STATEWIDE WEB-BASED
STANDARDS OF LEARNING TECHNOLOGY
INITIATIVE

September 2007

COMMONWEALTH of VIRGINIA

DEPARTMENT OF EDUCATION
P.O. Box 2120
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September 12, 2007

The Honorable Timothy M. Kaine
Governor of Virginia
Patrick Henry Building, 3rd Floor
1111 East Broad Street
Richmond, Virginia 23219

Dear Governor Kaine:

I am pleased to transmit the attached status report, *Statewide Web-Based Standards of Learning Technology Initiative*, as required by Item 135 C.14.h. of the 2006 Appropriations Act (Special Session I, 2006).

This report details the progress to date of this very important initiative. The Department of Education and the Virginia Information Technologies Agency have worked together on this status report and the implementation of this exciting project.

Sincerely,

Billy K. Cannaday, Jr.

BKCJr/slm

Attachment

cc: The Honorable John H. Chichester, Senate Finance Committee
        The Honorable Vincent F. Callahan, Jr., House Appropriations Committee

CONTENTS

EXECUTIVE SUMMARY

The 2007-08 school year marks the eighth year of implementation for Virginia's Web-Based Standards of Learning (SOL) Technology Initiative. Its goal is to use Web-based systems to improve SOL instructional, remedial, and testing capabilities in high schools, middle schools, and elementary schools. The initiative has four objectives:

1. Provide at least one computer for every five students
2. Create Internet-ready local area network capabilities in every school
3. Assure adequate high-speed, high-bandwidth capabilities for instructional, remedial, and testing needs
4. Establish a statewide Web-based SOL test-delivery system

As detailed in previous annual reports, the Virginia Department of Education (VDOE), with assistance from the Virginia Information Technologies Agency (VITA), implemented a formal project management structure at the outset to ensure successful project completion. The VDOE still employs that structure while guiding school divisions toward completion of the four objectives.

The Web-Based SOL Technology Initiative continues to be well received by Virginia's school divisions due to the technical and financial resources provided and the benefits gained by administering SOL tests in an online environment. Through the successful implementation of the initiative, Virginia is recognized as a national leader in the area of online high stakes test administration.

Impact of the Initiative Beyond Web-Based Test Delivery

The success of the Web-Based SOL Technology Initiative has impacted the overall Virginia Assessment Program beyond the delivery of online SOL tests. This became evident over the past year as the VDOE transitioned to a new statewide assessment contract that included a greater reliance on technology for all aspects of test administration and reporting. The changes implemented throughout the past year were significant and required the levels of technology and network capacity made possible in school divisions through the Web-Based SOL Technology Initiative. The changes were designed to streamline administrative processes associated with the assessment program for school division and VDOE staffs, improve the accuracy of data reported by school divisions, improve the accessibility of assessment data and reports, and continue the growth of online test delivery options.

An example of an improvement includes the ability for school divisions to electronically enter assessment data into a Web-based test administration system for all student records regardless of whether the students were tested online or with paper/pencil

tests. School divisions no longer need to record student demographic information manually on a paper/pencil answer document with a number-two pencil.

With the student assessment data now entered into the new Web-based system, division personnel can review and revise their data before, during, and after testing by accessing a Web-based system. These options were not previously available with paper/pencil assessments.

School divisions' accessibility to student performance data was improved through the additional use of technology. Electronic student performance reports were made available in a reduced time frame and in an increased variety of formats. The reports and data files are now downloadable from a secure Web-based system after completion of the tests and scoring regardless of whether the student was tested online or with paper/pencil tests. Data updates are now reflected in the downloadable data file the day after the updates have been made. Previously, the time frame in which updated files would be made available would be a minimum of several days.

While the changes resulted in a number of well-received improvements in the assessment program, work is actively continuing to refine some of the completed changes and to determine what others still need to occur. For example, during the spring test administration, technical issues in the online testing system resulted in school divisions reporting interrupted online SOL tests for approximately 10,000 students. Some of the 10,000 test irregularities resulted in students needing to retake their SOL test that was interrupted. A collaborative effort between VDOE and the assessment contractor, Pearson, is underway to implement changes beginning in fall 2007 test administrations to significantly reduce the likelihood of such interruptions occurring in the future. Similar efforts are currently underway by VDOE and Pearson in other areas of the assessment program to mitigate risks associated with all aspects of test administration and reporting.

Financial Support for the Initiative

Funding for year seven (2006-07) was generated by proceeds from the Series VII Technology Equipment Notes, sold by the Virginia Public School Authority (VPSA) in May 2007. As a result, school divisions had access to approximately $58,728,000 to improve technology infrastructure. These funds increased the total statewide investment in technology infrastructure for the initiative to more than $406,328,000.

Table 1 shows a summary of the annual investments to date, based on an allocation of $26,000 per school and $50,000 per school division. This formula has remained constant since the start of the initiative.

Table 1. Annual Investment in the Web-Based Standards of Learning (SOL) Technology Initiative

Series #	Date of Issuance	Total Dollars Available to School Divisions	Percent Expended by School Divisions (as of August 2007)
I	May 2001	$57,248,000	100%
II	May 2002	$58,286,000	100%
III	May 2003	$58,390,000	100%
IV	May 2004	$58,728,000	100%
V	May 2005	$58,330,000	97.4%
VI	May 2006	$58,624,000	77.3%
VII	May 2007	$58,728,000	21.5%

Achieving Readiness for the Web-Based SOL Technology Initiative

The Commonwealth launched the initiative in July 2000 and introduced preliminary architectural guidelines for high schools in January 2001, followed by permanent guidelines in July 2001. In 2004, the certification procedures were revised to include middle and elementary schools, higher minimum specifications for newly purchased technology equipment, a more manageable process for determining a division's technical capacity to administer online SOL tests, and the flexibility to certify multiple school levels simultaneously.

All 132 Virginia school divisions have achieved the first two stages of High School Readiness Certification. As of May 2007, 106 divisions (80 percent) have attained Middle School Readiness Certification; 50 of these (37 percent of all divisions) have realized Elementary School Readiness Certification. The specific divisions with Middle School and Elementary School Readiness Certification are listed in the Certification section.

School Division Participation

All 132 divisions use state funding to upgrade technical infrastructure, improve student-to-computer ratio, and achieve School Readiness Certification. All divisions participated in the 2007 SOL online testing. The number of divisions participating in

End-of-Course (EOC) online SOL testing increased steadily until reaching the maximum number of 132 divisions the last two years (see Figure 1).

Figure 1. Number of School Divisions Administering Online SOL Tests
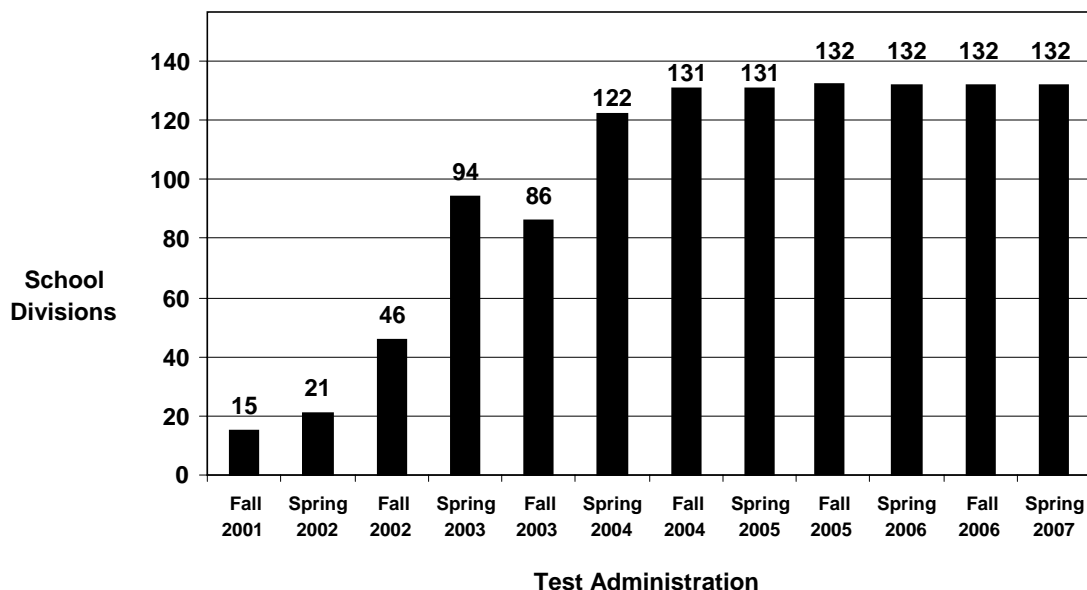
While paper/pencil tests remain an option, divisions increasingly are administering SOL tests online (see Figure 2). The spring 2007 online test administration presented the highest volume of concurrent online SOL tests administered to date. At the highest volume, the PEMSolutions System supported the online delivery of more than 102,000 SOL tests in a single day. The highest number of online tests administered during a single week occurred in May 2007 when over 435,000 SOL tests were completed online. Over 20,000 simultaneous SOL tests were administered online successfully on multiple occasions during the spring 2007 online test administration.

Figure 2. Number of Online SOL Tests Administered
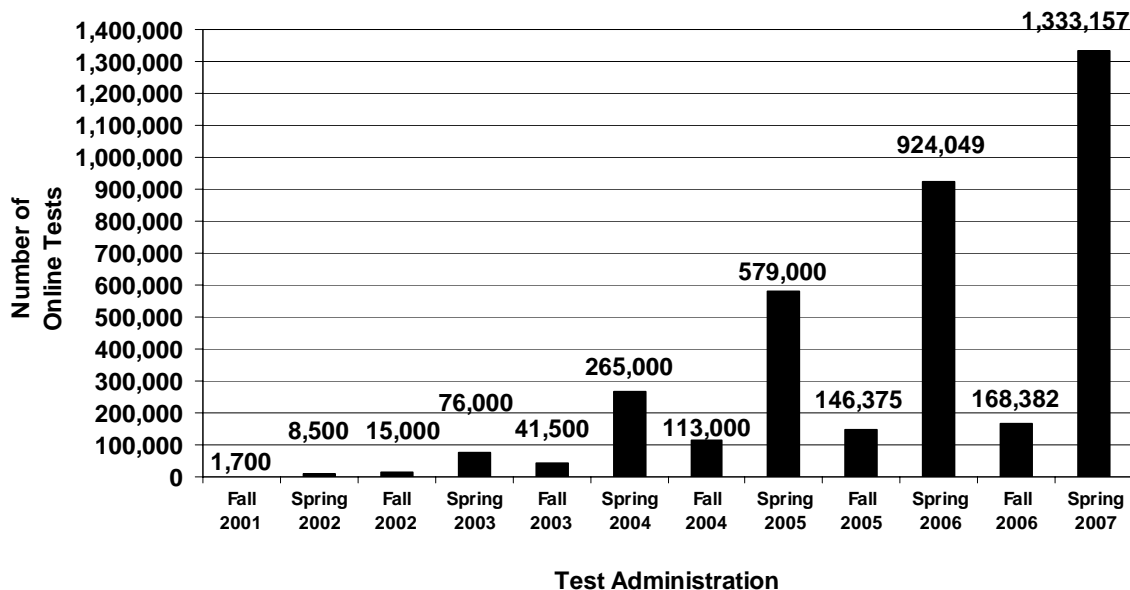
Increased Availability of Online Testing

Over the course of the initiative, the number of different SOL tests being offered online continually has increased (see Table 2). In spring 2007, all middle and elementary school tests except the Grade 8 Cumulative History and Social Science test and the English Writing tests were available online. The Grade 8 Cumulative History and Social Science test will not be administered online due to the test being discontinued as a statewide assessment. School divisions are administering the various content specific history tests in place of the Grade 8 Cumulative History and Social Science test.

Table 2. Schedule of Online Test Administration

Standards of Learning Test	Online Implementation Date
End-of-Course SOL Tests	
Algebra I	Fall 2001
Earth Science	Fall 2001
English: Reading	Fall 2001
Algebra II	Spring 2002
Biology	Spring 2002
Virginia & U.S. History	Fall 2002
World History I	Fall 2002
World History II	Fall 2002
Chemistry	Spring 2003
World Geography	Spring 2003
Geometry	Spring 2004

Middle and Elementary School SOL Tests	
Grade 8 Science	Spring 2005
U.S. History to 1877	Spring 2005
U.S. History: 1877 to Present	Spring 2005
Civics & Economics	Spring 2005
Grade 8 Mathematics	Spring 2006
Grade 8 Reading	Spring 2006
Grade 7 Mathematics	Spring 2006
Grade 7 Reading	Spring 2006
Grade 6 Mathematics	Spring 2006
Grade 6 Reading	Spring 2006
Grade 8 Plain English Mathematics	Spring 2007
Grade 7 Reading	Spring 2007
Grade 7 Plain English Mathematics	Spring 2007
Grade 7 Mathematics	Spring 2007
Grade 6 Reading	Spring 2007
Grade 6 Plain English Mathematics	Spring 2007
Grade 6 Mathematics	Spring 2007
Grade 5 Science	Spring 2007
Grade 5 Reading	Spring 2007
Grade 5 Mathematics	Spring 2007
Grade 4 Reading	Spring 2007
Grade 4 Mathematics	Spring 2007
Grade 3 Science	Spring 2007
Grade 3 Reading	Spring 2007
Grade 3 Mathematics	Spring 2007
Grade 3 History & Social Science	Spring 2007
Virginia Studies	Spring 2007

In 2006, the VDOE developed several new SOL tests to meet the No Child Left Behind (NCLB) mandate of conducting annual reading and mathematics assessments for all students in grades three through eight. During the first administration of these new SOL assessments in spring 2006, online versions of the tests were not administered below the sixth grade level. In spring 2007, the VDOE responded to school division requests and significantly expanded the availability of online SOL tests. For the first time, all elementary school level SOL tests, with the exception of the writing assessment, were available to schools to administer in the online format.

Continuing its efforts to maximize the availability of online SOL tests, the VDOE expanded its scheduled paper/pencil administration of a Grade 8 Direct Writing Field test to include an online administration option for any division volunteering to participate. A Direct Writing Field test consists of students preparing a written response to one of the various prompts being field tested. The main purpose of administering a field test is to evaluate the quality and feasibility of newly developed writing prompts for use in an
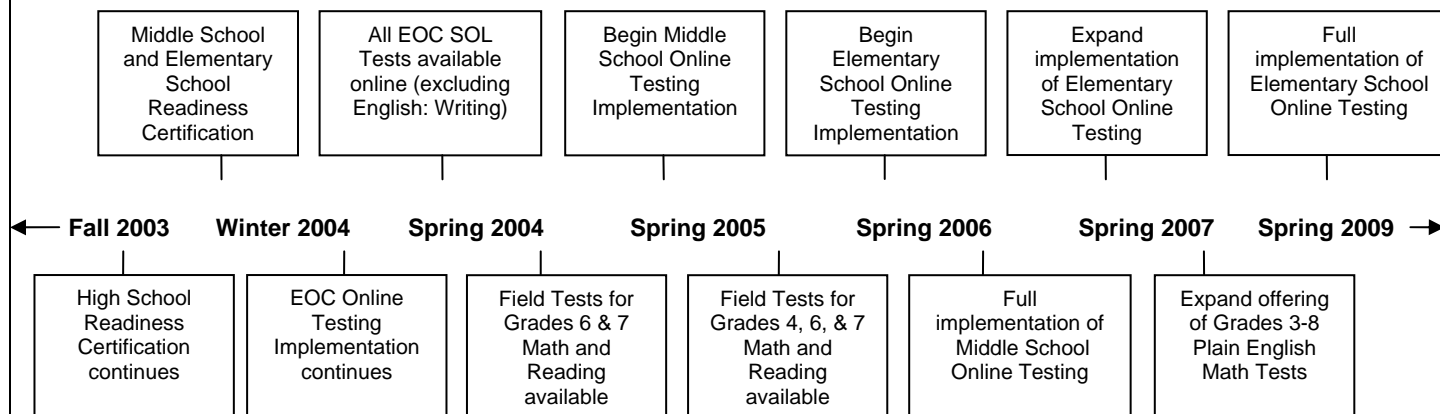
operational or live test administration. By having some students complete the field test in an online environment, the VDOE was able to gather data for the first time about how students perform when completing a writing test on a computer as compared to completing their response on a paper answer document.

Future Activities

Implementation of the Web-Based SOL Technology Initiative continues to progress as initially planned. Figure 3 shows a high-level timeline of the initiative as planned through spring 2009.

Figure 3. High-Level Timeline of the Web-Based SOL Technology Initiative through Spring 2009

Middle School and Elementary School Readiness Certification	All EOC SOL Tests available online (excluding English: Writing)	Begin Middle School Online Testing Implementation	Begin Elementary School Online Testing Implementation	Expand implementation of Elementary School Online Testing	Full implementation of Elementary School Online Testing

← **Fall 2003   Winter 2004   Spring 2004   Spring 2005   Spring 2006   Spring 2007   Spring 2009** →

High School Readiness Certification continues	EOC Online Testing Implementation continues	Field Tests for Grades 6 & 7 Math and Reading available	Field Tests for Grades 4, 6, & 7 Math and Reading available	Full implementation of Middle School Online Testing	Expand offering of Grades 3-8 Plain English Math Tests

The timeline represents activities associated with making all SOL tests available online except the English Writing tests that are administered at grade 5, grade 8, and at the End-of-Course level. A Grade 8 Direct Writing Field test occurred in the past year as a first step toward the possibility of administering the English Writing tests online. During the coming year, the data from the administration of the field test will be analyzed and a research report will be prepared. The report will include the observations and findings related to the administration of the online and paper/pencil versions of the tests.

Feedback from school division personnel indicates the volume of online SOL tests will continue to increase in the coming year. The VDOE will support and monitor the School Readiness Certification process as divisions prepare middle and elementary schools for technical certification.

In addition to the activities presented, the collaborative effort between VDOE and Pearson will continue as both organizations actively work to make improvements in the tools and resources available to school division staff as well as to mitigate risks associated with the current processes and systems.

Report Format

The remainder of this report addresses specific elements of the initiative implementation. Each section provides additional details regarding information presented in the Executive Summary.

FINANCE

Financial support for year seven of Virginia's Web-Based SOL Technology Initiative was generated by the Virginia Public School Authority's sale of Series VII Technology Equipment Notes in May 2007. The proceeds resulted in approximately $58,728,000 for school divisions to improve technology infrastructure. The additional funds increased the total statewide investment in technology infrastructure for the initiative to more than $406,328,000.

Table 3 summarizes the annual investments to date, based on an allocation of $26,000 per school and $50,000 per school division. This formula has remained constant since the start of the initiative.

Table 3. Annual Investment in the Web-Based Standards of Learning (SOL) Technology Initiative

Series #	Date of Issuance	Total Dollars Available to School Divisions	Percent Expended by School Divisions (as of August 2007)
I	May 2001	$57,248,000	100%
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VII	May 2007	$58,728,000	21.5%

All Web-Based SOL Technology Initiative funds awarded to school divisions are reimbursements for eligible technology expenditures. To be eligible, the appropriate division personnel must certify to the VDOE that all expenditures meet the criteria of one or more of the four categories detailed in Table 4. This certification of expenditures is part of the Request for Reimbursement forms completed by divisions.

Table 4. Categories for Reimbursements

Category	Definition of Category
1. Classroom Multimedia Network Computers	Requests in this category include only the cost of the new computer system itself (e.g., monitor, CPU, keyboard, mouse, operating system software).
2. Internet-Ready Local Area Network (LAN) Capability	Requests in this category include costs related to networking, retrofitting, upgrading school buildings, and operating software related to Internet-ready local area network capability (e.g., wiring, servers, power upgrades).
3. High-Speed Access to the Internet	Requests in this category include costs related to networking, retrofitting, upgrading school buildings, and operating software related to providing high-speed Internet access (e.g., wiring, servers, power upgrades).
4. Instructional Software	Requests in this category shall not exceed $1/13^{th}$ of the amount spent on hardware in categories 1 through 3. Software purchased must have a useful life of at least one year and be included in the division's approved technology plan; software such as student information systems, network operating systems, and desktop operating system upgrades are not included.

From the time technology equipment notes are issued, school divisions have approximately 18 months to complete eligible purchases and apply for reimbursements. Within that same time period, divisions are required to appropriate and utilize local matching funds for technology that total 20 percent of the annual allocation from the General Assembly; one-quarter of the 20 percent match must be dedicated to instructional technology training for division teachers.

Each year, the VDOE provides information to divisions regarding their funding allocations and the reimbursement process for eligible expenditures. On April 20, 2007, the VDOE published a superintendent's memo with details of the Series VII technology equipment notes: http://www.doe.virginia.gov/VDOE/suptsmemos/2007/adm014.html.

CERTIFICATION

The legislation creating the initiative stated that all Virginia public schools must become technologically capable of utilizing Web-based systems for instruction, remediation, and assessment. As the state agency responsible for implementing this legislation, the VDOE developed a process enabling divisions to certify schools that meet the minimum technological requirements.

The original legislation required divisions to certify high schools first, followed by middle schools, and finally elementary schools. Because of the focus on high schools, the process initially was called High School Readiness Certification. The process eventually was expanded to account for the technical capability at all school levels (elementary, middle, and high schools) and was renamed School Readiness Certification. The current School Readiness Certification process consists of three different levels:

- **Stage 1 Certification** allows divisions to self-certify when their schools meet the required specifications in the areas of (1) awareness and planning; (2) infrastructure; (3) computers and printers; and (4) wide area networks, local area networks, and network equipment and servers.

- **Stage 2 Certification** requires divisions to estimate the maximum volume of online SOL tests to be administered concurrently throughout the division. The division then verifies the technical capability of its infrastructure to support that volume. Utilizing the available financial resources (see Finance section), the divisions must upgrade their technology to support the necessary number of concurrent online tests across their division.

- **Stage 3 Certification** consists of a checklist of technology and assessment tasks to be completed prior to all online SOL test administrations. This certification is known more commonly as the *96-Hour Checklist*. The VDOE strongly encourages divisions to reference the checklist as a final readiness check 96 hours (four days) before starting each online SOL test administration. As a result, Stage 3 is the only certification level not required to be submitted with signatures to the VDOE.

Due to the nature of technology infrastructure and bandwidth, the School Readiness Certification is a cumulative process. All Virginia school divisions have fully certified their high schools at the three stages. As a result, the focus has shifted to middle and elementary schools. As divisions extend their technical capability downward to the middle school level, the overall infrastructure throughout each division must support both high school and middle school online activities. After achieving middle school certification, the technical capability must then be expanded to support elementary schools.

Some divisions are certifying all school levels simultaneously, with the understanding that middle schools must be certified before elementary schools. The School Readiness Certification includes most elements of the previous High School Readiness Certification process and a few significant changes.

First, the Stage 1 Readiness Checklist denotes higher minimum specifications for newly purchased technology equipment. Examples include faster minimum processor speeds and increased workstation memory.

Second, Stage 2 Certification requires a new process for divisions to verify the technical capacity of their infrastructures. Divisions previously utilized the Load Test™ software application, developed by Pearson Educational Measurement. This application simulated the typical network load produced by a high school online test administration. While this software worked effectively for a small number of schools, it was unmanageable for simulating a typical network load produced by simultaneous online testing at multiple sites. The VDOE partnered with Pearson Educational Measurement to develop the Stage 2 Bandwidth Estimator Worksheet, which compiles data such as available bandwidth, bandwidth utilization, and number of computers used simultaneously for testing. These data are combined with the requirements for TestNav™, the online test-delivery software. Data calculations based on the worksheets determine if the existing technical resources can adequately conduct the specified level of simultaneous online testing. Beyond the certification process, divisions use the Stage 2 Bandwidth Estimator Worksheet to predict how network changes may affect the performance of online SOL testing.

Third, two procedural changes have been implemented in the School Readiness Certification process. Divisions now complete their Stage 1 and Stage 2 certifications within the same document, thus streamlining the process and reducing paperwork. In addition, divisions now have the flexibility to certify multiple school levels at the same time. For example, a division that has achieved High School Readiness Certification may certify middle and elementary schools simultaneously if those schools are prepared. The division also can follow the original process of certifying middle schools first, followed by elementary schools. The VDOE added this flexibility to meet the varying needs of divisions.

Regardless of certification levels, the process still requires collaboration among various division personnel. The director of testing, director of technology, and Web-Based SOL Technology Initiative project manager play important roles in providing the information needed to complete the process. The division superintendent must approve and sign the final documentation before submitting it to the VDOE.

Since publication of the new School Readiness Certification process, 106 school divisions (80 percent) have achieved Middle School Readiness Certification; 50 of these (47 percent of the 106 divisions, or 37 percent of all divisions) have achieved Elementary School Readiness Certification. The deadline for divisions to certify middle schools was spring 2006; elementary schools must be certified by spring 2009. As of May 10, 2007, the divisions listed in Tables 5 and 6 had certified all their middle and elementary schools.

Table 5. School Divisions with Middle School Readiness Certification (106)		
Accomack	Grayson	Rockbridge
Albemarle	Goochland	Rockingham
Alleghany	Greene	Russell
Amelia	Halifax	Salem
Amherst	Hampton	Scott
Appomattox	Harrisonburg	Shenandoah
Arlington	Henry	Smyth
Augusta	Hopewell	Southampton
Bedford	Isle of Wight	Spotsylvania
Bland	King George	Staunton
Botetourt	King William	Suffolk
Bristol	Lancaster	Surry
Brunswick	Lee	Sussex
Buchanan	Louisa	Tazewell
Buckingham	Lynchburg	Virginia Beach
Buena Vista	Madison	VSDB Staunton
Campbell	Manassas	Warren
Caroline	Manassas Park	Westmoreland
Carroll	Martinsville	Williamsburg/James City
Charles City	Mathews	Winchester
Charlotte	Mecklenburg	Wise
Charlottesville	Middlesex	Wythe
Chesapeake	Montgomery	
Chesterfield	New Kent	
Colonial Beach	Newport News	
Colonial Heights	Norfolk	
Covington	Northampton	
Culpeper	Northumberland	
Danville	Nottoway	
Dickenson	Orange	
Dinwiddie	Page	
Essex	Petersburg	
Fairfax County	Poquoson	
Fauquier	Portsmouth	
Floyd	Powhatan	
Franklin City	Prince Edward	
Franklin County	Prince George	
Frederick	Pulaski	
Fredericksburg	Radford	
Galax	Richmond City	
Giles	Richmond County	
Gloucester	Roanoke County	

Table 6. School Divisions with Elementary School Readiness Certification (50)		
Accomack	Louisa	Wise
Appomattox	Madison	Wythe
Arlington	Manassas Park	
Bland	Martinsville	
Bristol	Mathews	
Brunswick	Northumberland	
Campbell	Page	
Caroline	Patrick	
Charles City	Poquoson	
Charlotte	Prince Edward	
Colonial Beach	Radford	
Dickenson	Richmond County	
Franklin City	Rockbridge	
Franklin County	Russell	
Frederick	Scott	
Fredericksburg	Shenandoah	
Giles	Smyth	
Goochland	Spotsylvania	
Halifax	Staunton	
Harrisonburg	Suffolk	
Henry	Sussex	
King George	Tazewell	
Lancaster	Warren	
Lee	Winchester	

TECHNOLOGY

The goal of the initiative is for divisions to use Web-based systems to improve the SOL instructional, remedial, and testing capabilities in their schools. Much of the required technology centers on infrastructure, specifically available bandwidth, consistency, and reliability of networks.

The 2006-07 academic year was the fourth full year school divisions had access to the proctor-caching software with online SOL testing. The VDOE continued emphasizing the performance benefits of the proctor-caching software and urged all divisions to implement it as part of their standard online testing configurations. Most divisions now use the software on a regular basis. VDOE and Pearson will be providing updated training and support documentation for those school divisions who may have experienced staff turnover or who could benefit from a review of how to configure and utilize the software.

Even with full utilization of this software, unpredictable network slowdowns or complete network failures are possible when administering a statewide Web-based assessment program over the Internet. The disruptions experienced during the spring 2007 administration are examples of the types of issues that can occur with no advance notice. Although full protection is not possible, the VDOE has worked diligently to prevent data loss during online testing. The first effort was the Early Warning System (EWS), piloted in spring 2004.

Built into the TestNav application, the EWS alerted students to contact the test administrator when an Internet interruption occurred. The EWS displayed an electronic copy of the student's test answers and information about which answers had been transmitted and saved. The administrator could print the student's responses and attempt to reestablish an Internet connection. If the problem was localized to one computer, the student could log into another computer, reenter answers from the printed page, and continue taking the test. If the problem was more widespread, such as a failure of the school's Internet connection, the EWS enabled test administrators to print or record all students' responses. Based on the anticipated downtime, administrators could decide how to proceed.

In spring 2005, Pearson Educational Measurement and the VDOE piloted the Enhanced Early Warning System (EEWS), an upgraded version of the EWS. In the event of a network failure, the EEWS saves answers to a student's workstation. When the connection is reestablished, the responses are transmitted to the Pearson servers for scoring. School divisions piloting EEWS in spring 2005 were pleased with the results; the VDOE recommended that school divisions use EEWS beginning in spring 2006.

Work is currently underway to improve EEWS by the fall 2007 test administration. A significant change being implemented is the included integration of EEWS when installing the online testing software. School divisions will not choose whether to install EEWS, but instead the divisions will provide the required parameters and EEWS will be in use by all school divisions beginning in fall 2007. Other changes include an improved user interface and additional training for staff involved in administering tests and for staff involved in the technical aspect of maintaining the online testing software and the required parameters.

During the 2005-06 school year, the VDOE implemented a unique statewide testing identifier (STI) in its Educational Information Management System (EIMS). The VDOE required that the STI be provided on all assessment records submitted for both online and paper/pencil tests. This further ensured the accuracy and integrity of student data while enhancing the use of longitudinal assessment data in the instructional decision-making process.

The new Web-based test administration system, PEMSolutions, now verifies the accuracy of the STI provided on student records by the school division. PEMSolutions is linked to EIMS and requires a match between the provided STI and various demographic fields such as student name, gender, date of birth, etc. The data in EIMS and the data provided on the student assessment record must match before a test result for the student record will be reported. This requirement has improved the accuracy of student data among all assessment records.

The spring 2007 online test administration presented the highest volume of concurrent online SOL tests administered to date. At the highest volume, the PEMSolutions System supported the online delivery of more than 102,000 SOL tests in a single day. The highest number of online tests administered during a single week occurred in May 2007 when over 435,000 SOL tests were completed online. Over 20,000 simultaneous SOL tests were administered online successfully on multiple occasions during the spring 2007 online test administration.

WEB-BASED ASSESSMENTS

The VDOE gradually increased the number of End-of-Course (EOC) tests available online from fall 2001 through spring 2004. In 2005-06, the VDOE introduced online assessments in the middle schools; in 2006-07, the agency expanded online testing at the middle schools and introduced the initiative at the elementary school levels (see Table 7).

Table 7. History of the Online SOL Test Implementation

Standards of Learning Test	Online Implementation Date
End-of-Course SOL Tests	
Algebra I	Fall 2001
Earth Science	Fall 2001
English: Reading	Fall 2001
Algebra II	Spring 2002
Biology	Spring 2002
Virginia & U.S. History	Fall 2002
World History I	Fall 2002
World History II	Fall 2002
Chemistry	Spring 2003
World Geography	Spring 2003
Geometry	Spring 2004
Middle School SOL Tests	
Grade 8 Science	Spring 2005
U.S. History to 1877	Spring 2005
U.S. History: 1877 to Present	Spring 2005
Civics & Economics	Spring 2005
Grade 8 Mathematics	Spring 2006
Grade 8 Reading	Spring 2006
Grade 7 Mathematics	Spring 2006
Grade 7 Reading	Spring 2006
Grade 6 Mathematics	Spring 2006
Grade 6 Reading	Spring 2006
Grade 8 Plain English Mathematics	Spring 2007
Grade 7 Reading	Spring 2007
Grade 7 Plain English Mathematics	Spring 2007
Grade 7 Mathematics	Spring 2007
Grade 6 Reading	Spring 2007
Grade 6 Plain English Mathematics	Spring 2007
Grade 6 Mathematics	Spring 2007

Elementary School SOL Tests	
Grade 5 Mathematics	Spring 2006
Grade 5 Reading	Spring 2006
Grade 4 Mathematics	Spring 2006
Grade 4 Reading	Spring 2006
Grade 3 Mathematics	Spring 2006
Grade 3 Reading	Spring 2006
Grade 5 Science	Spring 2007
Grade 5 Reading	Spring 2007
Grade 5 Mathematics	Spring 2007
Grade 4 Reading	Spring 2007
Grade 4 Mathematics	Spring 2007
Grade 3 Science	Spring 2007
Grade 3 Reading	Spring 2007
Grade 3 Mathematics	Spring 2007
Grade 3 History & Social Science	Spring 2007
Virginia Studies	Spring 2007

Participation in Online Testing

In fall 2005, the number of divisions administering online SOL tests increased to include all 132 school divisions (see Figure 4). In addition, many divisions administered more online SOL tests (see Figure 5). Divisions still have the option of using paper/pencil tests, but the VDOE encourages them to administer at least a small number of tests online. Divisions that implement online SOL testing typically request permission to administer additional online tests at the next opportunity. No school divisions have attempted online SOL testing and later decided to return to the traditional paper/pencil format.

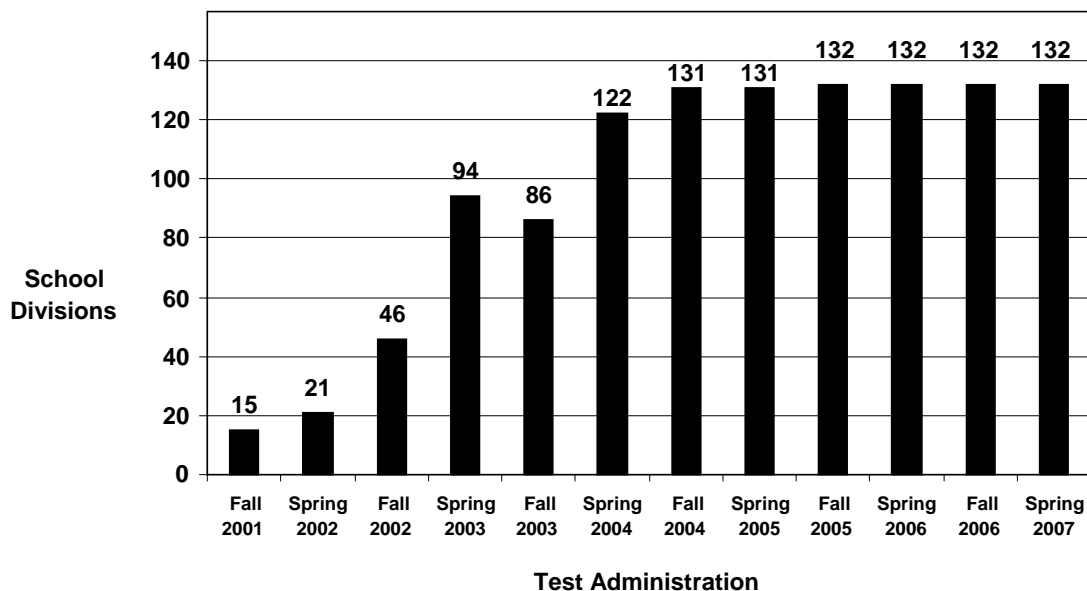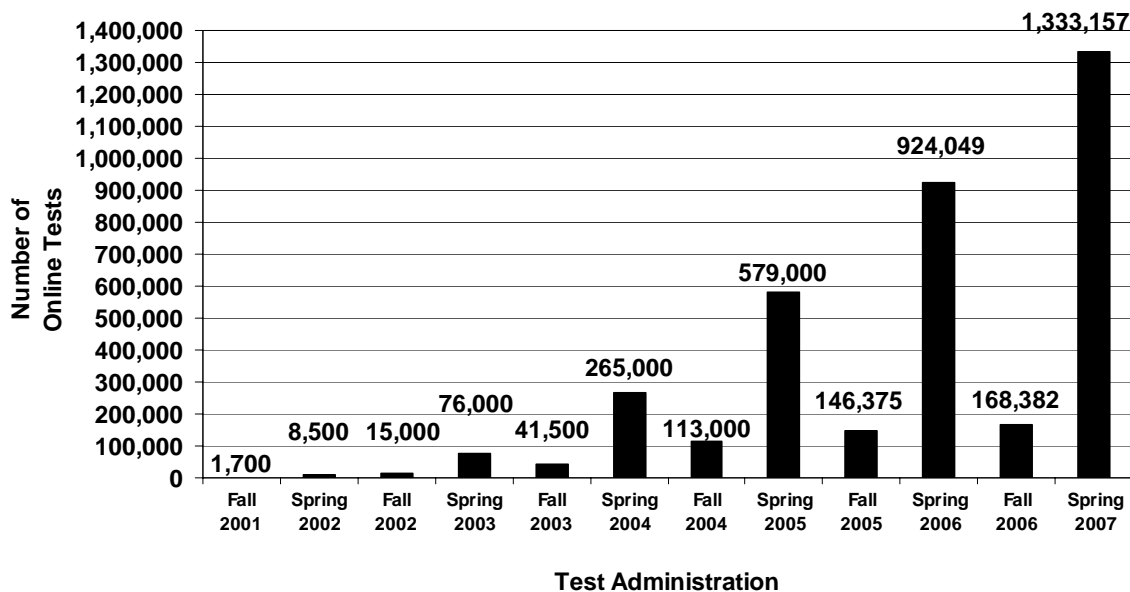**Figure 4: Number of School Divisions Administering Online SOL Tests**

Figure 5: Number of Online SOL Tests Administered

Supporting Online Testing Participants

With the increase in participating divisions and online SOL testing, the VDOE and Pearson Educational Measurement have continually reevaluated technical assistance

needs. Above all, the most needed training topics relate to the PEMSolutions System and online assessment policies and procedures.

Since the beginning of the initiative, the VDOE has provided hands-on training for division personnel prior to each scheduled SOL test administration (fall, spring, and summer). Even divisions that previously have administered online SOL tests will request to participate. The VDOE staff members conduct the approximately 3.5-hour sessions regionally throughout the state. The sessions include a slide presentation and an extensive opportunity for participants to use computers, guided by a trainer and training workbook. Each participant receives handouts of the slide presentation, training workbook, copies of *PEMSolutions User's Guide*, and a comprehensive set of checklists to be accomplished during the test administration.

In addition, the VDOE has offered a training session specifically for the division staff responsible for technical aspects of administering online tests. Training topics have included hardware and software configurations, bandwidth management, and network configurations. During these sessions, technology staff members received details regarding the technical requirements and configurations needed for the various types of online testing scenarios. Participants are introduced to the various resources available on the Support Pages within the PEMSolutions System. Existing resources and documentation include, but are not limited to, the following:

PEMSolutions Technology Guidelines: Recommended Hardware and Software
Details of minimum and recommended hardware and software specifications and configurations when administering tests via PEMSolutions.

TestNav Technology Guidelines: Configuring Your Test Delivery Environment
Details of minimum and recommended hardware and software specifications and configurations when delivering online tests via PEMSolutions.

Proctor Caching User's Guide
Details of how to properly install, configure, and implement the proctor-caching software to optimize the delivery of online tests within various network and workstation environments.

Content Filtering and Caching: Recommended Configurations
Details of how to properly configure content filter solutions and caching solutions to optimize the delivery of online tests within various network and workstation environments.

The documents for each test administration are updated and posted on the Internet. The VDOE uses a central e-mail address (esol@VDOE.virginia.gov) to notify division personnel, specifically the director of testing and director of technology or

project manager, about the posted documents. This has helped reduce the volume of phone calls requesting information.

Increased Availability of Online Testing

With the planned growth of the Web-Based SOL Technology Initiative, the number of available online tests continues to increase. In spring 2006, all middle school tests, except the Grade 8 Cumulative History and Social Science test and the English Writing tests, were available online. The Grade 8 Cumulative History and Social Science test will not be administered online due to the test being discontinued as a statewide assessment. School divisions are administering the various content specific history tests in place of the Grade 8 Cumulative History and Social Science test.

In spring 2007, all SOL tests were available online with the exception of the English: Writing test (End-of-Course grade 5 and grade 8). Additional consideration and research are needed prior to administering Virginia's direct writing assessment in an online high-stakes assessment environment. In spring 2007, the Department of Education administered a Grade 8 Direct Writing Field test to students in school divisions that volunteered to participate. It evaluated the quality and feasibility of newly developed writing prompts for use in an operational or live administration of the Virginia Grade 8 Writing test. For the first time in Virginia, a portion of the students were able to complete the Writing Field test online in addition to the traditional paper/pencil format. Of the participating school divisions, students were assigned randomly to complete the field test in either the paper/pencil or the online format.

A total of 46 divisions participated in the field test and 37 of those divisions opted to administer the online version of the writing field test to a randomly selected population of their eighth-grade students. The design of the field test and the random selection of students needed to complete the online version of the test resulted in approximately 15% of the completed field tests being completed as online tests.

The data from the field test are being analyzed and a research report is being prepared. The report will include the observations and findings related to the administration of the online and paper/pencil versions of the tests. This work represents a significant initial step in the process of considering the feasibility of administering the SOL Writing test in an online environment in the future.

INSTRUCTIONAL SOFTWARE

The goal of the initiative is to use Web-enabled systems to improve instruction, remediation, and testing capabilities in Virginia schools. One of the objectives is to make up-to-date instructional and remedial software applications available for teachers and students.

As part of the initiative, the VDOE hosts a Web page of instructional software reviews written by Virginia teachers who have selected the software for their divisions to purchase: http://www.VDOE.virginia.gov/VDOE/Technology/softwarereview.html.

During the past year, divisions continued using the Electronic Practice Assessment Tool (ePAT), a standalone version of the TestNav™ application into which Pearson Educational Measurement has loaded previously released SOL test items. The benefits of ePAT are twofold. First, students can study subject-area content by reviewing and answering previously released SOL test items. Second, students can become familiar with the test items in the same type of environment as the online SOL tests. ePAT incorporates the same tools, reflecting the look and feel of live SOL testing. Students can peruse the multiple-choice test items and click on a tool bar to select answers. A separate browser window displays all answer choices, indicates the correct answer, and explains why each is correct or incorrect. The student then proceeds to the next question. Current ePAT content will be transferred into an updated version of ePAT, which will enable students to see how they performed on each of the questions after completing a practice test. After the public release of the spring 2007 SOL tests in March 2008, a series of new ePATs will be offered to school divisions for all levels, including a first-time release of ePATs for elementary schools.

School divisions also use the application as a remediation tool for students who need to retake a recently failed test. The software has been used widely as one of the remediation tools in the Project Graduation program. The application is available for free download at http://etest.ncs.com/Customers/Virginia/pat_home.htm.

The VDOE also assists divisions with educational software procurement. In collaboration with the WHRO Ed Tech Consortium, the VDOE works with the MiCTA Service Corporation (MSC)/American TelEdCommunications Alliance (ATAlliance) to secure reduced prices on software approved by the state Board of Education for remediation and instruction.
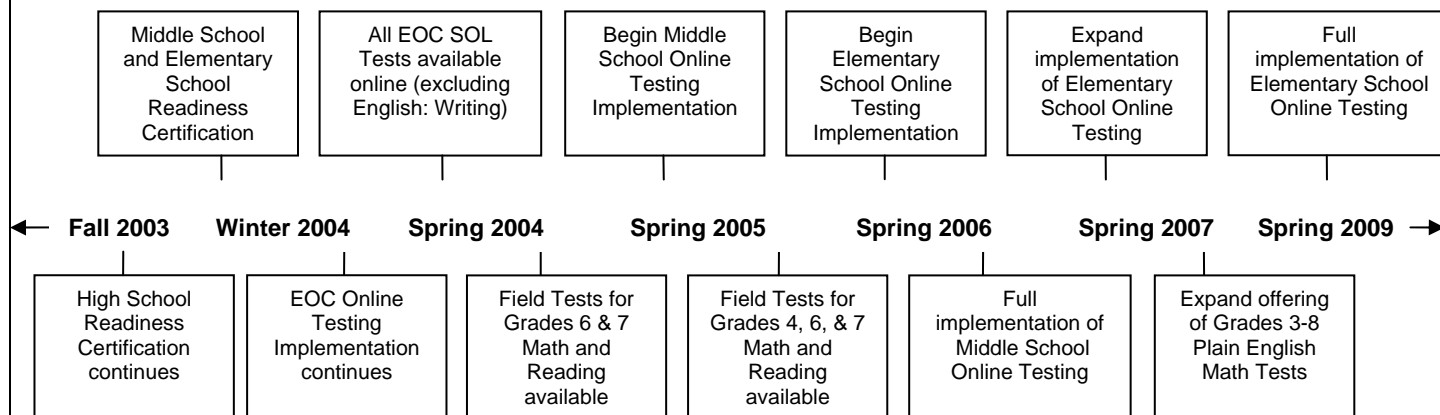
Several online workshops were conducted during the 2006-07 school year. The sessions focused on SOL-aligned electronic resources and activities for instruction and remediation.

FUTURE ACTIVITIES

Implementation of the Web-Based SOL Technology Initiative continues to progress as initially planned. Figure 6 shows a timeline of activities through spring 2009.

Figure 6. High-Level Timeline of the Web-Based SOL Technology Initiative

Middle School and Elementary School Readiness Certification	All EOC SOL Tests available online (excluding English: Writing)	Begin Middle School Online Testing Implementation	Begin Elementary School Online Testing Implementation	Expand implementation of Elementary School Online Testing	Full implementation of Elementary School Online Testing

← Fall 2003	Winter 2004	Spring 2004	Spring 2005	Spring 2006	Spring 2007	Spring 2009 →

High School Readiness Certification continues	EOC Online Testing Implementation continues	Field Tests for Grades 6 & 7 Math and Reading available	Field Tests for Grades 4, 6, & 7 Math and Reading available	Full implementation of Middle School Online Testing	Expand offering of Grades 3-8 Plain English Math Tests

The timeline represents activities associated with making all SOL tests available online except the English Writing tests that are administered at grade 5, grade 8, and at the End-of-Course level. A Grade 8 Direct Writing Field test occurred in the past year as a first step toward the possibility of administering the English Writing tests online. During the coming year, the data from the administration of the field test will be analyzed and a research report will be prepared. The report will include the observations and findings related to the administration of the online and paper/pencil versions of the tests.

Feedback from school division personnel indicates the volume of online SOL tests will continue to increase in the coming year. The VDOE will support and monitor the School Readiness Certification process as divisions prepare middle and elementary schools for technical certification.

The Web-Based SOL Technology Initiative project team will continue to collaborate with the project team responsible for developing and implementing the Educational Information Management System (EIMS). Joint meetings have helped both project teams establish and deploy standardized data definitions for all student information. This shared awareness enables the VDOE to deliver a consistent, unified message to school divisions.

In addition to the activities presented, the collaborative effort between VDOE and Pearson will continue as both organizations actively work to make improvements in the

tools and resources available to school division staff as well as to mitigate risks associated with the current processes and systems.