Connections for Classrooms
Case Studies

THE GOVERNOR'S OFFICE OF
STUDENT ACHIEVEMENT

December 2016

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Overview

Technology plays an ever increasing role in the education of students in Georgia, both inside and outside the classroom. A recent study estimates that school districts nationwide provide one computer for every five students,[1] but with limited or no access to the Internet, the potential of these devices remains largely untapped.

Since 2014, school districts across Georgia received more than $77 million from the Connections for Classrooms (CFC) grant program to expand high-speed broadband access in schools and classrooms. Administered by the Governor's Office of Student Achievement (GOSA) in partnership with other state agencies, CFC grants have enabled significant upgrades to districts' network infrastructures. The enhanced bandwidth and wireless access have impacted learning at the classroom level and continue to drive the rapid growth of digital learning opportunities for Georgia's students. Districts are now leveraging technology to provide students and educators more flexibility over the time, pace, path and place of learning.

GOSA partnered with Public Consulting Group (PCG) to document the early impact of the CFC grant program through a series of case studies. Five school systems were selected from among local education agencies (LEAs) that received CFC awards. These five LEAs represent the diversity among Georgia's school systems in terms of geography, size, urbanicity, and in their approaches to utilizing technology to change instruction.

> **Connections for Classrooms Case Study Districts & Schools**
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The selected LEAs included two rural districts from southern Georgia, Thomas County Schools and Ben Hill County Schools; Hall County School District in northern Georgia; one of Georgia's largest districts, Fulton County; and a state school, Georgia School for the Deaf, located in western Georgia.

In fall 2016, PCG staff visited schools and classrooms to conduct interviews and focus groups with key stakeholders from each LEA. These sessions included district staff, teachers, and students and focused on local implementation and the impact on teaching and learning. PCG staff also toured school buildings and observed classrooms. The following CFC case studies present information gathered during those visits and from district grant applications. The purpose of the case studies is to tell the story of what the CFC-supported, increased connectivity has enabled in each district rather than provide an in-depth evaluation of student outcomes in these LEAs.

Acknowledgements

GOSA and PCG would like to thank the district personnel, teachers, students, and community members from the participating school systems who opened their doors and shared their stories to benefit other school systems in the state and across the country that are just beginning this work.

GOSA determined the focus of each case study based on applications to CFC and early progress reports. These narratives highlight unique aspects of local initiatives to implement more digital and blended learning, enabled by CFC-funded upgrades.

Ben Hill County Schools

The focus for Ben Hill County Schools is a pilot of a one-to-one instructional device initiative in its primary school's earliest grades (K-2).

Fulton County Schools

The Fulton County Schools case study focuses on the district-wide rollout of personalized learning with examples of early implementation from three district schools.

Georgia School for the Deaf

For Georgia School for the Deaf, the case study demonstrates the important role of uninterrupted online video in its bilingual education model.

Hall County School District

In the Hall County School District, the case study describes the transformation of non-classroom areas into flexible learning spaces as well as the increase of online learning opportunities.

Thomas County Schools

The Thomas County Schools case study reviews the district's successful online administration of Georgia Milestones in 2016, well ahead of state goals and timeline.

More information on the Connections for Classrooms grant program, including grant award amounts, annual reports, and program procedures, is available on the Connections for Classrooms website: http://gosa.georgia.gov/connections-classrooms-grant-program.

[1]*Editorial Projects in Education Research Center. (2016, February 5). Issues A-Z: Technology in Education: An Overview. Education Week. Retrieved November 28, 2016 from http://www.edweek.org/ew/issues/technology-in-education/*

Transforming teaching and learning in rural Georgia: Piloting a one-to-one program for K–2 students

Connections for Classrooms Case Studies: Ben Hill County Schools

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Background

Ben Hill County Schools (BHCS) is a small, rural school district in South Georgia with an enrollment of 3,200 students. Nearly 83 percent of students in BHCS qualify for free or reduced-price lunch. Despite limited resources, BHCS has set ambitious goals to use technology as a lever to transform the teaching and learning process in its schools to maximize student academic growth and prepare all learners for the 21st century. The district invested significant resources to bring technology into classrooms over the last several years. Investments to promote technology integration included enhanced network capacity, software, hardware, and professional learning for staff. The district set near-term goals to scale up its technology district-wide with plans to become an exemplary digital learning district.

In early 2015, with funds provided to BHCS by the Connections for Classroom (CFC) grant program, the district replaced outdated network equipment and upgraded wireless capacity at all four schools. Until that point, the network was unable to support high levels of utilization and students' technology use was largely confined to computer labs.

That year, with the network upgrades in place, the district began a one-to-one pilot program in seven classrooms in Ben Hill County Primary School (grades K–2, 162 students).

One-to-One Pilot Implementation

Ben Hill County Schools took an incremental approach to one-to-one implementation. At the primary school, the principal solicited volunteers from the teaching staff to participate in the pilot. The principal and district staff then selected teachers from each grade level and subject area. Students in each pilot classroom were assigned a tablet to use during the school day.

To support the transition, the district selected an online program that supports individualized learning in English language arts (ELA) and mathematics. The program uses diagnostic and benchmark data provided by the district to determine customized learning activities for each student. The program also contains internal assessments tied to the lessons provided to students. These frequent assessments provide regular feedback to students on their performance and data to teachers as another way to monitor students' progress. Teachers use a range of applications in their instruction, but this program provides an anchor for their work across all pilot classrooms.

BHCS provided both formal and ad hoc professional development to staff in the one-to-one pilot program. Formal professional development days included summer technology "boot camps" conducted by district staff and external vendors. Ad hoc support came from other pilot teachers and from independent exploration. Julia Manley, a second grade teacher explained that "some of it is trial and error, spending time after school, setting up mock student accounts to see what a particular app or program looks like from the student perspective." The district's educational technology staff provided another source of support to teachers, working with them in their classrooms and in the pilot group. As a result, teachers reported feeling well-supported, with a shared desire to take their instruction "to the next level" with additional training focused on project-based learning.
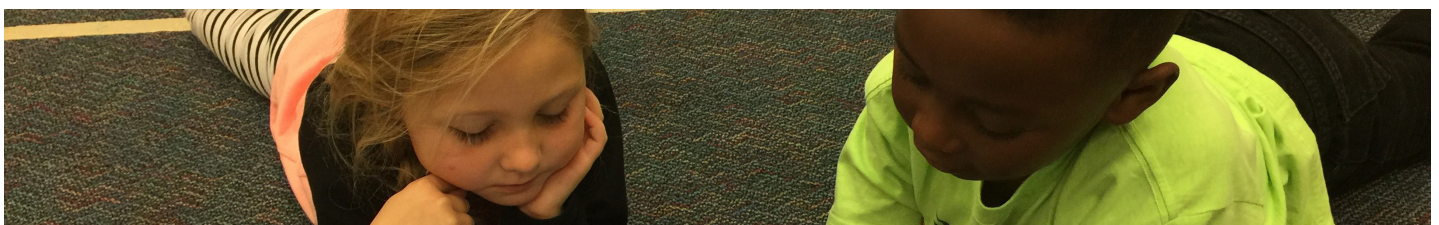
Ben Hill County
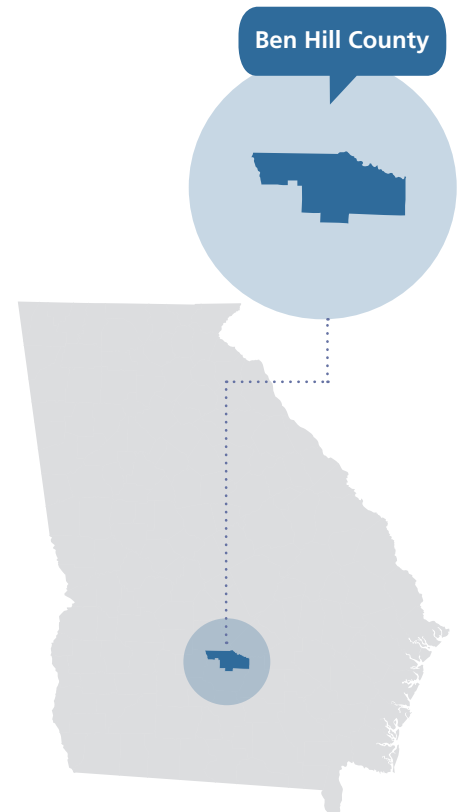
CFC Award Amount:

$134,555.06

Federal E-rate Amount:

$393,638.97

Total

$528,194.03

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Impact on Instruction

Teachers and district staff described two essential ways in which the one-to-one program has transformed their instruction and benefitted students.
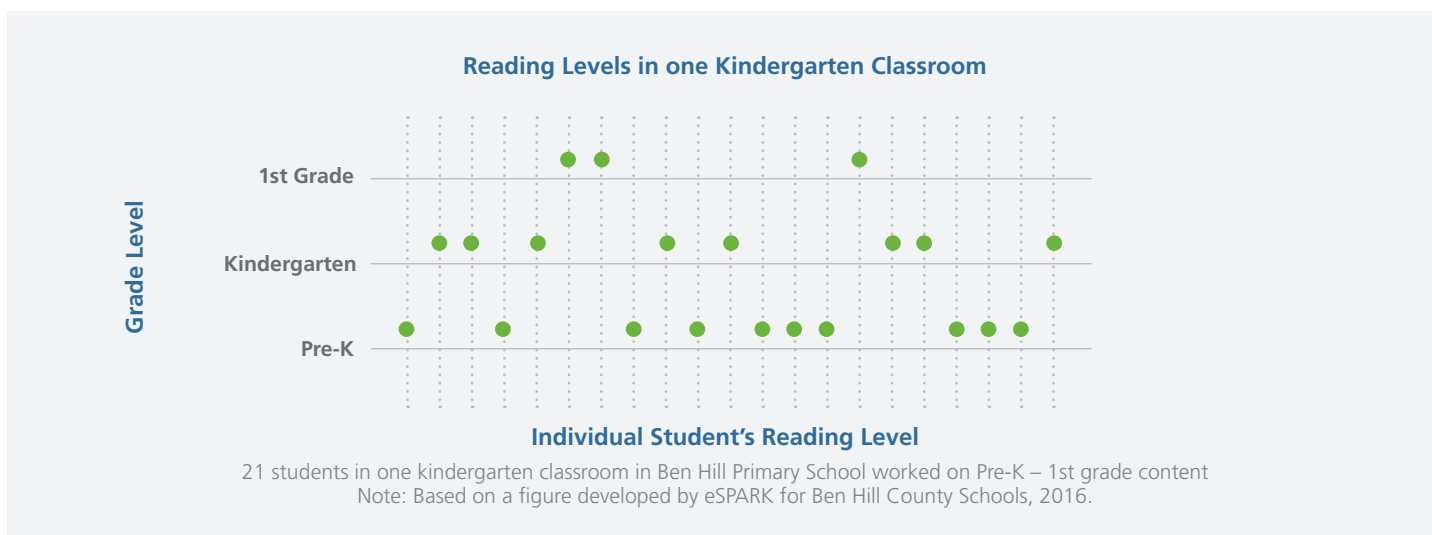
Differentiation of Instruction

Teachers in the one-to-one pilot program unanimously cited using tablets, in concert with the online math and literacy program, as critical to supporting differentiation of instruction. Students enter their classrooms with a range of academic abilities and needs. Within any given class, a number of students may be on grade level, but a significant number of students may be above or below expectations in particular subjects. The graphic illustrates the range of academic needs of one Ben Hill County Primary School kindergarten class based on district diagnostic assessments in ELA.

Using data from the new assessments, students in each pilot class were assigned work on their tablets in English and math that was targeted toward specific individual needs. Data were also used to support flexible grouping for small group instruction. Prior to the pilot program, teachers tried to provide students with work that would challenge them individually; technology enabled a more fine-tuned and efficient process. Jessica Smith, a second grade teacher explained: "We are able to slow it down for students who need more time, or accelerate students who already meet the standard. [Before] we were pulling our hair out trying to make sure everyone was covered. The additional resources and calibration using the technology helps." Assessment information provided by the program and other applications, gave teachers an unprecedented amount of real-time data at their fingertips to determine student progress and next steps. As a result, teachers felt more effective with students.

> **"We are able to slow it down for students who need more time, or accelerate students who already meet the standard. [Before] we were pulling our hair out trying to make sure everyone was covered. The additional resources and calibration using the technology helps."**
>
> - Jessica Smith, 2nd Grade Teacher

Reading Levels in one Kindergarten Classroom

Grade Level — 1st Grade / Kindergarten / Pre-K

Individual Student's Reading Level

21 students in one kindergarten classroom in Ben Hill Primary School worked on Pre-K – 1st grade content
Note: Based on a figure developed by eSPARK for Ben Hill County Schools, 2016.

Transition to Facilitator

Teachers in the pilot group also noted a significant change in their role from information provider to "learning facilitator." Teachers offered less whole-group instruction where all students work on the same material at the same time. Instead, teachers spent more time providing support to individual students and small groups, guiding them to resources and activities. Libby Nelms, a second grade teacher, explained: "I am able to walk around and see where the students are and engage myself with those students who need me versus those students who are continuing to move along on their own. It doesn't take the place of your teaching, but it does take the place of everyone having to practice the same thing at the same time." Teachers also noted that as students' independence and engagement increased, they spent less time on classroom management and discipline and more time on learning activities.

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Impact on Student Learning

Teachers in the primary school and administrators in Ben Hill County noted several ways in which the pilot one-to-one program continues to have an impact on student learning. The one-to-one program expanded in 2016-2017 to include additional classrooms at each grade level in the primary school.

Student engagement and motivation increased: Students in the one-to-one pilot were more engaged and motivated. The technology, paired with personalized assignments and a variety of activities, kept students focused. Built-in assessments provided students with instant feedback and an incentive to keep working toward specific goals. The additional resources deepened students' knowledge.

Students have more equitable access to technology: Although teachers noted that most students had access to personal devices outside of school, it was not true for all students. The one-to-one initiative provided equitable access to all students in the pilot classes, meaning that all students had the opportunity to become tech savvy and proficient in 21st century skills. Wanda Kimbrell, Executive Director of Student Services stated, "We are a small school district with limited funds, but grants like [CFC] help us better serve our kids because they deserve to have that technology in their hands."

Student responsibility increased: The one-to-one program encouraged greater student responsibility for learning through the self-paced, individualized lessons. Students received immediate feedback and monitored their personal progress though a set of targeted lessons on their own devices. In addition, because students were assigned their own tablets for the school year, it became their responsibility to make sure the tablets were charged, handled carefully, and carried with them from class to class.

> **"It doesn't take the place of your teaching, but it does take the place of everyone having to practice the same thing at the same time."**
>
> - Libby Nelms,
>   2nd Grade Teacher

> **We are a small school district with limited funds, but grants like [CFC] help us better serve our kids because they deserve to have that technology in their hands.**
>
> - Wanda Kimbrell, Executive
>   Director of Student Services

One-to-One Classroom Snapshots

A tour of the one-to-one pilot classrooms at Ben Hill County Primary School this fall revealed some of the many ways that technology is integrated with daily lessons in each classroom:

- Students searched their kindergarten classroom for shapes from an assigned list. When they found ones that met the criteria, they photographed the objects with their tablets, and typed labels using a photo collage program.

- A second-grader peeked out from a curtained booth near the door of her classroom and explained that she was in the "recording studio" to make a video documenting a completed assignment and reflect on her responses.

- A group of second grade students completed a math pretest on their tablets. Their results were immediately available to students and their teacher, highlighting existing strengths and areas needing additional support in the lessons ahead.

- At a classroom "listening station," a set of book tags listed book titles and provided Quick Response (QR) codes. Students scanned the codes with their tablets, and the books automatically loaded onto their devices, either to read or have it read to them (see photo).

- A second grade class reviewed math problems on the digital whiteboard with the teacher. Students took a poll regarding the correct responses and registered their votes on their tablets.

These activities would have been inhibited or impossible prior to the CFC-funded wireless network upgrade.

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Personalized learning: Meeting the learning needs, skills, and interests of every student

Connections for Classrooms Case Studies: Fulton County Schools

Background

During the 2014–2015 school year, Fulton County Schools (FCS) embarked on a plan to restructure the delivery of education to its 94,000 students. Breaking with a traditional one-size-fits-all approach to education, FCS launched a personal learning initiative that promised "learning customized to an individual learner's needs, skills, and interests"[1] for students in all 96 schools by 2017.

FCS is among the largest and most diverse school districts in the state and serves students in the Metro Atlanta area (see figure). FCS covers a large geographic area and has some of the highest and lowest performing schools in Georgia.

The FCS plan to turn every school into a personalized learning environment was fueled by three student achievement goals: by 2017, 1) 90 percent of students will graduate on time; 2) 85 percent will be eligible for a University System of Georgia college or university; and 3) 100 percent will be career-ready.

District-wide roll out of personalized learning required the alignment of a range of resources, including an infrastructure capable of handling the increased demand created by adding more than 65,000 wireless devices. Upgrades took place in the years leading up to the initiative, but not at the level required to make the transition seamless. In 2014, FCS applied for and received funding from the Connections for Classrooms (CFC) grant program. These funds, along with E-rate funding and additional grants supported needed upgrades.

Instructional technology plays a critical role in the implementation of personalized learning. Kenny Wilder, Director of IT Infrastructure at FCS noted that in Fulton County Schools, "if technology is interrupted, instruction is interrupted."

The robust and reliable wireless network funded through the CFC grant made the implementation of the new instructional model, which relies heavily on one-to-one devices, possible.
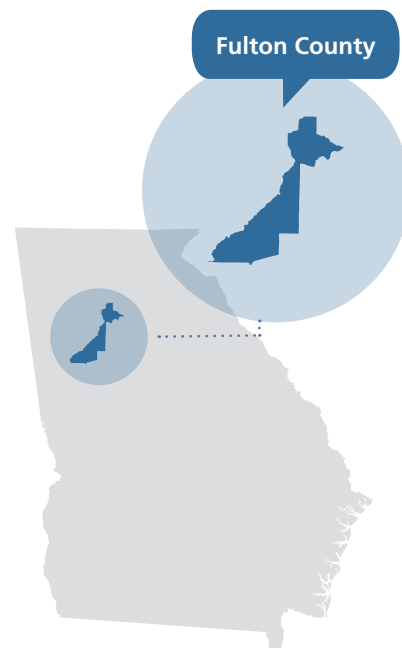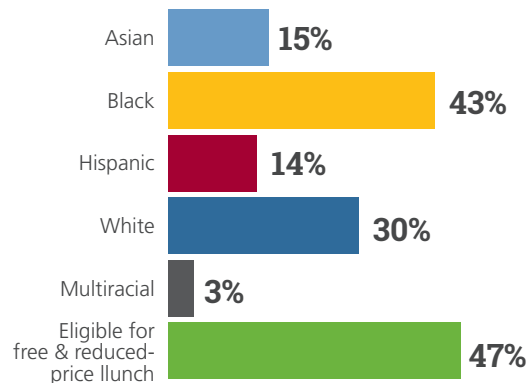
Fulton County

CFC Award Amount:

$3,469,663.10

Federal E-rate Amount:

$3,410,454.90

Total

$6,880,118.00

Students in Fulton County Schools 2015-2016[2]

Asian	15%
Black	43%
Hispanic	14%
White	30%
Multiracial	3%
Eligible for free & reduced-price llunch	47%

Personalized Learning Planning

The timeline for FCS' personalized learning initiative provided schools with an extensive planning period to focus on the unique needs of their students and to design instruction specifically to meet those needs, including selecting the tool or tools to best support their instructional plans.

As a charter system, FCS have flexibility and autonomy with regard to how they meet state accountability goals. Decisions regarding school operations are made at the school level, closest to classroom teaching and learning. FCS' planning model prescribed a series of focused steps to transform schools into personalized learning environments, but honored schools' autonomy by allowing them to design their own paths.

Hoke Wilcox, Director of Instructional Technology, credits this bottom-up approach for high levels of engagement with the personalized learning initiative: "There's a lot of ownership. The schools have been able to make choices based on their plans and their visions."

At the outset of the initiative, FCS asked all schools to complete a series of self-assessments including a "readiness" rubric. Schools rated themselves on a range of topics: the capacity of leadership, educator readiness, instructional spaces, the current practice of transformational instruction, and the alignment of the school strategic plan to personalized learning. FCS offered schools the choice to join one of five implementation cohorts, starting with Group One in January 2015 through Group Five, which began in March 2016. In all, 19 schools joined Group One to be among the first to implement personalized learning in the district.

Each school established a planning team that worked to prepare for success during the 12- to 18-month process. During the first meetings, schools identified the areas of greatest need within their schools. At that point, team members attended a series of workshops to confirm their understandings of personalized learning and how it could support those needs. An outside partner organization facilitated design workshops to help schools refine the visions for their instructional models, professional development plans, and communication plans.

A final step in planning was selecting a device to support the team's instructional vision. FCS used a "marketplace" model, and offered schools a set of pre-selected tablet and laptop options from which to choose. FCS sent "kits" to each school and stakeholder group, including teachers, community members, students, and administrators, and all reviewed each kit using a rubric provided by FCS. Each school's selection committee analyzed the responses and brought a recommendation to their School Governance Council for a vote.

Principles of Personalized Learning[3]

- **Varied strategies:** Students are given more than one way or modality to learn the material or access content.
- **Just-in-time direct instruction:** Direct instruction is available to students when it is needed, by an in-person or virtual teacher.
- **Choice and voice:** Students express their learning styles and preferences as learners in the lesson.
- **Mastery-based assessment:** Students drive curriculum rather than the curriculum driving the students. Assessments are used to demonstrate proficiency and competency.
- **Choice for demonstrating learning:** Students have multiple ways to demonstrate mastery of standards. They can leverage technology tools and traditional tools.
- **Flexible pacing:** Students move through the curricula at the pace that fits their individual abilities and allows for mastery learning rather than a by time-bound learning schedule.
- **Co-planning learning:** Students, parents, and community members are involved in planning and setting goals, pace, determining appropriate demonstration of learning, and defining mastery levels.
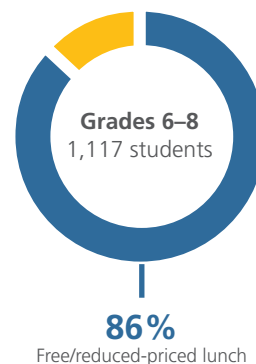
Implementation

Once plans were completed and devices selected, schools were ready to roll out the personalized learning and distribute devices to their students.

Professional development to help teachers with the transition was a key element of implementation at each site. The content of professional learning varied based on the school plan, but in each case, it included a combination of school-level collaboration and external support. In addition, FCS contracted with a local partner to provide each school with weekly on-site support from a coach with expertise in personalized learning and technology integration. According to Dr. Anthony J. Newbold , Principal of Bear Creek Middle School: "The onsite support was a game changer. It has been instrumental in helping us get to where we want to be."

A cadre of middle and high school student leaders were also trained as part of the FCS plan. Student advocates fulfilled different roles at each site, including supporting the distribution and roll-out of the devices (no small undertaking in large schools), representing students' voice in technology decisions, and providing professional development to teachers.

Finally, FCS utilized its district-wide network of teachers, media and educational technology instructors, and district and school leaders called the FCS Vanguard Team to support implementation. Team members based at each school provided job-embedded coaching to peer teachers and school administrators to support effective implementation of best instructional practices that included technology. Members met at the district level to share expertise and experiences and provided feedback to FCS about the initiative and the training needs at their schools.

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Implementation Highlights

The following presents some highlights of personalized learning implementation in three Group One schools.

Bear Creek Middle School

The transition to a personalized learning model at Bear Creek Middle School helped staff focus on student achievement goals in literacy and math. The school implemented a blended, data-driven math intervention featuring station rotation—students move among activities based at stations throughout the room—in renovated classroom space that can accommodate flexible use. To encourage students to work at their own pace, teachers at Bear Creek use a variety of online tools to manage course content, resources, assignments, and recorded lessons ("flipped" instruction). Teachers develop "differentiated learning menus" in an English Language Arts (ELA) course to provide students with the opportunity to exercise choice to meet the demands of a particular assignment and demonstrate mastery. Teachers also created a website to share professional development materials, increasing collaboration and sharing best practices in personalized learning.

Grades 6–8
1,117 students

86%
Free/reduced-priced lunch

Holcomb Bridge Middle School

At Holcomb Bridge Middle School, teachers focused their personalized learning implementation on supporting students at all points on the achievement spectrum to direct their own learning, challenge themselves, and gain greater mastery. Specifically, teachers worked on path and pace: presenting students with an instructional goal, and providing them with multiple paths to pursue, encouraging them to take the time they need. Teachers also focused on transitioning students from traditional role expectations where teachers lead and students follow. Teachers described using more real-time data to identify students' knowledge at the beginning or end of a lesson or unit and then using those data to guide next steps. A student at Holcomb Bridge described her recognition of the importance of personalized learning, "[It] gives us more opportunities to learn the way we need and want to learn."

Grades 6–8
796 students

56%
Free/reduced-priced lunch
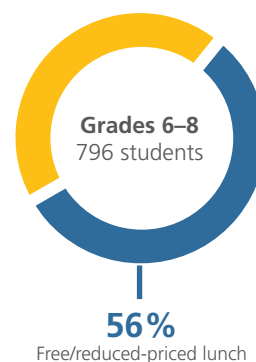
Randolph Elementary School

The implementation of personalized learning at Randolph Elementary School increased the school's focus on differentiated instruction and providing new learning opportunities to propel all students toward increased achievement. In 2015–2016, the school reported nearly 20 students completed one or more online middle school classes through Fulton Virtual, FCS' online learning program, which would not have been possible without the implementation of a personalized learning model, classroom devices, and the wireless capability supported by the CFC grant. Teachers described the initiative as leveling the playing field for their students because it allowed all students access to the same curriculum, while meeting each at their levels. The school renovated space to support more collaborative and project-based work and expanded course offerings to stimulate students' interest. These included online foreign language classes offered in Spanish, Chinese, French, and German to all grade levels, K-5, and establishing a new Science Technology Engineering and Mathematics (STEM) lab.

Grades Pre-K–5
600 students

68%
Free/reduced-priced lunch
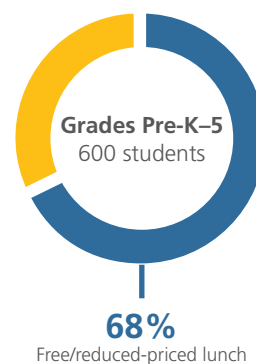
"Personalized learning gives us more opportunities to learn the way we need and want to learn."

- 7th grade student, Holcomb Bridge Middle School

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Impact

Teachers, students, and administrators noted many outcomes from the early implementation of personalized learning in FCS schools. They include:

Schools are deeply engaged with personalized learning. FCS schools embraced all aspects of planning for and implementing personalized learning. School staff and district administrators credited customized roll-out and strong district supports, including a thoughtful, school-level planning process, as significant contributors to schools' sustained interest in and commitment to implementation.

Personalized learning has "leveled the playing field" throughout the district. The equitable roll-out of personalized learning to every FCS school provided all students with access to opportunities for self-direction, expanded curricular content, and personal technology. Furthermore, through the greater use of differentiated instruction, teachers offer students within each school the opportunity for academic growth regardless of their levels. As noted by Lakesha Wallace, a 5th grade teacher at Randolph Elementary School: "The most immediate benefit [of personalized learning and integrated technology] is being able to push kids forward no matter what their levels. There's always a tool for enrichment, there's always one for remediation."

Teachers have changed their practice to facilitate more and lead less. Teachers implementing personalized learning across FCS changed instructional practice to provide more choices to students regarding path and pace. They provide more resources for and less direction on how to reach classroom goals. Teachers use data more often to determine which students need targeted support and structure classes differently to provide more time for small group or independent work.

Students are becoming drivers of their own learning. As a result of changes in teaching practice to emphasize facilitation, students in personalized learning environments make more decisions about how they pursue classroom work and how they are assessed on that work.
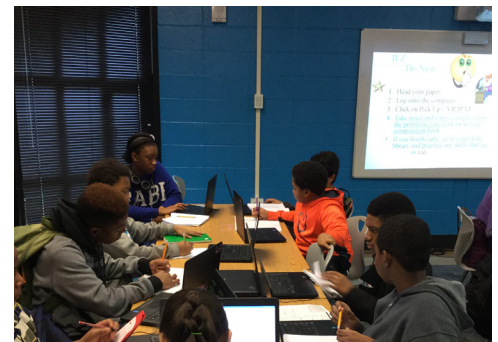
The network is no longer a barrier for students to have a personalized learning experience. Prior to the CFC grant, a one-to-one device initiative would have overwhelmed the network. Wilder explained that in contrast, "now when they roll out the devices to every student, the school infrastructure is ready to sustain them."

> **"The most immediate benefit [of personalized learning and integrated technology] is being able to push kids forward no matter what their levels. There's always a tool for enrichment, there's always one for remediation."**
>
> - Lakesha Wallace, 5th grade teacher, Randolph Elementary School

> **"The onsite support was a game changer. It has been instrumental in helping us get to where we want to be."**
>
> - Dr. Anthony J. Newbold Principal, Bear Creek Middle School

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Photos provided by Fulton County Schools
Case Study prepared by PCG Education

Online video: A critical tool in improving academic outcomes among deaf students

Connections for Classrooms Case Studies: Georgia School for the Deaf

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Background

The Georgia School for the Deaf (GSD) is a state-operated residential school for students who are deaf and hard of hearing. GSD has a large campus comprised of 12 buildings on 480 acres in Cave Spring, GA.

Students at GSD come from towns and cities across the state and range in age from three through 21. Among the 102 students at GSD, the majority reside at school with a small number of day students from nearby school districts. GSD students are racially and ethnically diverse, and 46 percent qualify for free or reduced price lunch. Many of the students who enroll at GSD arrive with significant language challenges and may be multiple years below grade level.

GSD provides a bilingual education program of American Sign Language (ASL) and English. ASL is considered to be the student's first language and is necessary to support their education in English. Because ASL is a visually based language that relies on manual signs, facial expressions, and head and body movements to convey meaning, instructional technology, specifically video, can provide important learning opportunities for GSD students. In fact, GSD Superintendent Leslie Jackson stated that these tools are "vital to our education process [at GSD]."

GSD applied for, and received, Connections for Classroom (CFC) grant funds in 2014 to augment its existing network with the highest capacity wireless arrays available. Prior to the upgrades, demands from mobile and wireless devices routinely exceeded the capacity of the network; it was not able to support the high frame rate necessary for effective ASL communication. For deaf students, interrupted or lagging video makes it impossible to follow the meaning of what is being said. Thus, the lack of adequate network capacity created a significant barrier to student learning, both inside and outside the classroom.

As a result of the CFC grant, GSD's upgraded network is now more reliable and accessible for both classroom instruction and independent learning in academic buildings and dormitories. Access to consistent and dependable video content enables GSD teachers to realize the school's digital learning goals, including use of hybrid, flipped and distance instructional models, expanded content, and alternative assessment. Accessible video content also provides academic support to students through a personalized learning approach.

Georgia School for the Deaf
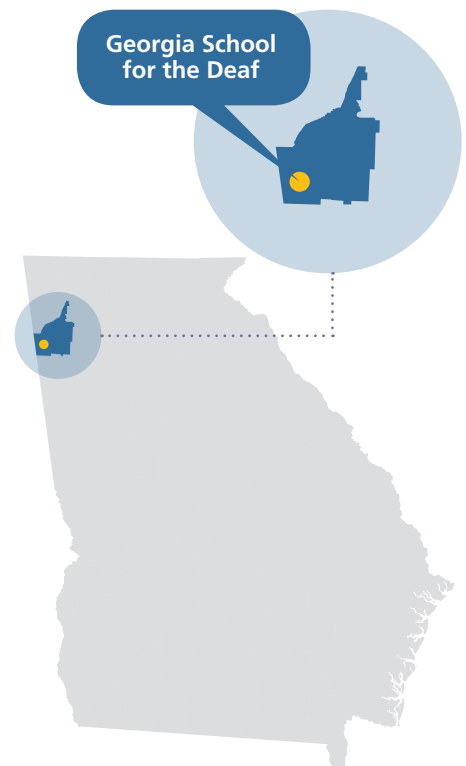
CFC Award Amount:

$30,958.41

Federal E-rate Amount:

$9,180.00

Total

$40,138.41

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Digital Learning at GSD

Over the past five years, GSD invested in a number of tools to leverage the potential of technology to support their unique bilingual curriculum. Each classroom is equipped with a set of tablets and laptops, a video camera, and an interactive white board. Additional digital displays hang in hallways and common areas such as the cafeteria. Collaborative workspaces in the media center are also furnished with large displays, and additional equipment is provided to students in dormitories.

Video is integrated within the educational program at GSD in a variety of ways:

Recorded classroom presentations: Teachers at GSD increasingly record classroom presentations and make them available to students through their course webpages. Recorded lessons give students the opportunity to preview content in advance of class meetings and offer them control over the time, place, and pace of their learning. Using this flipped or hybrid instructional model, students utilize time outside of class to build background knowledge and class time for project-focused work or discussion.

Students also rely on classroom videos to reinforce or expand their learning. Deaf students are not able to take notes in class while they are receiving instruction (unless time to do so is explicitly built into the classroom schedule). In order to retrieve classroom content, students must rely on memory. However, when teachers record lessons, students can revisit course material as needed to support homework and recall. This is a crucial support for students since homework is typically in written English, but classes are conducted in ASL. Without video, students have no reference for their work.

Resources to empower students: Teachers at GSD have created short instructional videos in academic subjects to provide additional visual support in ASL for specific concepts. These videos are designed to supplement or scaffold student learning. In one example (see graphics), Loren Frick, a middle school math teacher, and his students created videos to explain specific topics in math. In another example, Andrew McAllister, a high school English teacher, described his plans to create a video dictionary for students. He explained that because of students' varied reading levels and needs, "I can't be there for every student at the same time. For example, one class might have seven students, and they all need my assistance…I want to make a dictionary of correct signs and provide examples of other vocabulary so they can look it up… themselves. We're trying to empower the students instead of being reliant on the teachers all the time."

Teachers also provide students with links to a variety of high quality video materials to enhance and expand existing course materials.

Alternative assessment: Video technology provides students with new opportunities for alternative assessments. Students can record themselves signing in ASL to demonstrate their knowledge, rather than submit a written response in English each time. Several online video programs and software in use at GSD allow teachers to provide feedback on student work in ASL. The feedback may be inserted as video comments embedded into students' videos.

Collaboration: Video conferencing provides new opportunities for students at GSD to communicate, outside of class periods or school hours, in their primary language, ASL. Students confer about assignments and group projects using real-time video conferencing software.

Incidental learning: GSD takes full advantage of common spaces to provide students with what Superintendent Jackson calls "incidental learning," where students consume educational content while engaging in other activities. Video displays in common spaces such as hallways and the cafeteria are used to improve student vocabulary through "living word walls"— videos designed to improve vocabulary by introducing new words in both ASL and English. These videos are on a constant loop and are refreshed frequently.

Displays are also used to post storytelling videos in ASL. Storytelling videos increase students' exposure to correct language in ASL, as well as build overall literacy skills. Superintendent Jackson noted, "If language is everywhere in their world, not just in the classroom, it is more powerful."

Seven feet…seven feet.
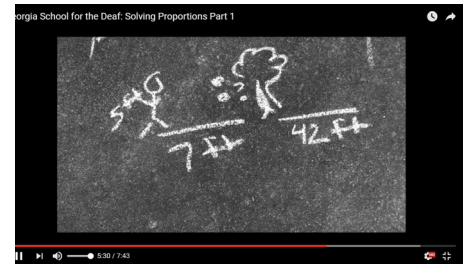
Loren Frick, a middle school math teacher at GSD, frequently collaborates with students to create videos that illustrate math concepts through real-world vignettes. This video focuses on proportions in the context of plans to cut down a large tree (https://www.youtube.com/watch?v=73GxxNLJPv8).

"Deaf students can't take notes during a lesson—you can't watch the teacher and take notes at the same time. So the flipped classroom model where the teachers video themselves teaching gives [students] instant access back to the classroom…We really want the opportunity for the kids to not have to hold everything in their head."

– Superintendent Leslie Jackson

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Impact

Students, teachers, and administrators described many ways in which increased access to high-quality video has positively transformed teaching and learning at GSD.

There are fewer interruptions during instructional time: With the upgraded network, classes are able to use video without any delay as they would have used any other materials. GSD staff described the loss of important class time while waiting for video or other content to load prior to the upgrade. Paul Saunders, a high school social studies teacher, explained "all of that video requires a lot of bandwidth. Before we would lose 10–15 minutes per class just waiting on video to upload. But with the improvements…there's no interruption to instructional time…We have [the time] back to help the students rather than waiting for the technology to catch up. So now more content can to be taught through the increased bandwidth."

Students have access to expanded curricular content: Students have broader access to video content posted by their teachers, and it is more generally available through the increased connectivity. Students have greater access to high-quality materials in both ASL and English, which reinforces their learning.

Students are more accountable and take greater ownership of their learning: With broader access to content and supports, faculty noted that GSD students have become more accountable for their learning. The ability to start and stop lessons, and scaffold as needed, allows students to learn at their own pace. Students' dependence on their teachers has decreased, and the number of times students access resources in online course folders has increased significantly.

Students' skills have increased: Teachers and administrators at GSD reported that students' skills in all subject areas, including reading, writing, and ASL communication have increased as a result of the expanded video supports. Technology provides an important tool for reinforcement and self-paced learning. Further, students' ability to record and share their own videos allows them to demonstrate mastery in new and innovative ways and provides teachers with additional opportunities to provide feedback on student performance.

Connected learning: Wireless access helps transform all areas of a school into flexible learning spaces

Connections for Classrooms Case Studies: Hall County School District

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Background

Hall County School District (HCSD) serves approximately 29,000 students across 37 schools in north Georgia. HCSD believes that "students are most successful when they are involved in programs that engage and motivate them, that capitalize on their unique talents and interests."[1]

To realize its vision for student engagement, the district offers students a range of education pathways through its school choice program. Students in HCSD can attend their zoned school or select among schools and programs that specialize in areas such as dual language immersion, Science, Technology, Engineering, and Math (STEM) education, fine arts, career preparation in a variety of fields, and International Baccalaureate. Within each school, students make additional choices among programs customized to their interests, including opportunities to learn online through courses developed by Hall County's online learning group.

Nearly 60 percent of students in HCSD qualify for free or reduced price lunch. District demographics shifted significantly during the past 15 years toward greater racial and linguistic diversity. Once a predominantly white district, the population of Hispanic students has grown to 40 percent, and English Language Learners comprise 20 percent of the population. The need to differentiate instruction to address the academic needs of the district's diverse learners has never been more acute. In response to the shifting demographics, the district committed to moving instruction to a blended learning format to offer students additional choice regarding time, place, pace, and path of learning.

During the past several years, HCSD made significant investments in its technology infrastructure, but the existing wireless network also needed upgrades. It was unreliable and not able to handle the increased usage of a blended learning format. With grant funds from Connections for Classrooms (CFC), the district implemented a robust wireless infrastructure in all schools. Now, students throughout the district can access digital content from wireless devices without worrying about the quality of the connection.

The increased wireless connectivity precipitated two changes in student learning in Hall County: it transformed all areas of schools into potential learning spaces, and it enabled increased enrollment in HCSD's online courses.

Hall County
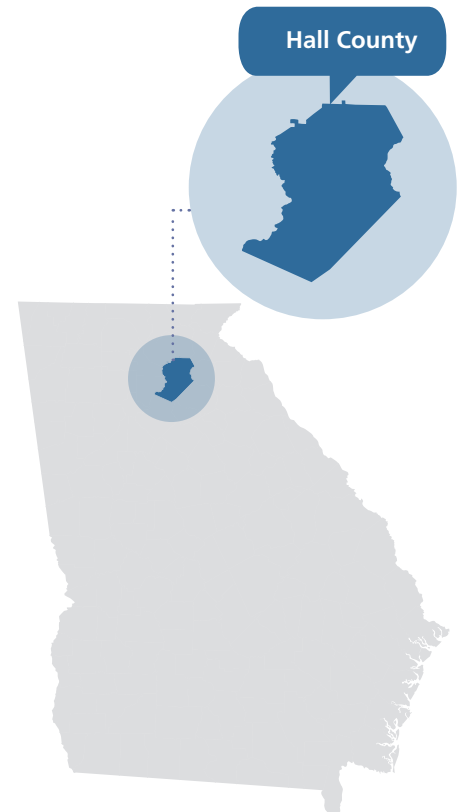
CFC Award Amount:

$795,481.08

Federal E-rate Amount:

$921,166.40

Total

$1,716,647.48

"Before, students had to go to where [classroom] technology was to study." With increased wireless capacity and HCSD's bring-your-own-device (BYOD) strategy, "technology becomes part of the natural learning environment, not something separate from it."

- Aaron Turpin,
  Assistant Superintendent of Technology

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[1] Hall County website: http://www.hallco.org/boe/site/school-choice/

Transformed Learning Spaces

With the increased wireless network capacity funded through the CFC grant, learning has expanded past classroom walls as students can now choose the location where they learn. Schools across the district are transforming non-classroom areas into active learning spaces that leverage the increased connectivity. In several school buildings, such as North Hall Middle School and Academies of Discovery, the district funded renovations to create new, flexible learning commons. "Before, students had to go to where [classroom] technology was to study," said Turpin. With increased wireless capacity and HCSD's bring-your-own-device (BYOD) strategy, he said "technology becomes part of the natural learning environment, not something separate from it." Turpin noted that technology now travels with students in their classrooms, hallways, common areas, and media centers— anywhere learning can take place, "which is everywhere!"

New Learning Commons

At **North Hall Middle School,** the renovation of the 3,100 square foot media center created an open, airy learning commons that can be used in a number of ways simultaneously. Stationary bookshelves and fixed computer stations were replaced by more mobile furniture. As Principal Tamara Etterling was quick to point out, all the furniture in the learning commons—from the low bookcases, chairs, and tables, to the library catalog station— are now on wheels. HCSD also acquired new technology for the space, including two 65-inch interactive display units on adjustable easels and a wall-sized display (10 ft x 12 ft) where students and teachers can share their screens to project video or other content. The new learning space comfortably accommodates large and small groups to gather and collaborate— up to 115 people, including 40 in the projection screen area. This flexibility enables students to arrange furniture into multiple configurations, clustered around the interactive displays or in front of the large wall display as needed.

The **Academies of Discovery** updated a once underutilized atrium to become a learning commons using a similar model. The school furnished the bright, two-story room with several collaborative workstations featuring large projection screens and a video wall for larger group presentations. According to Turpin, the learning commons is a hub for project-based collaboration for whole classes, small groups, and individual students. Connectivity allows students to project to screens within the learning commons and collaborate online.

Active Learning Spaces

Other learning spaces in the Academies of Discovery also benefitted from the expanded wireless coverage: **DaVinci Academy's** museum, which displays physical and digital student-made artifacts, and Gary Martin's video production studio, where students regularly share their memory-heavy videos and photography. Trey, a seventh grade student in Martin's class, described using the wireless capacity in the room for "almost anything," for "research, sharing documents, reviewing instructional videos from Mr. Martin… and posting assignments."

Lanier Charter Career Academy (LCCA), a high school offering career preparation in hospitality, culinary arts, advertising and marketing, leverages the increased wireless capacity to support its student learning in non-traditional classroom spaces. These include student-run businesses on "Main Street," which are used by the public and provide real world experience for LCCA students. Executive Director David Moody noted that every business on Main Street relies on the new wireless network for all business functions. Without that strong wireless connection, necessary payment and other business systems would collapse.

In addition, LCCA faculty make the most of their hands-on time with students in their learning space by using a flipped instructional model. Teachers often record the instructional portions of their lessons so that students can watch them in advance. This format enables students to spend more time with teachers executing projects, rather than sitting and listening.

Collaborative Work in the Learning Commons

In the North Hall Middle School learning commons, a group of seventh grade students position the interactive display as a table (see photo) in order to examine the text of a poem. Students look for different figures of speech and collaborate to annotate and highlight corresponding text. At the conclusion of the lesson, they save their work and electronically submit it to their teacher for review.

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Expanded Online Learning

Hall County's improved wireless capacity also expanded opportunities for online learning. Prior to the upgrades, students who wanted–or needed–to take courses beyond those accessible to them at school were constrained by geography and the wireless capacity of their schools. When the district first offered online instruction in 2012, it was limited to Spanish I, which had an enrollment of 30 students. The improved connectivity now enables successful videoconferencing and the growing number of online courses. Today, the district offers nine e-learning courses, and student enrollment has grown to 500. Students take e-learning courses in Spanish, Chinese, personal fitness, health, and AP Physics, with HCSD expanding these offerings each year. Online courses are part of the high school curriculum across the district. Students take online courses as part of their regular course schedule or during free periods in common areas, media centers, available classrooms, or even at home. At the middle school level, students are eligible to enroll in online courses to complete high school requirements in advance. Ultimately, the new network has allowed HCSD to expand the curriculum, enhance student choice, and create more flexible learning spaces.

The majority of online course content is developed in-house by HCSD teachers to ensure alignment with the Georgia and HCSD' standards. To manage the many layers of online instruction across the district, from course content to real-time video conferences with students, Hall County created the Center for Online Learning at the Academies of Discovery, which is staffed by several full-time instructors.

Hall County teachers and district staff also engage in online learning. Technology staff noted that, "in HCSD, it is no longer acceptable to offer professional development in a non-blended format." Bus drivers and teachers alike keep up-to-date with requirements and professional learning through online or blended trainings.

Impact

With the CFC grant funding and its new robust wireless network, HCSD transformed learning spaces and expanded education options for its increasingly diverse learners. Students and staff report that these changes have affected teaching and learning in several important ways.

Student engagement increased: Teachers and administrators noted a significant increase in student engagement related to the increased choice and the personalized delivery of education content via mobile devices. Expanding learning opportunities beyond traditional classroom walls offered students more real-world connections to their learning.

High-quality and relevant course content became more accessible to all students: The expanded learning opportunities (increased access to online courses, additional resources for research, and hands-on, collaborative learning projects, to name a few) gave students in this diverse school system the chance to customize their education to their needs and personal interests in a wide range of areas.

Confidence in the wireless network led to greater use: As one member of the HCSD technology staff noted, "the optimal condition for the wireless network is to be something that teachers and students never wonder about." Increased network reliability led to a surge in daily usage by students and teachers and an expansion of blended content. Teachers and students continue to rely more heavily on online resources to enhance the curriculum; and students are increasingly responsible for driving their own instruction.
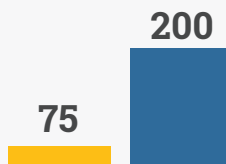
Growth of Online Learning in HCSD

500
30
Enrollment

9
1
Courses Offered Online

200
75
Waitlist

■ 2012-2013
■ 2016-2017
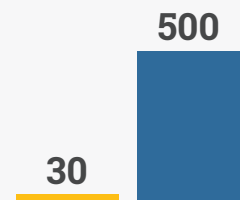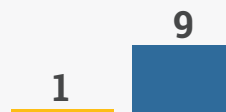
How do you **successfully** administer Georgia Milestones online?

Network infrastructure, cross-team coordination, and practice

Connections for Classrooms Case Studies: Thomas County Schools

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Background

Thomas County Schools (TCS) is a rural school system in southeast Georgia serving 5,700 PK-12 students across its eight schools. To increase equity for these rural students, Superintendent George H. Kornegay, Jr. has prioritized the integration of instructional technology and digital learning since he began his tenure five years ago.

In 2014, TCS applied for, and received, a Connections for Classrooms (CFC) grant to upgrade broadband and wireless network capacities at its two elementary schools, Garrison-Pilcher and Cross Creek. These upgrades enabled the rollout of its system-wide, one-to-one instructional device initiative, which created new opportunities for students to engage in digital learning and develop computer skills like coding. Further, the upgrades also allowed the school system to administer more than 81 percent of their Georgia Milestones tests online last year, well ahead of state expectations.

Teachers in Thomas County increasingly use a range of online tools and applications in their daily instruction. In addition to the integration of digital learning into academic classes, TCS added computer science and robotics courses, as well as a coding sequence to its K-12 curriculum to further students' computer skills—something not often seen in rural schools. Superintendent Kornegay explained, "It has been one of my goals as superintendent to have our students leave our system prepared to compete on equal footing with students who have graduated from a metro area school."

Successful Transition to Online Georgia Milestones

One benefit of the upgraded network infrastructure and expanded bandwidth has been TCS' successful implementation of online Georgia Milestones assessments. In a year when some districts faced network obstacles to Milestones testing, TCS had almost no issues while completing a greater percentage of tests online than most districts. This success was accomplished through careful planning and testing the capability of the infrastructure that was available in 2014, which built confidence among staff, students, and parents.

Staff report that the upgraded network is now reliable and able to handle daily classroom use where technology is available, as well as the rigors of the testing period when thousands of students complete online assessments simultaneously.

Thomas County's systematic implementation made successful online testing the district norm through three key actions, including:

Network Infrastructure

Prior to the grant, Garrison-Pilcher and Cross Creek elementary schools had significant gaps in wireless coverage that inhibited online access for educational and administrative systems and tools. With the CFC grant, TCS updated switches, wireless access points, and other network hardware to provide consistent wireless access throughout each school building. The expanded capacity paved the way for the use of mobile devices for instruction and online assessment, both of which could only be conducted in each school's computer labs, prior to the upgrade.

The district moved quickly to provide devices (primarily laptops and tablets) for all students using grant funds from other sources. According to Associate Superintendent Melanie Chavaux, acquiring more mobile devices without the network upgrades would have had limited impact, since the network was routinely pushed to its limit before the upgrades. Since then, the use of instructional technology has grown exponentially.

Thomas County Schools
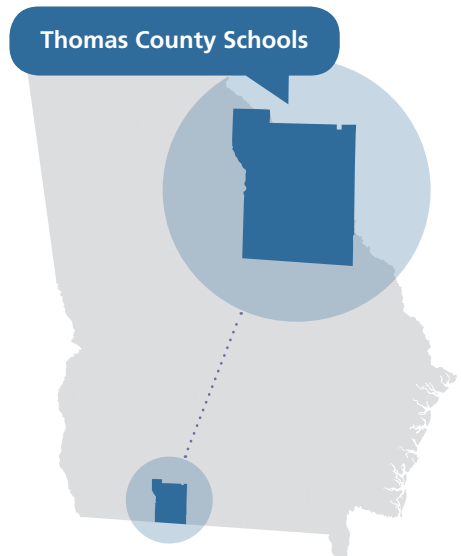
CFC Award Amount:

$382,960.41

Federal E-rate Amount:

$292,308.28

Total

$675,268.69

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Cross-Team Coordination

When asked about Thomas County's success in the rapid implementation of online testing, Superintendent Kornegay noted, "the greatest asset is the team I have." Wes Davis, Director of Technology, worked tirelessly across district- and school-based teams to lay the groundwork for success. All district stakeholders were involved with the planning and execution of online testing, including the technology team, instructional technology team, assessment team, district instructional team, and each school's staff. This collaboration included scheduling assessments to reduce disruption, assuring adequate infrastructure, and preparing students and teachers to minimize anxiety.

Practice

Thomas County initiated multiple rounds of practice to ensure staff and student familiarity with the new testing procedures.

As a starting place, students frequently completed online formative assessments in their classes. These assessments supported classroom instruction and began to familiarize students with online testing. Erin Rehberg, the System Instructional Technology Coordinator, explained "We feel it's important to give the students practice throughout the year with testing online, instead of waiting until April when the high stakes tests come along." In addition, because of the integration of devices with instruction, students' comfort level increased. Student log-in information remained the same for every system and program students used—from their lunch accounts to online assessments—to facilitate ease of use.

Thomas County also leveraged district benchmark tests and Georgia Milestones field tests to serve as "dry runs" for testing procedures. For benchmark tests, the schedule, groups, and instructors are the same as those used for Milestones. Mr. Davis explained that this is "so that everyone knows where they will be, who they will be with, and when they will be there."

The Milestones field tests simulated testing conditions, grade by grade and school by school, building up to a full-scale testing simulation of 1,600 students at once. Though the duration of the simulations was short, they were long enough to increase student, teacher, and even parent familiarity with the processes and also highlight any technical issues that could emerge.

The district assigned technology teams to each building during the practice runs, so that staff were available to troubleshoot or intervene if problems surfaced. These teams also conducted systematic building walkthroughs to confirm wireless coverage throughout each classroom. During practice and actual testing, the teams carefully monitored network use at each building and asked other schools not participating in particular tests to limit their usage during testing days. To the surprise of the district team, online testing taxed the network much less than a typical instructional day because the assessments do not use broadband-intensive activities like streaming videos. In addition to these preparations, the testing vendor offered a means to cache testing data on a local server so that student answers could be saved and submitted at a later time if the district's connection was interrupted.

By the time TCS administered the online Milestones assessment, teachers and students had completed two to three simulations specifically for Milestones. The practice runs built student and teacher confidence in the process, which reduced distractions and test-related stress.

> "The key [for us] is practice and preparation. We started practicing at the middle school in October or November—going to the practice website, getting the kids familiar with what it looks like. I really feel that is why we were so successful as far as implementing and getting the kids ready for when it was time for the [actual] test."
>
> -Lindsay Thompson, Former MS teacher and current HS Instructional Technologist

> "We feel it's important to give the students practice throughout the year with testing online, instead of waiting until April when the high stakes tests come along."
>
> -Erin Rehberg, System Instructional Technology Coordinator
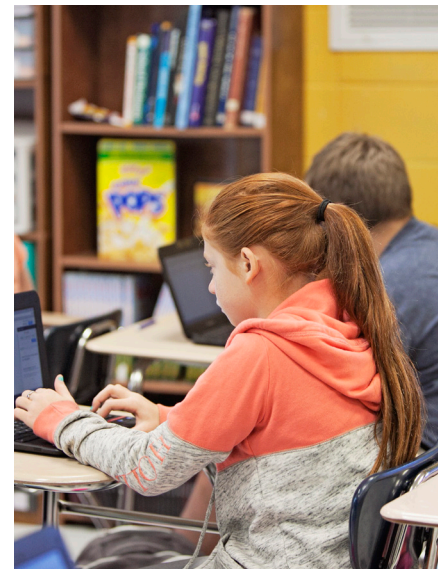
Impact

More than 81 percent of tests completed online, exceeding state targets: The Georgia Department of Education has established annual targets for districts to rollout online assessments over a five-year period. The state goal for 2016-2017 is 80 percent, with 100 percent expected by 2018-2019. Thomas County reached 81 percent in 2016, surpassing the state target a year early (see graph).

Testing anxiety decreased: Teachers and administrators observed a decrease in testing anxiety among students, teachers, and parents, indicating a successful transition to online assessments for TCS. They attribute this success to the detailed practice completed with other tests prior to Georgia Milestones.

Test administration is less cumbersome: For grades where online tests are administered, teachers no longer have to physically handle, manage, and keep secure high stakes paper materials. While test administration is less cumbersome for teachers and test coordinators, lower test results indicate the need to address daily practice and preparation for students that did not score as well as when they took a paper and pencil test.

Testing disrupted far less instruction than in prior years: Motivated first and foremost by the need to reduce the disruption to regular instruction, district staff reported that the ability to administer Milestones assessments using laptops and tablets has allowed computer labs to remain available for non-testing classes. In addition, having a reliable infrastructure has prevented additional loss of instructional time due to retesting when data are lost.

District technology goals were met two years ahead of schedule: Overall, district staff report that funds provided by the CFC grant program were a significant force in accelerating their efforts to upgrade systems and introduce new technologies to classrooms. As a result of CFC funding, Superintendent Kornegay notes that the district is two years ahead of the timeline set forth in its original technology plan. Network upgrades funded through CFC freed other district funds to invest in student and teacher mobile devices, bringing the district within reach of its goal of providing a one-to-one program to students district-wide.

% of tests administered online

	2015	2016
Georgia	53%	73%
Thomas County	33%	81%

Photos provided by Thomas County Schools
Case Study prepared by PCG Education

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