are more than 2.7 million full-time teachers employed in K-12 public and private schools (NCES, 2004), and the cost of teachers is the largest component – estimated at about 50% – of the more than \$400 billion our country will spend each year on public K-12 education (NCES, 2003).

No Child Left Behind and HOUSSE Teacher Quality Requirements

In response to the critical need for a high quality teacher in every classroom, the No Child Left Behind legislation requires that all teachers of core academic subjectsⁱⁱ be highly qualified by the end of the 2005-2006 school year. The NCLB teacher quality requirements are written in broad terms, so that each state can develop its own specific teacher quality criteria and measures. Specifically, the NCLB definition of "highly qualified" requires that the teacher:

1. Has obtained full state certification or passed the state teacher licensing examination and holds a license to teach in the state;
2. Holds a minimum of a bachelor's degree;
3. Has demonstrated subject matter competency in each of the academic subjects he or she teaches.

The specific requirements differ for new and for experienced teachers, and for elementary, middle, and high school teachers. New elementary school teachers must demonstrate competency by passing a rigorous state test on subject knowledge and teaching skills in reading and language arts, writing, math, and other areas of the elementary curriculum. New middle and secondary school teachers need to demonstrate subject knowledge either by completing an academic degree or its equivalent or by passing a rigorous state test in the specific subject area or areas they teach. Experienced teachers can meet the same standards as new teachers or meet a High Objective Uniform State Standard of Evaluation (HOUSSE), which each state has the option



to develop. HOUSSE enables practicing teachers to demonstrate knowledge of their subject area without necessarily taking a test or participating in further formal study.

The Education Commission of the States (ECS) (www.ecs.org/clearinghouse/49/68/4968.doc) reports that HOUSSE systems developed by states use the following types of criteria:

- Point systems that provide teachers with credit for activities related to the subject taught, such as coursework, professional development, service on curriculum development committees, professional presentations, and publications.
- Professional development activities, often allowing teachers to develop plans that will enable them to meet the competency standard by 2006.
- Performance evaluations, including observations and reviews by peers, a panel, or a supervisor.
- Portfolio assessments that provide collections of evidence from the teacher's practice, such as lesson plans, student work, and classroom artifacts, that demonstrate competency in the subject taught.
- Student achievement data that measures the teacher's impact on their students' achievement.

ECS also provides summaries of the HOUSSE provisions developed by each state (www.ecs.org/ecsmain.asp?page=/html/educationissues/teachingquality/housse/housedb_intro.asp).

The teacher quality standards drive a need for substantial professional development to ensure that current teachers have opportunities to meet the standards. In response, NCLB provides substantial funding to the states for professional development programs. Title I Part A supports professional development for teachers of disadvantaged students; Title I Part B, the Reading First and Early Reading First programs, provides funding to each state for programs that prepare teachers to implement effective reading instruction. Title II Part A provides nearly \$3 billion a year for the Improving Teacher Quality State Grants program. Other parts of Title II support programs to enhance teacher subject-matter knowledge in mathematics and science; district

efforts to recruit, train, and retain individuals from other careers to become teachers in high-need schools; and programs that prepare teachers to use technology to enhance education. Title III supports professional development programs for teachers of English language learners; Title V supports programs to increase the highly qualified teacher population in order to reduce class size. Other NCLB Titles and other federal programs, such as the Individuals with Disabilities Education Act (IDEA), provide additional funding for professional development.

Teacher Quality Challenges for States, Districts, Schools, and Teachers

While NCLB sets the teacher quality requirement and provides substantial funding, meeting these requirements presents major challenges for states, districts, and schools, as well as for individual teachers. These challenges include the following:

1. In many areas, there are large numbers of under-qualified teachers who do not meet the state certification requirements but are teaching with emergency permits or credential waivers, since adequate numbers of credentialed teachers have not been available. For example, in 2002-2003, 7.2% of the K-12 teachers in California schools – more than 21,500 teachers – were teaching with emergency permits or credential waivers (CCTC, 2004, p. 2)
2. There is an inequitable distribution of under-qualified teachers. For example, the 2003 California study *on The Status of the Teaching Profession* finds that students in the lowest-achieving schools, measured by the state's Academic Performance Index, are 4.5 times more likely to face under-prepared teachers than students in the highest-achieving schools (CFTL, 2003).
3. There is a high turnover rate of teachers, with about a third leaving the profession within their first three years of teaching and almost half leaving within their first five years. In low-income urban schools, the turnover rate is even higher than the national average (NCTAF, 2003).

4. There is a shortage of qualified teachers in particular subject areas, such as mathematics, the sciences, foreign languages, and special education (Darling-Hamond, 2000, p. 7).
5. Many pre-service teacher preparation programs are inadequately preparing graduates to meet the state teacher quality standards (ACE, 2004; US DoE, 2003).
6. There are specific issues at the middle school level, in which many current teachers have elementary credentials and lack adequate expertise in the subject area they teach.
7. Small rural schools often have teachers who teach multiple subjects and therefore must demonstrate subject matter expertise in each one. (Recent NCLB guidelines provide additional time for eligible teachers who meet high quality standards in one subject area to do so in other areas they also teach.
8. About 700,000 teachers are projected to retire over the next 10 years (NCTAF, 2003), and some districts have reported teachers deciding to retire earlier than they had previously planned rather than meet the new teacher quality requirements.
9. There is a shortage, in many places, of professional development opportunities that directly address what each teacher needs in order to reach the teacher quality standard. This is particularly true in rural areas, but teachers throughout the country may be challenged to find high-quality professional development that fits their specific needs and is available when and where they can participate (ACME, 2002).

Clearly, solutions to this myriad of challenges requires addressing the full range of systemic issues that underlie the problems of teacher recruitment, training, and retention. However, e-learning can contribute to addressing each challenge by enhancing the preparation of new teachers, providing high quality and readily accessible professional development opportunities for active teachers, and making the teaching profession more attractive (e.g., by providing online resources for teachers and new connections to colleagues and mentors) to help address the teacher recruitment and retention problems. This paper considers the potential of e-

learning as a powerful new tool to help address the teacher quality challenges.

Principles of Effective Professional Development

In order to be effective, e-learning for teachers must reflect the principles of effective professional development. Research has led to agreement on a number of key principles of successful professional development practices for K-12 educators. In a summary of these principles, Sparks and Hirsh (1997) describe a “paradigm shift” in staff development, away from one-day in-service presentations to professional development as an integral, ongoing part of teachers' lives. Major research studies and syntheses by Shulman (1987), Stigler and Stevenson (1991), Darling-Hammond and McLaughlin (1995), Sparks and Hirsch (1997), Ball and Cohen (1999), National Foundation for the Improvement of Education (1996), National Staff Development Council (2001a), Borasi and Fonzi (2002), and others consistently agree that professional development is more effective when it:

- fosters a deepening of subject-matter knowledge, a greater understanding of learning, and a greater appreciation of students' needs;
- centers around the critical activities of teaching and learning—planning lessons, evaluating student work, developing curriculum, improving classroom practices and increasing student learning—rather than on abstractions and generalities;
- builds on investigations of practice through cases that involve specific problems of practice, questions, analysis, reflection, and substantial professional discourse;
- values and cultivates a culture of collegiality, involving knowledge and experience sharing among educators; and,
- is sustained, intensive, and continuously woven into the everyday fabric of the teaching profession, through modeling, coaching, and collaborations.

These principles are reflected in the NCLB legislation, which specifies that high quality professional development includes, but is not limited to, activities that:

- Improve and increase teachers' knowledge of academic subjects;
- Are integral to broad school-wide and district-wide educational improvement plans;
- Give teachers and principals the knowledge and skills to help students meet challenging state academic standards;
- Improve classroom management skills;
- Are sustained, intensive and classroom-focused; are not one-day or short-term workshops;
- Advance teacher understanding of effective instructional strategies that are supported by scientifically based research;
- Are developed with extensive participation of teachers, principals, parents and administrators (US DoE, 2004).

The Potential of e-Learning

While there is general agreement about the core principles that underlie successful professional development programs, these principles can be difficult to implement in actual practice because the required expertise, time, funding, and culture of collaboration may not be readily available at a school or district. In addition, the high quality standards drive a need for subject area and grade-level specific professional development, and the specific program a teacher needs may not be available locally, especially in rural areas and for teachers of specialized courses. This situation, combined with the widespread access to the Internet in K-12 schools, teachers' homes, libraries, and other community centers, has led to the increased use of e-learning as a vehicle for delivering professional development targeted to specific teachers' needs.

There are many forms of e-learning courses. The example programs described below primarily use an *online professional learning community* approach, in which a cohort of educators participates in a series of learning ac-

tivities, exchanging ideas with others in the cohort as well as with the instructor. This approach generally uses readily available web-based technologies and asynchronous discussions, so teachers can participate on their own schedules from any location with Internet access. Courses using a learning community approach often include classroom or school-based activities in which teachers are asked to implement a sample lesson, prepare lesson plans, assess students' work, or visit other classrooms, and then discuss these activities online or incorporate their work into their projects.

Other e-learning programs *use video broadcast formats*, in which teachers view lectures, demonstration classes, and other materials online. This approach allows an instructor's presentation to be broadcast to multiple sites, and, depending upon the available technology, for interactions via video conferencing, audio conferencing, or online text messaging. The disadvantage of this approach is that it generally requires participants to go to a specific site in which the technology is available, so it involves scheduled sessions. However, as the technology and available bandwidth continues to advance, video conference-based approaches will become more widely accessible to teachers in their schools and homes.

Another common e-learning format *provides individualized, self-paced instruction*, in which each teacher proceeds through a series of online learning activities at his or her own pace. For some limited topics, this takes the form of self-study without any interactions, but more often this approach involves some interactions with an instructor through an online discussion board, email or, in some cases, telephone. While this approach provides the most flexibility, it lacks opportunity for interactions with colleagues.

Other approaches are emerging. For example, some e-learning programs are beginning to explore the use of voice-over-internet to enable participants to engage in spoken exchanges. There are also hybrid models that integrate onsite meetings, classroom visits, or local study groups into a primarily e-learning course.

In addition to providing full courses, e-learning can be used to enhance and extend face-to-face workshops and courses, coaching and mentoring programs, teacher

study groups, and other professional development approaches. In each case, the e-learning technology provides a convenient means of communicating and sharing information, one that doesn't depend on people being available at the same time or place. As an enhancement to other types of professional development programs, e-learning can enable participants to continue discussions from onsite meetings, provide access to experts and resources that are not available locally, enable rapid responses to questions, facilitate developing collections of shared resources, and, in general, deepen connections with colleagues and mentors.

Examples of e-Learning Programs for Educators

e-Learning for educators has rapidly come into widespread use in the past few years (Galley, 2002). According to the Association for Supervision and Curriculum Development, online courses are the fastest growing form of teacher training (Seal, 2003). A wide variety of innovative programs are available from states, districts, universities, colleges of education, regional service providers, and for-profit and non-profit companies. As examples, a few of the many innovative programs are briefly described below.

Louisiana State Department of Education (www.doe.state.la.us/lde/)

The Louisiana State Department of Education (LA-DoE) has been one of the early innovators in the use of e-learning in professional development. Some examples of e-learning in Louisiana statewide programs include the following:

1. *Bridging the Gap through Universal Design for Learning* (www.doe.state.la.us/lde/lcet/399.html) is a LA-DoE initiative for districts interested in addressing the challenges of the Individuals with Disabilities Education Act (IDEA) and learning how to make the general curriculum accessible for all learners. The program is designed for district or school teams comprised of special education teachers, regular education teachers, curriculum and special education supervisors, library media or technology specialists, and building or district administrators. It is offered in both face-to-face and in anytime, anywhere e-learning, with the same content presented in each. Since the program began in 2002, more than 200 K-
- 12 educators and university faculty have completed the online course
2. LA-DoE also offers *Effective Instructional Technology* (www.doe.state.la.us/lde/lcet/1821.html) online courses to enable educators from across the state to meet national and state standards relative to technology. The first twelve-week online course helps teachers understand and apply the benefits of instructional technology in their classrooms. The second course guides the teacher through the process of creating a portfolio that demonstrates their progress toward enhancing education through technology. These courses enable teachers to complete activities that address all of the International Society for Technology in Education (ISTE) National Educational Technology Standards (NETS) for students and teachers. These courses also count toward rec licensure of a teaching certificate, earn university credit or Continuing Learning Units, and provide six of the nine hours needed to meet the requirements for certification in Educational Technology Facilitation. Since this program began in Fall 2003, about 20 educational leaders have been trained as instructors in the program and more than 75 teachers have completed the first course.
3. The *Louisiana Teacher Assistance and Assessment Program* (LaTAAP) (www.doe.state.la.us/lde/pd/623.html) is a state-mandated induction program designed to support new teachers in meeting the performance standards required for certification. Each mentor is an experienced teacher who acts as a coach, models effective practices, and helps the novice teacher formulate a formal Professional Development Plan. With funding from NCLB Title IID grants, a number of Louisiana districts have added an e-learning component LaTAAP to create the FIRSTTech (Framework for Inducting, Retaining and Supporting Teachers with Technology) program. In these districts, the teachers and mentors are each given a laptop computer and access to an e-learning environment that provides both on-demand resources for the new teachers and a communication channel that extends the mentoring opportunities through electronic exchanges. Twenty-five of Louisiana's sixty-eight school districts have participated in the FIRSTTech program since its inception in 2002.



4. The *Louisiana Principal Induction Program* (LPI) (www.doe.state.la.us/lde/lcet/1642.html), mandated for new principals and assistant principals, is designed to build the capacity of new building-level administrators to provide leadership to their schools in both instructional and administrative areas. In addition to local, regional and state meetings, a major component of this two-year program consists of online modules based on the Standards for School Principals in Louisiana and other national leadership standards. These modules focus on teaching and learning, promoting school improvement, and enhancing student achievement. The online activities are facilitated by team mentors and LA-DoE staff, and incorporate statewide discussions with inductees. During the past three years, more than 1,280 building level administrators have completed the online component of the LPI program.

5. Experienced principals and district administrators are also provided with online learning opportunities through the state's *LEADTech* (Louisiana Educational Advancement and Development with Technology) program (www.louisianaschools.net/leadtech/). LEAD-Tech, originally funded through the Gates Foundation, provides administrators with an eight-week, graduate credit, online course designed to build strong instructional leaders who effectively use technology. Since the program began in spring 2000, more than 1,200 educational leaders and policymakers have successfully completed the online course.

Florida Online Reading Professional Development Program (www.itrc.ucf.edu/forpd/about/)

The Florida Online Reading Professional Development program (FOR-PD) provides an online staff development course designed to serve as a primary delivery mechanism for improving teaching methods in preK-12 reading instruction. Developed by the University of Central Florida with funding from the Florida DoE, the goals of FOR-PD include the following:

- support the Florida Department of Education in its statewide implementation of a reading professional development system using online delivery;
- serve as a model for reading professional development online delivery;

- translate scientifically-based research into action;
- empower teachers to use innovative, creative, and effective strategies to help all children learn to read proficiently;
- increase the teachers' knowledge base about reading; and
- improve curriculum and reading instruction in order to improve student learning.

The FOR-PD 14-week online course is facilitated by reading specialists and other qualified educators who receive training to become certified to teach the course. Since FOR-PD was first offered in January 2003, more than 6700 Florida teachers have enrolled in the course. The course is offered for free to Florida teachers. By arrangement with Florida universities, teachers can obtain graduate credit, with a tuition fee required.

An outside interim report of the first year of the FOR-PD course found that:

- Over 90% of participants indicated that the value of reading strategies introduced in FOR-PD was excellent or good;
- Approximately 97% of participants indicated FOR-PD was excellent or good in covering the state and national reading initiatives;
- Over 90% of participants indicated that FOR-PD has contributed to their knowledge of effective reading theory, research, and instructional practice to an excellent or good extent; and
- Over 87% of FOR-PD participants indicated they would make changes to their classroom reading instruction as a result of FOR-PD.

Milwaukee Public School District (www.milwaukee.k12.wi.us/pages/MPS/Teachers_Staff_Tech_Tools/Portal)

The Milwaukee Public School District (MPS) has established a strategic initiative, the Professional Support Portal, designed to use technology to support teacher induction, retention, and continued professional growth at all stages of the teaching career continuum. The goal of the Portal project is to build social and technical infrastructures that will help address three

categories of teachers' needs: (1) access to classroom resources, lesson planning tools, and teaching and classroom management strategies; (2) opportunities to work with mentors and observe classrooms led by experienced teachers; and (3) ongoing social, emotional, and professional support from peers and experienced teachers. The Portal project has allowed for a convergence of several key technology initiatives already underway, and has supported the initiation of new e-learning opportunities for both teachers and principals. Some of these include:

- Guidance via videoconferencing from Harvard faculty for a cohort of MPS principals who completed the Harvard Principal's Institute in Cambridge, MA this past summer and now are receiving feedback and support as they implement leading-edge practices in local settings;
- The use of TappedIn®, a non-profit multi-user virtual environment for professional development developed by SRI International (www.ti2.org). By providing an online conference center that combines tools for exchanging resources and for asynchronous and synchronous communications, TappedIn® enables Milwaukee educators to build and sustain communities of practice;
- A series of online professional development workshops. With training and support from the EDC EdTech Leaders® Online program, MPS staff has developed capacity to design, implement, and sustain a robust district-wide online professional development program (www.milwaukee.k12.wi.us/pages/MPS/Teachers_Staff/Training/Continuing_Education/Technology). Through this program, MPS has offered more than 50 workshops, with more than 1300 participants. These six-week workshops, facilitated by MPS staff, have focused on the use of technology in different subject areas and grade-levels, and on the use of data-informed decision making for teachers and administrators. Through an arrangement with Cardinal Stritch University, a local Institution of Higher Education with close teacher preparation and professional development ties to the district, participants in these workshops can receive graduate credit.

Lesley University (www.lesley.edu/online_courses.html)

Lesley University (previously Lesley College), based in Cambridge Massachusetts, is the largest teacher certification program in Massachusetts and the largest graduate program for educators in the United States. In addition to traditional, on-campus programs, Lesley University offers Bachelor's and Master's degree programs in education designed to provide flexibility to meet the needs of students who have responsibilities that make it impossible for them to attend regular on-campus courses. These programs, which have a 20-year history at Lesley University, are currently provided at learning sites in 21 states. They use a weekend study format in which 45 hours of class time are provided in two intensive weekend sessions, with class assignments completed before, between, and after these sessions. Students in these degree programs are grouped into cohorts that progress through the course sequence together so that each cohort forms an ongoing learning community. Lesley University also provides online library resources and other supports to make the off-site weekend program experience as similar as possible to the experience of its on-campus students.

The Lesley University off-site model provided a natural basis for offering e-learning programs and Lesley University has, since 1997, offered an online Master's program in Technology in Education. Courses are spread over 12 weeks, rather than packed into two intensive weekends, with weekly sessions involving readings, assignments, and online, asynchronous discussions. Students can proceed through the program at their own pace but find that an online learning community develops within each course. Students receive feedback from faculty on their work, and faculty are available for online and phone exchanges outside of class. A recent survey found that students in the online program rated their experience to be very positive. They rated the frequent interactions with the instructors as most valuable, followed by the up-to-date and relevant content and the interactions with their fellow students.

Lesley University also offers a new online Master's degree in K-8 science education program, developed in collaboration with TERC (www.lesley.edu/soe/science/ts_indepth.html). Program participants build their understanding of core science concepts while engaging in



the same learning paradigm of inquiry-based science that they will bring to their classrooms. Approximately 50% of each course in this program is devoted to learning science content by doing science, 25% to considering issues of pedagogy, curriculum, and assessment, and 25% to trying ideas in the classroom and reflecting on these experiences with other program participants. Each module is taught by two instructors: a scientist well versed in the science domain and a science educator who supports participants as they consider pedagogical strategies for bringing science inquiry into their classrooms. Participants use threaded discussions, an electronic meeting place, images, videos, text, and current online data and information. Instructors track learners' progress through an online archive of participant portfolios. Research comparing this program to the Lesley University on-campus equivalent program showed better learning results for the online students in understanding the inquiry process and classroom use of inquiry methods. The research also showed that the online students and instructors both spent more time on the course than the on-campus group (Harlen & Altobello 2003).

Western Governors University Teachers College
(www.wgu.edu/education/landing.asp)

WGU is a true virtual university: while its administrative officers are based in Salt Lake City, it has no campus and its faculty are distributed around the country. Founded by the governors of 19 western states as a non-profit university, WGU is the only accredited university in the U.S. offering competency-based, online degrees. The WGU Teachers College offers Bachelor's degree teacher preparation programs and post-baccalaureate licensure programs to prepare students for licensure as preK-8 teachers, or as middle school or high school mathematics, social studies, or science teachers. It also offers Master's degree programs in the same areas of specialization.

Each student is guided by a WGU mentor. Following a pre-assessment and interview, the student and mentor develop an individualized *academic action plan* that guides the student in selecting online courses, independent study modules, or other educational experiences to prepare for the competency-based assessments. The courses and other learning activities in the academic action plan are chosen from a wide variety of

WGU-approved online courses available from colleges, universities, and other providers. That is, WGU does not have its own catalog of courses; the course options for its students are distributed among many course providers. WGU Teachers College also arranges for students to do trial teaching and demonstration teaching (equivalent to student teaching) in a school district in the student's area, and arranges for a field supervisor to monitor and assess the student's classroom practice.

All WGU programs are competency-based, rather than course or credit based. The WGU Teachers College has developed a comprehensive set of competency standards for teachers that includes those found in many state and national standards. Based upon these standards, they developed a comprehensive assessment system to evaluate each student's subject area knowledge, conceptual foundations of teaching, and teaching practices. The assessments involve a combination of proctored examinations to assess knowledge, performance tasks to assess skills, and observations of classroom practices to assess teaching ability. A student who successfully completes all the required assessments is eligible for his or her degree, no matter how the student has acquired the knowledge and skills assessed. Therefore, students can take advantages of their existing competencies and advance through their program at their own rate

As part of their program, candidates enrolled in a WGU teacher preparation program plan and teach a four-week standards-based instructional unit that provides an opportunity to demonstrate that they can integrate all elements of teaching and positively influence student learning. They complete a *Teacher Work Sample* professional portfolio that provides direct evidence of the candidate's ability to design and implement a multi-week standards-based unit of instruction, assess student learning, affect student achievement and then reflect on the learning process.

The WGU programs are designed for highly motivated adults who want to become certified teachers, or for certified teachers who want to complete their Master's degree. Success in these programs requires an ability to work independently and a comfort with online communication. It does not replace a typical college experience, but provides a new, flexible option for many



adults who need to fit continuing education around work and family commitments.

The infrastructure of the WGU Teachers College has been designed to allow for rapid growth to a large number of students. As of June 2004, WGU Teachers College had approximately 1600 students enrolled in its degree programs. Students can start at the beginning of any month, and currently 200 to 300 students are being added each month.

Other e-Learning and Teacher Quality Programs

There are many additional programs throughout the country involving e-learning and teacher quality. A few examples include:

The Southern Regional Education Board (SREB) Multi-State Online Professional Development Consortium (www.sreb.org/programs/EdTech/toolkit/onlineindex.asp)

The Southern Regional Education Board (SREB), working in collaboration with the 16 states in its region, the SouthEast Initiatives Regional Technology in Education Consortium (SEIRTEC), and EDC, has established the Multi-State Online Professional Development Consortium to promote and support efforts of states and schools to use online professional development. All 16 SREB states' departments of education are working together to use and promote the use of the Web to provide needed quality professional development for teachers regardless of where they live or work.

Virginia Regional Consortia

In Virginia, several regional consortia are building e-learning collaborations, with the support of Title IID funds, to share online professional development resources and workshops. The Blue Ridge West Consortium (www.scsb.org/etlo_workshops.htm), encompassing 19 school divisions, will offer approximately 75 online workshops for teachers during the next year in a wide range of subject areas and grade levels. A similar program is available through the Virginia North Tier Partnership (www.culpeperschools.org/ETLO), which will offer 50 online workshops to teachers across their 13 school district consortium. In both consortia, the workshops are a component of their teacher quality initiatives and college credit is available for participants.

Michigan LearnPort (<http://www.learnport.org/>)

The Michigan Department of Education and the Michigan Virtual University, with support from the legislature and governor, is creating the Michigan LearnPort, a state-wide portal designed to help both teachers and education para-professionals meet the Michigan quality standards. LearnPort is designed to effectively disseminate information to all educators in the state, provide a repository of educational resources to which teachers can contribute, and provide a central resource for online professional development. LearnPort will offer all educators in Michigan free, five hours of online learning that will introduce them to e-learning and enable them to become better consumers of online education. It is also working with universities, colleges, and school districts within Michigan to develop a catalog of e-learning courses for teachers and para-professionals.

Los Angeles Unified School District (www.lausd.k12.ca.us/lausd/offices/opd/)

The Los Angeles Unified School District (LAUSD) has incorporated e-learning into its ongoing professional development and training programs. Since October 2000, more than 25 online professional development specialists have been trained to design and deliver online workshops that are aligned with district standards and address a range of subject areas and grade levels. Each of these workshops includes six weeks of online instruction and two face-to-face meetings. In the fall of 2003, LAUSD expanded use of online learning to students, and launched the Los Angeles Virtual Academy (LAVA).

PBS TeacherLine (www.pbs.org/teacherline)

Funded by the U.S. Department of Education, PBS TeacherLine has worked with a variety of content developers to create a catalog of online professional development courses for teachers, focusing on mathematics education, teaching reading, and effective uses of technology in the classroom. These courses are made available through local PBS affiliate stations and through other partnerships.

Lessons Learned about e-Learning for Educators

Most research studies on e-learning are based on higher education courses, with impact on learning

measured by tests and grades (Phillips and Merisotis, 1999). The most common result of this research is to find no significant differences between student learning in face-to-face and online courses, and to find that those who take online versions of courses are as satisfied with the experience as those who attended classes (Russell, 1999). However, in some studies, such as Koory's (2003) comparison of an Introduction to Shakespeare course delivered online and face-to-face, and Harlen & Altobello's (2003) comparison of an online and face-to-face science education course, the results showed better learning outcomes online.

Survey data from participants in many online professional development programs show that when online courses are well-designed and implemented, participants report them to be valuable and enjoyable learning experiences that impact both knowledge and professional practice. That is, the participant survey results from many programs are consistent with those from the Florida and Lesley University programs summarized above. Experimental comparisons of different models of e-learning and onsite professional development for educators are underway, but results are not yet available.

The available data, along with analyses of the e-learning programs on which they are based, lead to the conclusion that well-designed e-learning programs can have positive impact on educators' knowledge and practices, and the amount of impact is comparable to that in other professional development approaches. It appears that the quality of the course content and design, and the nature of the interactions with the instructor, are more important determinants of learning than whether the course is taught face-to-face, online, or some blend of both (Koory 2003). If this is verified by future research, e-learning will become an increasingly important tool to help meet teacher quality requirements, one that can provide professional development opportunities not otherwise available and that can also be used to enrich other forms of professional development by adding online resources and communications.

However, e-learning is not a magic solution, and many educators have already experienced poor quality e-learning offerings. Some of the lessons learned about

providing effective e-learning for educators include the following:

- Successful e-learning programs need to be designed to incorporate principles of effective professional development and to take good advantage of the opportunities afforded by the technology, such as anytime, anyplace access to discussions, resources and experts.
- The e-learning format must match the goals of the course and the needs of the participants. For example, specific skills and knowledge can be learned by *online, self-paced courses*, but changing classroom practices generally requires an *online learning community approach* in which teachers view model practices (in person or via video), experience using them in the classroom, reflect upon their experience, and engage in discussions with peers and mentors.
- The nature of the online interactions between learners and instructors, and among the group of learners, is critical. Courses that are highly rated by participants generally involve many, content-rich interactions with the instructor and with other participants.
- Developing effective, multi-media, online learning experiences for educators is both challenging and expensive. It requires knowledge of the subject matter, adult learning theory, course design, multi-media technology development, and the specifics of online learning. Quick conversions of successful face-to-face courses and workshops to the online medium general result in poor quality e-learning.
- Teaching online is different from teaching face-to-face, and instructors who teach online should receive training in online communications and course facilitation.
- e-Learning has a different cost structure than onsite courses, is not necessarily less expensive. While there are savings in physical space and perhaps travel, there are costs for the technology infrastructure and course design. Many instructors find that teaching online takes more time than teaching a comparable class face-to-face, given the nature and amount of online exchanges that occur. Therefore, online instructors, in interactive formats, cannot handle more students than in a comparable onsite class.

- Participating teachers need support and incentives, just as they do for other types of professional development. Districts that view e-learning as a low-cost alternative because teachers can do it on their own time, allowing the district to avoid providing release time and pay for substitutes, generally find resistance from their teachers and the teachers' union.
- Ready access to reliable technology with the needed capabilities—and to technical support when needed—is essential for participants to have good experiences with e-learning. It is essential that the technology demands of the e-learning program do not exceed the technology available to participants at both school and home.
- There are a number of e-learning technology systems available, with Blackboard, WebCT, eCollege, Desire2Learn and ANGEL among those that are commonly used in programs for educators. While each system has some strengths and weaknesses compared to the others (and each keeps releasing new versions with additional features), the quality of course design and of online teaching is far more important than which e-learning platform is used.
- When possible, hybrid programs that blend e-learning with face-to-face meetings, study groups, coaching, and other activities result in the most effective professional development programs.
- e-Learning may not be for everyone. Some educators report that they are simply uncomfortable communicating online or unable to organize their time and work without face-to-face meetings.
- e-Learning provides teachers with a chance to experience for themselves new ways of learning, which can inform their decisions about the use of technology with students.
- e-Learning provides more opportunities for accountability and quality control than other forms of professional development. By its very nature, e-learning leaves a detailed record of content, assignments, products, and interactions that can be reviewed to insure quality. A discussion in an onsite classroom vanishes as it is produced; an online discussion in an e-learning course is preserved for as long as desired,

and the contribution of each individual can be assessed. e-Learning systems thereby capture a great deal of information that can be used to assess participation and learning, as well as the quality of teaching.

Policy Issues

e-Learning also brings challenges to policymakers. These challenges can be summarized by the need for policies that support the development of e-learning resources and programs, remove barriers to e-learning, provide funding for innovation and research, and ensure high-quality e-learning programs for educators.

The NCLB teacher quality requirements place a strong emphasis on subject area content knowledge. Programs that provide online content in courses designed for teachers, such as the Lesley University K-8 science education program, have shown good initial success. But many more high-quality, content-rich, educator-oriented e-learning courses are needed to meet the professional development demands driven by NCLB. There are many potential providers of these courses: universities, colleges of education, state departments of education, school districts, regional service providers, online learning consortia, national grant-funded programs (such as PBS TeacherLine), education publishers, and other private sector organizations, will all be needed to help meet this demand in a timely way. Developing high quality online professional development programs is expensive, and support for this work is essential to the success of using e-learning to help address the teacher quality challenges on a national scale.

e-Learning providers are finding a number of policy barriers. For example, e-learning is very compatible with competency-based or knowledge-based assessments for teachers, but not with traditional measures such as number of contact hours. It is also not compatible with accreditation criteria that require buildings, physical libraries, and on-site faculty. e-Learning programs can easily cross state boundaries, but state certification systems don't always have a place for courses and programs offered from other states. Policies regulating incentives for teachers are also critical, as teachers engaged in e-learning professional development need to have access to the same stipends, credits, re-

lease time, salary increases, and other incentives as teachers engaged in more traditional forms. e-Learning for teachers also raises equity issues: Will all teachers have access to the needed technology to participate in this form of professional development?

We are just beginning to explore the potential of e-learning and learning to understand how to use it most effectively. In addition, as more advanced technologies become widely available to educators, the opportunities for e-learning and the need to explore potential uses of these technologies will increase. Some examples include real-time virtual visits to classrooms, use of video that can be annotated by course participants, voice-based online discussions, digital portfolios, and more sophisticated online collaborative work tools. Support is needed to develop innovative models of e-learning for educators and to conduct research to test the effectiveness of these models.

Quality control policies and procedures are critical for the widespread success of e-learning. For some, the reputation of e-learning has already been damaged by poor quality courses that have been marketed to educators. In some places, the response to experiences with poor quality e-learning has been to not accept e-learning as a valid form of professional development, rather than to put the needed quality assurance processes in place. In addition, since e-learning is new, most educators and policymakers are not yet prepared to be intelligent consumers of the many formats of e-learning, and this problem will increase as more sophisticated technologies are employed. In addition, many have underestimated the expertise, time, and costs involved in developing high quality e-learning courses and programs. While several groups have developed e-learning guidelines (e.g., ITRC 2000, NSDC 2000, NASBE 2001), these have not yet been incorporated into widely-used quality assurance policies and procedures.

Conclusions

The challenges of meeting the teacher quality requirements are huge, and the time to meet them is short. e-Learning can clearly provide a valuable means to help us meet these challenges, and the success of well-designed and well-implemented e-learning for educators has been demonstrated. e-Learning is ideal for in-

creasing professional development opportunities for current teachers and for strengthening the preparation of future teachers. The anytime, anyplace nature of e-learning provides flexibility that can expand access to those in rural areas and to those whose schedules are filled with other responsibilities. In addition, e-learning can be blended with other professional development approaches to extend opportunities for educators to communicate and share resources. Much still needs to be done, however, before all educators will have sufficient access to high-quality e-learning courses that address the specific content and competencies they need to meet their state teacher quality standards. To meet this goal, policy makers need to support the development of e-learning resources and programs; remove barriers to e-learning; provide funding for innovation and research; and ensure high-quality e-learning programs for educators

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ⁱⁱ NCLB includes the following as core academic subjects: English, reading or language arts, math, science, history, civics and government, geography, economics, the arts, and foreign language. Special education teachers and teachers of English language learners must be highly qualified if they teach core academic subjects to their students.

