

Investigating the Impact of the Cisco 21st Century Schools Initiative on Forrest County Agricultural High School

Summative Report



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Cisco Global Education

Transforming school systems for the 21st century

Cisco Global Education is engaged in shaping 21st century teaching and learning through thought leadership, practical engagements, and communication. Education systems urgently need to prepare students for the fast-moving demands of this century—this is not in question. Our work focuses on developing, scaling, and replicating successful working models to promote global system transformation. Through practical engagements, we test and refine these models in real-world situations, driving hands-on change in schools in Louisiana, Mississippi, New York, Jordan, and China.

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Executive Summary

Forrest County Agricultural High School (FCAHS) is located in Brooklyn, a small rural town in southern Mississippi and part of the Hattiesburg Metropolitan Statistical Area. Unlike the other schools that participated in the Cisco 21S initiative, FCAHS is not part of a larger school district. Therefore, the unit of analysis throughout this summary is the school itself.

Over the four years of the 21S initiative, the school's population declined from 602 students in 2005–2006 to 555 students in 2008–2009. In the last year that figures were available (2007–2008), the student body was 30 percent African American and 69 percent White. In 2008–2009, 62 percent of students were eligible for free or reduced lunch.

For the 2008–2009 school year, the staff at FCAHS consisted of 4 administrators and 47 teachers. While 3 of the 4 administrators and 205 students (37 percent) completed an online survey in 2009, only 7 of the 47 teachers (15 percent), and only 7 parents (3 percent) did. Because of the low completion rate in all survey groups, in absolute and/or relative terms, it is not possible to derive percentage figures that are statistically reliable. Therefore, this report will focus on more qualitative observations of change that occurred over the span of the 21S initiative.

Vision and Leadership

Establishing a clear vision and well-defined expectations are the first order of business in developing a school change strategy. The Cisco 21st Century Schools Initiative (Cisco 21S Initiative) represents an intensive, four-year, \$80 million investment in technology, training programs, and Cisco employee resources in Mississippi and Louisiana. Since the 21S Initiative began 4 years ago, FCAHS's vision has become crisper and more focused. In 2009, administrators were able to articulate a more specific goal of preparing students to become productive members of their community, state, and nation. In prior years, the goal was expressed more vaguely—that they wanted to prepare students for future endeavors.

To bring key stakeholders into the change process, administrators say they have created a leadership within the school. But simply crafting a vision is insufficient; it must also be sustained. In order to maintain the 21S vision even after Cisco's support has ended, administrators report they have developed a sustainability plan to establish a dedicated technology budget, seek grants, develop partnership networks, and reallocate budget funds to new areas.

At Forrest County Agricultural High School, as elsewhere, the 21S Initiative centers around three structural transformations:

- *Connected District/School:* The Connected District/School component established a secure and manageable baseline technology platform (data, voice, video, etc.), which encompasses all the equipment and human resources necessary to support all administrative and instructional processes in the school.
- *Connected Learning:* The Connected Learning component promoted 21st century teaching and learning through new technologies, instructional approaches, and professional development.
- *Connected Community:* The Connected Community component focused on fostering positive relationships between the school and a broad set of stakeholders, including parents, businesses, agencies, and non-profit organizations.

Connected District/School

The first step for FCAHS in becoming a Connected School was to build a safe, reliable, and robust technology infrastructure. This included installing cable throughout the building, establishing a security system, and upgrading science and math labs. Once built, the school's more robust infrastructure enabled FCAHS leaders to effectively address other components of the 21S vision.

The school also used initiative funds to buy equipment such as interactive whiteboards, laptops and laptop carts, Internet Protocol (IP) phones, microphones, video equipment, and scanners. In addition, leaders invested heavily in educational software such as BrainPOP, Fast Math, NovaNet, SuccessMaker Cognitive Tutor, and Ramp-Up. All administrators surveyed reported that the technology infrastructure implementation at the school is now on or above target, whereas none said that last year. The same leaders also said that current technical support is very or somewhat helpful.

In 2009, teachers and students reported a wide variety of technology tools and software in their classroom, including computers, interactive whiteboards, Internet and telecommunications equipment, organizational software, and Web 2.0 tools, but low survey responses made it difficult to determine how much, if at all, access to technology increased over time.

Connected Learning: Educator Outcomes

The Connected Learning component of the Initiative is focused on professional development (PD) resources and programs designed to promote leadership, technology integration, and student-centered instructional strategy. Measures of Connected Learning include the quality and quantity of professional development, and the frequency of constructivist¹ teaching practices in the classroom.

Professional Development: At FCAHS, much of the technical training offered to teachers centered on the use of specific technology tools and software, such as Cognitive Tutor software, SAS Curriculum Pathways, and Ramp-Up to Literacy and Math programs. Teachers also attended the Cisco Networking Academy, and received an additional 40 hours of professional development over the summer. As the advancement placement (AP) courses were growing, many teachers also received subject-specific training in order to prepare them to teach those classes.

Teacher Use of Technology: In terms of technology, although results cannot be generalized, all seven teachers who responded to the 2009 survey reported using computers on a daily basis, while six of seven said they used interactive whiteboards, the Internet, and telecommunications daily. All three FCAHS administrators who responded to the survey indicated that there has been significant positive change in the overall quality of teaching in the district. In addition, two of the responding administrators believe there has been *significant or system-level positive change* in technology integration into the curriculum since the Cisco Initiative began, and a similar number report that teachers' ability to integrate technology into the curriculum is currently on target.

Connected Learning: Student Outcomes

Student engagement is measured through student inputs such as levels of participation in classroom activities and everyday reading practices, as well as test scores and changes in student behavior.

¹ Constructivism is an approach to teaching and learning based on the belief that students learn by fitting new information together with what they already know. Constructivist teaching puts the students at the center of the classroom, where the teacher acts as a facilitator of student exploration, synthesis, and social interaction. Subsequently, learners develop their own understanding through carefully designed supported learning experiences.

Student Use of Technology: Although only 37 percent of students completed the 2009 survey, 93 percent of these feel confident using a wide range of technology tools. Of these students, the vast majority said they were using the technology tools to research, organize, and evaluate, and that they were using more technology tools in their classrooms. All three administrators surveyed agreed that student Information, Communication and Technology (ICT) literacy has improved over the course of the 21S Initiative.

Student Engagement: Overall, students surveyed in 2009 agreed that they are active participants in their learning, indicating that they have opportunities to ask teachers questions about their work, have chances to be creative about their schoolwork, have a voice in their classrooms, and get to make choices about what they study at school. All three administrators who completed the survey and 88 percent of the 205 students who responded agreed that participation in the Cisco 21S Initiative has increased students' engagement in their classes. In addition, 85 percent of student respondents said they were learning more on their own.

Participation in Math/Science Fairs: The 21S initiative seems to have sparked greater interest in math and science among FCAHS students, as indicated by their participation in various student competitions. In 2009, the number of students participating in state-level math/science fairs increased six-fold over the prior year (from 2 students to 12), while district-level participation went up 50 percent (from 8 students to 12). Additionally, although no data was available for prior years, the school saw a large number of student entries (87) in contests in 2009.

Student Behavior: While there are many factors that affect student behavior, it is encouraging to see positive behavior patterns at FCAHS throughout the course of the Cisco Initiative. According to data provided by the school, absenteeism decreased significantly in 2009 (5673 vs. 7018 in 2008), while late arrivals declined by almost half (467 vs. 879 in 2008). Suspensions likewise declined from 192 to 148.

Broader Course Offerings: Offering more diverse courses was also an important component of the Connected Learning strategy. To prepare students for college, SAT and ACT prep courses are now offered at the school. In addition, FCAHS has made Advanced Placement (AP) classes available to students in a number of areas including Physics, Government, Economics, and US History. And, new agreements with local universities now allow FCAHS students to take college-level courses.

Student Test Results: While the number of responses was low, a majority of administrators, teachers, and students who completed surveys believed that student performance on state tests has improved as a result of the Cisco 21S Initiative. These beliefs are supported by test data.

FCAHS students made gains in three of the four Subject Area Testing Program tests between 2007–2008 and 2008–2009. The largest increase in passing scores occurred in Algebra I, with an impressive 16 percent gain. FCAHS students outperformed their peers across the state on two (Biology and U.S. History) of the four subject tests in 2009.

Graduation Rates: The declining population of FCAHS makes year-to-year comparisons tricky, but it is important to note that even with fewer students, the absolute number of graduates has risen every year of the Cisco Initiative (105, 110, 123, and 125 respectively), and dropout rates have correspondingly dropped (43, 37, 37, and 28).

College Preparation: The 21S Initiative also aims at increasing students' ability to enter and succeed in college. School data show that over the four years, many more students are taking the ACT college admissions exam. Between 2005–2006 and 2008–2009, the ACT participation rate rose steadily every year. For the first three years, the increased participation was accompanied by an increase in average ACT scores (19.2 in 2006, 20.1 in 2007, and 21.0 in 2008). However, in 2009, the average ACT score decreased by 2 points to 19.0. This decrease may be due in part to the dramatic increase in the ACT

participation rate to 96 percent of students, up 27 percent over the prior year). The number of students taking AP courses has also increased over the past four years, but to date, no students have sat for an AP test.

Connected Community

This component of the 21S Initiative involves reaching out to parents and community members to educate them about the 21st century education vision and its implementation. At FCAHS, all three administrators surveyed reported that their decision-making process includes community members, partners such as civic organizations, tutoring programs, community service organizations, and faith-based groups.

Parents are an important part of the school community, and all FCAHS administrators say they have sought out parents' ideas and opinions to inform decision-making when appropriate. However, although survey responses are too low to be statistically reliable, those parents who responded to the survey gave low ratings to outreach efforts and school-provided resources. One bright note is that parent attendance at open houses has increased by 60 percent over the four years of the Initiative.

Remaining Challenges

While important gains have been made over the course of the 21S Initiative, it appears that a number of significant challenges remain before FCAHS fully achieves its vision of becoming a 21st century learning environment. The fact that student response rates—and especially teacher and parent response rates—were low on 2009 surveys may indicate that other issues are claiming stakeholder attention, or may be a symptom of change fatigue. The lack of response perhaps does indicate that full-fledged commitment to the Cisco Initiative may need to be rekindled.

Vision and Leadership Challenges: The low teacher response rate makes comparisons difficult, but in general, FCAHS administrators' expectations for teachers tend to outpace how teachers perceive those expectations. This suggests that teachers may benefit from further education about the 21S vision and their role in achieving it.

Connected School Challenges: The connected schools component of the Initiative may need improvement in the following areas:

- Two of the 3 FCAHS administrators who responded to the 2009 survey indicated several areas where they have faced difficulties in implementation, specifically, in providing adequate levels of technical support and in maintaining technology-based security in the school.
- Of the 7 teachers who responded to the 2009 survey, 4 said their access to stable, reliable Internet connections is below their expectations.
- While all responding teachers said that they have access to computers, 3 of 7 indicated that they do not have access to enough computers to accommodate their students.

Connected Learning Challenges: EDC analysis of the Connected Learning component of the Initiative shows a number of areas where improvement is needed. Additional focus on these areas may help transform established practices.

- *Changing Practices:* Two of three administrators indicated that changing antiquated teaching philosophies has been a challenge.
- *Student Use of Technology:* Students report that they rarely: use video cameras, digital cameras, and video conferencing equipment, use e-mail to communicate with their teachers or

with students from other countries, collaborate with students from other schools on academic projects, or discuss ideas from readings or class with teachers outside of class.

- *Building Teacher Skills:* Four of the seven FCAHS teachers who responded to the survey rated their skills using Personal Digital Assistants (PDAs), Web 2.0 tools, video conferencing equipment, and student assessment software at the novice level. As these are the areas where the fewest teachers have received training, future professional development on these topics could help build teachers' skills.
- *Integrating Technology into the Curriculum:* Four of the seven responding FCAHS teachers indicated that their ability to integrate technology into the curriculum is somewhat or not proficient and that they do not receive enough professional development support around using technology tools and software.

Connected Community Challenges: In addition to its successes, there are several areas where FCAHS has had difficulties implementing the Connected Community component of the Initiative. These may be opportunities to target as the Initiative continues.

- *Community Outreach:* Two administrators out of the three who responded to the 2009 survey report difficulties getting community members involved in the program, and feel that involvement of local businesses and local institutes of higher learning in the school has not increased over the course of the Initiative.
- *Parental Outreach:* Those FCAHS parents who completed the survey reported that the school's outreach efforts have been largely unsuccessful, and that resources to support their involvement in the school were largely unavailable.

Lessons Learned

As the 21S Initiative draws to a close, and Cisco ends its formal partnership with Forrest County Agricultural High School, it is appropriate to look back at the experience to identify the lessons learned. Effective leadership is among the most powerful factors in any school transformation. Complicating the picture at FCAHS are the low response rates and small numbers of the various stakeholder groups. Still, looking back at the past four years of the Initiative, some recommendations can be framed from both positive and negative findings concerning the FCAHS experience. To achieve an effective transformation, school leaders should commit themselves to:

- Creating a powerful and dynamic vision of a 21st century learning environment that involves all members of its stakeholder community
- Crafting structures and processes to enable key stakeholders to share in the vision and guide its ongoing evolution
- Providing vehicles and processes to foster communication and collaboration among educators, parents, and community members
- Crafting an ambitious professional development plan and bolstering it with technical and pedagogical support
- Strategically cultivating community partnerships

To begin the transformation of Forrest County Agricultural High School into a 21st century learning environment capable of supporting greater administrative efficiencies and a student-centered approach to teaching and learning, school leaders did the following:

- Revamped the technology infrastructure and improved access to software, hardware, wireless Internet connections, and technology-based security systems within the school

- Installed a variety of educational hardware and software in the classroom to support student learning
- Provided technical support to teachers and administrators
- Supported additional professional learning opportunities aimed at promoting effective technology use and instruction within the school
- Created richer and broader course offerings for students

Introduction

Education systems in the early 21st century are in transition and have the potential to evolve into very different institutions. Embodying the values of diversity and collaboration, encouraging innovation, and integrating technology into every aspect of the learning environment, these new systems enable students to be active participants in defining, pursuing, and assessing their own learning so that they can develop the skills and habits of independent thinkers and lifelong learners. Education leaders, policy makers, community leaders, businesses, government agencies, and research organizations have come to realize that the approaches that worked just 50 years ago will no longer serve to prepare students for the challenges in today's world. They are calling for the transformation of current education systems.

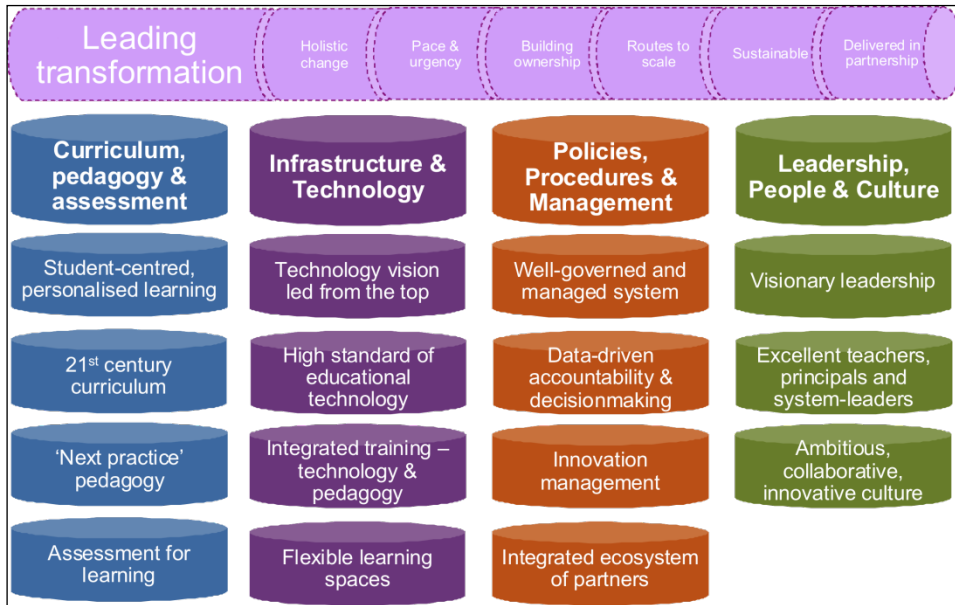
As this education transformation agenda was under discussion at the national and international levels, Cisco Systems, Inc. (Cisco) was in the process of responding to Hurricane Katrina's destructive impact on Mississippi and Louisiana. After several visits to the region, and consultation with the education leadership in Mississippi and Louisiana, Cisco leadership chose to focus on education and offered to develop a complex and large-scale education technology project, which is called the "Cisco 21st Century Schools Initiative" but is best known as the "Cisco 21S Initiative." The Initiative represents an intensive, four-year, \$80 million investment in technology, training programs, and Cisco employee resources. Its goals are to help not only rebuild the Jefferson Parish Public School System in Greater New Orleans and seven districts in Mississippi post-Katrina,² but also to transform these districts to meet 21st century educational demands. The Initiative is organized around the following three interrelated structural components:

- *Connected District/School:* The Connected District/School component established a secure and manageable baseline technology platform (including data, voice, video, etc.), which encompasses all the equipment and human resources necessary to support all administrative and instructional processes in the district.
- *Connected Learning:* The Connected Learning component supported administrators, teachers, and technology personnel to create 21st century learning environments through access to expertise and international best practices.
- *Connected Community:* The Connected Community component helped schools develop plans for interacting effectively with parents, local businesses, and community members and turn each participating school into a hub of the community.

Helping districts and schools make connections across all three components of the program is central to the 21S Initiative. Through the implementation of these program components in the Gulf Coast region, Cisco has learned how to effect rapid 21st century education transformation in real education systems. As a result, Cisco's education and technology leadership have articulated a concrete vision and framework for a 21st century education system (Cisco Systems, 2008). In conjunction, they have developed tools to manage better the process of education transformation. The principles of 21st century education fall into four key categories, which are shown in Figure 1 and described below.

² The selected districts in Mississippi include Petal School District, Hattiesburg Public School District, Moss Point School District, Harrison County School District, Forrest County Agricultural High School, Forrest County School District, and Lamar County School District.

Figure 1: Cisco’s global education roadmap



Source: Cisco, 2008

1. *21st century curriculum, pedagogy, and assessment:* The adoption of 21st century curriculum, pedagogy, and assessment allows all stakeholders to have a role in promoting student-centered and personalized learning and addressing the full range of knowledge and competencies that students need in order to prosper in a global world economy. A system-wide pedagogy agenda emphasizes adopting and improving best practices from around the world and constantly seeks emerging practices. Finally, formative and summative assessment techniques are consistently employed to improve learning and to gain a full insight into the abilities of each and every student.
2. *High-quality infrastructure and technology:* In a 21st century education system, the educational technology vision is led from the top but shared, owned, and effectively managed throughout the system. A high standard of technology is deployed effectively to support 21st century teaching and learning. Initial training and ongoing support integrate technology with pedagogical development. The physical environment is designed to optimize 21st century teaching and learning.
3. *Policies, procedures, and management:* A 21st century education system is governed and managed with the ultimate goal of maximizing learning outcomes for all students. There are transparent processes in place to communicate and implement decisions, develop and monitor curriculum, sustain the budget, and procure resources. Additionally, policies and procedures are implemented to enable these education institutions to use data to drive school standards and accountability while stimulating and managing innovation. Finally, school learning is recognized as being embedded within and dependent on an ecosystem of partners that support learning and/or provide other essential children’s services (e.g., health, social services).
4. *Leadership, people, and culture:* The entire system is a learning organization with a supportive culture that promotes ambitious and innovative approaches to teaching and learning. Leaders throughout the system champion and model the 21st century educational vision and work with well-trained and well-supported teachers. Emphasis is placed on the recruitment and retention

of both principals and teachers through carefully designed outreach efforts and training programs. A 21st century system explicitly promotes a culture of high expectations, respect, collaboration, and shared accountability.

As of September 2008, the goals of Forrest County Agricultural High School (FCAHS) are to: (1) increase the use of formative assessment tools for all students, (2) complete the digital portfolio program, (3) increase collaboration and teamwork through professional development, the use of common assessments, and planning, (4) establish an interdisciplinary and local curriculum, (5) form a school/district committee to monitor software uses and needs, (6) improve Algebra test scores, (7) broaden community outreach (e.g., businesses, community organizations) by developing community programs, (8) ensure sustainability of technology equipment: maintain equipment, use students to build program and provide support, and (9) create a foundation (alumni). Making connections across all these components of the program is central to transforming FCAHS into a 21st century education system.

Evaluation Approach and Activities

The Center for Children and Technology at Education Development Center, Inc. (EDC) conducted the Initiative's summative evaluation, which is designed to measure system change at the district, school, and community levels. EDC researchers used a multi-method approach to gain a broad view of the implementation status of the 21S Initiative in FCAHS (e.g., through surveys) and an in-depth understanding of the Initiative at the district, school, classroom, and community levels (e.g., through classroom observations, interviews), and measure its impact on the entire system, especially on participants (e.g., through surveys, interviews, outcome data). The following questions guided the summative evaluation in FCAHS:

- What are the key programmatic components being implemented and how are they being implemented?
- What is the impact of the Initiative at the district, school, classroom, and community levels?
- What are the lessons learned from the implementation of the Initiative?
- What are the program recommendations for future Cisco education engagements?
- How can/will the Initiative be sustained when Cisco is gone?

To answer these questions, the EDC research team engaged in the evaluation activities listed below.

Collecting and Reviewing Documents: Cisco and the district shared relevant documents with EDC researchers. Most of the documents contained data on the demographic characteristics of administrators, teachers, students, and parents, as well as information about 21S implementation, community outreach, and dissemination. The research team reviewed the collected documents to better understand the 21S implementation process in FCAHS.

Compiling 21S Participation Data: The research team developed a series of implementation data collection charts that staff used to gather data about 21S participation in the school. School leaders compiled the numbers of administrators, technology personnel, teachers, students, and families who have participated in the 21S Initiative over the last four years. EDC researchers used the data to better understand the strategies used to roll out various components of the Initiative and to involve different stakeholders over time.

Tracking Yearly Implementation Progress: The EDC researchers tracked progress related to the three principal components of the 21S Initiative: Connected Schools, Connected Learning, and Connected Community. They asked administrators to list activities and projects that they planned to implement

over the course of the school year. At the end of the year, staff marked each input as completed, in progress, or not completed, according to its status at that time. The categories of inputs, along with the percentage completion rates, are presented as pie charts in this report (see pages 21 and 25).

Compiling Outcome Data: The Outcome Data Tables are a series of four tables that aided in the collection of yearly data related to administrator, teacher, student, and parent outcomes. School administrators collected student test scores, teacher retention rates, administrator professional development participation, and outreach to parents. They populated the table with as much information as they had available.

Collecting Survey Data: EDC researchers designed five online surveys, one for each key stakeholder group, to gather a wide range of information related to technology use in classrooms and homes across the community. Questions also focused on the impact of the Initiative on participants. Surveys were made available to participants between April 12 and May 31 of 2009. It took around 30 minutes to complete a survey. While the number of administrators and students participating in the survey increased from the previous year, the number of technology personnel, teachers, and parent respondents decreased (see Table 1).

Table 1: Survey participants

Participants	2006–2007	2007–2008	2008–2009
Administrators	0 (0%)	2 (50%)	3 (75%)
Technology Personnel	1 (100%)	1 (50%)	0 (0%)
Teachers	39 (85%)	23 (50%)	7 (15%)
Students	N/A	195 (34%)	205 (37%)
Parents	8 (3%)	18 (8%)	7 (3%)

Note: Percentage of total in district provided in parentheses.

Data Analysis: EDC researchers employed both quantitative and qualitative methods of analysis. For quantitative data, they used SPSS, a statistical software package, to conduct frequency, cross-tabulation, and correlation analyses (e.g., surveys, outcome data) (Dillman, 2000; Shadish, Cook, Campbell, 2002). For qualitative data, they used a grounded theory approach (Strauss & Corbin, 1990). They read and coded the interview transcripts for the purpose of identifying common themes, such as 21st century education vision, leadership, and environment. Actual transcribed text is provided to document the salience and substance of the themes and sub-themes that surfaced.

District System-Level Change

21st century districts are complex organizations working toward the common goal of moving away from a bureaucratic system and adopting a knowledge-based, next-generation education system. Districts engaged in this change often have difficulties managing the process, which occurs on numerous levels at the same time over a long period of time, and addressing local, state, and federal education requirements. Most of the 21S districts have been able to manage well the demand for 21st century change and have seized it as an opportunity to improve their education vision, leadership practices, technology vision and resources, professional development strategies, and organizational culture.

This section presents the findings drawn from the vision and experiences of those involved in the education reform efforts in FCAHS. To measure these efforts at the district system level, EDC researchers looked at:

1. Community environment
2. Number of schools, staff, and student demographics
3. Level of participation of the district in the 21S Initiative
4. District's 21st century education vision and leadership
5. District's learning environment
6. Relations between the 21S inputs and expected outcomes

District Locale and Background

Brooklyn is a small, rural town in southern Forrest County, Mississippi. It is part of the Hattiesburg, Mississippi, Metropolitan Statistical Area (MSA), which encompasses Forrest, Lamar, and Perry counties. The MSA population exceeded 150,000 as a result of a 10 percent increase following Hurricane Katrina in August 2005. While current figures are not available for Brooklyn due to its small size, Forrest County, like the MSA, experienced a gain in population of approximately 5 percent. The area around Brooklyn, as well as Forrest County, has grown, although they have had to deal with some after-effects of the storm. The median income in Forrest County (\$27,420) was lower than both the state of Mississippi and that of the United States (\$41,994).

In 2000, the population of Brooklyn was 907, but due to the small size, current figures were not available for the town. Out of a population of 79,425, Forrest County is 64 percent White and 33 percent African American. Hispanics make up approximately 1 percent, while Native Americans and Asians make up the remaining percentage. As of 2009, the unemployment rate in Forrest County (7.8 percent) is lower than that of both the state (9.6) and the United States (9.7) as a whole. The poverty rate in Forrest County (20.8 percent) is slightly higher than that of Mississippi State (19 percent), and significantly higher than that of the United States (12 percent). The violent crimes index in Forrest County (0.13) is significantly smaller in comparison with the indexes of both the state of Mississippi (2.91) and the United States (2.31). This rural town in Forrest County is where the Forrest County Agricultural High School (FCAHS), the subject of this report, is located. FCAHS is a self-contained single-school district.

Forrest County Agricultural High School/District

FCAHS functions as a fully autonomous school and district unit within the Forrest County School District. It is one of three agricultural high schools in the state. FCAHS witnessed significant

administrative changes during the second year of the Cisco 21S Initiative. To paraphrase one of the administrators, the school has experienced years of growth with bumps.

The number of administrators, technology personnel, and teachers in FCAHS has increased over the last four years (see Table 2). The number of administrators grew to 4 in the 2006–2007 school year. This number has remained stable through 2008–2009. The number of technology staff increased in the 2007–2008 school year. Finally, the number of teachers in the district has increased in both the 2006–2007 and 2008–2009 school years. Currently, 4 administrators, 2 technology personnel, and 47 teachers serve FCAHS. The average teacher/student ratio is 1:12.

The number of students attending FCAHS has steadily decreased over the past four years (see Table 2). As of 2007–2008, of the total enrollment, 30.4 percent were African American, 69.2 percent White. Hispanics, Native Americans, and Asians made up the remaining percentage; 46.9 percent were females. The free and reduced lunch population, as of 2008–2009, was 62 percent.

Table 2: Forrest County Agricultural High School/District makeup

School Year	Schools	Administrators*	Technology Staff	Teachers	Students
	#	#	#	#	#
2005–2006	1	3	1	45	602
2006–2007	1	4	1	46	588
2007–2008	1	4	2	46	582
2008–2009	1	4	2	47	555

* Includes administrators in schools and central office

The number of administrators returning increased from three to four between 2005-2006 and 2006–2007 and then decreased to two in 2008–2009. The number of days that administrators missed school increased, slightly rising from 14 in 2005–2006 to 17 in 2007–2008, but then decreased to 9 in 2008–2009. The number of teachers returning to FCAHS in the following year has steadily increased between 2005–2006 and 2008–2009. However, the number of days that teacher missed school has also increased over the four years. Table 3 provides more information about staff’s employment, retention, and attendance numbers.

Table 3: Employment, retention, and attendance

	2005–2006	2006–2007	2007–2008	2008–2009
Number of teachers to apply	21	25	19	22
Percentage of teachers employed	43	46	46	48
Number of teachers returning the following year	34	35	37	46
Number of teacher absences	221	268	276	317
Number of administrators employed	3	4	4	4
Number of administrators returning the following year	2	4	4	2
Number of administrators absences	14	11	17	9

The qualifications and experience of FCAHS administrators and teachers has increased over the past four school years. The total number of years of experience held by Forrest County Agricultural High School administrators has increased between 2005–2006 and 2008–2009. In 2005–2006, three administrators had teaching certificates in Special Education, Counseling, and Social Studies. This number rose to four in 2006–2007 and then stayed steady for the next two years. The types of degrees held by administrators have also changed slightly over the past four years. The number of administrators holding a PhD increased from one to two in 2006–2007. While the number of administrators holding a Master’s degree decreased by one in 2007–2008, an administrator with a specialist’s degree started working at the school at this time. None of the administrators employed by Forrest County Agricultural High School have earned the Internet and Computing Core Certification (IC3). Table 4 provides more information about administrators’ qualifications.

IC3 is a certification program that is designed to teach individuals the digital literacy skills associated with basic computer and Internet use. In addition, while the number of teachers holding Bachelor’s degrees has decreased slightly, the number of teachers holding Master’s degrees has steadily risen. All teachers over the past four years have had teaching certificates. Of the teachers employed in 2008–2009, two are IC3 certified. Table 4 shows more details on teachers’ qualifications.

Table 4: Staff qualifications

	2005–2006	2006–2007	2007–2008	2008–2009
Number of years of experience (administrators)	42	58	62	88
Number of administrators with a Master’s degree	2	2	1	1
Number of administrators with a PhD	1	2	2	2
Number of teaching certifications (administrators)	3	4	4	4
Number of teachers with a Bachelor’s degree	22	23	24	21
Number of teachers with a Master’s degree	19	21	22	23
Number of teachers with teaching certifications	43	46	47	48

The number of professional development opportunities offered to teachers has remained fairly stable over the past four years. Although the number of opportunities increased from 45 to 47 in 2006–2007, it has remained steady at 47 since then. All FCAHS teachers have taken advantage of professional development activities. The total number of hours that teachers have spent in professional development activities rose from 90 hours in 2005–2006 to 94 hours in 2006–2007. It has remained steady at 94 hours since then.

The number of professional development opportunities offered to administrators has also remained stable over the past four years. All administrators have taken advantage of professional development activities. In 2008–2009 FCAHS administrators attended 242 hours of professional development. Table 5 provides more details on professional development activities.

Table 5: Staff professional development

	2005–2006	2006–2007	2007–2008	2008–2009
Number of professional development opportunities (teachers)	45	47	47	47
Number of teachers attending professional development activities*	43	46	46	48
Number of professional development hours attended by teachers	90	94	94	94
Number of professional development opportunities offered to administrators	50	50	50	50
Number of administrators attending professional development activities	3	4	4	4

* These numbers come directly from the school and have one duplicate. One staff member is probably both a teacher and an administrator at this school.

Cisco 21S Participation

Cisco started the implementation of the 21S Initiative in FCAHS in 2005–2006. All of the district administrative staff, technology staff, teachers, and students have been involved in the 21S Initiative across all four years. In addition to district staff and students, various community businesses and organizations have also been involved in the 21S Initiative. A list of all involved businesses and community organizations is provided in Table 6.

Table 6: Local businesses and organizations

Local Government/Organizations	Businesses	Higher Education Institution
Brooklyn Volunteer Fire Department	Hattiesburg Clinic	Pearl River Community College
McLaurin Volunteer Fire Department	Tim Lee Electrical Services	
Forrest County Board of Supervisors		

21st Century Education Vision and Change Leadership

Articulating a clear education vision is the first step in the transformation process for the successful implementation of a 21st century education system. FCAHS leadership’s vision statements have reflected some of the changes occurring in the district over the year. Most notably, administrators in 2009 were more specific about what they hoped their school would prepare students to do. In 2008, they noted vaguely that they wanted to prepare students for future endeavors, while a year later they more clearly stated their goals to prepare students to become productive members of their community, state, and nation. In terms of technology, in 2009, FCAHS administrators said their vision was “to be on

the cutting edge of integrated educational technology.” Table 7 offers a side-by-side comparison of a sampling of the actual vision statements as articulated by school administrators between 2008 and 2009.

Table 7: Comparison of administrators’ vision statements over time

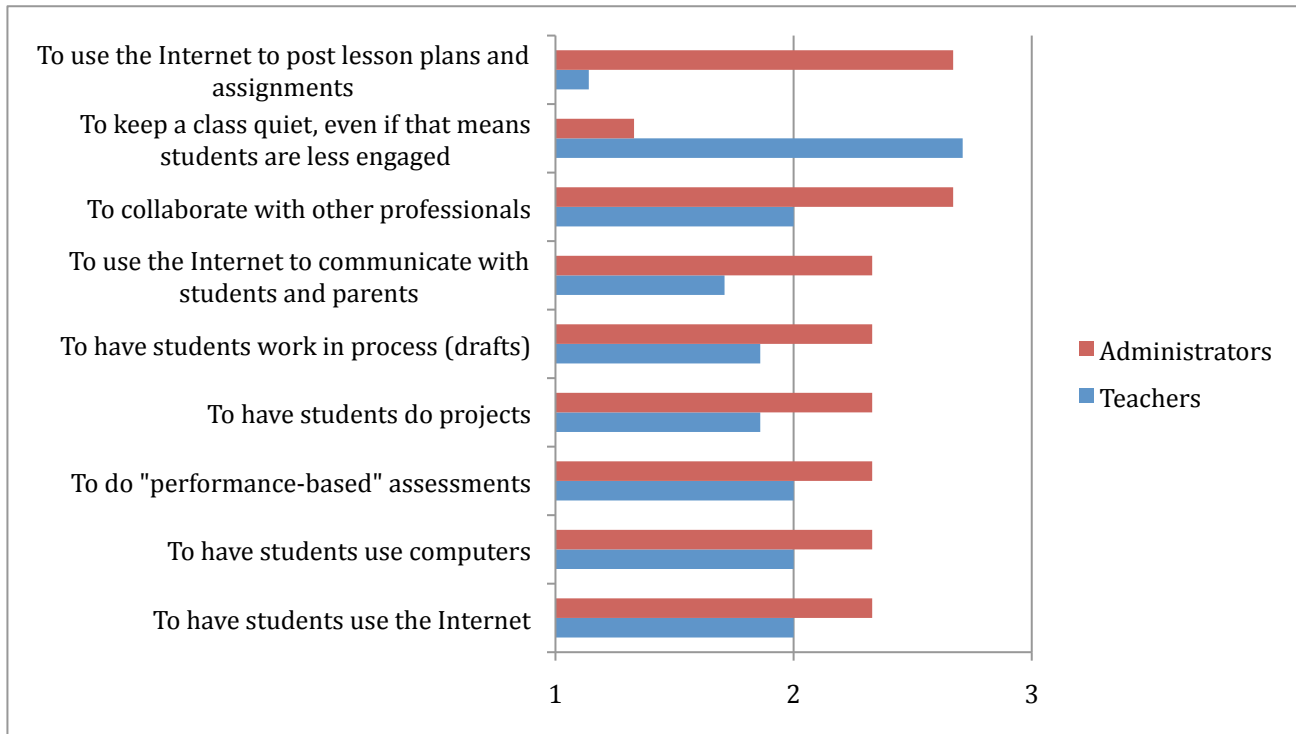
About Students	
2008	2009
To increase student participation, interest, and academic achievement.	To improve the quality of life for each student.
A program that will help our students prepare for their future endeavors.	To prepare our students to be productive members of our community, state, and nation.

A clear educational vision is an imperative first step in the development of a 21st century learning environment, partially because it facilitates the development of a supportive work environment where ideas are shared and expectations are clear. In general, administrators report that such a working environment exists in Forrest County Agricultural High School. Two of the three administrators who completed the survey indicated that discussion of goals and how to achieve them is a regular part of district/faculty meetings. They also felt that the majority of their colleagues share their beliefs about what the central goals of the school should be and indicated that teachers have input regarding innovations, projects, and changing practices.

In addition, administrators and teachers agreed that technology is an integral part of the overall education program and that their school encourages experimentation and innovation.

Clear expectations are an important part of a healthy work environment. Administrators reported how often they expect teachers to engage in certain teaching practices. At the same time, teachers were asked how often they were expected to engage in the same practices. Comparing administrators’ and teachers’ responses offers insight into the amount of success, or lack thereof, that administrators have had in conveying their expectations to teachers in the district. In general, administrators’ expectations for teachers tend to be higher than teachers’ perceptions of administrator expectations. The one exception to this pattern is the item “to keep a class quiet, even if it means students are less engaged” where teachers’ perceptions of expectations actually exceed administrators’ expectations. The two areas where there are the largest differences between administrators’ expectations and teachers’ perceptions of expectations are: using the Internet to post lesson plans and assignments, and keeping a class quiet. Therefore, these may be areas where expectations may need to be more clearly conveyed (see Figure 2).

Figure 2: Administrator and teacher expectations



Note: Administrators and teachers rated each statement on a scale from 1 (never) to 3 (always) with higher scores indicating higher endorsement.

Another important component of the Cisco 21S Initiative is the creation and sustaining of leadership teams at both the district and school levels. All three administrators (100 percent) reported having a leadership team dedicated to the 21S Initiative in their school. The administrators indicated that their leadership team has developed a change management process for monitoring innovation throughout the education system and that they adhere to this process.

A clear vision and plans alone are necessary but not sufficient to lead the district to a fully sustained 21st century education system. Access to resources is critical to the long-term sustainability of the innovation. FCAHS administrators indicated that the most commonly used methods to ensure future funding in their district included: establishing a dedicated technology budget, seeking and responding to grants, developing partnership support networks, and reallocating budget funds to new areas.

21st Century Learning Environment

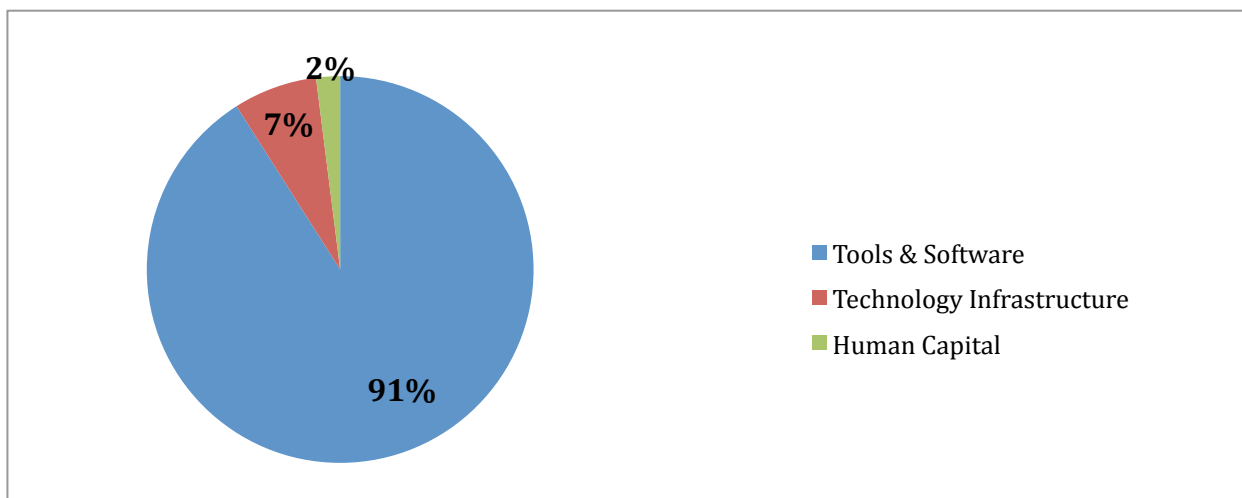
In addition to the creation and promotion of a 21st century education vision, FCAHS needed to develop a safe, reliable, and robust technology infrastructure (Connected Schools) to support technology access and integration; quality professional development and training resources and programs (Connected Learning); and vigorous parental and community involvement (Connected Community). What follows shows how the implementation of those components has changed over time, and describes what those three pieces look like in practice today. In the following sections, various impacts are outlined and also organized by those three component areas.

Connected District/Schools

To create a 21st century learning environment capable of supporting administrative efficiencies and a constructivist approach to teaching and learning, the school revamped its entire technology infrastructure and acquired new technology tools.

Over the course of the 21S Initiative, 93 percent of FCAHS's Connected Schools inputs came in the form of technology tools and software. More specifically, the district used its funds to buy equipment such as interactive whiteboards, laptops and laptop carts, IP phones, microphones, videography equipment, and scanners. There was also a heavy investment in various educational software programs, including math and science programs and tutoring software to improve student literacy and mathematics test scores. In addition, some infrastructure changes took place, including installing cable throughout the building, establishing a security system, and upgrading science and math labs. Figure 3 shows how the Connected Schools inputs were distributed over the course of the Initiative.

Figure 3: Connected Schools input distribution pie: 2007–2009

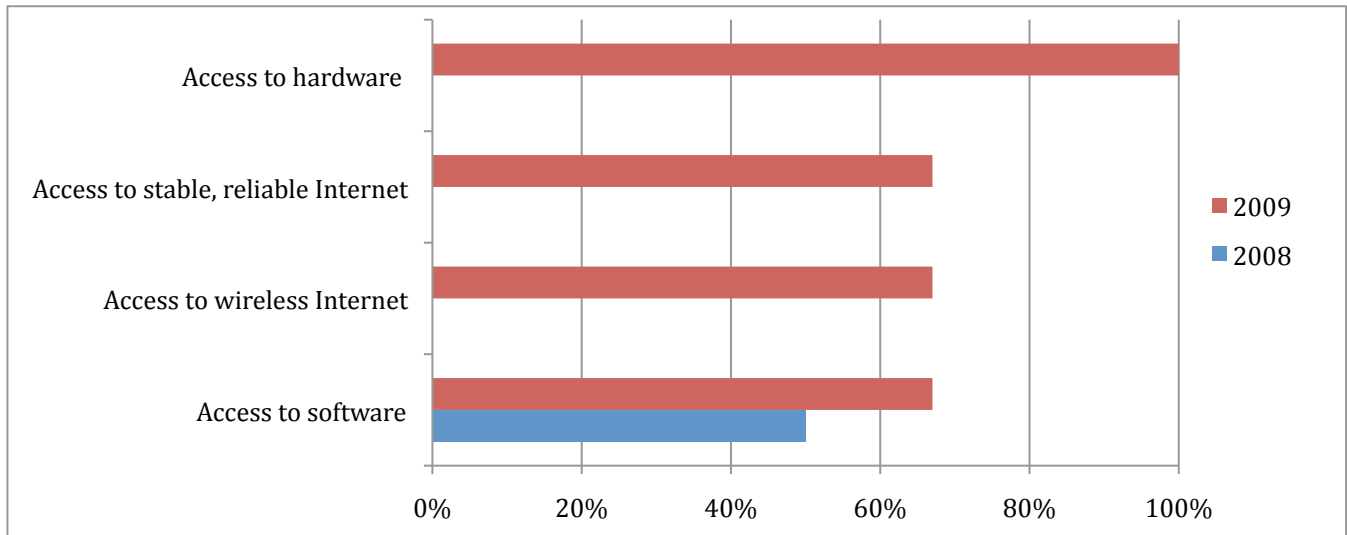


Technology Access at the School Level

Administrators agree that, overall, the current state of implementation of the Cisco 21S Initiative is either on target or above expectations.

There has also been positive change in some specific aspects of the technology infrastructure. In 2008, no administrators indicated that access to hardware, access to stable, reliable Internet services, or access to wireless Internet services were above expectations. In 2009, more administrators felt that infrastructure components were on target. In addition, more administrators indicated that access to software is above expectations than they did in 2008 (see Figure 4).

Figure 4: State of implementation (administrators): above expectations*



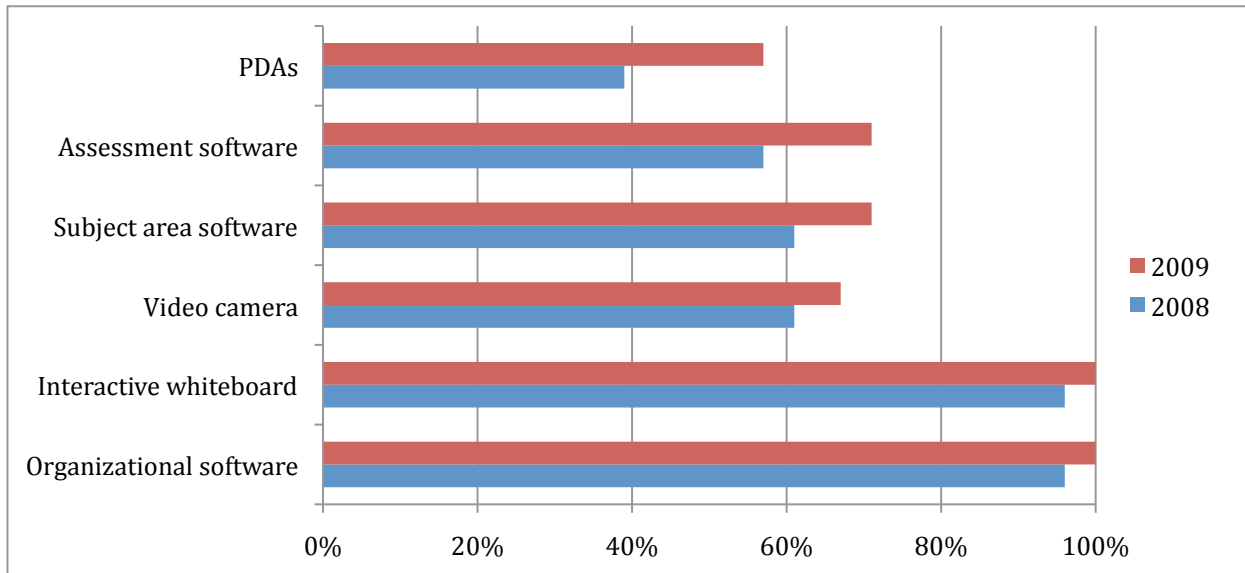
* Missing bars represent a value of 0 percent, not missing data.

Technology Access at the Classroom Level

FCAHS teachers also agreed that access to technology infrastructure is on target or above where they expected it to be. The majority of teachers (71 percent) felt that their access to wireless Internet connections and to Web 2.0 tools is on target or above their expectations.

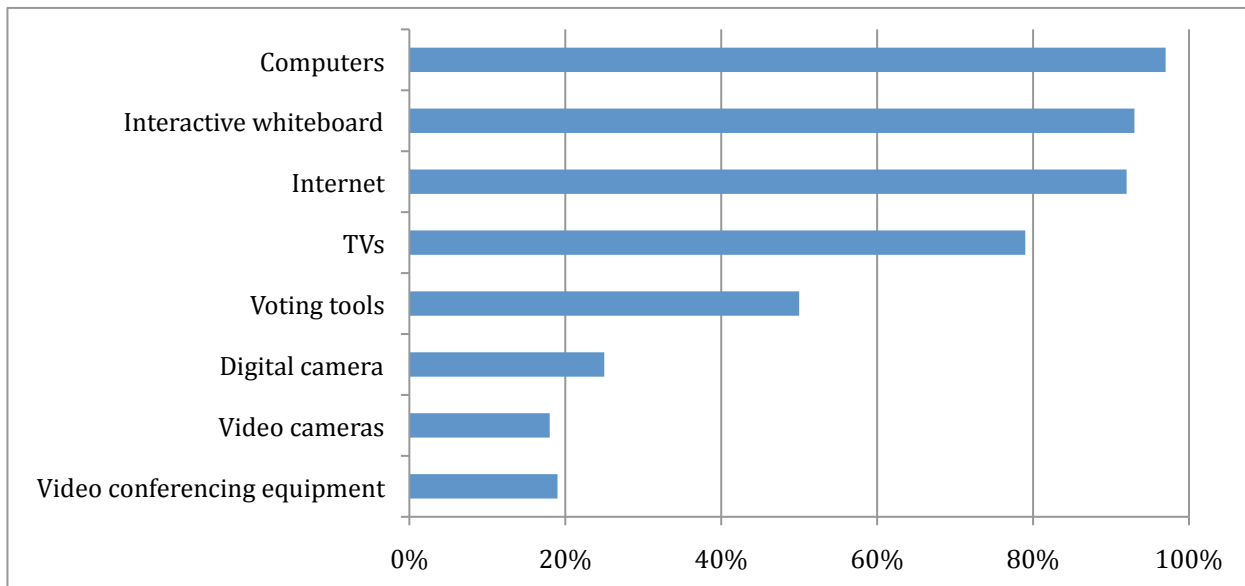
One hundred percent (100%) of teachers also believe that their access to hardware and software is on target or above their expectations. More specifically, teachers have access to many types of technology tools and software in their classrooms. The technology tools and software that the most teachers have access to include the following: computers (100 percent), interactive whiteboards (100 percent), Internet and telecommunications equipment (100 percent), organizational software (100 percent), and Web 2.0 tools (100 percent). Between 2008 and 2009, there were increases in teachers' access to technology tools and software. The largest increases in access were for PDAs (18 percentage points gained), assessment software (14 percentage points gained), and subject area software (10 percentage points gained) (see Figure 5).

Figure 5: Change in teacher access to technology tools



Forrest County Agricultural High School students also report having access to a wide range of technology tools in their classes. The most commonly mentioned tools include computers (97 percent of students have access), interactive whiteboards (93 percent), the Internet (92 percent of students have access), and TVs (79 percent of students have access) (see Figure 6).

Figure 6: Student access to technology tools

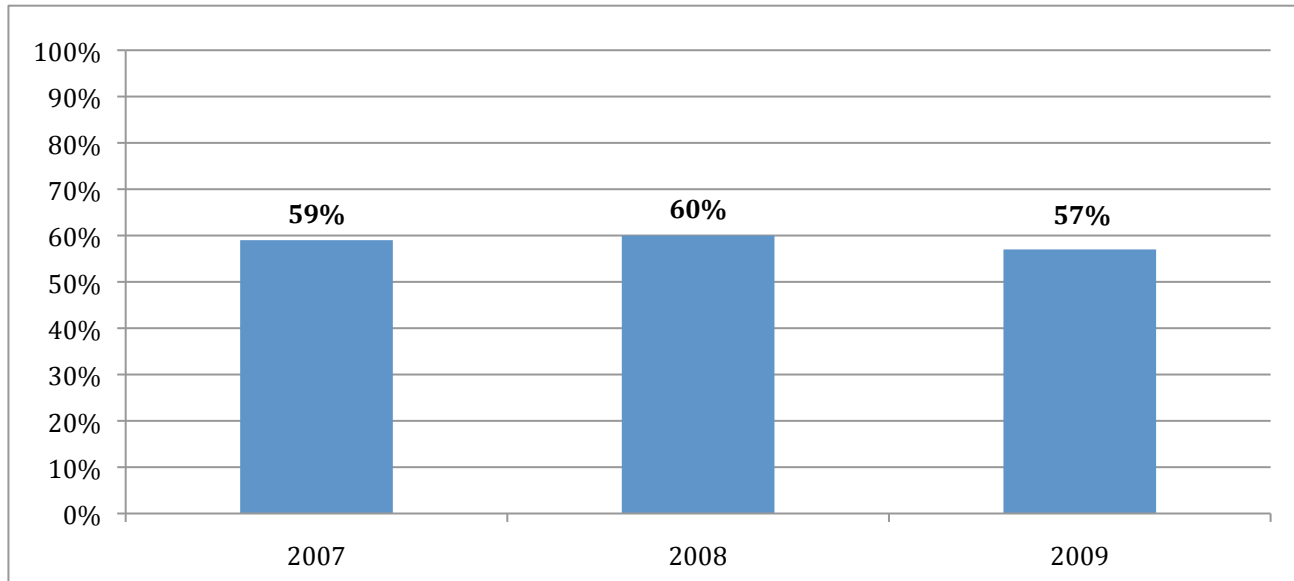


Technical Support

Technology personnel's commitment to supporting teachers and providing a stable and reliable technology infrastructure is reflected in teachers' reports of the amount of technical support available to them. Teachers' reports of technical support availability have been consistently high over the last three

years of the Initiative, with roughly 60 percent of teachers saying that technical support was frequently or always available to them (see Figure 7).

Figure 7: Availability of technical support 2007–2009



Note: Percentage of teachers who described technical support as frequently or always available.

The quality of technical support available in the district is also high. In 2009, administrators who completed the survey indicated that support from technology staff in the district was very or somewhat helpful. In addition, the majority of administrators and teachers (71 percent) feel that access to technical support is on target or above expectations.

Connected District/School Challenges

The connected schools component of the Initiative can be improved in the following areas:

- Even though FCAHS administrators indicate that the implementation of the Connected Schools component of the Initiative is on track, there are several areas where they have faced difficulties. Specifically, some administrators reported difficulties providing sufficient amounts of technical support and maintaining technology-based security in the school.
- While teachers report that access to wireless Internet services is where it should be, it is the reliability of the connection that causes problems. Fifty-seven percent (57%) of teachers indicated their access to stable, reliable Internet services is below their expectations.
- The technology tools and software that teachers have the *least access* to include the following: PDAs (43 percent of teachers do not have access) and digital cameras (43 percent of teachers do not have access).
- While a high percentage of teachers (100 percent) indicate that they have access to computers, 43 percent indicate that they still do not have access to enough computers to accommodate their students.

Connected Learning

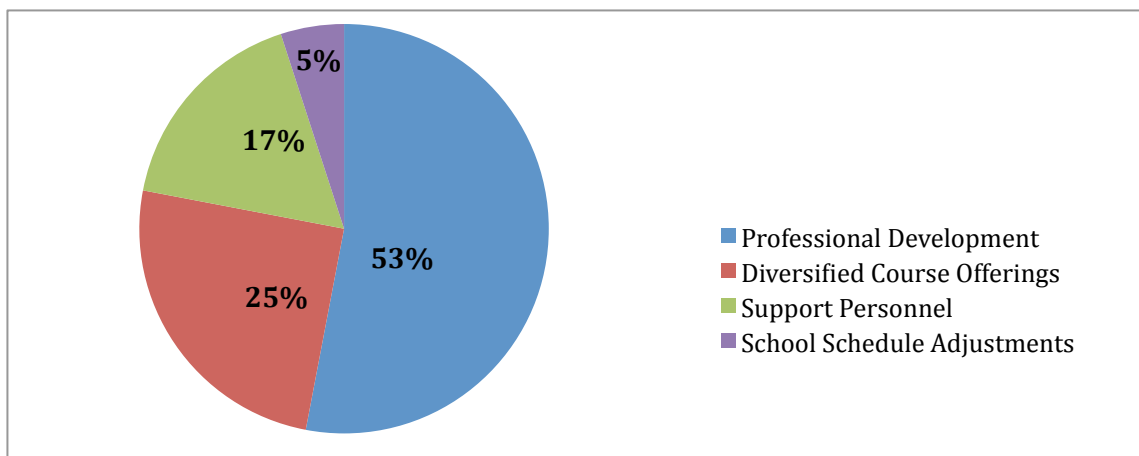
The connected learning component of the Initiative is focused on high-quality professional development resources and programs, which are intended to improve leadership, streamline administrative practices, increase technology access and integration, and promote student-centered teaching and learning through technology. In addition to its focus on professional development, this component also aims to affect the general learning environment present in a district. This includes, but is not limited to, the quality and quantity of professional development, the type of pedagogical practices used in the classroom, and the level of student engagement as measured through classroom participation and everyday reading practices.

In order to better understand how this component had been impacted by the 21S Initiative, stakeholders were asked directly about their perceptions of the learning environment. The data below highlights areas such as teacher communication and collaboration, and administrative and school support. High technology use and integration into the curriculum and external resources (e.g., experts, museums) are crucial for this component.

FCAHS had completed 100 percent of its Connected Learning inputs in 2009. Cumulatively over the course of the Initiative, 53 percent of the Connected Learning inputs were related directly to providing professional development for teachers and administrators in the district. Much of the training provided was about how to use specific technology tools and software, as well as how to integrate those things smoothly into the curriculum. More specifically, FCAHS staff attended professional development for various tutoring software, as well as for Math and literacy-specific software. In addition, teachers attended the Cisco Networking Academy and 40 hours of professional development over the summer. AP courses also became more prevalent at the high school, so many teachers received subject-specific training in order to prepare them to teach those classes.

Offering more diverse courses was also an important component of the Connected Learning inputs (25 percent). More SAT and ACT prep courses are now offered at the school. In addition, FCAHS has made AP classes available to students in a number of areas, including Physics, Government, Economics, and US History. Articulation agreements were also put in place to allow FCAHS students to take college-level courses at neighboring universities. Figure 8 below shows how Connected Learning inputs were distributed over the course of the Initiative.

Figure 8: Connected learning input pies 2007–2009



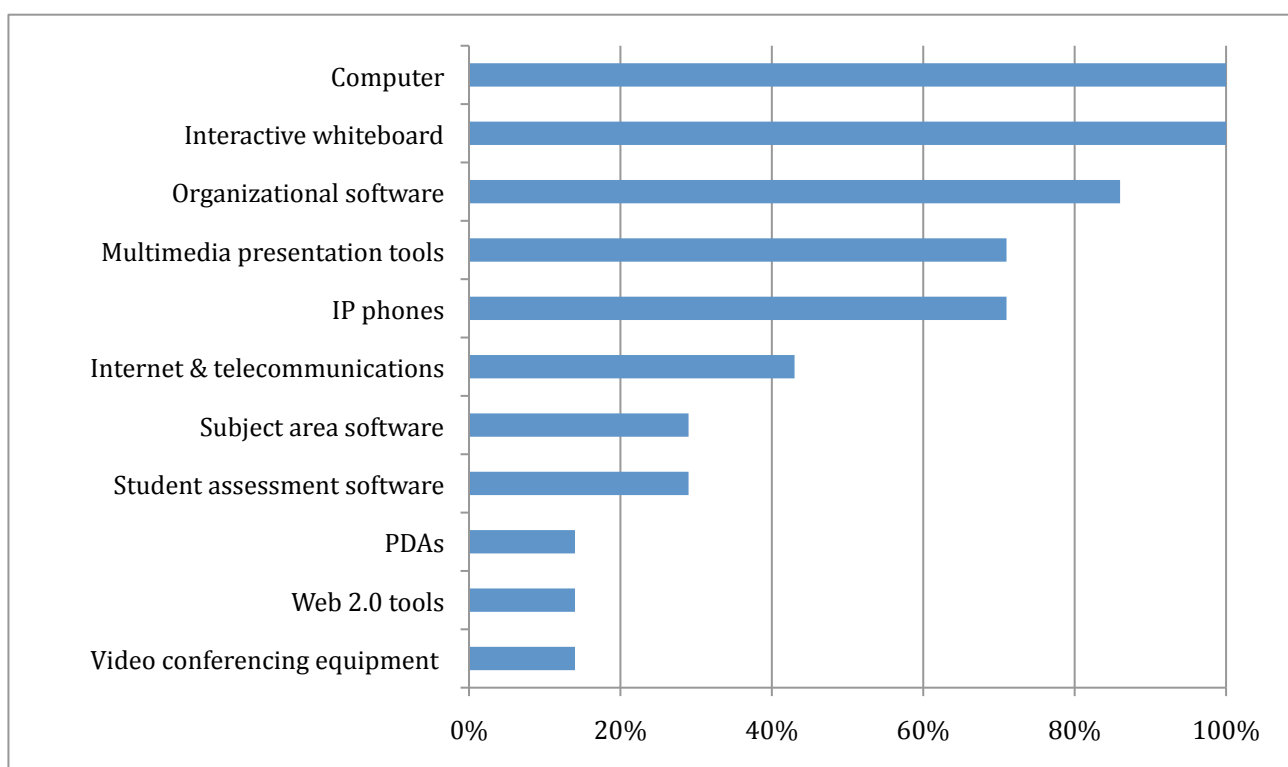
Administrator and Technology Personnel Training

All three administrators (100 percent) report seeing significant positive change in administrator professional development since the Cisco partnership. They also agreed that technical training for technical staff is on target or above expectations.

Teacher Training & Ongoing Support

FCAHS teachers received training for a variety of technology tools and software packages. The highest percentage of trainings attended were in: computers (100 percent), interactive whiteboard (100 percent), organizational software (86 percent), multimedia presentation tools (71 percent), and IP phones (71 percent) (see Figure 9).

Figure 9: Teacher technology training



Besides training in specific hardware and software, teachers received support around integrating those tools into their daily lesson plans. In 2009, 71 percent of teachers felt that their access to technological integration support is on target or above expectations.

Over the course of the Initiative, teachers received technology training from a variety of sources including technology coordinators, external partners, other classroom teachers, and Digital Opportunity Trust (DOT) interns. All seven FCAHS teachers who responded to the survey reported receiving training from other classroom teachers, the interactive whiteboard trainer, and the DOT intern. While all of the trainings were helpful to some degree, 100 percent of teachers indicated that trainings provided by other classroom teachers were very or somewhat helpful. In addition, 86 percent of teachers indicated that trainings from the interactive whiteboard trainer and the DOT intern were very or somewhat helpful.

All FCAHS teachers (100 percent) said they had worked with their school’s DOT intern in some capacity. While teachers indicated that the DOT intern helped them in a variety of ways, the most commonly mentioned ways were helping with software training (71 percent) and troubleshooting hardware/software problems (57 percent). Two of the three FCAHS administrators (67 percent) said support from the DOT intern in their school was very helpful.

Impact of Professional Development

To assess the impact of the professional development resources and programs offered to administrators, teachers, and students, EDC researchers looked at administrative support, management and data use, teacher technology use, student technology use, pedagogical practices, technology integration, and communication and collaboration.

Administrative Support

The majority of FCAHS teachers (72 percent) believe that they have sufficient administrative support to effectively integrate technology into their lessons. In addition, teachers’ perceptions of administrative support increased in two areas between 2008 and 2009 (see Figure 10).

Figure 10: Administrative support



Note: Participants indicated how much they agreed or disagreed with statements on a scale from 1 (strongly disagree) to 4 (strongly agree). Higher scores indicate greater agreement.

Management and Data Use

FCAHS administrators reported significant change in a number of areas of management and data use. Specifically, they agreed that data analysis, collection, and dissemination had seen significant changes; they also said there had been significant change in the use of data for management, accountability, and instructional and equity decisions; and finally, they reported that administrative efficiency had increased over the course of the Initiative.

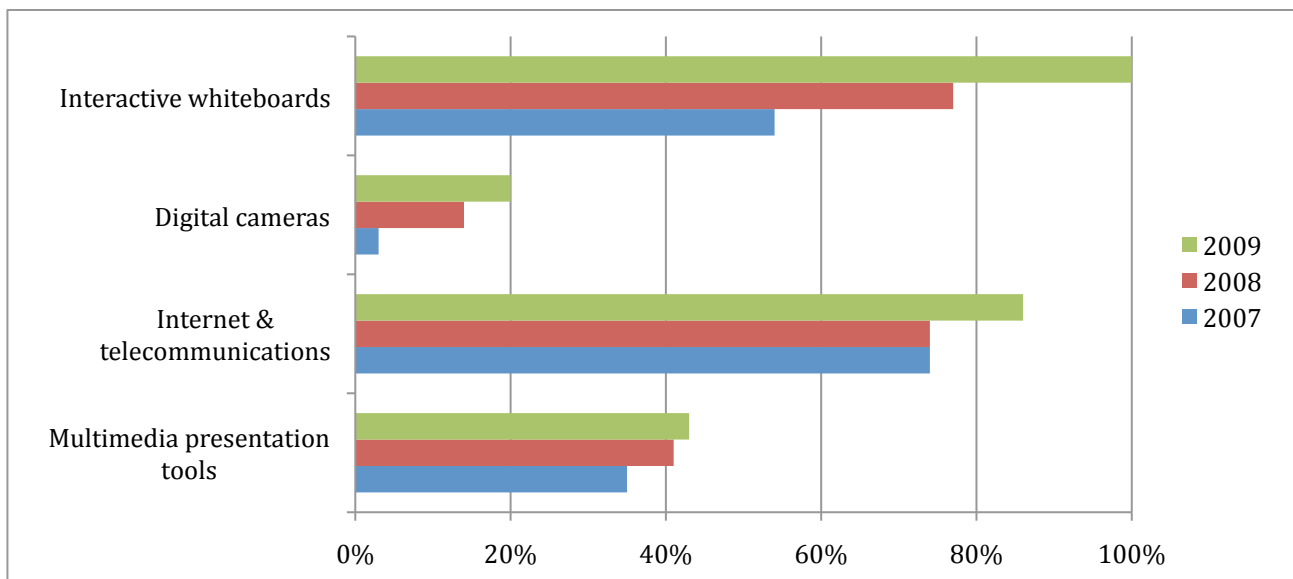
While only 29 percent of teachers reported that they were frequently expected to use data to inform their instruction, 72 percent reported using data to inform their instructional practices.

Teacher Technology Use

On average, teachers use technology tools and/or software in 95 percent of the periods that they teach. Eighty-six percent (86%) of teachers report using technology in all of their classes.

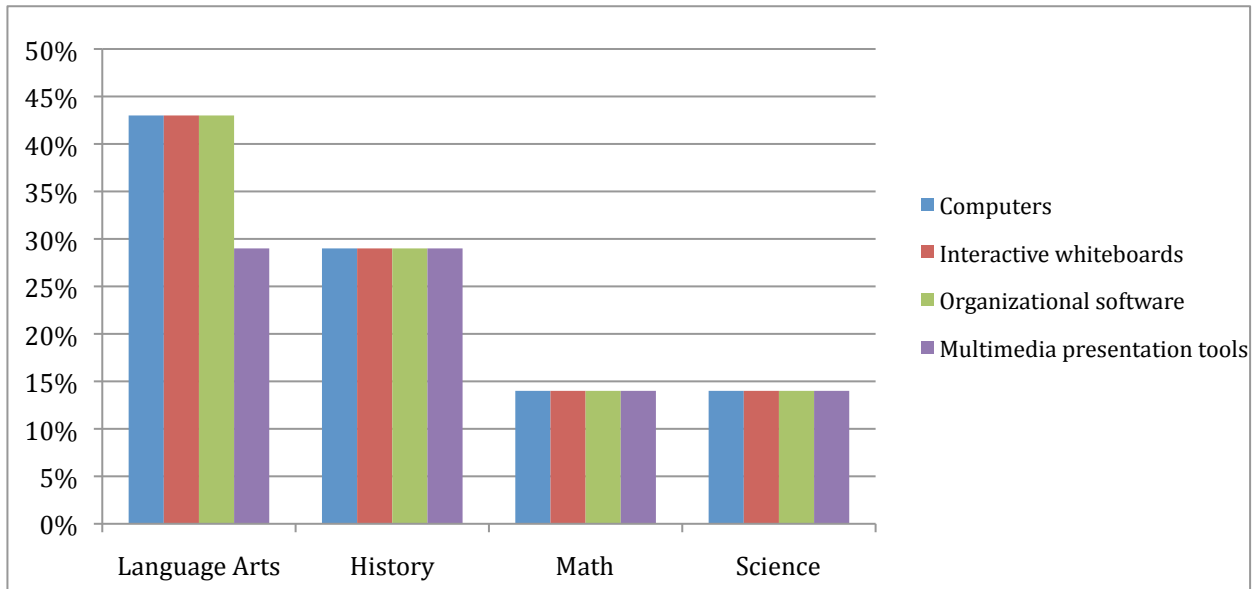
Teachers report using several technology tools on a daily basis. The most frequently used technology tools are interactive whiteboards (100 percent), IP phones (86 percent), Internet and telecommunications equipment (86 percent), and organizational software (57 percent). There are several tools for which the percentage of teachers using them on a daily basis has increased over the three years of the 21S Initiative. The largest increases in frequency of usage occurred for: interactive whiteboards (gain of 46 percentage points), digital cameras (gain of 17 percentage points), Internet and telecommunications equipment (gain of 12 percentage points), and multimedia presentation tools (gain of 8 percent). Figure 11 shows the change in technology use.

Figure 11: Change in teachers' daily technology use



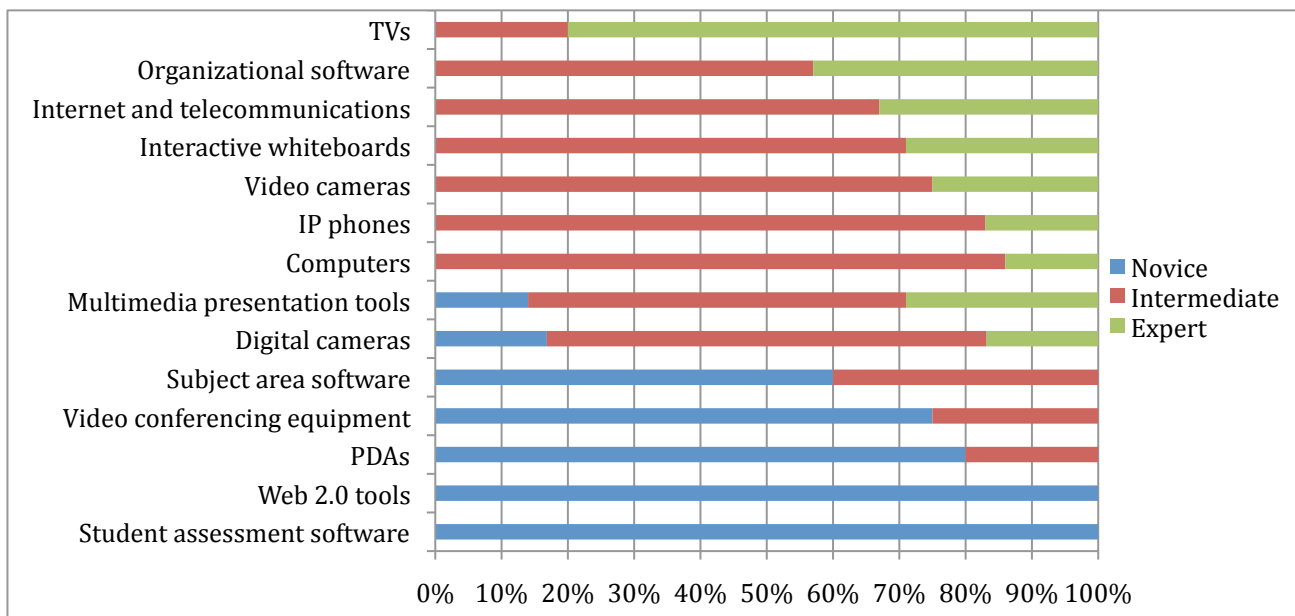
Teachers were also asked how often they use technology tools in Math, Language Arts, Science, and History. Across subjects, the most commonly used technology tools are computers, interactive whiteboards, organizational software, and multimedia presentation tools. In general, technology tools are most often used in Language Arts and least often used in Math and Science (see Figure 12).

Figure 12: Use of technology tools by subject



Teachers were asked to rate their own level of expertise using a variety of technology tools and software. While reported levels varied across the type of technology and the variety of software, many more teachers identified themselves as intermediate or expert than novice. The largest percentage of teachers (who had access to these technologies) indicated that they were experts in using the TVs (80 percent), organizational software (43 percent), the Internet and telecommunications (33 percent), interactive whiteboards (29 percent), and video cameras (25 percent). Figure 13 provides more details.

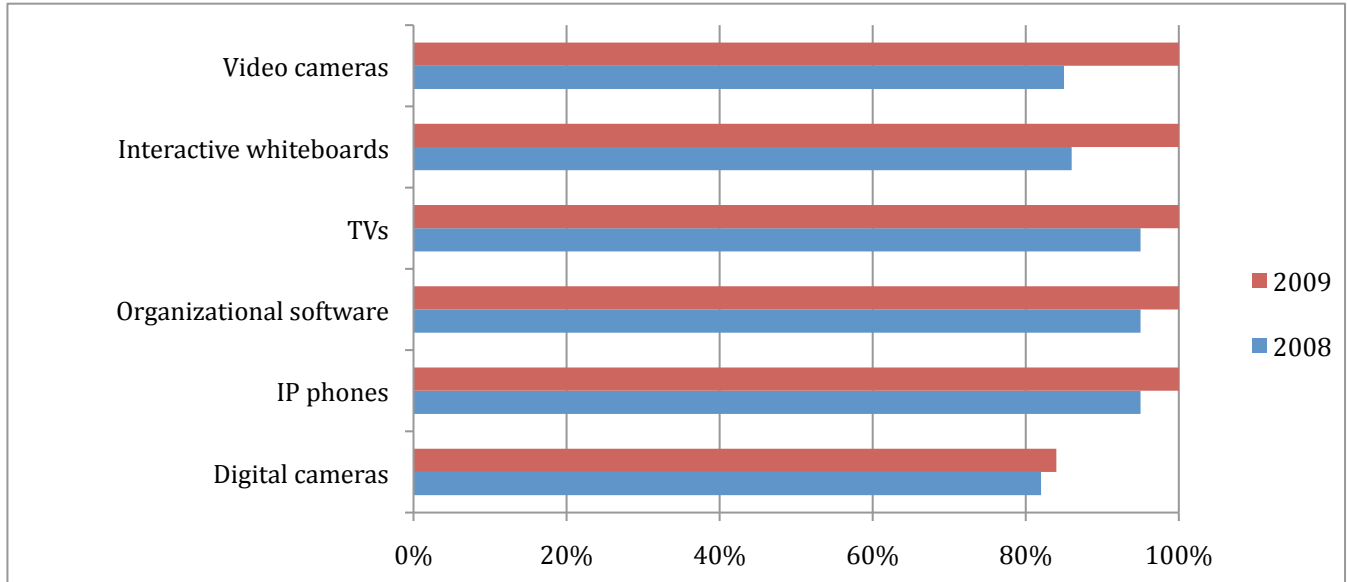
Figure 13: Level of teacher technology proficiency



Even though teachers' levels of expertise are high, there were additional increases in ability over the course of the Initiative. The area where this change was most pronounced was with video cameras and

interactive whiteboards. The percentage of teachers who reported themselves as intermediate or expert in these area increased by 15 percentage points and 14 percentage points respectively (see Figure 14).

Figure 14: Change in teacher technology expertise

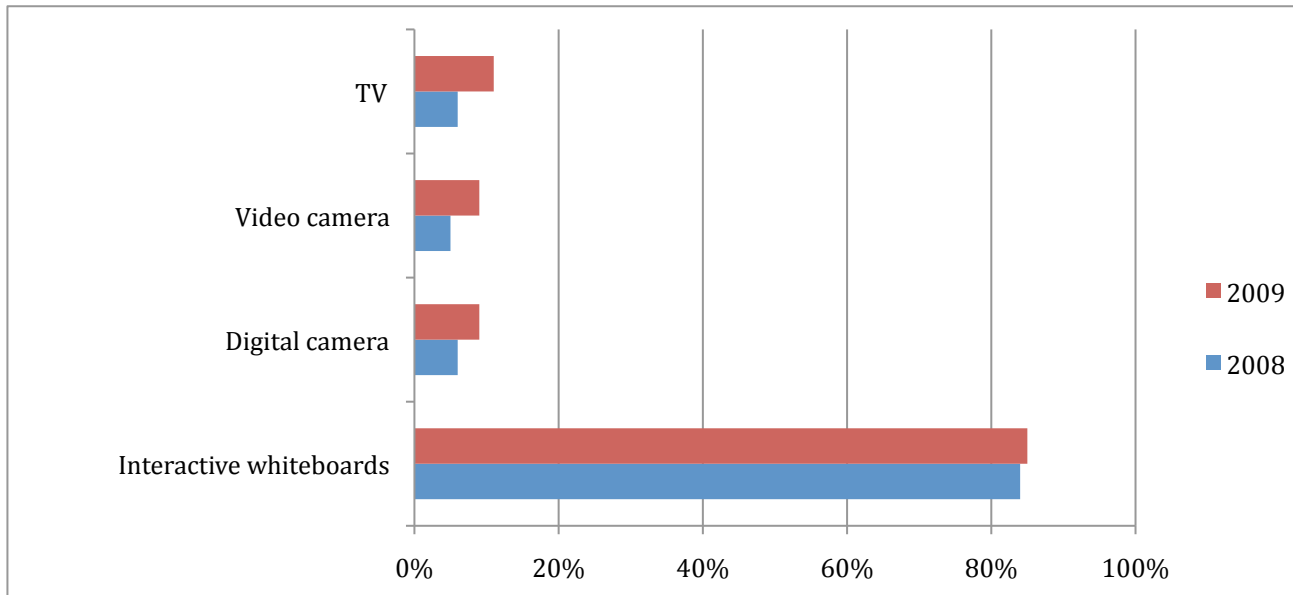


Note: Percentage of teachers rating themselves as intermediate or expert

Student Technology Use

Like teachers, students use a variety of technology tools in their classes. The ones that most students use on a daily basis include interactive whiteboards (85 percent), Internet and telecommunications (48 percent), and computers (45 percent). Since 2008, there have been increases in the percentage of students using TVs, video cameras, digital cameras, and interactive whiteboards on a daily basis (see Figure 15).

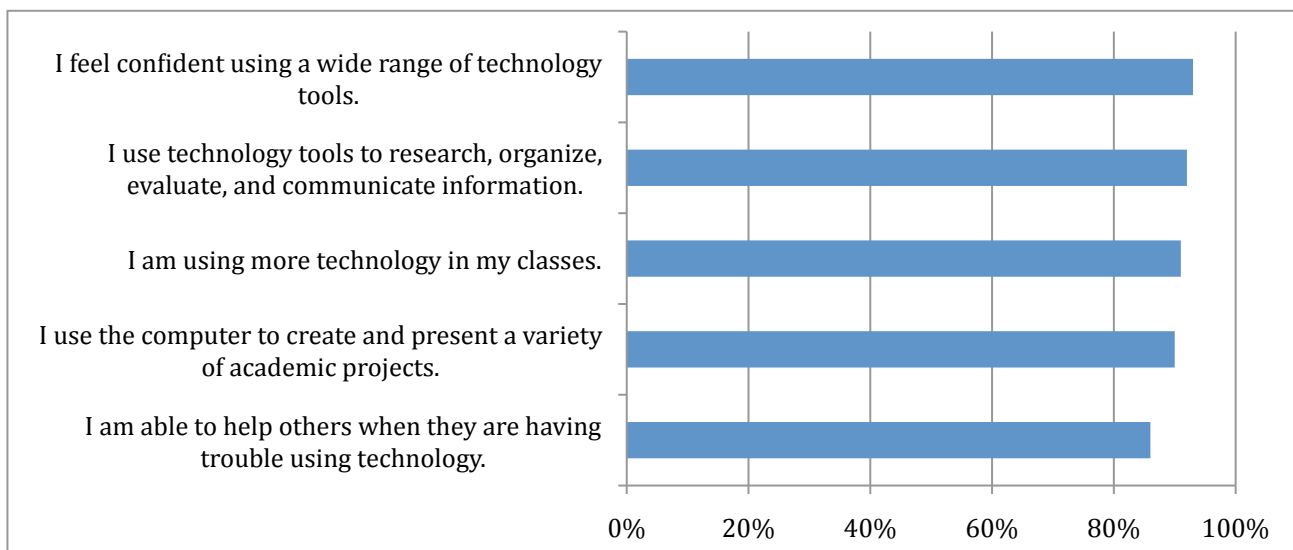
Figure 15: Change in students' daily technology use



While students use technology tools in a variety of classes, students cited Math (64 percent), English/Language Arts (62 percent), Science (58 percent), and History/Social Studies (38 percent), as classes where technology was used on a regular basis.

FCAHS students report a high level of ICT literacy. The majority of students agree that they feel confident using a wide range of technology tools (93 percent agree or strongly agree with this statement). In addition, students indicate that they are using technology tools to research, organize, evaluate, and communicate information (92 percent) and they are using more technology tools in their classrooms (91 percent). Students use the computer to create and present academic projects (90 percent) and are comfortable helping others use technology (86 percent) (see Figure 16). In addition to what students reported about themselves, the administrators agreed that students' ICT literacy has improved over the course of the 21S Initiative. Figure 16 shows student-reported ICT literacy in 2009.

Figure 16: Student ICT literacy



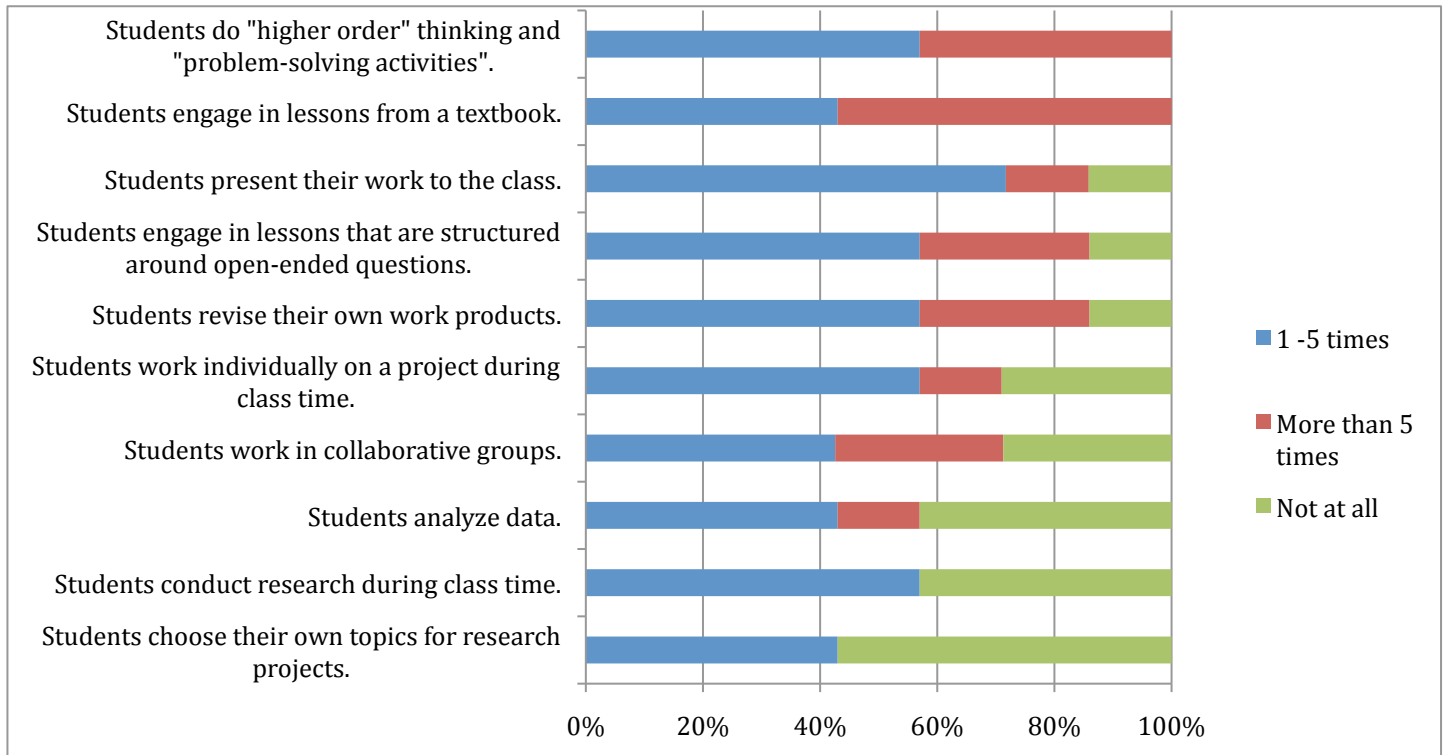
Pedagogical Practices

The Connected Learning program component of the Cisco 21S Initiative also aimed to influence teacher pedagogy and teaching styles. The goal was to shift teachers towards a constructivist teaching approach. Constructivism is an approach to teaching and learning based on Jean Piaget's belief that students learn by fitting new information together with what they already know. Constructivist teaching puts the students at the center of the classroom, where the teacher acts as a facilitator of student exploration, synthesis, and social interaction. Subsequently, learners develop their own understanding through carefully designed supported learning experiences.

FCAHS administrators who responded to the survey (100 percent) indicated that there has been significant positive change in the overall quality of teaching in the district. On average, teachers scored a 2.57 on the pedagogy scale (0=traditional vs. 5=constructivist), indicating a slightly more constructivist than traditional pedagogy. Of the seven teachers who responded to the survey, only one (14 percent) received a 0 on the pedagogy scale, indicating that he/she endorsed all five traditional pedagogy statements. One teacher (14 percent) received a 5 on the pedagogy scale, indicating that he/she endorsed all five constructivist pedagogy statements.

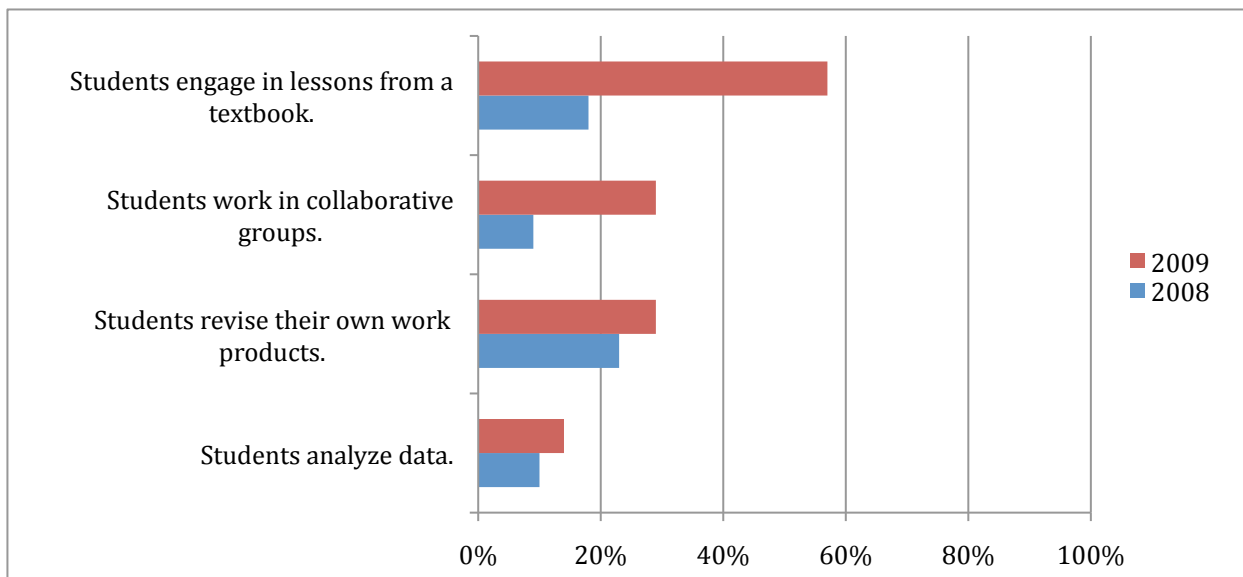
Teachers utilize a variety of instructional techniques in their daily and weekly teaching practices. While only 29 percent of teachers reported that they were frequently expected to use data to inform these practices, 72 percent reported that they in fact use data to inform what they do with their students in the classroom. FCAHS teachers reported on the frequency with which they use particular teaching and assessment techniques in a typical two-week period. The teaching techniques that are most commonly used at least once in a two-week period include having students do higher order thinking skills (100 percent), having students engage in lessons from a textbook (100 percent), having students present their work to the class (86 percent), having students engage in lessons that are structured around open-ended questions (86 percent), and having students revise their own work products (86 percent) (see Figure 17).

Figure 17: Teaching practices



Teachers' instructional practices have changed between 2008 and 2009. There have been increases in the percentage of teachers who indicated that they have students engage in lessons from a textbook (39 percentage points increase), have students work in collaborative groups (20 percentage points increase), have students revise their own work products (6 percentage points increase), and have students analyze data (4 percentage points increase) more than 5 times in two weeks (see Figure 18).

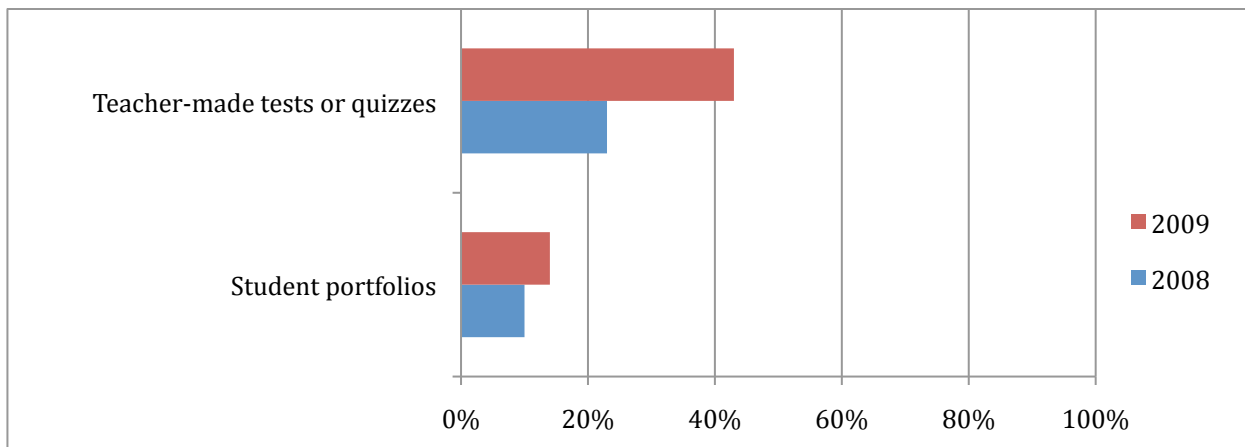
Figure 18: Change in instructional practices (more than 5 times in two weeks)



The assessment techniques that are most commonly used at least once in a two-week period include teacher-made tests or quizzes (100 percent), performance-based assessments (86 percent), and teacher-made rubrics (71 percent).

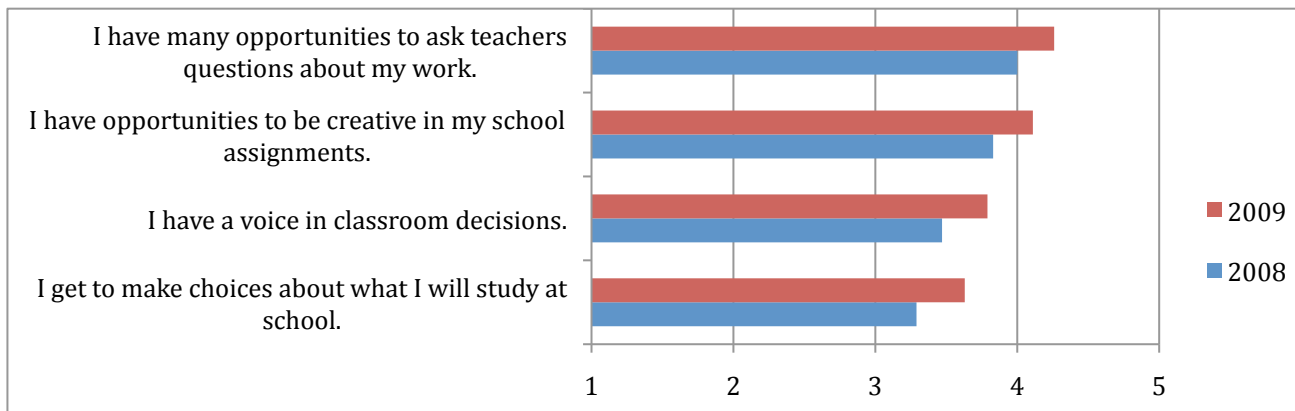
There have also been changes in teachers’ assessment practices between 2008 and 2009. There were increases in the percentage of teachers who reported using teacher-made tests or quizzes (20 percentage points increase) and student portfolios (4 percentage points increase) to assess student performance more than three times in a two-week period (see Figure 19).

Figure 19: Change in assessment practices (more than 3 times in two weeks)



The role that students play in the classroom is also an indicator of a teacher’s pedagogical practices. FCAHS students were asked several questions about how they are encouraged to partake in their classes. Overall, students agreed that they are active participants in their learning, indicating that they have opportunities to ask teachers questions about their work, have chances to be creative about their schoolwork, have a voice in their classrooms, and get to make choices about what they will study at school. In addition, there have been increases in students’ reports of agency in all four areas between 2008 and 2009 (see Figure 20).

Figure 20: Change in students’ reports of agency in the classroom



Note: Students rated each statement on a scale from 1 (strongly disagree) to 5 (strongly agree) with higher scores indicating higher endorsement.

Technology Integration

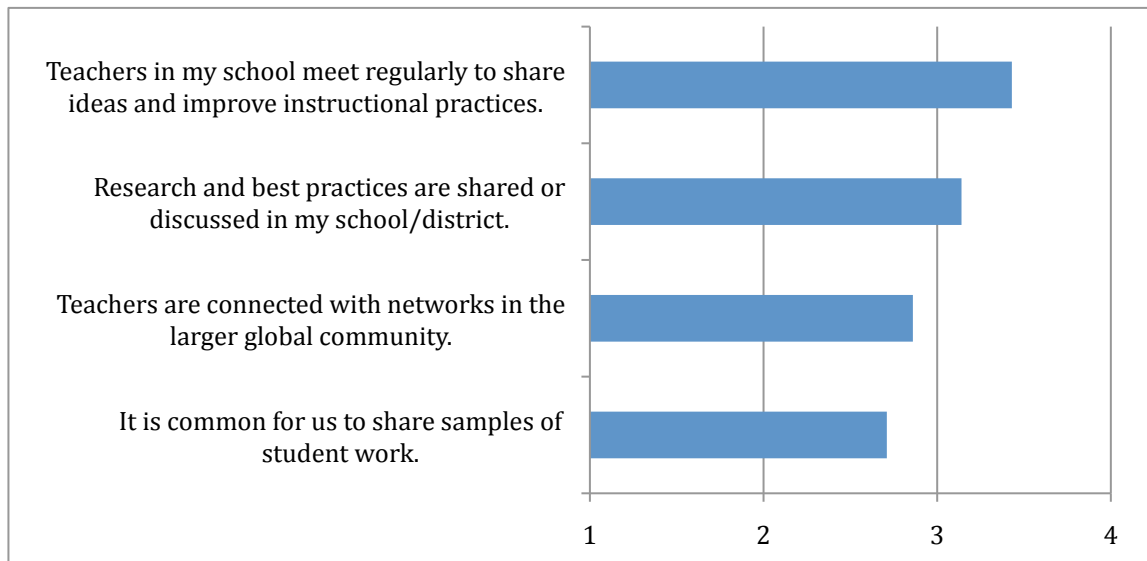
While technology access and expertise are two important components of the Cisco Initiative, the act of efficiently and effectively integrating technology into daily lesson plans is where teachers can have the biggest impact on students. Three of the seven responding FCAHS teachers (43 percent) rated themselves as “approaching highly proficient” and three teachers (43 percent) rated themselves as “somewhat proficient” at integrating technology into their teaching practices. In addition, FCAHS administrators have seen *significant or system-level positive change* in technology integration into the curriculum since the implementation of the Cisco 21S Initiative, and two administrators also reported that teachers’ ability to integrate technology into the curriculum is currently on target.

Two contributing factors that enable smooth integration are time and visible mentors. Forty-three percent (43%) of FCAHS teachers said that they have time to integrate technology into their curriculum, and 57 percent of teachers feel like they have role models in the school to emulate. In addition, the percentage of teachers who said they had role models in their school for integrating technology into their teaching increased from 10 percent in 2007 to 57 percent in 2009.

Communication and Collaboration

Administrators agreed that there has been significant change in teacher collaboration over the course of the Initiative. Teachers also agreed that collaboration is part of their school culture. Teachers reported a high level of agreement on four measures of collaboration, indicating that they frequently mentor each other, meet, exchange ideas, share student work, and interact with global networks (see Figure 21).

Figure 21: Teacher communication and collaboration



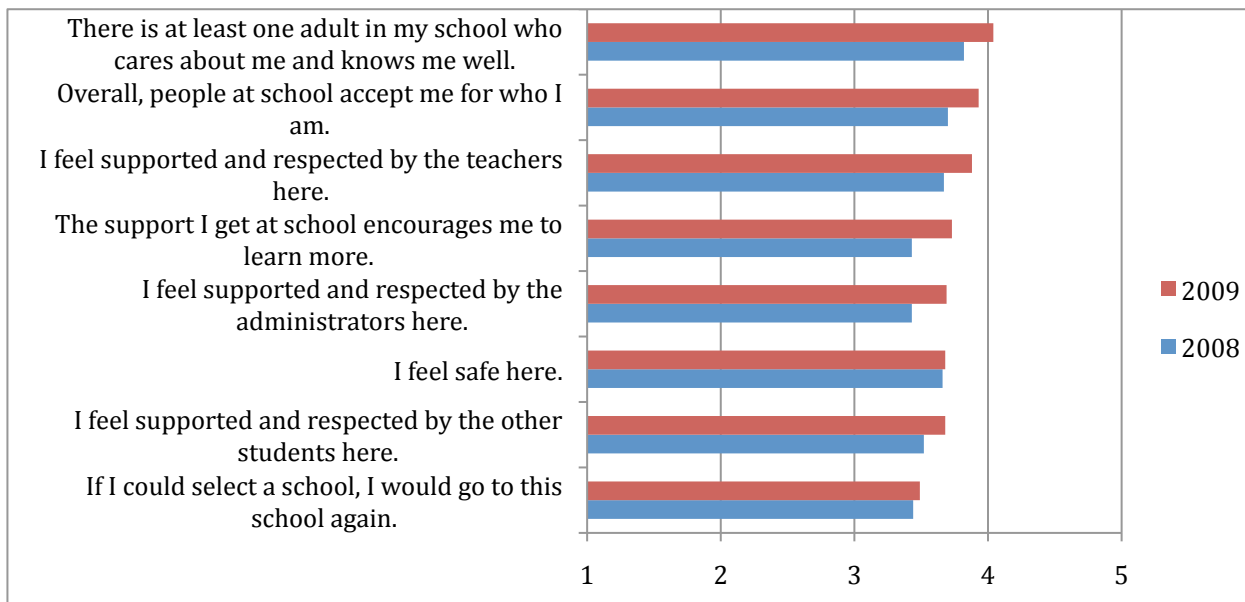
Note: Teachers rated each statement on a scale from 1 (strongly disagree) to 4 (strongly agree), with higher scores indicating a higher level of agreement.

While communication and collaboration between teachers is an important component of a healthy learning environment, communication between teachers and students is also critical. Teachers were asked to report how often during a typical two-week period of instruction they communicate with students using six different methods of communication. The *most commonly* (at least once in a two-week period) used forms of communication include using the Internet to post lesson plans (86 percent)

and using the Internet to post students assignments (72 percent). The *least commonly* used forms of communication include using Skype with students (0 percent), speaking on the phone with students (0 percent), and using a blog (0 percent).

The amount of communication and collaboration present in the learning environment can impact students’ perceptions of support. FCAHS students were asked to respond to eight statements about the amount of support available to them in their schools. Overall, students reported experiencing high levels of support. In addition, there have been increases in students’ perceptions of support between 2008 and 2009 across all eight statements. In 2009, the item that was rated the highest is “There is at least one adult in my school who cares about me and knows me well” (see Figure 22).

Figure 22: Change in students’ perceptions of support



Note: Students rated each statement on a scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating a higher level of agreement. The mid-point (3) is “neutral.”

Impact on Students

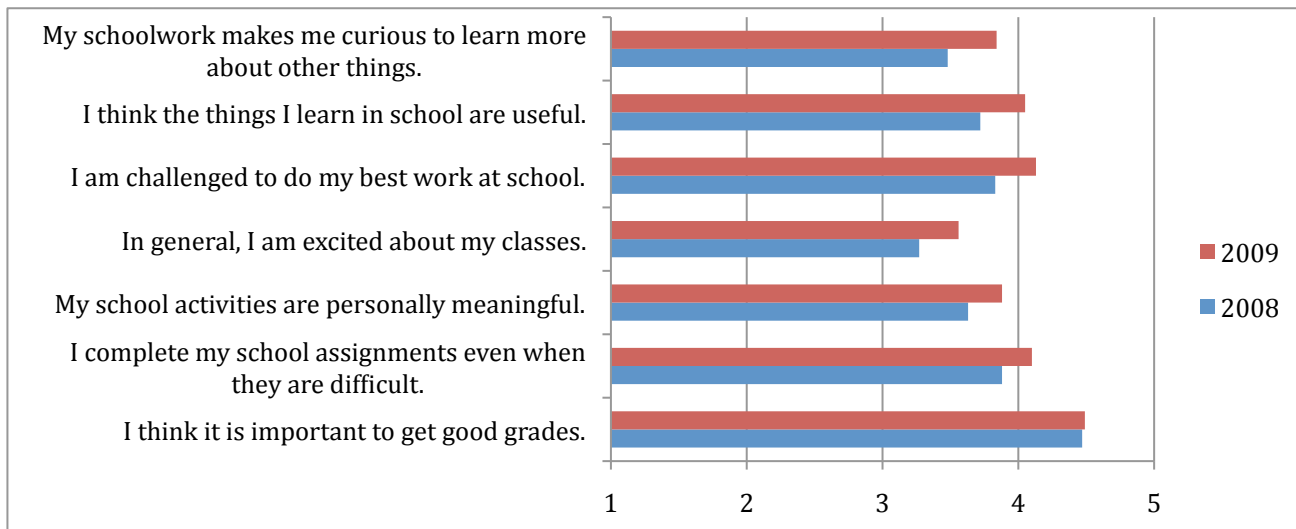
To assess the impact of the Initiative on students, EDC researchers looked at a variety of student outcomes, including student engagement and motivation, student test scores, grade promotion and graduation, and college and workforce readiness.

Student Engagement and Motivation

The majority of FCAHS administrators, teachers (100 percent), and students (88 percent) agree that participation in the Cisco 21S Initiative has increased students’ engagement in their classes. In addition, 85 percent of students said they were learning more on their own.

Students were also asked a series of statements assessing their engagement in more specific classroom activities. Overall, FCAHS students report high levels of engagement in their classes and schoolwork. In particular, most students believe they are being challenged to do their best and that it is important to get good grades. In addition, between 2008 and 2009 there have been increases in student reported engagement. The biggest gain was on the item “My schoolwork makes me curious to learn more about other things” (see Figure 23).

Figure 23: Change in student engagement



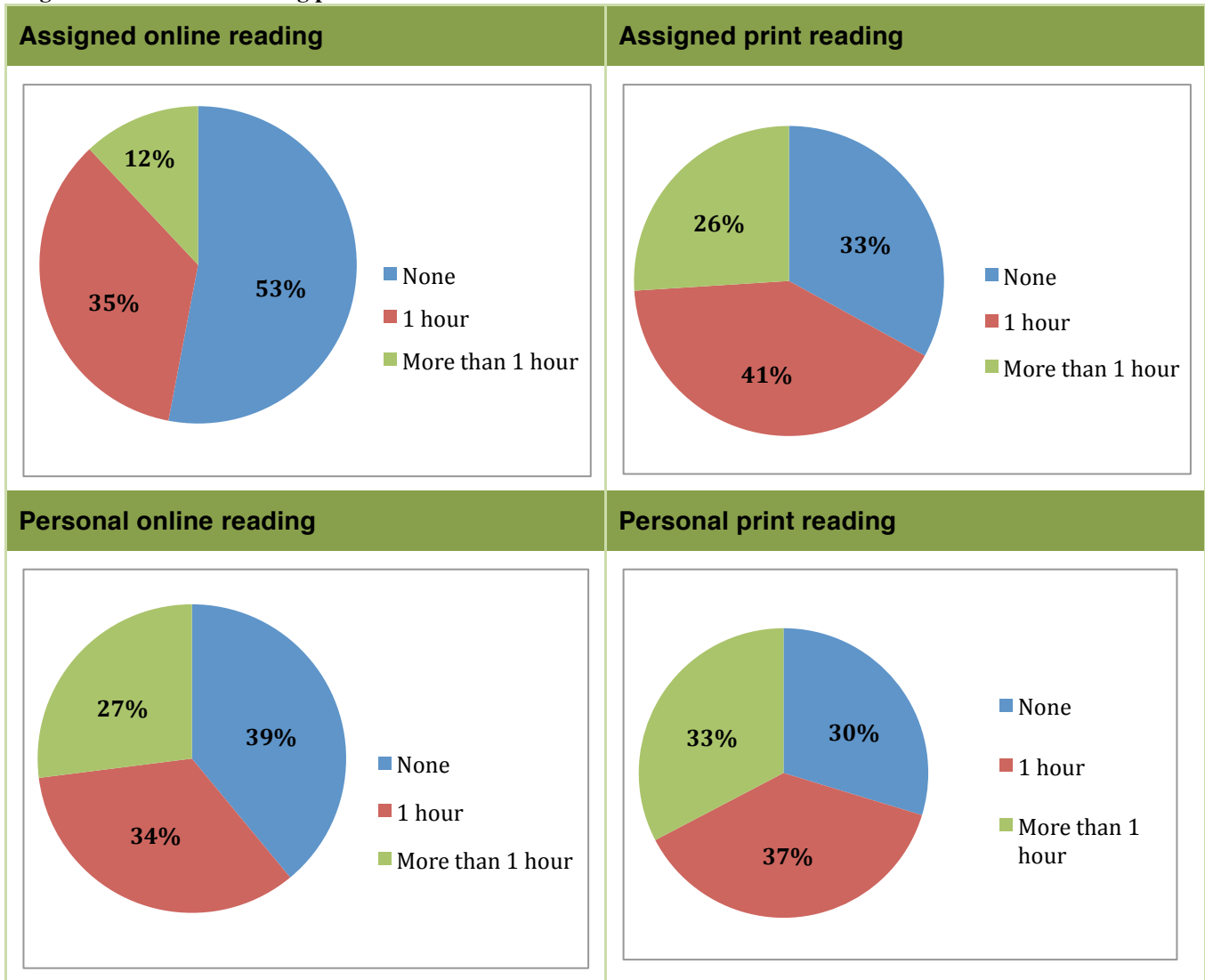
Note: Participants indicated how much they agreed or disagreed with statements on a scale from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate greater agreement.

In order to get a more nuanced assessment of student engagement and motivation in this new learning environment, EDC researchers also looked at students' interest in reading as tested by the amount of time spent reading (e.g., books, online materials) in an average day, level of participation in class, participation in extracurricular academic activities (e.g., science and math contests and fairs), and behavior incidents (e.g., absences, late arrivals, suspensions).

Interest in Reading

There has been an increase in the amount of time that FCAHS students spend reading. In 2008, 35 percent of students said they spend one hour or more reading each day; in 2009 that percentage rose to 58 percent. Students were also asked about the average number of hours spent per week reading assigned reading, personal print reading, and online reading. More students read assigned and personal print reading than assigned and personal online reading (see Figure 24).

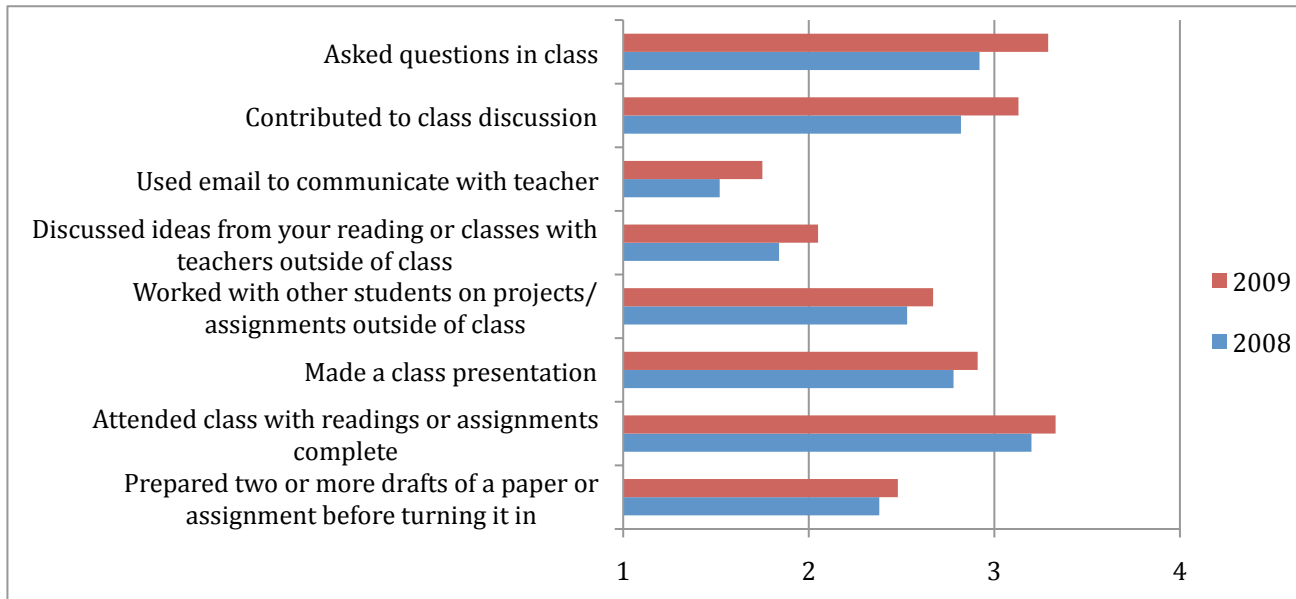
Figure 24: Students' reading practices



Participation in Class

FCAHS students report high levels of participation in class. In 2009, the areas where participation was the highest were in terms of attending class with assignments completed and asking questions in class. Students' class participation has also increased in a number of areas in the past two years. Students reported that the largest changes occurred in the areas of asking questions and contributing to class discussions (see Figure 25).

Figure 25: Class participation over time



Note: Participants indicated how much they agreed or disagreed with statements on a scale from 1 (never) to 4 (very often). Higher scores indicate greater agreement.

Teachers were also asked to report on student participation in their classes. On average, teachers noted that approximately 66 percent of their students ask questions in class. Similarly, they reported that about 84 percent of their students arrive to class prepared to engage in the lesson.

Participation in Math/Science Fairs

The number of students participating in math and science fairs at the district, state, and national levels has increased over the last four years. In addition, the number of awards given to students in contests increased slightly between 2007–2008 and 2008–2009 (see Table 8).

Table 8: Participation in math/science fairs

	2006	2007	2008	2009
Number of students participating at Nat'l level	0	0	2	1
Number of students participating at State level	0	0	2	12
Number of students participating at District level	0	0	8	12

Behavior Incidents

In the last four years, Forrest County Agricultural High School has seen positive changes in student attendance and tardiness. The number of student absences steadily increased between 2005–2006 and 2007–2008 but then decreased by 19 percent in 2008–2009. In addition, there was a dramatic decrease in the number of late arrivals between 2005–2006 and 2008–2009, dropping from 1,253 to 467 (see Table 9). On average, teachers report that approximately 90 percent of their students arrive to

class on time. Fifteen percent (15 percent) of students said they had not missed a day of school in the past year, an increase from 7 percent in 2008. In addition, 42 percent of students indicated that they did not have any unexcused absences, an increase from 17 percent in 2008.

There was an increase in the number of student suspensions between 2005–2006 and 2007–2008 but this number then decreased in 2008–2009. The number of student expulsions has remained relatively low over the four years (see Table 9). All three administrators (100 percent) and 43 percent of teachers agree that students have fewer discipline problems as a result of the 21S Initiative.

Table 9: Behavior incidents

	2006	2007	2008	2009
Number of absences in district	5,546	6,058	7,018	5,673
Number of late arrivals	1,253	851	879	467
Number of suspensions	92	181	192	148
Number of expulsions	6	8	4	8

Student Academic Performance

FCAHS administrators, teachers, and students all agree that they have seen positive changes in student academic performance as a result of the 21S Initiative. In order to understand how students' scores on standardized tests may have been affected by the 21S Initiative, EDC researchers collected and analyzed school and state test scores. The test scores that were examined include the Subject Area Testing Program (SATP) (see definition of SATP in Box 1).

Box 1: What is the Subject Area Testing Program (SATP)?

High school students participate in the SATP, which tests proficiency in the areas of English, Algebra I, Biology I, and US History. The test measures how well students are meeting the state's grade-level expectations. Students must pass the SATP to graduate from high school.

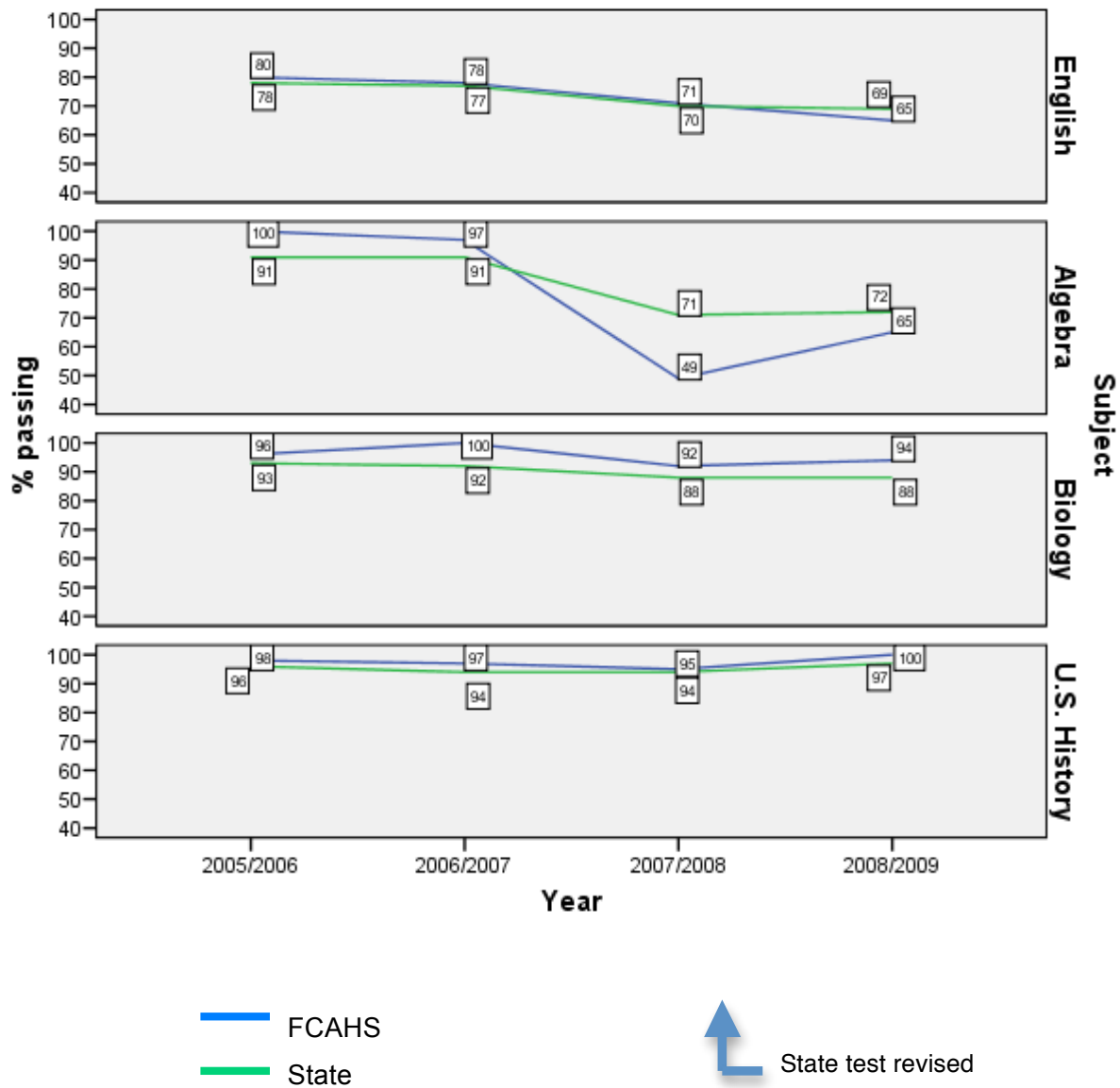
SATP results are scored between 0 and 500, with 300 and above considered to be a passing score.

EDC researchers examined patterns of change across testing years for both FCAHS and the state overall. The Subject Area Testing Program (SATP) was updated in 2007–2008. These changes make it difficult to compare scores across 2006–2007 and 2007–2008. Therefore, in our analysis we focus on patterns of change between 2007–2008 and 2008–2009. To compare the position of FCAHS's test scores relative to state scores, state scores are also included in the graphs.

SATP

FCAHS students made gains in three of the four subject tests between 2007–2008 and 2008–2009. The largest increase in passing scores occurred in Algebra I, with an impressive 16 percent point gain. In addition, in 2009, FCAHS students outperformed their peers across the state on two (Biology and U.S. History) of the four subject tests (see Figure 26).

Figure 26: SATP (percent passing)



Grade Promotion and Graduation

Over the course of the 21S Initiative, FCAHS has seen both improvements and declines in the areas of grade promotion and graduation. The number of students being promoted to the next grade increased between 2006–2007 and 2007–2008 but then decreased in 2008–2009. However, the number of students that dropped out has decreased by 31 percent between 2005–2006 and 2008–2009. In addition, Forrest County Agricultural High School has experienced a steady increase in the number of students receiving diplomas over the past four years (see Table 10).

Table 10: Change in grade promotion and graduation

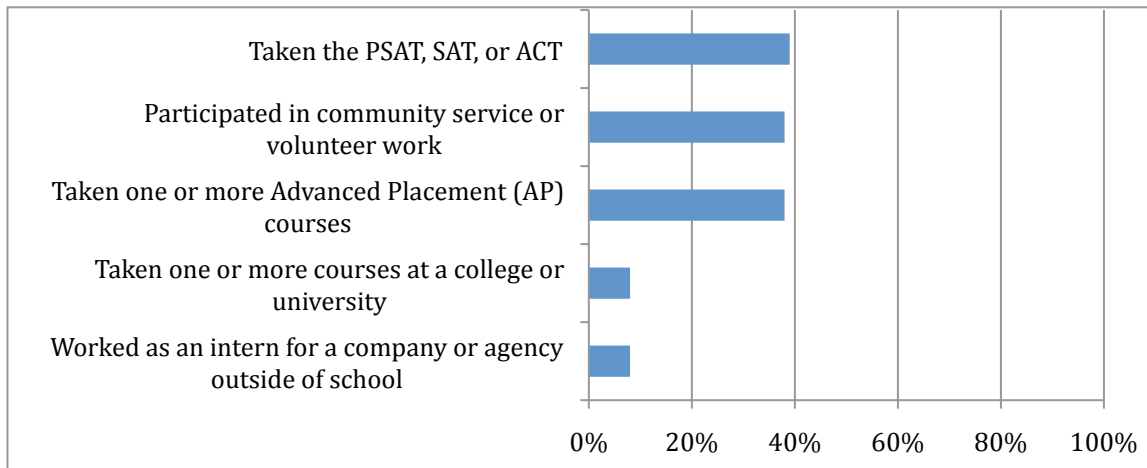
	2006	2007	2008	2009
Number of students moving on to next grade level	***	352	363	348
Number of students receiving diplomas	105	110	123	125
Number of students that dropped out	43	37	37	28

*** Data not available.

College and Workforce Readiness

Administrators and 71 percent of teachers agree that students are better prepared for college and the workforce. In addition, FCAHS students report that they have participated in a variety of college or workforce preparation activities. The most common activities included taking college entrance exams (39 percent), participating in community service or volunteer work (38 percent), and taking Advanced Placement classes (38 percent) (see Figure 27).

Figure 27: College and workforce preparation activity participation



In addition to what survey respondents say, district data show that over the four years, students' participation in college entrance exams has been on the rise. Between 2005–2006 and 2008–2009, the ACT participation rate rose from 69 percent to 92 percent. In addition, between 2005–2006 and 2007–2008, there was a steady increase in average ACT scores. In 2008–2009, the average ACT score decreased by 2 points. However, this decrease may be due in part to the dramatic increase in the ACT participation rate that also occurred in 2008–2009. The number of students taking Advanced Placement (AP) courses has steadily increased over the past four years. However, no students have yet to score a 3 or above on the test (see Table 11).

Table 11: Change in college entrance exam participation and scores

	2006	2007	2008	2009
Percent of ACT participation	69%	73%	65%	92%
ACT average score	19.2	20.1	21.0	19.0
Number of AP course participants	29	68	72	96

Connected Learning Challenges

The connected learning component of the Initiative can be improved in the following areas:

Changing Instructional Practices

Some administrators indicated that changing antiquated teaching philosophies has been a challenge in the implementation of the Connected Learning component of the Initiative.

Students report that they rarely use video cameras, digital cameras, and video conferencing equipment. This could be a result of lack of access or teachers' reluctance to introduce those tools in the classroom.

In addition, students report that they rarely use e-mail to communicate with their teachers, nor do they discuss ideas from readings with teachers outside of class. It is also uncommon for students to communicate with peers from other countries or collaborate with students from other schools on academic projects. These may be areas that administrators can target in order to change established practices.

Building Skills

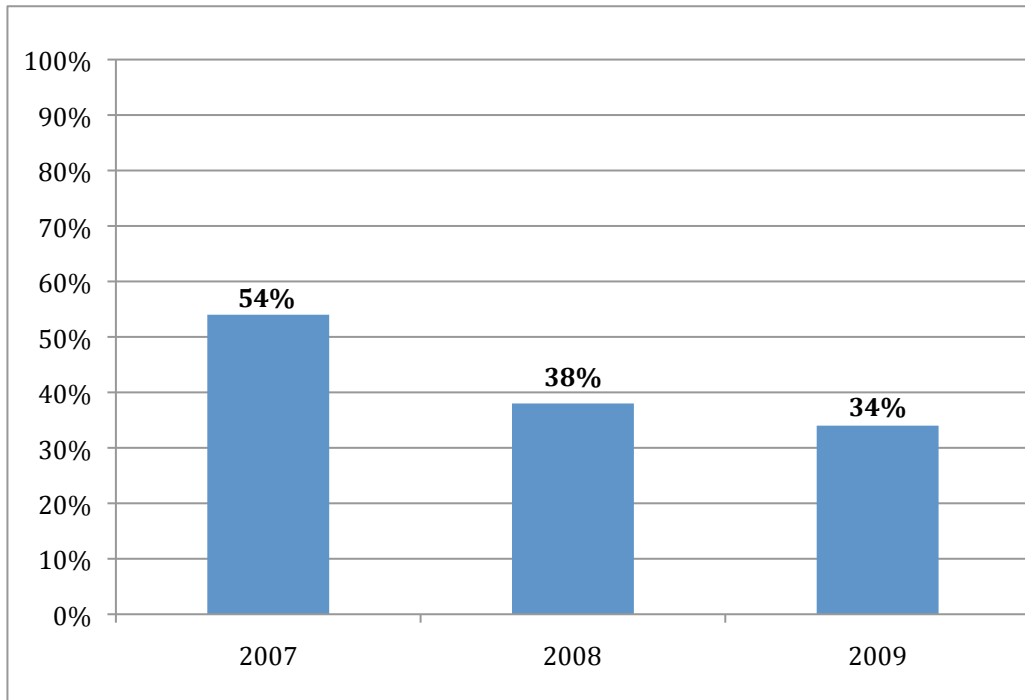
The majority of FCAHS teachers rated their skills using PDAs, Web 2.0 tools, video conferencing equipment, and student assessment software as novice. In addition, these are the areas where the least number of teachers have received training. Therefore, these may be areas that future trainings need to target in order to build teachers' skills.

Integrating Technology into the Curriculum

More than half of FCAHS teachers indicated that their ability to integrate technology into the curriculum is somewhat proficient. Forty-three percent (43%) of FCAHS teachers reported that they do not have time to integrate technology into their teaching, and 57 percent feel that they do not receive enough professional development support around using technology tools and software.

Perhaps some of the issues concerning technology integration are related to the drop in support over the course of the Initiative. From 2007 to 2009, teachers reported that technology was less frequently available to them. Figure 28 shows how the percentage of teachers reporting that instructional support was frequently or always available to them dropped from 54 percent to 34 percent in 2009.

Figure 28: Availability of instructional support 2007–2009



Note: Percentage of teachers who said support was *frequently* or *always* available.

Connected Community

An integral piece of the Connected Community program component is the positive promotion of the relationship between the school, parents, and the community. FCAHS’s approach to the Connected Community component of the 21S Initiative is multifaceted and includes reaching out to parents and the community to explain their 21st century education vision and how the 21S Initiative is being implemented in the community.

Outreach to Community

FCAHS has made efforts to involve the community in the school. One of the administrators and 72 percent of teachers report that community members are included in the decision-making process when appropriate.

FCAHS administrators report that there are a variety of community organizations that are in partnership with the school, including civic organizations, tutoring programs, community service and action organizations, and faith-based groups. Specific organizations include: Hattiesburg Clinic, Pearl River Community College, Tim Lee Electrical Services, Brooklyn Volunteer Fire Department, McLaurin Volunteer Fire Department, and Forrest County Board of Supervisors.

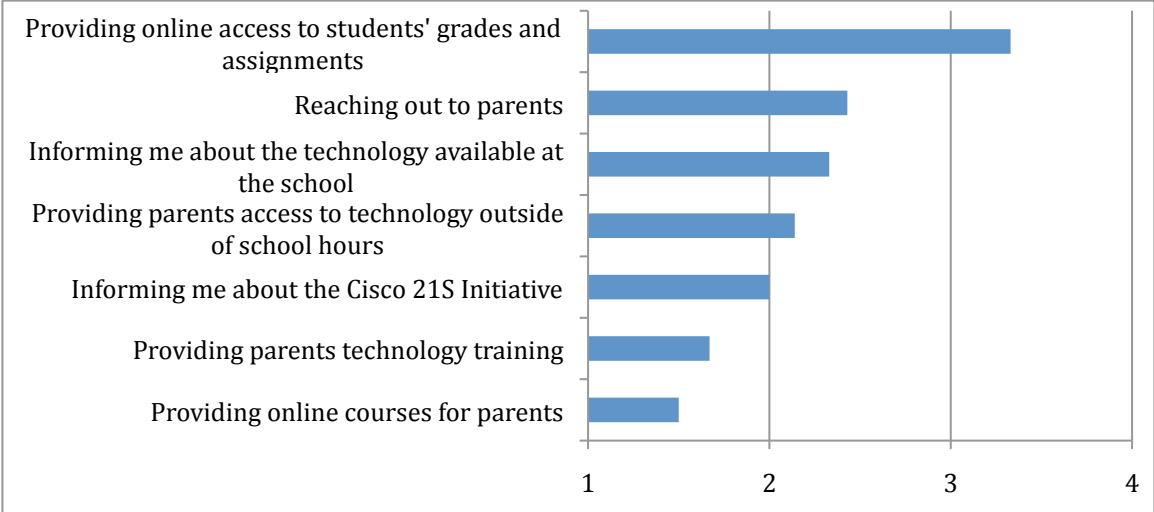
Outreach to Parents

Parents are an important part of the school community, and FCAHS teachers and administrators have made a concerted effort to ensure their involvement at multiple levels. All administrative respondents and 72 percent of teachers agree that parents’ ideas and opinions are actively sought to inform decision-making when appropriate.

The school also uses a variety of methods to keep parents informed about what is happening on its campus. Teachers communicate with parents via a variety of mediums including over the phone, face-to-face, and email. Eighty-six percent (86%) of teachers said they communicated with parents by phone and email at least once in a two-week period. Seventy-one percent (71%) said they met with parents at least once in that same time frame. From parents' perspective, the communication methods used most frequently by their children's schools include the school website (86 percent), a letter from the school (71 percent), and the school newsletter (57 percent).

Parents also rated the success of the various outreach techniques used by their children's school. Overall, FCAHS has not been successful reaching out to parents. The one area where the school has succeeded in reaching out to parents has been in the provision of online access to students' grades and assignments (see Figure 29).

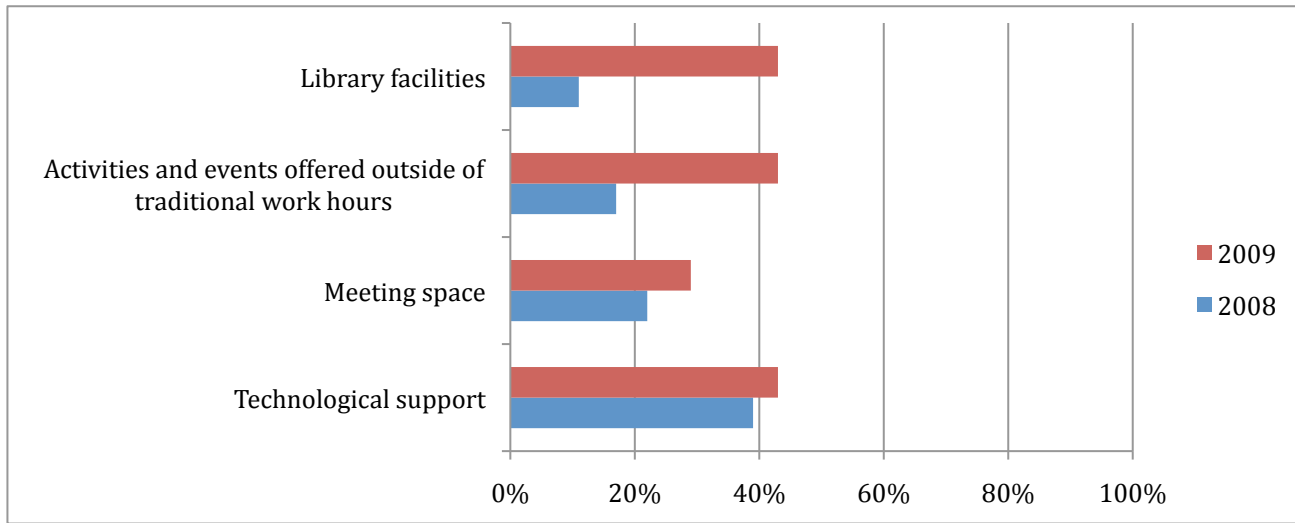
Figure 29: Success of school outreach



Note: Participants indicated how successful the school has been on a scale from 1 (Not successful) to 4 (Extremely successful). Higher scores indicate greater success.

Parents also indicated the types of resources/services that their children's schools provide to support parental involvement. The most common are: providing technological support (43 percent), offering activities and events outside of traditional work hours (43 percent), and providing access to library facilities (43 percent). In addition, there have been increases in some of the resources available to parents. Specifically, there have been increases in parents' access to library facilities, activities offered outside of traditional work hours, meeting space, and technical support (See Figure 30).

Figure 30: Resources Provided for Parents



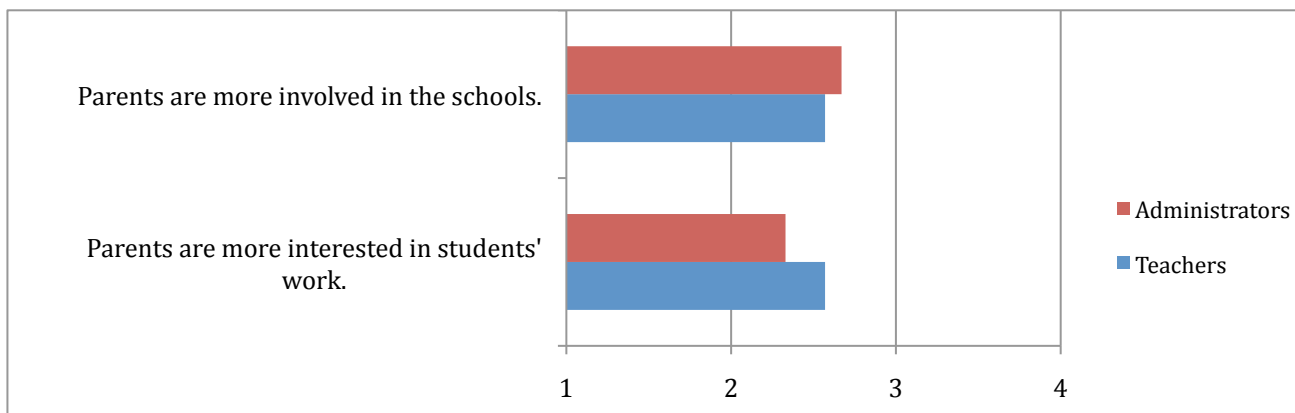
Impact of District/School Outreach

To assess the impact of outreach to the community and parents, EDC researchers looked at change in community and parental involvement.

Community Involvement: Some of the administrators reported seeing significant positive change in school/community partnerships and that involvement of the local community has increased as a result of participating in the Cisco 21S Initiative. In addition, they indicated that involvement of local businesses in the schools has increased and that support from businesses has been helpful. Administrators also agreed that interactions with local institutes of higher learning have increased and that the support they have received from local universities has been helpful.

Parental Involvement: Administrators and teachers were asked to indicate how much they agreed or disagreed with two statements about parent involvement. Both administrators and teachers reported that parents were more involved in the schools, and teachers indicated that parents are more interested in students’ work as a result of the 21S Initiative (see Figure 31).

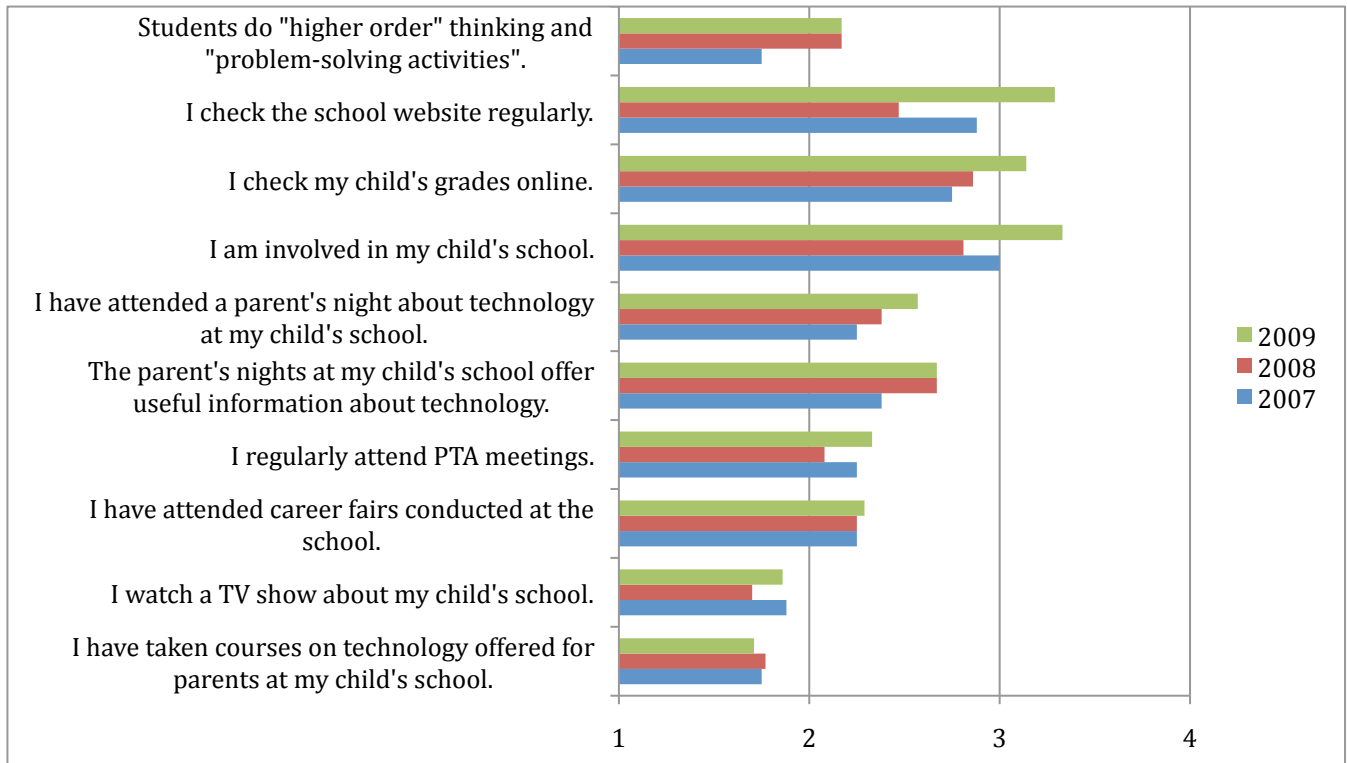
Figure 31: Parent involvement



Note: Participants indicated how much they agree with each statement on a scale from 1 (strongly disagree) to 4 (strongly agree). Higher scores indicate greater agreement.

In 2009, the highest percentage of FCAHS parents reported that they are involved at their child’s school through checking the school website, checking grades online, and attending parent/teacher conferences. In addition, there have been increases in parent involvement over the course of the Initiative. The largest gains were in terms of receiving automated phone calls from the school and checking grades online. These increases suggest that the integration of technology in the school is shaping the way that parents interact with the schools (see Figure 32).

Figure 32: Change in parents’ reported involvement in the school



Note: Participants indicated how much they agree with each statement on a scale from 1 (strongly disagree) to 4 (strongly agree). Higher scores indicate greater agreement.

FCAHS also provided information on website usage and parent attendance at open houses. The school has seen gains in both of these areas. Between 2006 and 2009, the number of parents attending open houses increased by 60 percent (see Table 12). In addition, FCAHS experienced a dramatic increase in the number of overall hits on the district website, from 4,700 in 2007–2008 to 8,509 in 2008–2009.

Table 12: Change in Parent Attendance at Open Houses

	2006	2007	2008	2009
Number of parents attending open houses	150	188	210	240

Connected Community Challenges

In addition to its successes, there are several areas where FCAHS has had difficulties implementing the Connected Community component of the Initiative. These may be areas to target for change as the Initiative moves forward.

Community Outreach

Administrators would like to get more community members involved in the program. More specifically, they felt that involvement of local businesses and local institutes of higher learning in the school has not increased over the course of the Initiative. Therefore, these may be organizations that FCAHS can target for developing a relationship with in the coming years.

Parental Outreach

Some FCAHS parents reported that the school's outreach efforts have been largely unsuccessful. Activities or events that would bring parents to the school more often include: activities related to their children (86 percent), parent/teacher conferences (71 percent), and awards ceremonies (71 percent).

Resources available to the community

The resources that parents indicated were least available to them via the school include: outreach office/staff (0 percent), training, seminars, forums (0 percent), sponsored programs (0 percent), faculty research services (0 percent), daycare (0 percent), school reform initiatives (0 percent), and workshops to help parents improve and support their child's learning skills (0 percent). By targeting these specific areas, the high school might garner involvement from parents who otherwise might not be interested in participating at the school.

Lessons Learned

As the full implementation of the 21S Initiative draws to a close, it is appropriate to look back at the experience to identify the lessons learned about leadership, educational vision, culture change, and improvement in teaching and learning.

Vision and Leadership

Effective leadership is among the most powerful factors in any school transformation. FCAHS has had turbulent leadership transitions over the last three years. This had a negative impact on the following goals:

- Creating a powerful and dynamic vision of a 21st century learning environment involving all stakeholders
- Establishing structures and process to share vision
- Fostering communication and collaboration among educators, parents, and community members
- Crafting an ambitious professional development plan and activities
- Strategically cultivating community partnerships

21st Century Learning Environment

The district has access to high quality 21st century technology capable of supporting greater administrative efficiencies and a student-centered approach to teaching and learning. Specifically, the district leaders and staff engaged in the following activities to transform the learning environment:

- Revamped the technology infrastructure and improved access to software, hardware, wireless Internet connections, and technology-based security systems within the school. They established a security system and upgraded science and math labs. They installed a variety of educational hardware and software in all classrooms.
- Provided technical and professional development support to teachers and administrators. The professional development focused on the use of specific management and instructional technology tools and software. Teachers received subject-specific training.
- Created richer and broader course offerings for students.

As the result of the resources and support provided by the 21S Initiative, there has been significant positive change in the overall quality of teaching in the district, in system-level technology integration into the curriculum, and on teachers' ability to integrate technology into the curriculum.

Students have benefitted from the 21S Initiative. They have improved their technology literacy, have become active participants in their learning, have opportunities to ask teachers questions about their work, have chances to be creative about their schoolwork, have a voice in their classrooms, get to make choices about what they study at school, are participating at a greater rate in state level math/science fairs, have decreased absenteeism and suspension rates, have increased test scores (outscored their peers in the state on Biology and U.S. History), have high graduation rates, and are taking more college admission exams (ACT).

The district is working with a limited number of parents, community members, and organizations. When appropriate, they seek their ideas and opinions to inform policy and educational decisions.

Remaining Challenges

Although FCAHS leadership and staff have worked hard to achieve a dramatic transformation of the school, a number of important challenges remain.

Vision and Leadership

FCAHS administrators' expectations for teachers tend to outpace how teachers perceive those expectations. This suggests that teachers may benefit from further education about the 21S vision and their role in achieving it.

Connected School

The Connected School component of the Initiative may need improvement in the following areas:

- Providing adequate levels of technical support.
- Maintaining technology-based security in the school.
- Ensuring reliable access to the Internet.
- Improving access to computers to accommodate students.

Connected Learning

This component of the Initiative shows a number of areas where improvement is needed.

- *Changing Practices:* Changing antiquated teaching philosophies has been a challenge.
- *Student Use of Technology:* Students rarely use video cameras, digital cameras, and video conferencing equipment, use e-mail to communicate with their teachers or with students from other countries, collaborate with students from other schools on academic projects, or discuss ideas from readings or class with teachers outside of class.
- *Building Teacher Skills:* A few of the teachers rated their skills using PDAs, Web 2.0 tools, video conferencing equipment, and student assessment software at the novice level. As these are the areas where the fewest teachers have received training, future professional development on these topics could help build teachers' skills.
- *Integrating Technology into the Curriculum:* A few of the teachers' ability to integrate technology into the curriculum is somewhat proficient or not proficient, and they do not receive enough professional development support around using technology tools and software.

Connected Community

FCAHS has had difficulties implementing the Connected Community component of the Initiative. The district has difficulties getting community members involved in the program, and feels that involvement of local businesses and local institutes of higher learning in the school has not increased over the course of the Initiative. FCAHS's outreach efforts have been largely unsuccessful, and resources to support community involvement in the school were largely unavailable.

Recommendations

Building on the gains in leading, teaching, and learning that FCAHS has accomplished, we suggest that the recommendations below be taken into account in future district improvement plans:

- Leaders should more clearly articulate what they want teachers to prioritize in their day-to-day teaching. Teachers would benefit from clarity regarding the 21S vision and their role in achieving it, and ideal student behavior and the frequency with which teachers are expected to use the Internet to post lessons and communicate with parents. Setting and communicating these expectations would help ensure that teachers know what to prioritize in their day-to-day teaching.
- In order to improve the Connected Schools component of the Initiative, the district must continue its efforts to increase access to technology personnel, provide reliable access to the Internet, and maintain the technology-based security in the school. Further, in order for the benefits of technology to reach its full potential, the District should make efforts to provide teachers with enough computers for all of their students.
- Increase administrator support to help teachers deal with antiquated teaching philosophies, provide adequate technical professional development to their staff, get all of their teachers to integrate technology into their lesson plans, and implement innovative ideas.
- Provide teachers with additional professional development support around the use of technology tools and software, as well as efficient and effective ways to integrate technology into their teaching.
- Offer students more opportunities to engage in active, self-directed learning. Teachers should encourage students to use the interactive whiteboards, and they should develop instructional strategies that allow them to communicate with teachers and students within and outside their school.
- Continue to cultivate relationships with parents and other community partners in order to build support and secure resources. New communication tools or different approaches to parent communication may help increase parents' involvement in the school.

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Appendix

Note: EDC researchers will deliver the rest of the Appendix section to Cisco in a separate document.