SOUTH CAROLINA
K-12 SCHOOL TECHNOLOGY INITIATIVE

2015-16 PROGRESS REPORT

Much has been accomplished in the effort to transition K-12 education in South Carolina into the digitally connected era, yet much remains to be done. Achieving this goal requires bold educational and technological initiatives as well as steadfast programmatic and budgetary support from our state's leadership.

TABLE OF CONTENTS

ABOUT THE INITIATIVE	04
EXECUTIVE SUMMARY	07
STUDENT LEARNING & CLASSROOM TECHNOLOGY	09
INFRASTRUCTURE & SECURITY	23
PROFESSIONAL DEVELOPMENT	38
COLLABORATION OPPORTUNITIES	42
REPORT CONCLUSION	44
APPENDIX A: INITIATIVE BUDGET	45
APPENDIX B: BY THE NUMBERS	46
APPENDIX C: PROFILE OF THE SC GRADUATE	51
APPENDIX D: INITIATIVE MILESTONES	52
APPENDIX E: WHAT OTHERS ARE SAYING	58

ABOUT THE INITIATIVE

Who are we?

The South Carolina K-12 School Technology Initiative was founded in 1996, as part of the General Assembly's proactive approach to addressing technology infrastructure, connectivity and education in schools throughout the Palmetto State.

The Initiative – steered by a unique public/private partnership that includes the SC Department of Administration, SC Department of Education, SC Education Oversight Committee, SC Educational Television, SC State Library and private sector representatives AT&T and the SC Telecommunications and Broadband Association – guides the distribution of funds appropriated by the Governor and General Assembly. These funds collectively help to meet our schools' needs for software, hardware, connectivity, digital content, instructional technologies, cybersecurity protection and professional development opportunities.

The K-12 School Technology Initiative is extremely proud of its progress in the development and implementation of educational technology as well as the strides that have been made in providing infrastructure initiatives designed to produce more successful students in South Carolina.

It is our hope that the leaders of the Palmetto State will continue their history of using the K-12 School Technology Initiative to guide the provisioning of high-quality, information-rich education for all students.

Who makes up the Initiative?

admin
THE SOUTH CAROLINA DEPARTMENT of ADMINISTRATION

SOUTH CAROLINA DEPARTMENT OF EDUCATION

SC EDUCATION OVERSIGHT COMMITTEE
Reporting facts. Measuring change. Promoting progress.

etv

south carolina STATE LIBRARY

at&t

SCTBA
South Carolina Telecommunications and Broadband Association

ABOUT THE INITIATIVE

Initiative Partners

SC DEPARTMENT OF ADMINISTRATION
P.O. Box 2825
Columbia, SC 29211
Phone: (803) 734-8120
Website: admin.sc.gov

SC DEPARTMENT OF EDUCATION
1429 Senate Street
Columbia, SC 29201
Phone: (803) 734-8500
Website: ed.sc.gov

SC EDUCATION OVERSIGHT COMMITTEE
P.O. Box 11867
Columbia, SC 29211
Phone: (803) 734-6148
Website: eoc.sc.gov

SC EDUCATIONAL TELEVISION
1041 George Rogers Blvd.
Columbia, SC 29201
Phone: (803) 737-3200
Website: scetv.org

SC STATE LIBRARY
1500 Senate Street
Columbia, SC 29201
Phone: (803) 734-8666
Website: statelibrary.sc.gov

AT&T
1600 Williams Street
Columbia, SC 29211
Phone: (803) 748-0121
Website: att.com

SC TELECOMMUNICATIONS AND BROADBAND ASSOCIATION
1122 Lady Street, Suite 840
Columbia, SC 29201
Phone: (803) 779-7282
Website: sctba.org

Initiative Principals & Committee Chair

SC DEPARTMENT OF ADMINISTRATION
Marcia Adams, Executive Director

SC DEPARTMENT OF EDUCATION
Molly Spearman, State Superintendent of Education

SC EDUCATION OVERSIGHT COMMITTEE
Melanie Barton, Executive Director

SC EDUCATIONAL TELEVISION
Linda O'Bryon, President and Chief Executive Officer

SC STATE LIBRARY
Leesa Aiken, Director

AT&T
Pamela Lackey, State President, AT&T South Carolina

SC TELECOMMUNICATIONS AND BROADBAND ASSOCIATION
Nola Armstrong, Executive Director

COMMITTEE CHAIRPERSON
Keith Osman, Director, Division of Technology Operations

WHO DOES THE K-12 SCHOOL TECHNOLOGY INITIATIVE SERVE?

81
SCHOOL DISTRICTS

1,210
PUBLIC SCHOOLS

192
PUBLIC LIBRARIES

55,985
INSTRUCTIONAL STAFF

760,500
STUDENTS

4,896,146
CITIZENS

1
SOUTH CAROLINA

1. EXECUTIVE SUMMARY

The South Carolina K-12 School Technology Initiative's 2015-16 Progress Report reveals a picture of great accomplishments in building the foundations of digital instructional technology needed to support public education, of an undertaking well-begun but requiring new and increased efforts as well as innovative solutions in the future.

Today's public schools and libraries are part of an interwoven data communications network whose foundations were laid nearly 20 years ago. During this time, South Carolina quickly emerged as a national leader in providing network and internet connectivity to each of its public schools, districts and public libraries. Combining its individual forces to create a state E-Rate consortium enabled the state to continue to build on its early successes, an effort that continues to the present day. However, establishing basic connectivity among a series of bricks-and-mortar locations is no longer the primary challenge of educational technology.

Instead, today's public education learning paradigm, while still rooted in the classroom, has grown to include a wide variety of locations and settings not possible just a few years ago. Such settings include students collaborating on a project in a campus common area, connecting with a teacher via email or social media applications to discuss a course-related matter, uploading video of biology specimens discovered during an off-campus nature walk, or editing a simple video at home on a school-issued tablet to complete a class assignment. With this change in paradigm, it is no longer adequate to the educational requirements of the public school system, or to the expectations of the technology skills to be acquired by its graduates, to focus attention solely on the network connectivity provided to the school building or even to connectivity provided to a specific network access point within that building.

> *"ESTABLISHING BASIC CONNECTIVITY AMONG A SERIES OF BRICKS-AND-MORTAR LOCATIONS IS NO LONGER THE PRIMARY CHALLENGE OF EDUCATIONAL TECHNOLOGY."*

New demands, such as mandated statewide online testing and 1:1 computing initiatives mean that schools and their IT support personnel, must deal with providing sufficient connectivity through the campus and, in some districts, on the system's school buses,

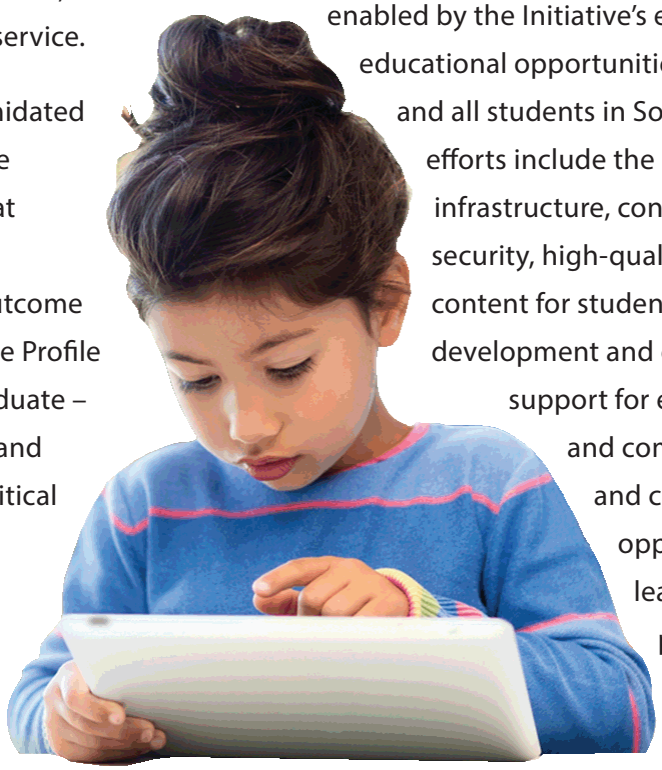
to allow each student to connect at will to the school wireless network and to the educational resources that reside on that network. While great strides have been made in extending sufficient technology services and resources to all of South Carolina's public school districts, schools and learners, it must be noted that pockets of inadequate service persist and these pockets do not necessarily align with rural districts or districts in the Abbeville equity lawsuit.

At the same time, public schools face unprecedented network security challenges which are only complicated by the expansion of the footprint of school networks to in-building and mobile computing devices. A related issue that is of concern, is that of ensuring home broadband connectivity for all learners, including those who, due to economic difficulties or remote locations, cannot afford adequate internet service.

While it is easy to be intimidated by the complexity of these challenges, it is critical that South Carolinians remain focused on the desired outcome to support and enable. The Profile of the South Carolina Graduate – a set of knowledge, skills and characteristics deemed critical for the state's graduates to compete in a global economy – continues to represent the landmark toward which our public schools are striving and which the state's educational technology investment fully supports.

In 2016, the General Assembly passed Act 195 affirming that the principles outlined in the Profile of the South Carolina Graduate are "the standards by which our state's high school graduates should be measured and are this state's achievement goals for all high school students." The partners that make up the K-12 School Technology Initiative agree with Section 59-1-50 of the South Carolina Code of Laws, in seeing educational technology as a means to "ensure that graduates have world class knowledge based on rigorous standards in language arts and math for college and career readiness."

Digital learning content and data communication infrastructure provided and enabled by the Initiative's efforts can bring educational opportunities to all communities and all students in South Carolina. Such efforts include the areas of network infrastructure, connectivity and security, high-quality digital learning content for students, professional development and curriculum support for educators, and communications and collaboration opportunities linking learners, educators, parents and the broader community.



2. STUDENT LEARNING & CLASSROOM TECHNOLGOY

South Carolina Technology Plan Goal:

All districts across the State of South Carolina are striving to improve student learning through technology.

Partner Efforts to Support the Goal:

Just like an automobile factory, a farm, or an IT application development firm, South Carolina's public schools are expected to yield a product at the conclusion of their prescribed process. In the case of schools, that product is educated, well-rounded young persons, ready to take their place in society and in the state's workplaces. And, just as would a farm or a factory, public schools have developed a set of guidelines or standards defining the product they are tasked with producing.

These standards, identified as part of the Profile of the South Carolina Graduate are, in fact, a set of quality control guidelines enumerating a set of skills the successful graduate must possess upon completion of their public education experience. These principles have now been validated by act of the South Carolina General Assembly as the criteria by which the success of our public education efforts should be measured.

The core assumptions of the Profile of the South Carolina Graduate is that young persons who achieve this profile will graduate ready to enter a career or pursue a postsecondary degree, thoroughly infused with and driven by information technology. Likewise the knowledge resources they must master, in virtually every job category, are comprised of digital information they must be able to retrieve, analyze, collate and apply rapidly and efficiently. This reality must be mirrored in South Carolina's public school classrooms. Students who experience teaching methodologies based on traditional textbooks and lecture may master a body of information, but they are highly unlikely to perform successfully in a fast paced, data-driven workplace.

> *"IT IS CERTAIN THE STATE CANNOT REACH ITS ECONOMIC AND EDUCATIONAL GOALS WITHOUT CONTINUING TO PLACE A VERY HIGH PRIORITY UPON DIGITAL LEARNING RESOURCES AND CLASSROOM TECHNOLOGY IN OUR PUBLIC SCHOOLS."*

The partners of the South Carolina K-12 School Technology Initiative have assembled and made available to educators and learners a wide

array of high-quality, standards-based digital learning resources. Collections such the South Carolina State Library's Discus and StudySC programs and South Carolina Educational Television's Knowitall.org and StreamlineSC media-enriched, online learning content have continued to assist our state's school districts in meeting their needs for digital instructional materials. In addition, the enrollment and course offerings provided through the South Carolina Department of Education's VirtualSC, the state's virtual, online public school system, continue to grow at a steady rate. Taken together, these resources provide a strong core collection of tested and approved digital learning resources which districts may also augment with additional materials available on the internet.

Content is just one pillar of the emerging structure of world-class public education. Inseparable from the content is the classroom technology that allows students and teachers to access and work with the material. K-12 classroom technology mirrors the ways in which our students must prepare to work later in life in ways that no textbook or blackboard ever could. Such technology is comprised of connectivity to the internet and to the school network, individual student computing devices such as laptops, tablets and other similar devices, as well as systems enabling group viewing of content and the facilitation of student interaction.

The ability to access content, interact with others, develop concepts and solutions based upon that content, and apply those solutions to problems, all the while working within the digital domain of a networked computing device is the de facto paradigm the successful South Carolina Graduate. It is certain that the state cannot reach its economic and educational goals without continuing to place a very high priority upon digital learning resources and classroom technology in our public schools.

Discus

Digital Information for South Carolina Users (Discus), South Carolina's virtual library, is an invaluable resource supported by the K-12 School Technology Initiative. Administered by the South Carolina State Library (State Library), Discus uses K-12 School Technology Initiative funds to help provide an electronic library of essential high-quality information and educational resources to all state residents through schools, higher education institutions and public libraries. These resources provide students of all ages a safe place to research and learn.

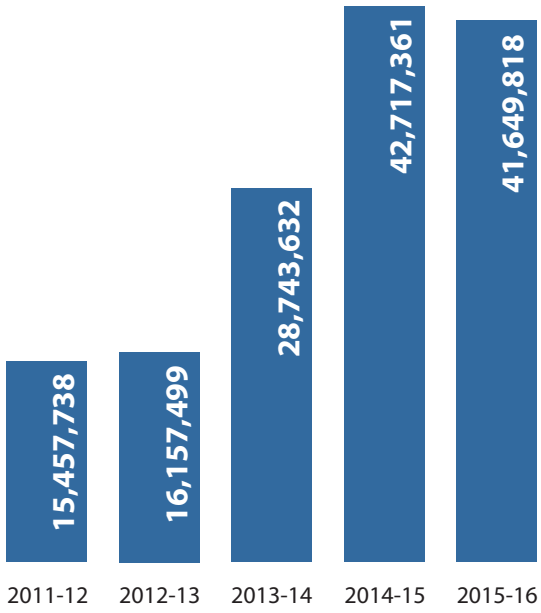
Discus is available on a 24x7 basis to all South Carolinians through geo-location technology allowing access to thousands of journals, e-books, primary sources, current event topics, reference materials, career practice tests, and much more. Since its inception 17 years ago, there has been a steady, overall increase in usage.

The chart included on the next page illustrates Discus usage over time and demonstrates the

program's contribution to the K-12 learning environment. In FY 2015-16, South Carolinians retrieved 41,649,818 items through Discus, of which the K-12 community has historically been responsible for a large portion of these retrievals.

In FY 2015-16, Discus usage decreased slightly from the previous year, however, it is comparable to FY 2014-15 due to the continued technological advancements implemented by the State Library to improve access capabilities. The slight decrease in usage was found to be primarily from the Ferguson's Career Guidance Center and LearningExpress Library databases. Both essential databases include jobs, skill-building materials, and other career tools. As the economy continues to improve these resources experience a reduction in usage.

Discus Usage (Items Retrieved)
Source: South Carolina State Library



In addition, during the FY 2015-16 reporting year, the Discus Training and Outreach Coordinator retired from the State Library which had a direct effect on the program's outreach opportunities and trainings offered. Training sessions and online webinars were temporarily postponed until the new employee could be hired and trained. These ongoing vendor webinars, onsite training sessions, and continued marketing efforts are essential to increasing the Discus usage.

In the South Carolina Department of Education (SCDE) document South Carolina Standards for School Library Resource Collections (2016), Discus was referenced as an integral part of each school library's resource collection and helps meet standard collection recommendations for all grade levels, including elementary, middle and high school. Without Discus, many resource-constrained schools could not meet these core collection recommendations.

Discus provides the same high-quality resources regardless of economic status or geographic location, supporting equal access for all. Without access to high-quality, current and age-appropriate information, student learning suffers. As such, K-12 media centers, as well as academic and public libraries, directly benefit from the availability of this virtual library.

Discus also provides an excellent return on investment from both a learning perspective and from a cost efficiency standpoint, as

indicated through the following information:

- Discus database license costs budgeted for FY 2015-16 were $2,177,860.
- If each library purchased access separately, the total cost would be over $57 million.
- Administration of this statewide program provides cost avoidance of over $52 million (Discus license renewal costs were over $2 million).
- All state funding for Discus goes directly to database acquisition.

Ensuring the State Library provides these resources saves schools and libraries millions of dollars each year by purchasing these products for them at significant statewide discounts.

The Discus program is designed to help ensure a level playing field for all South Carolinians by providing access to high-quality information needed for the success of students of all ages. The collection of resources included in Discus provides material on a wide range of subjects. Social science studies, appreciation of the world's cultures, health and wellness, science education, literary analyses, college readiness, and career exploration are some of the many subjects included in the collection.

In FY 2015-16, Discus experienced steady usage due to the continued technological advancements implemented by the State Library. During the past year the State Library worked with Online Computer Library Center (OCLC) to integrate EZproxy with Discus to provide a central solution of authentication.

OCLC is a nonprofit computer library service dedicated to furthering access to information and is a valued State Library partner. The EZproxy technology provides access without obstacles by working with the Discus content providers to ensure that South Carolinians are recognized as residents and are automatically granted access, which reduces the need for a username and password. The systematic deployment of EZproxy spanned the course of several months to alleviate any potential problems and production downtime.

The Discus database providers continue to incorporate research and collaboration tools for educators and students into their respective products, which keeps the resources on the cutting edge of technology. These Google and Microsoft tools provide a method of saving and sharing research information, leading to better communication and team building.

During FY 2015-16, Gale Cengage announced the inclusion of both the Google Apps for Education and Microsoft Office 365 tools into all of their electronic resources. This is significant for the South Carolina public school districts as many currently use either Google or Microsoft for their technology needs. This integration provides a means for educators and students to easily research, share, and retain valuable information for collaboration and further study. The Gale suite of products covers many subjects and topics pertinent to the Profile of the South Carolina Graduate including language arts, social studies, science, and critical thinking.

EBSCO Explora, a search interface unique to that content provider, has also integrated Google Classroom into its technology for schools that subscribe to Google Apps for Education. This powerful tool is another advancement that has been well received by educators throughout the state during the past year due to the ease of use and necessity for research in today's technical society. Information retained in Google and Microsoft folders can be retrieved by signing into individual accounts wherever internet access is found.

BrainPOP Jr., designed for the K-3 grade levels, continues to see tremendous usage due to its ease of use and the vast collection of information. Educators and students use BrainPOP, Jr. for unit introductions as well as for unit closings. Included in BrainPOP, Jr. are quizzes, activities, and games for younger students, making this a very popular resource.

The most significant decrease in usage is found with Ferguson's Career Guidance Center and LearningExpress Library; both resources used by career counselors and citizens searching for a job or interested in a career change. Ferguson's Career Guidance Center provides excellent career research by including overview articles and videos for over 3,000 jobs and 94 industries, broken into 16 career clusters created by the U.S. Department of Education. LearningExpress Library is an interactive tool that provides practice tests, tutorials and e-books for both students and adult learners to succeed on academic and licensing exams. As the South Carolina economy continues to improve fewer citizens are seeking information from career databases.

The Discus collection offers an exemplary set of online books, periodicals, and informational databases and includes a wide variety of valuable resources. Each database has its own unique area of focus, which makes the entire collection well rounded.

Critical thinking and problem solving skills are stimulated through the Points of View Reference Center and Opposing Viewpoints in Context resources. Global perspective education is promoted through the utilization of CultureGrams by ProQuest. CultureGrams, a database of country, state, and Canadian provinces reports aims to foster understanding and appreciation of the world's cultures and peoples by providing a global perspective for all ages.

Educators across South Carolina utilize Discus in the classroom at every grade level for homework and research assistance which continues as students matriculate through the state's academic libraries. Products such as BrainPOP Jr., Britannica online, and the EBSCO collection of research databases enrich and support the learning environment with content that engages students, supports educators, and bolsters academic achievement.

Resources are provided for STEM programs, literacy development, career growth, and many other areas. Learning research skills at a young age, along with the technical knowledge needed to access the electronic resources,

reinforces the need to provide these tools to all South Carolina students in order to ensure a successful career path.

To learn more about the State Library's Discus, please visit www.scdiscus.org.

SCETV Education Services

South Carolina Educational Television (SCETV) Education Services delivers a wide range of high-quality digital learning content for students and educators, as well as professional development and curriculum support, and communications and collaboration opportunities designed to link learners. SCETV partners with the K-12 School Technology Initiative to provide such resources used extensively by pre-K-12 children throughout the state.

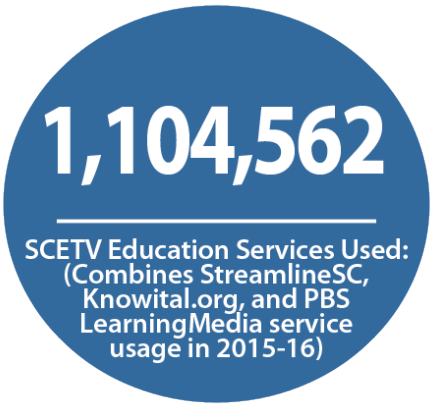
As an example, over the past 12 years, funding has supported SCETV's on-demand multimedia curriculum resource sites StreamlineSC and Knowitall.org. These highly regarded sites, coupled with SCETV's PBS LearningMedia accounted for 1,104,562 on-demand pre-K-12 resource uses in 2015-16.

While digital delivery is becoming increasingly important, traditional means of transmitting content remains the public's first choice of access. From September 2014 to September 2015, 71 percent of all children in the nation, from age two to eight, watched programs on Public Broadcasting Service (PBS) television stations. According to Nielsen research, PBS stations reach more children age 2-5 than any other children's television network, with weekday ratings up 8 percent among children 2-5 and up 7 percent among children 2-8 years of age. PBS Kids resources have been demonstrated to help close the achievement gap for children from low-income families and better prepare them for kindergarten.

Knowitall.org, a longstanding service supported by SCETV and the K-12 School Technology Initiative, is a free online collection of original and engaging educational resources designed specifically for classroom use. Two years ago, SCETV began an extensive overhaul of the site to make it more mobile friendly.

As a result of these efforts, and the transition of services funded by the K-12 School Technology Initiative, Knowitall.org Media was launched in the summer of 2015 with 854 mobile friendly videos.

For 2015-16, 807 videos were added as part of the planned phase two upgrade, resulting in a total of 1,661 mobile friendly videos being offered through the site. SCETV also added 70 audio and 400 images specifically for, and about, South Carolina.



Over 12 years ago, SCETV, in partnership with the South Carolina Department of Education (SCDE) and the K-12 School Technology Initiative, created StreamlineSC, a standards-based video-on-demand service, in an effort to help improve and manage learning resources in the state's schools. SCETV currently uses the curriculum-based content of Learn360, a subscription web-based delivery service for K-12 education. SCETV adds all of its pre-K-12 and professional development productions to StreamlineSC to provide teachers and students with South Carolina based media for classroom use. Learn360 began its supporting role in 2014-15, with the contract scheduled to end August 2017.

Web resources have increased tremendously in recent years, and PBS is now supporting this focus with its research-proven PBS LearningMedia. In 2015, PBS's Learning Media library grew to include more than 100,000 digital resources for pre-K-12 educators. During this same time, PBS collaborated to create more than 8,000 new resources using PBS local station's content. In 2017, PBS will launch PBS Kids 24/7.

Subscription services have become extremely costly, while the trending use of StreamlineSC has been tracking downward. Together, StreamlineSC and Learn360 offer over 143,000 resources to students throughout the state. However, due to limited funding and new SCETV services on the horizon, StreamlineSC will offer only "local" state-developed content after the end of the 2016-17 school year.

SCETV is one of the many educational institutions taking part in supporting the state's goal of the Profile for the South Carolina Graduate. Of the 1,433 respondents participating in an SCETV survey of pre-K-12 teachers, staff and administrators, 88 percent said that a searchable statewide repository of curriculum specific project-based learning activities would be extremely helpful or helpful.

To address the curriculum needs, SCETV is developing a new website to house innovative lessons for tomorrow's graduate. The new site, called LearningWhy, will target schools initiating 1:1 technology environments and is expected to conduct beta testing in the fall of 2016. The project-based and one-on-one lessons are being produced by SCETV and qualified partners, including higher education institutions, the South Carolina Department of Education and local district personnel. The site will include cross-curricular activities, lesson progressions, assessments, and all the media and content links needed for teaching to standards.

For many years SCETV's statewide distribution to schools was through an instructional television fixed service (ITFS) education closed-circuit broadcast system. To make spectrum more digitally compliant, the Federal Communications Commission enforced new regulations in 2005 for ITFS, creating the Educational Broadband Service (EBS). This development gave SCETV the opportunity to lease the state's EBS channels for educational purposes.

The resulting contract now provides over 500 free Wi-Fi devices to facilities within Sprint's coverage areas throughout the state, which SCETV is issuing to applicable early childhood educators and other educational organizations, including afterschool programs. Rural and urban low-income areas of the state now have limited access to Wi-Fi services. SCETV bundles Wi-Fi access with its quality professional development and content funded by the K-12 School Technology Initiative. The project helps close the digital divide in South Carolina and prepares students for success before and after school.

For the last three years, SCETV has surveyed pre-K-12 teachers, staff and administrators to identify needs and gauge the use of education services and technology use in schools. This year, 1,433 pre-K-12 respondents serving public schools, private schools, charter schools, home schools, childcare and adult education centers, and higher education institutions participated in the survey.

Over 86 percent of respondents represented public schools. Of the applicable survey respondents, 94.9 percent indicated the ETV Education Services they employed, including content and professional development, helped better facilitate learning to improve student performance and engagement, and meet the goals of the Profile of the South Carolina Graduate. The results of the survey, including graphs and tables, can be found by visiting the following site; https://www.surveymonkey.com/results/SM-PH9DBDYQ/.

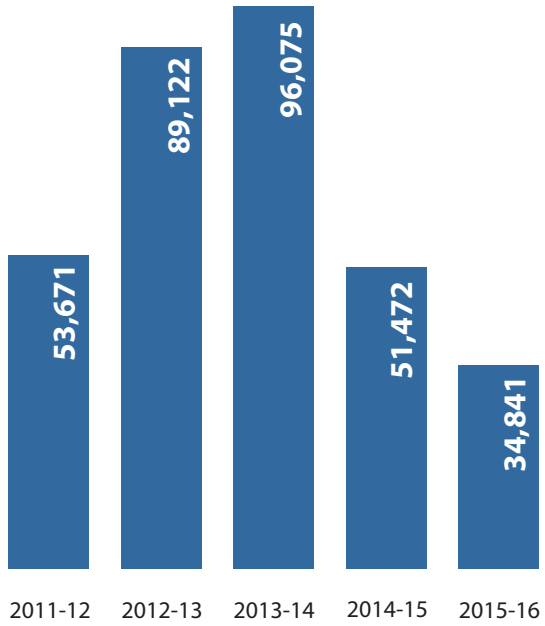
StudySC

In 2010, the South Carolina State Library launched StudySC, a K-12 educational resource that provides online content designed to support state-specific curriculum standards. StudySC provides South Carolina-related web resources for homework and project assistance while also offering lesson plans and other content designed to support classroom activities. Information is arranged by grade level and subject area so students can access the information they need as efficiently as possible. With links to high-quality websites and multimedia content, StudySC continues to be a valuable and popular resource.

The concept for StudySC emerged from feedback indicating the need for a

StudySC Sessions

Source: South Carolina State Library



comprehensive portal to assist in locating age-appropriate state information. StudySC was created to meet this need and to support 3rd and 8th grade social studies curriculum standards.

This student-friendly site includes such subjects as government, culture, history, environment and geography. In addition, there is a section on famous South Carolinians, a glossary, a daily Twitter feed with South Carolina-related facts, and South Carolina Book Award nominees from the South Carolina Association of School Librarians.

The responsive web design employed by StudySC facilitates a better user experience on tablets and smartphones. As a result, 28 percent of all sessions now originate from a tablet or other mobile device. In FY 2015-16, StudySC had 34,841 sessions from across the state.

To learn more about the State Library's StudySC, please visit studysc.org.

VirtualSC

VirtualSC, formerly known as the South Carolina Virtual School Program, was developed in 2007 by the South Carolina Department of Education's (SCDE) Office of Virtual Education. Since that time, VirtualSC has become an invaluable resource to students throughout the state by offering online courses for credit, free-of-charge to all South Carolina students.

The virtual school program has become increasingly popular since its inception, as evidenced by the 25 percent growth in student enrollments during the past year. VirtualSC courses, available to any public, private, home schooled or adult education student in the state, are provided online via an online learning management system, Moodle. Registration for these courses takes place in the program's customized student information system, OpenSIS. Teachers remain in contact with their students through a variety of methods, such as by telephone, web conferencing, and instant messaging systems like Skype.

> *"THE PROGRAM IS GREAT AND HELPS STUDENTS GET THE CREDIT THEY NEED IN ORDER TO GRADUATE."*
>
> *Student Testimony*

To help ensure course offerings meet quality, design and academic standards, the SCDE's Office of Virtual Education recently developed a curriculum team. The curriculum team, which consists of several instructional designers, a media team, a curriculum coordinator, and a program coordinator, is responsible for new course design and development, course reviews and revision, and media development for interactive learning objects within new and existing courses.

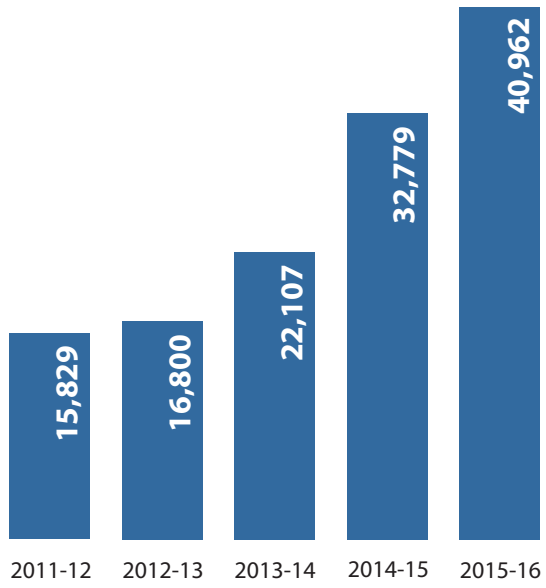
Recently, VirtualSC has begun to align all courses based on the Quality Matters framework to ensure courses meet accessibility guidelines and follow the guidelines of an external review framework. Future plans include having all courses reviewed by an external review committee using the Quality

Matters framework to ensure all courses meet national guidelines and standards, as well as state academic standards. The curriculum team also supports several other virtual academic resources for students, including test preparation for AP, SAT, ACT, Elementary Keyboarding, and EdReady Skills Recovery resources.

Courses offered through this program are taught by state-certified teachers who have demonstrated expertise in their individual subject areas. All VirtualSC full-time teachers hold a rating of "highly qualified" in their subject area by the SCDE. In addition to their outstanding credentials, all full-time and part-time teachers must undergo in-service online professional development training to teach with the program.

VirtualSC Enrollments

Source: South Carolina Department of Education



VirtualSC used a total of 34 full-time teachers for the academic year in addition to 105 part-time instructors to teach the courses offered through the program. The number of full time and part-time teachers has consistently grown over the past year due to the increased student demand for courses. The program intends to add an additional six full-time high school teachers and four middle school teachers for the current school year.

In 2015-16, VirtualSC was able to serve 40,962 student enrollments from 417 schools in 81 public school districts, 36 home school associations, 71 private schools, and 34 adult education centers located throughout South Carolina. Of the students who completed their course, the program had a successful course completion rate of 85 percent for the school year.

VirtualSC offered courses in 10 subject areas including career and technology education, English and language arts, fine arts, health/physical education, mathematics, science, social studies, world languages, skills recovery, and test preparation. The program also offered 78 diverse courses of varying levels, including advanced placement, honors, college preparatory and credit recovery classes. In addition to courses in the core content areas of English, mathematics, science, and social studies, VirtualSC offered courses in three languages – Spanish, Latin and German – as well as a variety of electives in such popular career majors as health occupations, family and consumer science and business education.

In addition to the 40,962 student enrollments served in high school level courses, the program also served an additional 36,180 elementary school students in the program's blended elementary keyboarding course. In total, the program served 76,104 enrollments across all virtual courses and resources, which totals 60,833 individual students from across South Carolina.

During the 2015-16 school year, VirtualSC added a number of innovative options for students and continues to seek out new opportunities for students based on statewide student and school needs.

Once again, VirtualSC has continued to partner directly with schools to offer its Virtual Learning Labs, which are designed to help schools fulfill several needs resulting from budget cuts, reduced funding and teaching vacancies at smaller schools across the state. Through these learning labs, schools are provided a standards-based virtual course as well as a highly qualified state certified teacher who meets virtually with students during a set period of the school day to provide instruction.

The program also continued its successful robot pilot program, which became part of the Virtual Learning Lab option. Through the use of "Double Robots," which display a visual image of the actual teacher, the VirtualSC teacher can better physically connect with students in the classroom. During the 2015-16 school year, VirtualSC offered robots to four schools including keyboarding at LEAD Academy Charter School and Dacusville Middle School, medical terminology at Timmonsville High School, and personal health at Manning High School. These classes included a total of 167 students and had an excellent overall success rate of 91 percent.

VirtualSC also continued to expand its flexible Franchise Program to schools and districts across the state. The program allows schools to use VirtualSC developed course content, the program's learning management system,

Moodle, and its student information system.

VirtualSC developed and began offering the Franchise Program to districts during the 2014-15 school year with one pilot district, Aiken County Public School District. In the 2015-16 school year, the Franchise Program expanded to four districts, serving a total of 2,026 students from Aiken, Berkeley, Dorchester Four, and Jasper school districts.

Each of the four districts use its VirtualSC franchise in a slightly different way to best fit its own unique needs. As an example, in the Aiken County Public School District, the VirtualSC enrollment was at capacity. Therefore, the District developed a complete supplemental virtual school program designed to fill gaps in what the district can offer and in student schedules.

Dorchester School District Four and Jasper County School District, on the other hand, are using their franchises to support students at their respective alternative schools. When students are referred to the alternative school in Jasper County, the teacher at the high school can continue to view the student's progress as the alternative school works to ensure the student is on track when they leave to go back to their regular classroom.

Dorchester School District Four has taken a competency-based approach to get students back on track and prepared for graduation by blending face-to-face instruction with the online curriculum provided by VirtualSC. When a student is deemed to be competent in a given area, they are allowed to move on at their own pace instead of being dependent upon others mastering content at the same speed.

Since the implementation of the VirtualSC Franchise Program in Dorchester Four, the district has seen tremendous growth in alternative school student achievement. Such growth can be seen in the number of students earning high school diplomas from the alternative school program, as well as the rise in End of Course Exam (EOCE) scores, which saw increases ranging from nine percent in U.S. history to 21 percent in English 1.

VirtualSC also continued to offer and expand its blended elementary keyboarding program. During the 2015-16 school year, VirtualSC served 36,180 elementary students in 38 districts across South Carolina. The elementary keyboarding program was also enhanced during the 2015-16 school year to include students in grades K-2. As a result, students in grades K-6 can now participate in the program.

The keyboarding program is offered at no cost to schools statewide and the students work with their teacher in a web-based virtual environment to complete tasks, games, and other projects designed to assist with learning effective keying strategies at a younger age. Schools had shown interest in such an offering for several years in an effort to begin preparing students for computerized standardized testing. VirtualSC was able to add the program based on district and school feedback.

The VirtualSC program completed a review of

its five year strategic plan focused on the Profile of the South Carolina Graduate – a description of the knowledge, skills and characteristics deemed critical for the state's graduates to compete in a global economy – and ensuring that students working with the program are college and career ready. Throughout the strategic planning process, the VirtualSC Leadership Team identified several ways to help meet this goal. Such efforts include working to develop middle school level courses that provide students the opportunity to learn how to take online courses as they prepare for high school and beyond. This ability will help ensure students acquire excellent life and career characteristics beginning as early as middle school. Students in grades 6-8 are scheduled to begin enrolling in these courses during the fall 2017 semester.

In addition, VirtualSC has plans to offer many exploratory courses to middle school students to ensure they are properly prepared to enter high school. The virtual school program will also support the Profile of the South Carolina Graduate in a number of ways, including the continued development of advanced world language courses. Currently, the program offers Spanish 1-4, German 1 and Latin 1-4. The program is planning to continue to build out additional levels of German and begin the development of a French 1 course.

Lastly, the program will begin to explore a variety of enrollment opportunities for students to expand upon the availability of the program. In the 2016-17 school year, the program will begin to offer an eight week version of many courses during a "fast track" semester. The program is also exploring the feasibility of providing competency-based courses that are offered on a personalized timeline with no fixed end-date, but will conclude once the student has demonstrated competency in the subject matter through a project or other such assessment. The VirtualSC program is continuing to look for innovative methods for enrollment and course length based on research from other state programs.

VirtualSC will be expanding and implementing a plethora of ways to ensure that students obtain world class knowledge, world class skills, and life and career characteristics needed to be academically successful in the a 21st century while supporting the Profile of the South Carolina Graduate.

Additional Funding Needs

The VirtualSC program is growing rapidly in multiple directions and is poised to assist the state with issues in educational equity to ensure that all students have equal educational options and opportunities regardless of where in South Carolina they live. In the 2015-16 school year, the program was able to serve 100 percent of the students that requested on-time registration during open enrollment periods. This was the first time in the history of the program that students were not turned away due to lack of teaching staff. This measure helped the program continue the pace of growth with other surrounding states,

however, that rapid growth has caused funds for additional adjunct teachers to become depleted. The program is on target for serving 100 percent of the anticipated number of students throughout the 2015-16 school year, but demand for the program will strain program funds.

South Carolina's virtual school program is looking at a more sustainable model for effectively supporting franchise districts. With the rapid growth and acceptance of the Franchise Programs from districts across the state, VirtualSC will need to look at an innovative approach to effectively serve those districts.

One method the program is seeking at the present time is to develop a new Moodle instance that will deliver the program's content through a Learning Tool Interoperability (LTI) connection. This will allow districts to utilize their own learning management system to provide content to students in a familiar learning environment.

SCDE's Office of Virtual Education is working with vendors to identify a low-cost or no-cost option to provide a learning management system for district's without access to one of their own. Such options will utilize an LTI connection to Moodle, which will contain the course content. This will allow the program to more effectively and securely distribute content to franchise districts and allow the program to continue to grow at the current pace.

To learn more about SCDE's VirtualSC, please visit virtualsc.org.

3. INFRASTRUCTURE AND SECURITY

South Carolina Technology Plan Goal:

Provide a robust, secure and cost effective technical infrastructure that improves equitable access to appropriate technologies for all schools in South Carolina.

Partner Efforts to Support the Goal:

As the K-12 educational technology model in South Carolina has matured, its focus has shifted inexorably from the simple provision of a data network or an internet connection to public schools. This is not to imply that connectivity, reliability, or adequate bandwidth are no longer concerns. However, the K-12 School Technology Initiative is now seeing needs such as 1:1 computing (the provision of a computing device for the sole use of every student in a given grade or school), enhanced data and system security, and wireless connection capability campuswide at school facilities as just as critical and as coequal providing basic network and internet services.

South Carolina has achieved much in the nearly two decades since it undertook the challenge of connecting all of its K-12 schools to a common computer network and providing internet access to support learning. And yet, the state finds itself challenged to keep pace with an ever-accelerating need. The quantity of bandwidth and the number of simultaneous connections required inside every school building in South Carolina has reached levels unthinkable a decade ago due to the demands of 1:1 computing, the increasing reliance on sophisticated digital learning content, and the demands of state-mandated online assessments.

The time when it was sufficient to provide a wired network connection to the school office, the media center, and possibly to one or two computer labs is long past. Learners, faculty, and staff must now communicate and collaborate among themselves on a constant basis and from virtually any location on school property, as well as off-site.

> *"ONE OF THE GREATEST RISKS TO THE VIABILITY OF THE ENTIRE K-12 INFORMATION TECHNOLOGY NETWORK, AND ALL OF THE EDUCATIONAL RESOURCES IT ENABLES, IS THE THREAT REPRESENTED BY MALICIOUS INFORMATION SECURITY EVENTS."*

The Federal E-Rate program continues to be critically important to maintaining and building upon the efforts and investments made in

South Carolina's educational technology network and resources. In turn, state allocations for educational technology and the meticulous administration of the state's collective E-Rate applications are crucial to leveraging federal funds for the continued development of K-12 educational infrastructure.

Under the direction of the General Assembly, the K-12 School Technology Initiative has established formal data gathering processes to track school technology readiness and to review district expenditures for educational technology. The South Carolina Technology Readiness Study, performed by third-party consultants engaged by the South Carolina Department of Education (SCDE) is designed to assess the preparedness of K-12 schools for state-mandated online testing beginning in 2017.

The South Carolina Technology Counts Survey, performed by the South Carolina Education Oversight Committee, in partnership with SCDE, tracks school district IT expenditures and assesses district progress in meeting the primary goals set by the K-12 School Technology Initiative. These goals include improvement of external and internal connectivity at schools and the development or expansion of 1:1 computing initiatives. The findings of these data gathering efforts will be discussed in detail below.

One of the greatest risks to the viability of the entire K-12 information technology network, and all of the educational resources it enables, is the threat represented by malicious information security events. Distributed Denial of Services (DDoS) attacks, in which school and district networks are literally shut down by purposely overloading them with outside network traffic, continue to increase monthly.

School and district networks are also subject to malware, virus, spyware and ransomware attacks. Sadly, one of the facts that has emerged from data collected in the studies cited above is the relatively insignificant percentage of K-12 technology allocations to districts being spent on information security. The K-12 School Technology Initiative is very conscious of the serious technical, logistical and human resource issues faced by many school districts, especially the smaller ones, in providing qualified IT support staff and adequate tools to defend their networks from malicious attacks.

The South Carolina Department of Administration's Division of Information Security (DIS) continues to provide monitoring of bandwidth at each K-12 public school district and school, as well as at nearly all public libraries statewide. But recognizing that more proactive measures are necessary to secure the K-12 network and educational resources, the K-12 School Technology Initiative is focused on offering additional support to districts and schools.

As examples of this support, powerful DDoS detection and mitigation services have been put into place to help shield schools and districts from the increasing risk of this type

of hacking exploit. Such protection is offered through the telecommunications companies, AT&T and Spirit Communications, who are partners in the K-12 School Technology Initiative.

SCDE, which sits at the head of the wide area administrative network linking schools, districts, and its office in Columbia, has deployed the Dell One network access and identity management system. This system will simplify end-user network security operations at the district level while providing enhanced protection from abuse and hacking.

The K-12 School Technology Initiative has procured and is making available to school and district IT support personnel, training vouchers allowing access to internationally-recognized SANS Institute IT security training, similar to training provided to staff at DTO.

The K-12 School Technology Initiative is actively engaged in ensuring that all of these valuable resources are used by districts and schools which need this support so urgently.

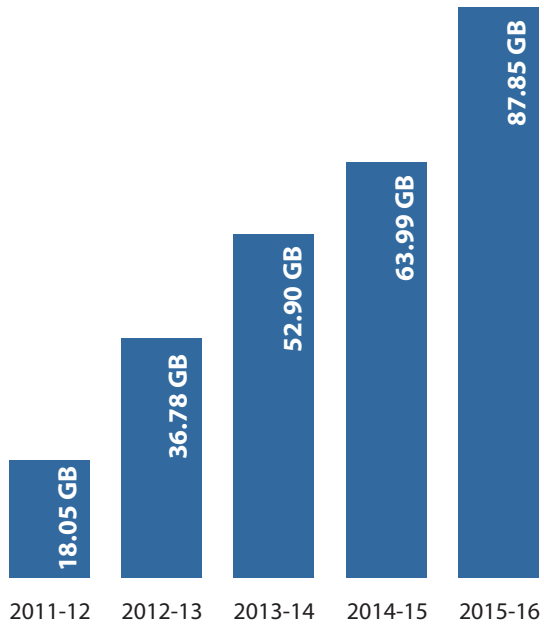
Expansion of High-Speed Broadband Infrastructures

Since 2010, the South Carolina Department of Administration's Division of Technology Operations (DTO) has strived to expand the network connectivity of the state's K-12 public schools and libraries. The main focus of this effort is designed to provide a stronger technology foundation for K-12 students, teachers and library patrons as they acquire the skills needed to prepare for 21st century emerging educational technologies and job opportunities. As a direct outcome of this focus, fiber-based high-capacity broadband connectivity continues to be expanded on a statewide basis among school and library entities.

Internet connectivity for South Carolina's public schools has indeed seen tremendous growth over this time, as evidenced by the fact that in June 2013, there were 67 districts that had 150 MBs or less of internet bandwidth, while only six districts had 1,000 MBs of internet bandwidth. Just three years later, there were only 14 districts with 150 MBs or less of internet bandwidth, and all districts had at least 100 MBs of bandwidth. The number of districts with 1,000 MBs or more bandwidth had grown from six to 32.

Growth of Bandwidth Demand

In School Districts (Measured in Gigabytes)



A complete listing of this information can be found in the Internet Bandwidth by District (2012-13 and 2015-16) Table, located on page 48 in the By the Numbers section of the report.

SC Technology Counts Survey

Per Proviso 3.6 of the 2015-16 General Appropriation Act, the South Carolina Education Oversight Committee (EOC) was charged with developing a form by which districts would report how the amount of funds appropriated for the K-12 School Technology Initiative were expended and for what purposes. Working with the South Carolina Department of Education (SCDE), the EOC provided questions that were included in the South Carolina Technology Counts Survey for the 2015-16 reporting period to address the following issues related to the K-12 School Technology Initiative:

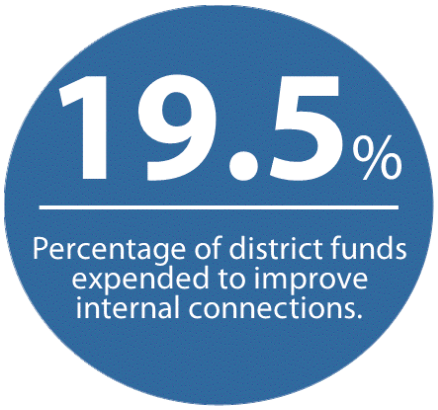
- How were K-12 School Technology Initiative funds expended in FY 2014-15 and FY 2015-16?
- Are school districts and schools meeting the three objectives of the K-12 School Technology Initiative: (1) to improve external connections to schools, with a goal of reaching at least 100 kilobits per second, per student in each school by 2017; (2) to improve internal connections within schools, with a goal of reaching at least 1 megabit per second, per student in each school by 2017; or (3) to develop or expand 1:1 computing initiatives?

All 82 school districts, including the South Carolina Public Charter School District, responded to the survey. Highlights of the survey are included below.

Regarding blended or virtual course offerings, not offered through VirtualSC, 31 districts responded that they offered such content. The thirty-one districts that responded in the affirmative are included in the Blended/Virtual Course Offerings by District Table found on page 48 in the By the Numbers section of the report.

As part of the Technology Counts Survey, school district's total expenditures by percentage were captured. Of particular note, the percentage of funds expended for the replacement or purchase of devices decreased from 67.1 percent in 2014-15 to 62.6 percent in 2015-16.

In addition, the percentage of funds expended to improve internal connections increased from 15.8 percent in 2014-15 to 19.5 percent in 2015-16. A complete listing of district expenditure percentages is provided in the Percentage of Total Expenditures Table, located on page 48 in the By the Numbers section.



When asked for what purpose carry forward funds were being expended in fiscal year 2015-16, districts responded accordingly. Twenty-six districts indicated they used all or a portion of their carry forward funds to improve internal connections in schools. The fewest number of districts indicated they would use a portion of their carry forward funds to improve security or expand broadband. A listing of district responses can be found in the Initiative Funds Carried Forward to 2015-16 Table, located on page 48 in the By the Numbers section.

The EOC and the K-12 School Technology Initiative Committee have been interested in knowing how many districts hire outside vendors or consultants to file Educational Rate (E-Rate) reimbursements and how much the districts pay for such service. The E-Rate program was instituted under the Telecommunications Act of 1996 to expand internet and telecommunication connectivity for schools and libraries. However, recent changes in the program have eliminated or reduced funding for services which have traditionally received full funding. Schools and libraries that are not monitoring this change will face significant funding loss and not be prepared.

Forty-four districts reported paying an outside vendor or consultant to file E-Rate reimbursements at a rate of 10 percent or less. If a district responded "not applicable," it can be assumed that either district staff files for the E-Rate reimbursements or no E-Rate reimbursements were filed. A listing of these reimbursements is provided in the District and E-Rate Reimbursements to Consultant Service Providers Table, located on page 48 in the By the Numbers section.

The Technology Counts Survey also asked schools questions regarding internal connectivity. There were 1,248 schools in the 82 school districts that responded to the survey. The following questions and responses highlight the technology capacity of individual schools, as reflected in the goals of the K-12 School Technology Initiative.

Regarding internal connections, the answers to the following questions overwhelmingly show that schools have adequate internal connections per device.

Question: On average, does each concurrent (actively in use) wireless student device at this school location have access to at least 1 Mbps of bandwidth from the device to the core of the local area network?
Answer: Yes – 1,072, No – 138, Unknown – 38

Question: On averages, does each concurrent (actively in use) wired student device at this school location have access to at least 1 Mbps of bandwidth from the device to the core of the local area network?
Answer: Yes – 1,127, No – 97, Unknown – 24

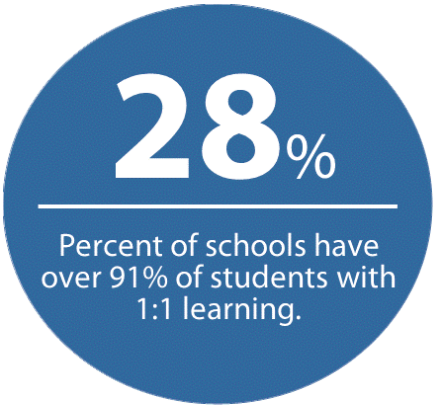
However, in looking at internal connections at the student level, the responses show that internal access can be improved for 40 percent of schools, based on the following question and responses. Approximately 55 percent of schools

have at least 1 Mbps of bandwidth within the school.

***Question:* On average, does each concurrent (actively in use) student device at this school location have access to at least 1 Mbps of bandwidth between the local area network and central location, such as district office or other sites which host common accessed resources for this location?**
Anser: Yes – 691, No – 527, Unknown – 28

The Classroom Access to Wireless Network Table, found on page 49, documents the extensive internal access of classrooms to wireless access networks. Over 95 percent of all schools reported that between 91 and 100 percent of classrooms in their school had internal access to wireless networks.

In regard to 1:1 learning, the Technology Counts Survey documents a wide range of responses received. Of particular note, approximately 27 percent of schools have no students with 1:1 learning while 28 percent of schools have over 91 percent of students with 1:1 learning. A complete listing of the responses can be found in the Percentage of Students with 1:1 Learning Table, located on page 49.



Two-thirds of schools reported having adopted a goal of implementing or expanding 1:1 computing. Of those schools responding they have a goal to implement or expand 1:1 computing, schools were asked several questions about the grade levels for which 1:1 computing is targeted or has been implemented.

The responses document that schools that have implemented 1:1 computing have focused on grades 3 through 12. Schools that are targeting implementation of 1:1 computing are focusing on grades three through five. A complete listing of the responses by district is provided in the Number of Schools in Each District Reporting No 1:1 Computing Capability in the School Table, found on page 50 in the By the Numbers section.

Of the 335 schools that reported having zero percent of students with 1:1 computing, 60 percent were either elementary or primary schools. These 335 schools were located in forty-eight districts. The Number of Schools Responding 1:1 Computing by Grade Level Table, contained on page 49, documents the responses to this question by school district and by type of school and identifies schools that have grade spans that extend from elementary to middle and middle to high.

SC Technology Readiness Study

The South Carolina Technology Readiness Study is an initiative, funded by the General Assembly, which provides technology technical consulting services to South Carolina public school

districts that may need assistance in preparing for online student assessments, beginning 2017. As part of this commitment, the South Carolina Department of Education (SCDE) has engaged independent third-party consultant services to offer individualized Technology Readiness Analysis.

The effort began with a prioritized list of rural and "plaintiff" districts of the Abbeville equity lawsuit (Abbeville vs. South Carolina). Areas addressed in this study include the district's technology readiness to deliver state-required and other local online assessments, 1:1 computing, enhanced internet connectivity for the support of instruction in their schools, and related IT aspects of school operations related to technology.

The Readiness Analysis provides an independent evaluation of each school district's ability to organize and conduct district-wide testing for their students in grades 3-8 starting in the spring of 2017. Federal testing guidelines will take effect in 2018, however South Carolina's legislature has implemented plans for all districts to begin formal testing in March 2017 for math and English language arts classes inclusive of all students in grades 3-8.

These proactive analyses benchmark a district and their schools in several key areas and provide a technology readiness score that leads to a roadmap of detailed tasks and deliverables that are necessary to improve any deficient areas.

The three specific objectives of this analysis are as follows:

1. Analyze the strengths and weaknesses of the school district and quantify their ability to carry out the online testing activities in 2017 and beyond, while documenting any major gaps in "readiness."
2. Identify recommendations to bridge the gap between where the district is and where they need to be in terms of readiness to carry out these activities.
3. Collaborate with the district to put in place a blueprint for completing any tasks (or procurements) necessary to achieve "technology readiness."

Primary Areas of Readiness

A number of primary areas of readiness were identified. These areas include facilities, infrastructure, hardware, teacher readiness, student readiness, funding mechanisms, strategic planning and IT support model.

District Participants

While there are a substantial number of rural districts in the South Carolina public school system, funds allocated for this initiative may not be adequate to offer high quality and much needed external consulting services to all districts of need. Therefore, it was recommended that initial focus be placed on the plaintiff districts involved in the lawsuit between districts and the state (Abbeville vs. South Carolina) and any other rural districts identified by the State Superintendent's office. Wave 1 and 2 consists of the Abbeville plaintiff

districts, while Wave 3 includes the initial rural districts requesting analysis activities.

Overview of Rating Scale

To evaluate the readiness of a district in multiple areas, the consultant team created a rating scale to objectively measure how effectively, or ineffectively, a particular area rates compared to other districts. After each area has been given a score, the analysis team compiles the statistics and averages them to derive a final readiness score for the district. To simplify the process, the consultants used a scale of 1-5 that increases in half point increments. The following scale can be used to track future readiness decisions:

- **Rating 1:** The district is unable to prove they can successfully complete online testing in 2017.
- **Rating 2:** The district could feasibly conduct testing in 2017 but there are multiple areas that need to be improved to make this happen and if they are not completed testing will more than likely be unsuccessful.
- **Rating 3:** District will be able to meet the 2017 Online Testing requirements. The District will not be able to handle additional subjects or grade levels without significant improvement in multiple areas.
- **Rating 4:** District will be able to meet the 2017 Online Testing requirements and they can meet a few extra subjects or grades but not all future needs.
- **Rating 5:** The district is prepared for 2017 and beyond. They do not have any measurable risks associated with Online Testing for 2017 or beyond. They can handle online testing for all grades and subjects.

Summary of Findings

The overall average score for the plaintiff districts was 2.6. The graph shows that 29 of the 34 participating districts could feasibly conduct testing in 2017, however there are multiple areas that need to be improved to make this happen. Five districts would be able to meet the 2017 online testing requirements but would not be able to handle additional subjects or grade levels without significant improvement in multiple areas.

As a result of the initiative, each participating district received a report detailing the consultants' findings and recommendations as to the district's readiness for online testing. The consultants presented each report directly to the district's superintendent and in several cases directly to the district's school board to further emphasize the importance of adequately preparing for these testing

activities.

The consultants worked with representatives of each district to create a detailed listing of specific "needs" that could be tied directly to increasing their readiness for online testing. The intent of this listing was to identify exactly what might be needed (i.e., space, more bandwidth, routers, access points, computers, monitors, desks and chairs, professional development, etc.).

Once the specific items were listed, the consultants confirmed what potential sources of funding "could" be used to acquire these items, such as K-12 School Technology Initiative funds, grants, tax money, bonds, general funds or other sources.

The state has drafted two provisos that are focused exclusively on the hardware and infrastructure components of the assessment. The total amount of the combined provisos is $16,800,000 and the funds can only be used in these areas.

Challenges the Districts Face with Resources

One of the common denominators many of the districts that participated in the state's Technology Readiness Studies face is lack of resources associated with technology support across the district and within the schools.

Number of Resources

Many districts simply don't have enough technology staff to do the work. The few existing staff are overworked and are consistently in "reactionary" mode and unable to think proactively nor strategically about how to improve technology utilization across the district or within a single school. On average, each district is missing at least two very specific types of support resources; technology coaches/professional development assistance and hands-on technology support personnel. Many of the mid-sized and larger districts struggle with even greater shortages.

- Professional development staff are lacking in most of the districts. The inability to have predictable funding makes it challenging to hire these types of resources.
- Many of the districts simply can't afford other technology technical support specialists and try to "make do with what they have."

Skill Sets of Existing Staff

Many districts have grown their existing IT staff by promoting media specialists up the ranks to ultimately manage the technology platforms. These staff resources were not properly trained nor are they equipped to complete many of the technology support activities needed in today's complex operating models. Many of these resources might have skills in one area but are generalists in other important areas because they lack the time and training to become more adept at these other areas. Examples include:

- Networking expertise is scarce.
- PC skilled desktop support staff struggle to support other operating system-

based products because the skills are not necessarily transferrable.

- Managing websites is challenging and time consuming.
- Managing IT security is extremely complex and requires skill sets many districts' staff simply do not possess.

Examples of specific skills might include the areas of:

- Router, firewall and switching.
- Networking/server.
- Disaster recovery.
- Internet/IT security.
- Infrastructure/database/virtualization.
- Professional development/training.
- Classroom/instructional technology.

Funding/Salary Structure

Another major challenge is how IT salaries are budgeted and funded. The budgets that are available to pay for technology equipment, services and staff are not predictable from year to year. The funds are also inadequate to pay for these high dollar expenses. Salary pay grades available in many districts to pay these scarce resources are neither competitive nor consistent with peer or market salary schedules.

IT salary structures among South Carolina school districts widely vary and often times the more affluent districts acquire talent from their neighbors because their salary structures pay substantially more for the same position.

Unfortunately, many of the school districts the consultants met have salary structures in place that are rigid and in many cases unrealistic. These salary bands/grades make it very hard to attract and retain technology resources needed. Until these are modernized (increased) it is difficult to see how these districts will be able to afford the talent required to support the technology that is critical to the education ecosystem across the state.

The presentation linked below provides information regarding the process and initial observations of this initiative. To view the presentation, please visit https://www.youtube.com/watch?v=S47Gr_7R_Z4&feature=player_embedded.

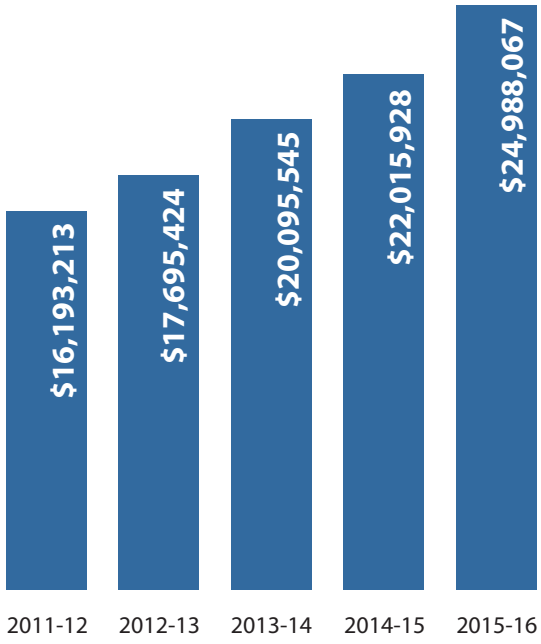
Federal E-Rate Program

Since 1998, the federal E-Rate Program has proved transformational for education technology in public schools and libraries across South Carolina. Today the support provided by this program is being utilized by the Division of Technology Operations (DTO) to acquire broadband services for the state's public K-12 school and library network participants.

DTO is also responsible for the administration of the South Carolina E-Rate Consortium which includes school districts, charter schools, special schools and libraries. Administrative functions in this area include preparing and filing annual applications for network connectivity – which is essential in providing internet access to most of the State's public schools and libraries. In addition, DTO's South Carolina

E-Rate Funding Disbursements

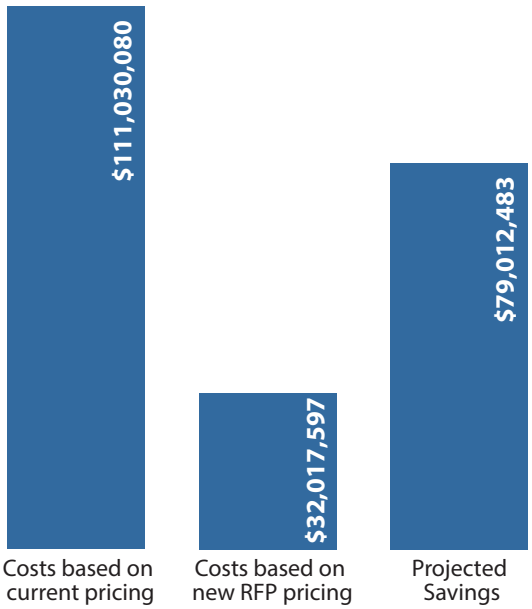
Source: Division of Technology Operations



7-Year Internet Contract Totals

Source: Division of Technology Operations

Costs include projected 10% growth/year after year one. Bandwidth projections for costs are based on 2016-17 Form 471 internet application.



E-Rate Consortium staff assist individual school districts and libraries with their own E-Rate applications and maintain state master contracts for E-Rate eligible services.

Such assistance is provided through the K-12 School Technology Initiative website and consists of current program news, resources and deadlines. Additional assistance is provided through a series of live training sessions held in multiple locations throughout the state.

To support the E-Rate Consortium, DTO manages funding from the K-12 School Technology Initiative which are used to pay service providers who supply network access to connect public schools and libraries with private-side wide area network (WAN) services and internet services. The E-Rate Consortium staff file for reimbursement from the Federal Communication Commission's Schools and Libraries Division based on the discount for which each district and library qualifies.

These high speed, 21st Century networks meet a number of local needs and connect the schools and libraries to a central hub which, in turn, links each site to the internet and access to numerous state resources.

The funding support offered by the E-Rate program is essential to the continued expansion of education technology in school and library entities statewide.

Value of State Master Contracts

Aside from providing broadband connectivity to members of the South Carolina E-Rate Consortium, the Division of Technology Operations (DTO) manages state procurement

on behalf of schools and libraries in South Carolina. As such, the schools and libraries in the Consortium are able to take advantage of lower prices and less administrative burden when using the 25 K-12 specific State Master Contracts.

The true value of the State Master Contracts is realized when DTO uses a competitive marketplace to provide high quality services at extremely low prices. In fall 2016, DTO awarded Spirit Communications a seven year internet State Master Contract valued at a projected $32,000,000. Under this new contract, DTO was able to negotiate new rates that are estimated to save the South Carolina E-Rate Consortium $79,000,000 over the seven year contract term.

Bandwidth Monitoring Program

The K-12 School Technology Initiative has continued its efforts to ensure that connectivity and Internet bandwidth are best being used to serve the state's educational needs. These services, offered by the Department of Administration's Division of Information Security (DIS), provide security and monitoring of internet bandwidth utilization.

As part of this service, DIS assists with the detection, prevention and handling of security breaches and virus attacks, as most districts and libraries do not have sufficient resources to manage these ever increasing threats. Through the Bandwidth Monitoring Program, DIS has monitoring sensors deployed in each of South Carolina's 81 public school districts, as well as eight charter schools, 10 special schools and 38 public library systems.

Distributed Denial of Service (DDos) Protection Service

In an effort to help South Carolina's schools and libraries combat the increased use of distributed denial of service (DDoS) attacks, the K-12 School Technology Initiative began offering a new managed security service in the summer of 2015. The DDoS Protection Service, offered through an agreement between the Division of Technology, Spirit Communications and AT&T, is designed to help detect and mitigate DDoS attacks before they can reach a K-12 connection.

The service helps identify and block malicious packets in near real time, while allowing productive Internet traffic to continue to flow. This prevents any possible negative and disruptive effects such attacks have on their intended targets.

DDoS attacks, which attempt to render an organization's online services unavailable by overwhelming it with network traffic from multiple sources, are extremely costly in both time and financial resources. Without protection, organizational resources are quickly overwhelmed by various types of resource depletion or simply by sheer volume of the traffic directed against targets.

With our growing dependency on the Internet-based delivery of data and other education-related services, the cost of DDoS attacks is expected to continue skyrocketing in the years

to come. A June 2015 article appearing in the Infosec Island website, stated that DDoS attacks could cost victims "as much as $40,000 per hour in lost revenue, loss of consumer trust, sensitive data theft and intellectual property losses."

A number of school districts in South Carolina have experienced major DDoS attacks in the past several years, while many others have experienced the same attacks to a somewhat lesser degree. Initial reports gathered during the first three months of the DDoS Protection Service indicate the frequency (averaging more than one per week) and the duration (ranging from hours to days) of smaller attacks are increasing as well.

This is particularly true during times when students may be motivated to disrupt school activities, such as online testing, that are dependent on Internet service. Students, or any other attacker, can initiate various types of DDoS attacks at a very low cost with little fear of being discovered or prosecuted. In some cases, students share the DDoS attack information with classmates, which quickly breeds additional attacks which may cause greater disruption of the targeted service.

It may not be possible to prevent DDoS attacks, however, it is imperative that they be mitigated quickly and effectively. The DDoS Protection Service helps to maintain the integrity and efficiency of Internet based resources for South Carolina's school and library administrators, teachers and students.

Security Training Voucher Program

The Security Training Voucher Program is another valuable resource established by the K-12 School Technology Initiative in an effort to enhance cyber and information security defense proficiencies among the state's public school districts. This effort focuses on promoting IT security training, the applied concepts of which will assist in improving the overall information security of students and staff district-wide.

Through this program, a staff member from each of the state's public school districts is provided with a voucher entitling the recipient to online training offered through the SANS Institute, a world renowned security training organization, and the ability to take the Global Information Assurance Certification (GIAC) examination without cost to the participating district.

The K-12 Technology Initiative is aware of the budgetary constraints our state's schools face, but also recognizes the essential need to further develop critical information security capabilities to better protect our schools, students, data and resources. This program was created with this need in mind, and provides districts the opportunity to acquire world-class security training for staff during a time in which budgetary demands might not otherwise allow.

The SANS training, which includes both OnDemand and vLive opportunities, was designed by a collaboration of the SANS Partnership program and the Center for

Internet Security (CIS) to assist in achieving a greater cyber security stance worldwide. The OnDemand and vLive formats, each offering slightly different features, allows participants the flexibility to choose the workflow, interaction, and training speed that best meets their individual needs.

The examination provided by GIAC, the leading provider and developer of information security certifications, tests and validates the ability of practitioners in related security areas. As a result, GIAC certification holders are recognized as experts in the IT industry and are better prepared to help enhance their district's security posture.

K–12 School Technology Initiative funds will continue to play a vital role in sustaining and refreshing South Carolina's technology in order to maintain hardware, software, connectivity and infrastructure.

Dell One Identity Manager Project

The South Carolina Department of Education (SCDE) selected the Dell One Identity and Access Management (D1IM) solution to replace its current access and authentication systems which consist of an in-house developed application and a commercial off-the-shelf solution which is at end-of-life. Dell One's solution is flexible and extensible to meet agency, district, technical and security requirements.

The D1IM solution will also allow for end-user self-service access requests; provisioning, de-provisioning, re-provisioning of accounts, entitlements and permissions; attestation and segregation of duties (SOD); role based access controls (RBAC); compliance and audit alerting and reporting; enable single sign-on (SSO), just-in-time cloud provisioning identity federation, access control and auditing for browser-based applications; empower agency and district users to manage policies and events without having to engage the helpdesk or IT.

In addition, the D1IM solution will save valuable time for SCDE and district staff by allowing access to various

applications through the SSO portal, providing the ability to reset passwords in a secure environment through the use of pre-determined validation questions, and updating demographic information such as phone numbers and physical addresses without having to involve the SCDE help desk.

D1IM will serve as a replacement for the current Web Accessibility Application (WAA) Tool currently utilized for access to SCDE applications through the agency's member center. This application is antiquated and in need of modernizing due to the fact that Microsoft is no longer supporting Unified Access Gateway (UAG) based applications.

The project began during the 2015-16 school year and is currently in the development phase with internal testing taking place with the SCDE's Chief Information Office and Chief Information Security Office staff. This testing will help to provide feedback on the overall functionality of the application as well as to ensure the efficiency of workflows and security configurations.

District involvement with the project began in September as several districts volunteered to assist SCDE with external user testing. Training for district web access coordinators and IT directors is scheduled for November/December 2016, with Dell One implementation scheduled for completion in December 2016.

4. PROFESSIONAL DEVELOPMENT

South Carolina Technology Plan Goal:

Improve teacher and administrator integration technology in the classroom, administration, and overall learning process.

Partner Efforts to Support the Goal:

It is important to understand that while today's technology infused classrooms place more responsibility for learning and managing information on the learners themselves, this does not imply automated or robotic teaching. On the contrary, teachers are more critical than ever to the learning process both in the classroom and beyond.

Teachers are transitioning from being the primary source of learning content, by means of lecture and classroom demonstration, to being enablers of learning, pointing students to the most useful resources, advising and encouraging them to grow their own analytical and problem-solving skills, and assisting them in making the best use of the technology resources at their disposal.

So it is that the task of providing teachers and administrators targeted, effective, and timely professional development opportunities has become more rather than less important.

The partners of the K-12 School Technology Initiative have long understood the intrinsic link between positive educational outcomes in the technology-driven learning environment and the professional development offered to teachers. The South Carolina Department of Education (SCDE), South Carolina Educational Television (SCETV) and the South Carolina State Library, continue to provide powerful, effective, cost-efficient, flexibly scheduled professional development opportunities for thousands of teachers annually.

"THE TASK OF PROVIDING TEACHERS AND ADMINISTRATORS WITH TARGETED, EFFECTIVE AND TIMELY PROFESSIONAL DEVELOPMENT OPPORTUNITIES HAS BECOME MORE RATHER THAN LESS IMPORTANT."

SCETV Teacher Training and Recertification

South Carolina Educational Television (SCETV) is historically committed to serving South Carolina's districts, schools and educators by providing quality professional development and teacher recertification to meet the needs of our teaching professionals, who impact learning each day in classrooms across our

state. SCETV provides the support needed to assure the success of the following projects funded by the K-12 School Technology Initiative: Knowitall.org, StreamlineSC, and now LearningWhy.

South Carolina's educators can save valuable time and effort in finding certificate renewal and graduate level courses using the SCETV Teacher Courses Searchable Site. Through this site, educators cannot only search by curriculum interest, professional development and credit needed, but can also readily find out if courses qualify for technology credit. One click on the course title and educators can find course descriptions, cost and also access to easy enrollment with the option to pay online.

The SCETV Teacher Courses Searchable Site contains all courses offered by SCETV Teacher Recertification, Teacherline Southeast and TeacherStep. There are courses for 20, 40 and 60 renewal credits and also courses that offer one to three hours of graduate credit through affiliated colleges and universities.

Special SCETV technology training and courses that meet Program of Alternative Certification for Educators (PACE) requirements are easily identified. ETV Recertification Courses traditionally point to curriculum content provided through StreamlineSC and Knowitall.org, giving the teachers the guidance and content they need to facilitate learning. The South Carolina Department of Education approves all courses. The online and blended course services are self-supporting through tuition and fees. There were 3,353 enrollments for all three online teacher courses services, which resulted in 92,884 instructional hours.

Teacher's preferred method of receiving SCETV training is through its online course. To learn more about SCETV Teacher Courses, please visit http://scetv.org/teachercourses.

It is vitally important to the success of the state's K-12 educational undertaking that teachers be as well-equipped as possible. The realization of this goal, accomplished in part through pre-service and in-service training, is crucial when dealing with the intense demands of lesson development and delivery, advancements in educational technology and accurate assessment of teaching and learning outcomes.

SCETV contributes to developing and maintaining the professional capacity of our teachers, staff and administrators. Over 55 percent of those responding to SCETV's 2015-16 annual survey indicated their school or district provides or require mobile or laptop technology for each student. To assist in this

ongoing transformation, SCETV conducts hands-on training on how to use SCETV web content and technology in the classroom.

In addition to the online offerings, SCETV's face-to-face training provided 6,305 public, private and home school teachers, staff and administrators quality professional development. Classroom and hands-on training services offered through SCETV include assessing training needs, conducting school, district-wide and regional training for educators on how to use the educational content, and technology for personalized and project-based learning.

Online Professional Development for Certified Staff

The South Carolina Department of Education's (SCDE) Office of Virtual Education recognizes the importance of improving teacher technology proficiency to help ensure students are receiving the appropriate instruction to become productive citizens in the 21st century.

The Office of Virtual Education has continued to offer online professional development courses for South Carolina certified staff. The courses that are offered are all technology integration courses and courses that help to lead to the Online Teaching Endorsement, as well as other endorsements, for certified teachers and administrators.

Courses are offered for both renewal credits and graduate credits to assist teachers in renewing their teaching license. Courses are taught by current classroom or former classroom teachers that had exemplary skills in integrating technology into their daily lessons.

The main purpose of taking courses through the program is to ensure that teachers have the skills to enhance their daily instruction by including technology in every way possible for the benefit of the students. Through taking these courses, we are more assured that teachers are preparing their students for becoming good digital citizens and are prepared with 21st century skills.

In 2015-16, the program saw continued growth by serving 6,742 educators. This year the program has been expanded to serve educators who are working to meet the requirements of the Read to Succeed legislation. The Office also partnered with the SCDE's Literacy Office to provide one course to educators at no cost by utilizing literacy specialists as the online instructor. The office provided training, professional development, and mentorship to the literacy specialists as they began teaching their first online course through the program's systems.

Currently, the program is an approved provider of the full suite of courses required to complete the Read to Succeed endorsement, as well as, the online teaching endorsement. Popularity has been growing for both of these endorsements. The program will continue to expand and explore online professional development opportunities for educators that are needed to ensure that teachers can best

serve their students in their classrooms.

Discus Professional Development

The Discus staff offers onsite and online training opportunities for teachers, counselors, librarians, and media specialists by hosting training sessions and recording trainings conducted by Discus vendor partners.

During FY 2015-16, Discus participated in state-wide conference presentations, local instructional fairs, school district professional development days, community outreach programs, as well as technology forum exhibits. Presentations were made to the South Carolina Independent School Association (SCISA), the South Carolina Association for School Librarians (SCASL), as well as to students in the University of South Carolina's School of Library and Information Science, to name a few.

These venues provide the opportunity to familiarize educators with the electronic resources available to them and the entire K-12 community for research and homework assistance. Educators had access to 67 Discus professional development opportunities delivered online and via live sessions and presentations, with 796 educators participating. In addition, exhibit booths targeted to K-12 participants at nine major statewide conferences and five local conferences further extended the Discus message to 1,424 booth visitors.

5. COLLABORATION OPPORTUNITIES

South Carolina Technology Plan Goal:

Identify innovative ways for state agencies, local school districts, schools, families, and local businesses to collaborate to enhance the learning experiences for the students of South Carolina.

Partner Efforts to Support the Goal:

The most wonderfully equipped schools with the latest in educational technology can still fail to achieve the goal of producing students that meet the criteria of the Profile of the South Carolina Graduate. Within the complex mechanism represented by teachers, students, digital learning resources, advanced student records systems, online assessment and escalated network security, the necessary linkage, the gear without which the machine fails to operate as designed, is public awareness and support for the ambitious educational goals set by our state.

This support begins, naturally, with the parents and families of our students, however it is not limited to only this group. It is critical that every citizen of South Carolina understand the opportunities and challenges facing public education in our state. Clearly, all South Carolinians benefit from a thriving public education system that produces graduates who can share and lead in the economic growth of our state. Citizens must be informed about, and ready to advocate for, public educational development that produces real results in terms of a deeply educated and job-ready populace.

> *"CLEARLY, ALL SOUTH CAROLINIANS BENEFIT FROM A THRIVING PUBLIC EDUCATION SYSTEM THAT PRODUCES GRADUATES WHO CAN SHARE AND LEAD IN THE ECONOMIC GROWTH OF OUR STATE."*

South Carolina Educational Television partners with other members of the K-12 School Technology Initiative, such as the South Carolina Education Oversight Committee, the South Carolina Department of Education, and others, to inform our citizens about the successes and challenges within our public education environment.

SCETV Public Awareness Efforts

In an effort to help inform citizens about the availability of educational programs, services and technologies, South Carolina Educational Television (SCETV) and SCETV Radio share stories of projects that serve to address the needs of teachers and students throughout

the state. A number of national and statewide television series and educational specials – including SCETV's Palmetto Scene, Speaking of Schools, and Carolina Classrooms – are broadcast and streamed for use in schools and classrooms, providing significant reach to both SCETV's television and radio audiences.

Content broadcast through these mediums provide case studies and best practices for use throughout the state. Promotion of these programs and services were provided through a variety of platforms, including SCETV communications, educational websites and broadcast interstitials, as well as community education outreach efforts through K-12 conferences, presentations and awards.

SCETV's Carolina Classrooms, a school-year series designed for teachers, educators and parents, features educational initiatives in South Carolina schools including those geared towards equity in education, assessments and literacy. State and local educators, as well as policy and business leaders, participated in this effort. Radio broadcasts of educational content included Walter Edgar's Journal, South Carolina A-Z and the South Carolina Department of Education's (SCDE) Speaking of Schools.

To learn more about Carolina Classrooms, please visit scetv.org/carolinaclassrooms.

Throughout the year, SCETV provides education-related newsletter blogs and partners with the South Carolina Education Oversight Committee (EOC) and the SCDE for the promotion of SCETV education features.

SCETV Education, working with the EOC, provides a monthly newsletter, subscribed to by over 73,000 teachers and staff, to assist in informing teachers of timely resources and services. SCETV also uses social media including Facebook and Twitter to engage the education community.

To learn more about SCETV's Education Blog, please visit scetv.org/education-blog.

6. REPORT CONCLUSION

Much has been accomplished in the nearly two decades since the first efforts were made to link South Carolina's public schools, districts, and public libraries together on a common, state-operated network backbone, and to provide internet access to support student learning objectives. The basic wide-area network, and the intercommunication and internet access that depend upon it, are well consolidated, robust and mature. However, educational technology has continued to expand and mature at the same time, creating new and more complicated challenges to be overcome.

As predicted for a number of years, learning has moved beyond the school classroom to the extended school campus, the school bus, the neighborhood public library and beyond, as 1:1 computing initiatives place the tools in students' hands to learn collaboratively from home.

However, this development creates new issues for student connectivity and for safely enabling remote connections to school systems and learning resources. Increasing external connectivity (school to state network backbone), internal connectivity (computing device to school network access point), and enhancing IT security have emerged as the greatest challenges and will continue to occupy the K-12 School Technology Initiative in the future.

The steady growth of the VirtualSC virtual public school system, 1:1 computing, and learners' needs to access educational content such as Discus, Knowitall.org, and StreamlineSC will require finding innovative and cost-effective ways to ensure that all learners can access broadband internet from their homes as easily and reliably as they do at school.

"INCREASING EXTERNAL CONNECTIVITY, INTERNAL CONNECTIVITY, AND ENHANCING INFORMATION TECHNOLGY SECURITY HAVE EMERGED AS THE GREATEST CHALLENGES AND WILL CONTINUE TO OCCUPY THE K-12 SCHOOL TECHNOLOGY INITIATIVE IN THE FUTURE."

The tasks of teacher professional development and raising public awareness will also be critical to enabling South Carolina to build on the success it has enjoyed to date in deploying advanced educational technology resources.

APPENDIX A:
FY16 INITIATIVE BUDGET

FY16 K-12 Technology Initiative Budget Plan

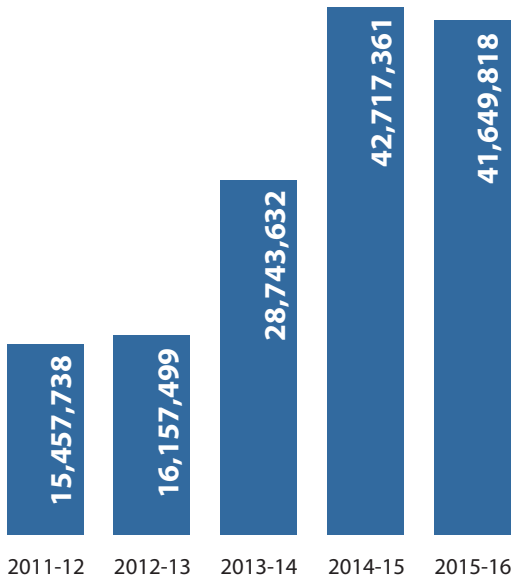
FY16	
Funds Available via Direct Appropriations:	
Base Appropriation: School Technology	$12,271,826
Total Appropriations :	**$12,271,826**
Carry Forward:	
State Library	$0
SCETV	$85,149
SCDE	$0
Department of Administration	$0
Total Carry Forward :	**$85,149**
Total Available Funds:	**$12,356,975**
E-Rate Funds (Estimated)	$25,637,000
Total Funds Anticipated:	**$37,993,975**
Total Budget Requested:	**$37,993,975**
Net Remaining funds:	**$0**

Priority	Principals Budget Requests	Budget Requests	School Technology Appropriation	E-Rate Funds (Estimated)	Approved Budgets
	DEPARTMENT of ADMINISTRATION				
1	Network Connectivity Costs	$35,846,000	$10,209,000	$25,637,000	**$35,846,000**
2	E-Rate Field Training	$560	$560		**$560**
3	Security Monitoring	$653,587	$653,587		**$653,587**
4	DDOS Protection	$470,400	$470,400		**$470,400**
5	Local Security/Training Enhancements	$92,859	$92,859		**$92,859**
	Total:	**$37,063,406**	**$11,426,406**	**$25,637,000**	**$37,063,406**
	STATE LIBRARY				
1		$0	$0		**$0**
	Total:	**$0**	**$0**		**$0**
	SCDE				
1	Dell One Identity Manager	$295,718	$295,718		**$295,718**
	Total:	**$295,718**	**$295,718**		**$295,718**
	SCETV				
1	Curriculum K12 Activities and Project Modules Platform	$175,000	$175,000		**$175,000**
2	StreamlineSC Content Subscription	$400,000	$400,000		**$400,000**
3	Knowitall Content Upgrade	$145,000	$145,000		**$145,000**
	Total:	**$720,000**	**$720,000**		**$720,000**
	PILOT PROJECTS				
		$0	$0		**$0**
	Total Carry Forward From Previous year:	**$0**	**$85,149**		**$ 85,149**
	Grand Total:	**$38,079,124**	**$12,356,975**	**$25,637,000**	**$37,993,975**
	*** Net Appropriation Allocation**		*$0*	**Balanced**	

APPENDIX B: BY THE NUMBERS

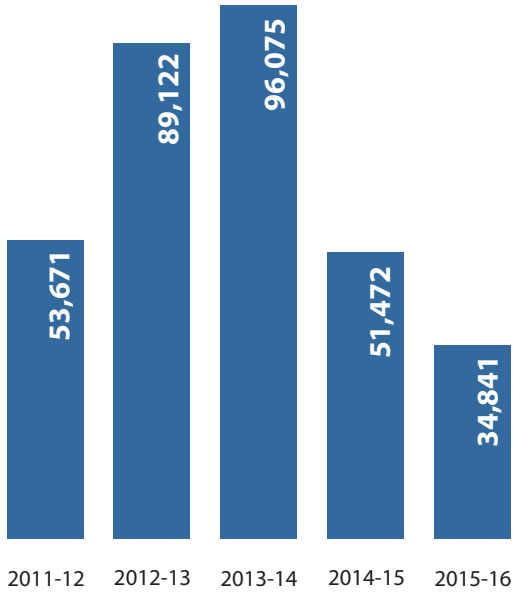
Discus Usage (Items Retrieved)

Source: South Carolina State Library



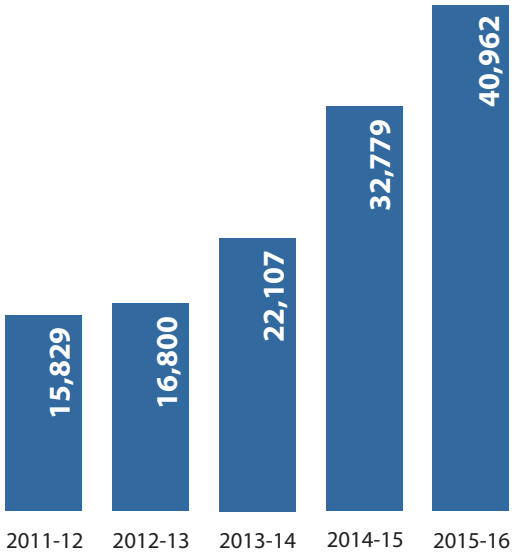
StudySC Sessions

Source: South Carolina State Library



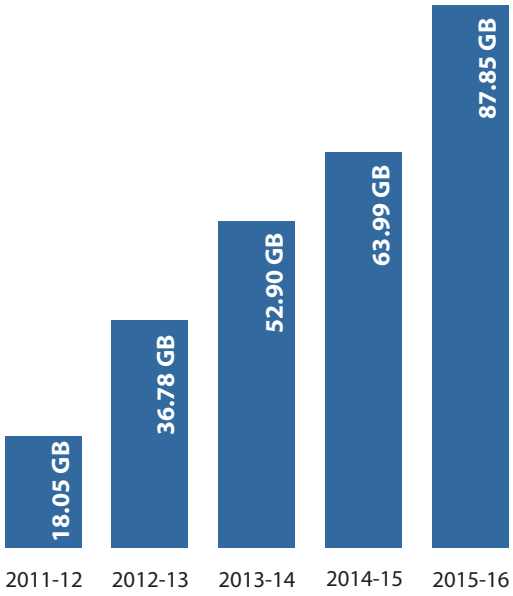
VirtualSC Enrollments

Source: South Carolina Department of Education



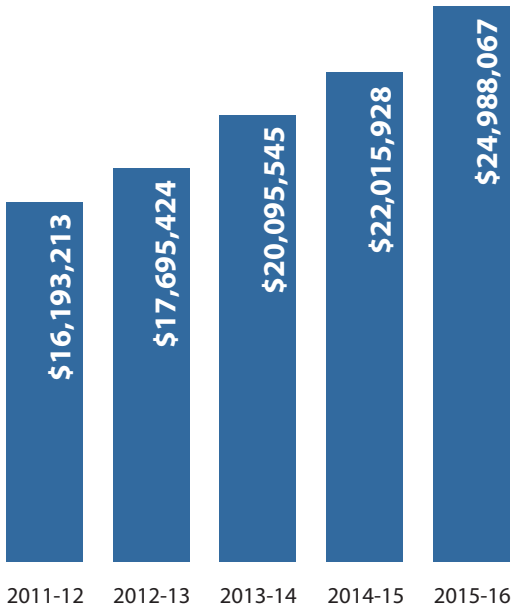
Growth of Bandwidth Demand

In School Districts (Measured in Gigabytes)



E-Rate Funding Disbursements

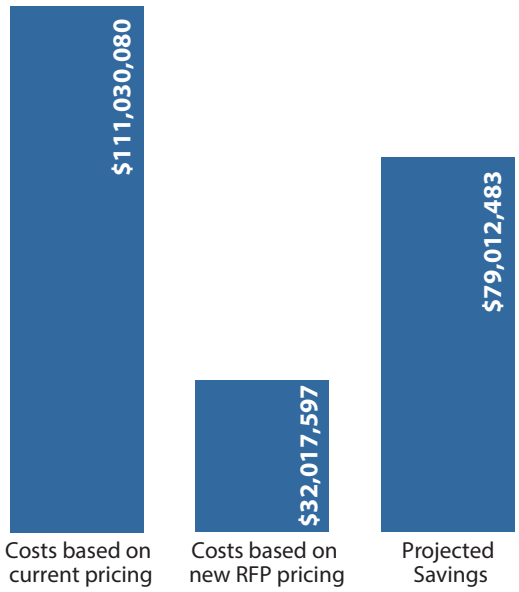
Source: Division of Technology Operations



7-Year Internet Contract Totals

Source: Division of Technology Operations

Costs include projected 10% growth/year after year one. Bandwidth projections for costs are based on 2016-17 Form 471 internet application.



1,104,562

SCETV Education Services Used: (Combines StreamlineSC, Knowital.org, and PBS LearningMedia service usage in 2015-16)

19.5%

Percentage of district funds expended to improve internal connections.

28%

Percent of schools have over 91% of students with 1:1 learning.

2.6

Overall average score for plaintiff districts in the Technology Readiness Study.

SCETV Professional Development

6,305 Face-to-Face Training Conducted

92,884 Online Recertification Hours

Internet Bandwidth by District Comparison		
Bandwidth (MBs)	Districts (12-13)	Districts (15-16)
0	1	0
10	4	0
30-90	3	0
100-150	59	14
200-250	0	6
300-350	2	9
400-450	0	4
500-550	4	11
600-900	1	4
1,000	6	13
1,500	0	2
2,000	0	7
2,500	0	1
3,000	0	4
4,000	0	3
5,000	0	2

Blended/Virtual Course Offerings by District	
Aiken	Horry
Allendale	Lancaster
Anderson 2	Laurens 55
Anderson 5	Laurens 56
Bamberg 1	Lexington 1
Berkeley	McCormick
Calhoun	Marlboro
Charleston	Oconee
Chester	Richland 2
Clarendon 1	Spartanburg 2
Darlington	Spartanburg 3
Dillon 4	Spartanburg 7
Edgefield	Sumter
Greenwood 51	Union
Greenwood 52	SC Public Charter District
Hampton 2	

Percentage of Total Expenditures For:		
Area	**FY 2014-15**	**FY 2015-16**
Expand broadband	3.3%	2.7%
Improve internal connections within schools	15.8%	19.5%
Replace devices	7.9%	9.8%
Purchase new devices	59.2%	52.8%
Improve security	2.6%	1.6%
Professional development for teachers	1.7%	0.9%
Technical assistance for district technology staff	0.5%	0.6%
Other	9.0%	12.1%

2014-15 Initiative Funds Carried Forward to 2015-16 For:	
Purpose	**No. of Districts**
Expand broadband	7
Improve internal connections within schools	26
Replace devices	19
Purchase new devices	9
Improve security	5
Professional development for teachers	7
Technical assistance for district technology staff	8
Other	0

Districts & E-Rate Reimbursements to Consultant Service Providers	
Percentage of E-Rate to Consultant	**No. of Districts**
0-5%	18
6-10%	19
11-15%	3
16-20%	3
21-25%	0
More than 25%	0
Not Applicable	37
Did not Answer	2

Classroom Access to Wireless Network	
Percentage of Classrooms	**No. of Schools**
0%	19
1-10%	14
11-20%	4
21-30%	2
31-40%	0
41-50%	2
51-60%	0
61-70%	5
71-80%	5
81-90%	4
91-100%	1,193
No Response	1
Total	1,248

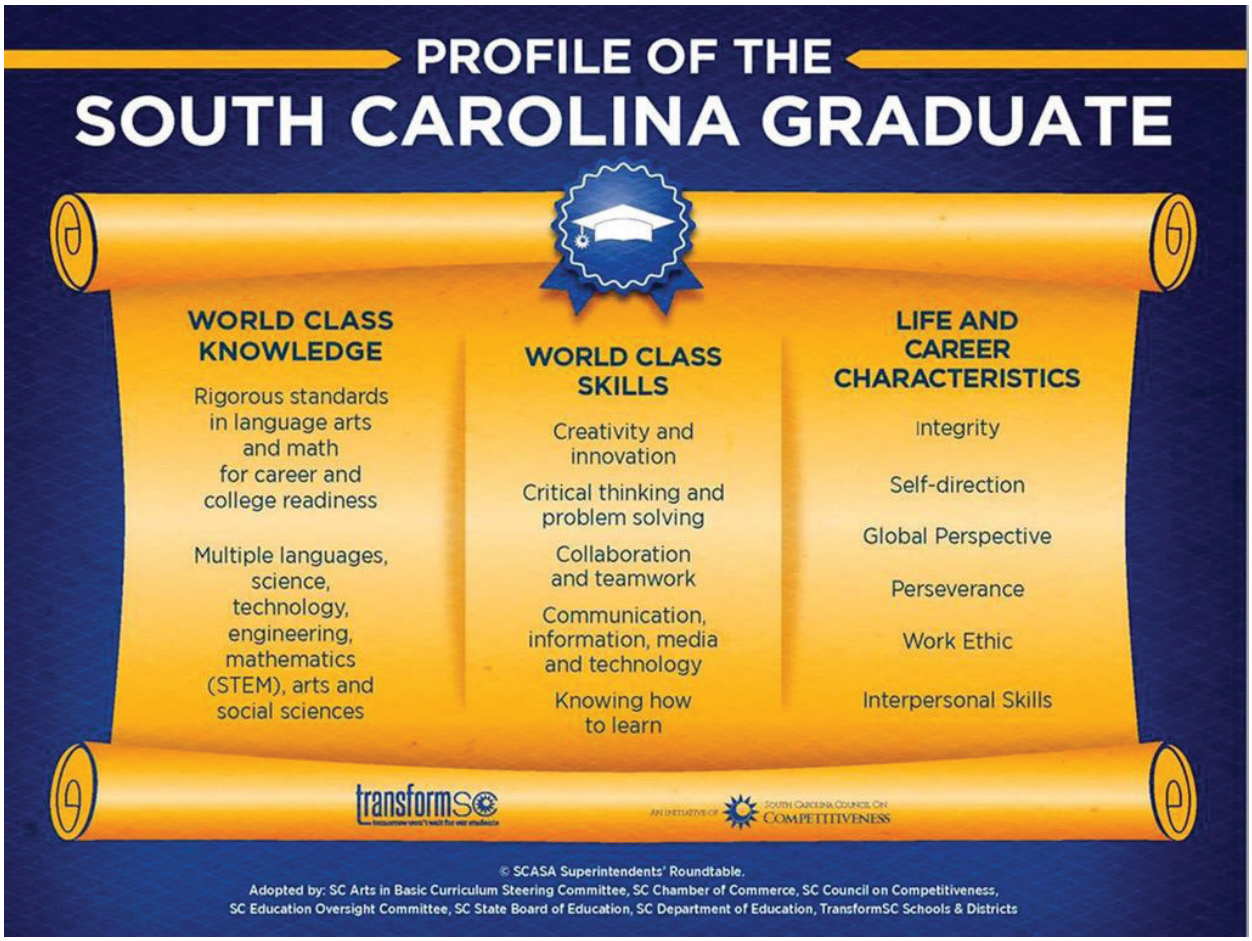
Percentage of Students with 1:1 Learning		
% of Students	**No. of Schools**	**% of all Schools**
0%	335	26.8%
1-10%	95	7.6%
11-20%	63	5.0%
21-30%	72	5.8%
31-40%	31	2.5%
41-50%	93	7.5%
51-60%	66	5.3%
61-70%	25	2.0%
71-80%	88	7.1%
81-90%	22	1.8%
91-100%	353	28.3%
No Answer	5	0.4%
	1,248	

Schools Responding 1:1 Computing by Grade Level				
Grade Level	**Targeted**	**Not Targeted**	**Implemented**	**No Response**
K	98	429	90	223
1	94	428	103	215
2	109	408	106	217
3	247	191	215	187
4	266	148	235	191
5	227	128	284	201
6	120	198	246	276
7	117	194	247	282
8	117	193	241	289
9	82	208	243	307
10	115	197	205	323
11	116	202	207	315
12	120	212	202	306

Schools Responding 1:1 Computing by Grade Level								
District	Elementary -Middle-High	Elementary	Elementary -Middle	Middle	Middle-High	High	Primary	Total
Abbeville	0	2	2	1	0	2	0	7
Aiken	0	9	1	3	0	0	1	14
Allendale	0	2	0	0	0	0	0	2
Anderson 1	0	0	0	0	0	0	1	1
Anderson 2	0	3	0	1	0	1	1	6
Anderson 5	0	0	0	0	0	0	2	2
Bamberg 1	0	0	0	2	0	1	0	3
Bamberg 2	0	1	0	1	0	1	0	3
Barnwell 19	0	1	0	0	0	1	0	2
Barnwell 29	0	1	0	1	0	1	0	3
Barnwell 45	0	2	0	1	0	1	0	4
Berkeley	0	8	0	2	1	6	4	21
Charleston	1	22	0	6	4	5	2	40
Chesterfield	0	7	0	3	1	3	2	16
Clarendon 1	0	0	0	0	0	0	1	1
Clarendon 3	0	1	0	0	1	0	0	2
Colleton	0	5	0	1	0	0	2	8
Dillon 3	0	0	0	0	0	1	0	1
Dillon 4	0	1	0	1	1	1	0	4
Florence 1	0	11	0	2	0	1	2	16
Florence 3	0	3	0	0	0	0	0	3
Florence 4	0	1	0	1	0	1	0	3
Greenville	1	0	0	1	0	2	5	9
Greenwood 50	0	8	0	0	0	0	0	8
Greenwood 52	0	1	0	1	0	1	1	4
Hampton 1	0	5	0	1	0	1	0	7
Horry	0	2	1	0	0	0	1	4
Jasper	0	2	0	0	0	1	0	3
Lancaster	0	8	0	2	0	3	0	13
Laurens 55	0	4	2	2	0	0	0	8
Laurens 56	0	0	0	0	0	0	1	1
Lexington 1	0	1	0	0	0	0	0	1
Lexington 4	0	0	0	0	0	0	2	2
Lexington 5	0	12	0	0	0	0	0	12
Marion	0	1	0	2	0	1	3	7
Marlboro	0	1	4	1	0	1	1	8
McCormick	0	1	0	1	0	1	0	3
Newberry	0	7	0	2	1	2	1	13
Oconee	0	6	0	2	0	3	0	11
Orangeburg 3	0	3	1	1	0	1	0	6
Pickens	0	7	0	2	0	0	0	9
Spartanburg 1	0	1	0	0	0	0	0	1
Spartanburg 4	0	1	0	1	0	1	1	4
Spartanburg 7	0	0	0	0	0	0	1	1
Williamsburg	0	1	0	0	0	1	1	3
York 1	0	6	0	1	0	0	0	7
York 3	0	0	1	0	0	0	1	2
York 4	0	7	0	4	0	2	0	13
Total	**2**	**165**	**12**	**50**	**9**	**47**	**37**	**322**

Note: A total of 13 schools did not have a known school type.

APPENDIX C: PROFILE OF THE SC GRADUATE



APPENDIX D: INITIATIVE MILESTONES

1996-97

- The South Carolina General Assembly created the K–12 School Technology Initiative.
- The K–12 School Technology Initiative began funding two-way video projects across South Carolina.

1997-98

- The K–12 School Technology Initiative distributed over $12 million to state districts for local technology implementation.
- South Carolina Educational Television (SCETV) began digitizing its video resources for use in schools.
- South Carolina was recognized by the Educational Testing Service as one of five states to provide telecommunications access in all schools.

1998-99

- South Carolina received over $26 million in E-Rate funding.
- South Carolina encouraged the state's school districts to adopt the International Society for Technology in Education's National Educational Technology Standards for Students (ISTE NETS-S) and National Educational Technology Standards for Teachers (ISTE NETS-T).
- By 1998, South Carolina invested more than $84 million in hardware, software and professional development opportunities or schools and districts.
- The K-12 School Technology Initiative began distributing funding for professional development in technology as well as technology implementation to districts, sending over $16 million in total funding to districts statewide.
- 86 percent of South Carolina's schools were equipped with satellite dishes in order to receive education programming, compared to a national average of 29 percent.
- 67 percent of South Carolina classrooms were connected to local-area computer networks (LANs), compared to 53 percent nationwide.
- Technology Counts '98 reported that South Carolina was one of only five states in the nation to provide Internet access to 100 percent of its schools.

1999-00

- South Carolina, an E-Rate leader, received over $42 million in funding.
- The South Carolina State Library's (State Library) Discus website was launched.
- The new student-information collection system, Schools Administrative Student Information (ASIxp), was provided free to all districts.
- 100 percent of all state K-12 schools have digital satellite reception.

2000-01

- South Carolina E-Rate funding continued to climb to over $52 million.
- State K–12 appropriations for educational technology funding increased to over $40 million.

2001-02

- The South Carolina General Assembly passed the Teacher Technology Proficiency Proviso, requiring districts to verify that teachers demonstrate technology proficiency during each recertification cycle.
- South Carolina received $44,280,175 in E-Rate funding.
- The K-12 Partnership provided $400,000 of funding, for technical training for district's technology support personnel.
- SCETV's Knowitall.org Web portal was officially launched.
- SCETV's Distance Education Learning Centers were operational in all school districts.
- The K-12 School Technology Initiative provided over $18 million in flow-through funding to districts for local technology and training.
- The South Carolina Education Oversight Committee (EOC) issued its long-range planning document, citing technology use as necessary for South Carolina to reach its 2010 goal of being ranked in the top half of states nationwide with regard to student achievement.
- ETV American Graduate, a public media initiative funded by the Corporation for Public Broadcasting (CPB) helped South Carolina's communities find solutions to address the dropout crisis.

2002-03

- K–12 School Technology Initiative funding decreased from a high of $40 million in 2001, to a five-year low of $19 million.
- South Carolina encouraged its school districts to adopt the International Society for Technology in Educations (ISTE) National Educational Technology Standards for Administrators (NETS-A).

2003-04

- The student-information collection system SASIxp was fully implemented in all state school districts.
- The Division of State Information Technology (DSIT) filed the calculations for all schools and districts for the E-Rate Discount Program, resulting in over $49 million for the state and school districts in discount payments.
- K–12 School Technology Initiative funding provided the Intel Teach program to educators across the state.
- The South Carolina Department of Education (SCDE) released its State Educational Technology Plan, 2003-08: Realizing the Dream, to all South Carolina stakeholders.
- K–12 School Technology Initiative funding supported 30 Technology Coaches.
- SCDE released a new SASIxp template and the Data Collections Manual, initiated quarterly collections and bean to rely on the new South Carolina Educational Data System (SCEDS).
- SCDE's South Carolina Online Professional Development (SCOPD) program, now known as eLearningSC, was officially launched.
- A new Training Teachers in Technology (T3) professional development CD-ROM entitled "The Nature and Needs of Gifted and Talented Students" was offered to districts.

2004-05

- SCDE's ePortolio project pilot was launched to assess teacher technology proficiency and to provide information on professional development offerings.
- SCETV's Internet video-on-demand service, StreamlineSC, was officially launched.

2005-06

- The South Carolina Legislature called for a feasibility study to investigate computer-based assessment in the state.
- SCETV's StreamlineSC reached 100 percent of the state's K–12 schools and had 1.3 million views within its first full year of operation.

2006-07

- The South Carolina Virtual School pilot was officially launched by the SCDE.
- SCETV's Knowitall.org celebrated its 10 millionth hit.
- SCETV's Knowitall.org launched two new sites, Knowitall Healthy! and Road Trip.

2007-08

- The State Library's Discus program launched its new website featuring Web 2.0 technology.
- The State Library began the implementation of SchoolRooms, an online multimedia discovery place for the K-12 community.
- The K-12 School Technology Initiative approved the implementation of a service offered by DSIT to provide security and monitoring of K-12 Internet bandwidth usage.
- SCETV procured a $1.94 million grant that began SCETV's transition from analog video over microwave delivery of educational content to a streaming media delivery in 33 of 85 school districts.

2008-09

- SCETV launched OnePlaceSC, its newest K-12 education Web portal.
- SCETV launched Digital Education Services (DES), an upgraded service of the Distance Learning Education Centers (DLEC), designed to transition existing analog and digital broadcasts to live and video streaming on-demand systems.
- SCETV live-streamed both SCETV radio stations, enabling the stations to be added to the OnePlaceSC programming lineup and for the general public to listen to SCETV Radio on the Internet.

2009-10

- SCDE released its State Educational Technology Plan for 2009-13.
- The State Library's Discus program launched SmartSearch, enabling the retrieval of information from multiple sources through a single "Google-like" search.
- The State Library's Discus program implemented IP geolocation technology through SmartSearch, allowing students to be recognized as being in South Carolina and automatically granted access without the need for usernames or passwords.
- The State Library added a number of career and workforce development products to Discus including Ferguson's Career Guidance Center, LearningExpress Library and the NetLibrary Career eBook collection
- The State Library launched the StudySC.org website, a resource designed to provide online links and multimedia content for homework help, project assistance and classroom use.
- The State Library received a Presidential Citation Award from the South Carolina Library Association in recognition of ten years of Discus, South Carolina's Virtual Library.
- SCETV's StreamlineSC video-on-demand service had 3.16 million views during the 2009-10 school year, and the highest per-teacher video-on-demand usage of any such service in the nation.
- SCETV's Knowitall.org portal had 6.01 million views in FY 2009-2010.
- SCETV's Web of Water site, part of Knowitall.org, was awarded a Corporation or Public Broadcasting MySource Education Innovation Award in March of 2010.
- SCETV's Digital Education Services (DES) systems were implemented in 44 of 85 state K-12 school districts.
- SCETV added new content to several of its most popular Knowitall.org Web sites, including Artopia, RiverVenture, Generations of Heroes, GullahNet, Educator+ and Career Aisle.
- DSIT filed E-Rate applications for network connectivity costs of $22.7 million in eligible services in 2009-10, and received federal E-Rate

reimbursements of $13.8 million.

- The K-12 School Technology Initiative, in conjunction with DSIT, developed version four of the Internet policy, designed to ensure the equitable use of available funds to supply sufficient Internet bandwidth to all districts.
- SCETV procured a $1.4 million American Recovery and Reinvestment Act grant through an agreement with SCDE. The funds were used to add an additional 26 school districts to districts viewing all media via SCETV's IP Media server technologies.
- Through SCETV, 73 of the state's 81 school districts received all district televised media via streaming Media Server constellation.

2010-11

- SCETV's website "Web of Water," received the nationally prestigious Corporation for Public Broadcasting (CPB) Innovation in Education Award.
- The State Library implemented five new products in its Discus program. The products included Biography In Context, Opposing Viewpoints In Context, Science In Context, U.S. History In Context and World History In Context.
- The State Library's Discus program added Ferguson's Career Guidance Center, LearningExpress Library and the EBSCO Career eBook Collection to its Discus Job and Career Resources component.

2011-12

- SCETV began offering the PBS Learning Media service.
- SCETV finalized the Educational Broadband System (EBS) transition from 67 four-channel groups to a streamed down single channel per group (EBS mid-band) dedicated to transmitting ITV programming for all school districts in the state.
- SCETV developed and instituted an agreement to migrate all StreamlineSC content to the constellation of IP Media servers, allowing districts to have a Streamline server on their internal Ethernet network. The higher capacity storage also enabled the districts to access the entire StreamlineSC asset library.
- Through a CPB American Archive Content Inventory Project grant, SCETV inventoried over 100,000 physical and electronic assets and compiled a database of metadata that can be accessed for educational and documentary projects.
- The State Library's Discus program conducted an extensive evaluation project during FY 2011-12, resulting in a new collection for FY 2012-13 that will retain many of the most heavily used products while adding much needed content in other areas.
- The State Library forged a partnership with the Partnership Among South Carolina Academic Libraries (PASCAL) which has helped to provide a richer array of resources utilizing combined funding efforts.

2012-13

- K-12 School Technology Initiative partners participated in the TransformSC initiative.
- SCETV partnered with Lexington School District Four to provide literacy resources to its pre-K and K-3 students to include scholarships for facilitators of the PBS "Raising Readers: Preparing Preschoolers for Success" initiative. This initiative addressed reading proficiencies and works directly with classrooms and the afterschool alliances in the district.
- SCETV secured and hosted a second grant from CPB for a new SCETV American Graduate Youth Media Summit and Civil Rights Forum in the spring of 2013. Students interviewed civil rights veterans, which were archived as part of SCETV Civil Rights History inventory.
- SCETV added a new K-12 service, PBS LearningMedia, a media-on-demand service that features PBS award winning content.
- SCETV added a new social media site to

support the Common Core State Standards Initiative. The site uses the Edmodo platform for teachers to share activities, best practices and useful websites.

- South Carolina Virtual School Program (SCVSP) legislation was amended to lift the credit limitations placed on students using the SCDE program.
- SCVSP piloted 8th-grade English and Math Intervention courses with approximately 150 students in two districts. As a result of this success, 6th and 7th-grade English and Math Intervention courses were developed and offered in the summer of 2013.
- SCVSP partnered directly with schools to offer blended learning opportunities to help fulfill several needs resulting from budget cuts, reduced funding and unfilled teaching vacancies at smaller schools across the state.

2013-14

- The South Carolina Virtual School Program was officially rebranded and renamed VirtualSC by SCDE.
- SCETV conducted a statewide Teacher Survey designed to assess ways educators use K-12 resources, as well as professional development areas of need. The survey included responses from over 2,000 participants.
- SCETV Education, in conjunction with the EOC, began a new monthly newsletter desinged to increase teacher awareness of available resources and services. The newsletter was subscribed to by over 73,000 teachers and staff.
- SCETV launched ETV Teacher Courses, a new website designed to provide teachers the ability to easily search and find relevant recertification credit informtion from such sources as SCETV's Teacherline Southeast, Teacher Recertification and TeacherStep.
- SCETV began offering week-long recertification courses using a blended hands-on, Web-based curriculum called "Using Video in the Classroom."
- SCETV added a similar course titled "iBloom: Using the Internet and iPads to Support Bloom's Taxonomy," which covered the use of free Web tools and applications in the classroom, in conjunction with Project Based Learning and Flipping the Classroom instructional strategies.
- SCETV introduced a simplified and improved OnePlaceSC website, which no longer required a teacher to log-in and locate or record the resources needed to facilitate learning.
- SCETV was awarded an 18-month $200,000 grant from the CPB for "American Graduate: Let's Make It Happen." SCETV, one of 33 hub stations nationwide, convened groups from across the state in an effort to improve outcomes for students from cradle to career. Reports on these efforts were broadcast on television, radio and online.

2014-15

- The State Library's Discus program implemented IP geolocation technology for its individual databases, thereby allowing all South Carolinians to be recognized as being a resident and automatically granted access to Discus without the need for user credentials.
- Discus implemented the EBSCO Discovery Service, which provides a streamlined search tool incorporating high-end indexing, subject indexing, and relevance ranking. This "Google-like" search provides a way to retrieve multi-media, reference resources, academic journals, newspaper articles and primary sources through one search box.
- The implementation of SCETV's Digital Asset Management System provided a process to tag and catalog digital assets with the successful inventory of 104,787 assets under the American Archive grant. As a result, approximately 3,000 hours were preserved and digitized. These assets reside on servers located at SCETV and the WGBD/Library of Congress.
- SCETV and the production team at the National Black Programming Consortium completed

a two-hour documentary titled "180 Days: Hartsville," that aired in March 2015, on PBS. The documentary, a part of CPB's American Graduate: Let's Make It Happen initiative, captures the unflinching determination of teachers and principals, backed by a committed business community, that sets a high standard for excellence in Hartsville, South Carolina.

- SCETV began an extensive redesign of Knowitall.org. The service, rebranded as Knowitall.org Media, offers a wide variety of new mobile-friendly videos and a sleek efficient design.
- SCETV's online series "Original SC" and the documentary "Zip Code: Your Neighbor, Your Health" both won a 2015 Telly Award. K-12 sites across the state access the programs via StreamlineSC.
- The Bandwidth Monitoring Program, administrered by the Division of Technology, has monitoring sensors deployed in each of South Carolina's 81 public school districts, as well as six charter schools and 42 public library systems. The program ensures that connectivity and Internet bandwidth are best being used to serve the state's educational needs.
- The K-12 School Technology Initiative began a Distributed Denial of Service (DDoS) Protection Service designed to help the state's schools and libraries detect and mitigate the risks associated with this form of cyber attack. The service is offered through an agreement between the Division of Technology, Spirit Communications and AT&T.
- The K-12 School Technology Initiative, through the Division of Technology, began a Security Training Voucher Program designed to enhance cyber and information security defense proficiencies among the state's public school districts.

2015-16

- The South Carolina State Library's Discus program implemented the EZproxy hosted service. This advanced technology solution adds a higher degree of seamless authentication for South Carolina's citizens and reduces the number of obstacles and passwords users need to remember for access to the electronic resources.
- SCETV offered a new Wi-Fi service to support reading and STEAM in pre-K-12 communities, increasing access to SCETV content to students before and after schools through Wi-Fi facility hotspots and quality professional development.
- SCETV and the K-12 School Technology Initiative began the development of a new curriculum resource site, LearningWhy, to host educational lessons for schools implementing 1:1 environments.
- SCETV has launched its first station-branded public media app. The SCETV App features local, education and national content, giving patrons mobile content at their fingertips.

APPENDIX E: WHAT OTHERS ARE SAYING

Knowitall.org

"I'm so in love with this site (Knowitall's Career Aisle)! It is just the kind of resource I've been looking for to provide high school students with a more in-depth look into individual career fields. I'm excited to be able to use Knowitall.org to help my students learn all there is to know about the field of interest."
Bernice Spain, Teacher Testimony

"I knew about Knowitall several years ago, but honestly haven't looked at it in several years. I think it is amazing what is available on there now, and how it can now be accessed on mobile devices. This is a great tool for all teachers and students to take advantage of!"
Maricary Hansen, Teacher Testimony

"There are so many resources and South Carolina stories (in Knowitall's Career Aisle) in addition to great career information. What I found to be most useful is everything! In my district, we have attendance issues, so next year I plan to assist teachers in incorporating career videos before lessons to make the school to work connection for our students. Thank you for reminding me about this resource!"
Martha Blankenship, Teacher Testimony

"Various types of media are available in order to enhance learning for my students. I like the way the site is organized by type of media which helps with different teaching and learning styles."
Pamela Crosby, Teacher Testimony

"I love Knowitall.org because the resources provide information about famous South Carolina people, about the Revolutionary War, and I love the videos on Andrew Pickens, Sumter, etc."
Jane Daffin, Media Specialist, Dorchester 2

VirtualSC, South Carolina's Virtual School Program

"The program is great and helps students get the credit they need in order to graduate."

Student Testimony

"Thank you for helping me to understand Chemistry! The online labs and videos were fun to do."

Student Testimony

"This is a great program and is a fun work environment for all students."

Student Testimony

"I didn't have good luck when I took this class last year, so I had to do my credit recovery. I need to say thanks because it helped me get my credit back."

Student Testimony

"I enjoyed this, it made it very easy to take the class when I didn't want to take it at school."

Student Testimony

SCETV Education Teacher Training, Online Courses and Knowitall.org

"I encourage all teachers who are considering implementing technology in the classroom to take this class. it is an excellent 'hands-on' class!"

M. Taylor, Calhoun Academy, SCISA

"The Making Connections with Natural History course with Rudy Mancke was very stimulating and interesting. The most helpful aspect to me was learning about the excellent ETV resources."

Katherine Burriss, Online Course Participant

South Carolina K-12 SCHOOL TECHNOLOGY INITIATIVE
4430 BROAD RIVER ROAD
COLUMBIA, SC 29210
WEBSITE: HTTPS://SCK12TECHINIT.SC.GOV