

White Paper  
Education  
Auburn, Alabama, USA

# Technology as a Tool for System-wide Transformation

The 21st Century Learning  
Initiative at Auburn City Schools

Part 3. Evaluating Change: Results and Looking Forward

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# Introduction

One of the nation's outstanding school systems, Auburn City Schools (ACS), has undertaken a two-year pilot of one-to-one mobile computing. Under the district's 21st Century Learning Initiative, Auburn Junior High (AJH) and Auburn High School (AHS) are wirelessly networked, and over 1,000 ninth- and tenth-graders use personal laptop computers. Teachers at the two schools have spent hundreds of hours in individual, departmental, and large-group professional development (PD) to advance their ability to incorporate technology effectively across the curriculum.

The initiative is part of transformative efforts across the district to increase use of technology for effective 21st century learning. All teachers undergo extensive, ongoing professional development on how best to incorporate technology into their teaching. Every school has a full-time, certified teacher dedicated to providing instructional technology coaching for teachers. Each K-9 classroom has Internet access, several computers, and an interactive whiteboard.

Midway through the pilot, an Intel communications team interviewed more than two dozen students, teachers, school media and technology specialists,

administrators and school board members from Auburn City Schools, as well as vendor representatives and Auburn University faculty. Our report follows the framework of *Blueprint Solutions for K-12 One-to-One Computing Initiatives*<sup>1</sup> and is published in three parts. Please refer to [www.k12blueprint.com](http://www.k12blueprint.com) for Part 1, Preparing for Change, which provides an overview of the initiative and addresses policy, leadership and funding issues; and Part 2, Enacting Change, which discusses infrastructure, professional development, and curriculum. The following discussion focuses on the results of the initiative, as well as the district's future plans.

1. Blueprint is available at [www.k12blueprint.com](http://www.k12blueprint.com).

## Results: Climbing Higher



**“If kids want to learn, we can teach them. With laptops, we’re seeing a lot more kids that want to learn. You can’t put a price on that. The eagerness I see on the face of the kids as they walk in the door—whether that’s measurable or not, I don’t know, but it’s got to pay off.”**

Mac Matthews  
History Teacher  
Auburn Junior High School

### Framework for Measuring Success

Auburn City Schools (ACS) established three goals for its 21st century learning initiative:

- Have teachers change and improve the delivery of instruction to realize the benefits of a one-to-one computing environment.
- Increase student achievement, engagement, and ability to learn to meet the demands of the world they are entering.
- Create and support equitable opportunities for student learning through the use of technology as an extension of the classroom.

For each goal, district leaders settled on a small set of objectives. They then spelled out activities and inputs that would help achieve the objective and realize the outcome, as well as data and measurements that would be used to assess their success. Table 1 outlines this.

### Timeframe for Change

The district is not expecting immediate, dramatic changes. “It takes a lot of time and effort and money to produce transformative change—maybe more time than anything else,” says Associate Superintendent Joyce Morgan. “I think we have to give it three years or even five years before we’ll see a sustained difference. Everyone wants immediate gratification, but it doesn’t happen, not in something as complex as this.”

Dr. John Saye, professor of secondary social science education at Auburn University, echoes the need for patience. “We need to have a long change-horizon, because transformation unfolds in stages,” he cautions. “First, teachers have to see a reason for using technology and doing something different. Then, they have to learn how to tie it into their specific subject with specific applications and examples. Meanwhile, we have to develop new tools and curriculum materials, and this happens iteratively over several years. We need national efforts like the Persistent History Initiative going on in every subject, developing repeatable best practices and examples.”<sup>2</sup>

Despite those issues, ACS teachers and administrators say they’re seeing plenty of signs that technology is enhancing teaching and learning, and moving them toward their goals of integrating technology for educational purposes, bridging the digital divide, and increasing students’ achievement, engagement, and ability to learn.

2. For more about the Persistent Issues in History Project, see part 2 of this report, “Enacting Change: Infrastructure, Professional Development, and Curriculum.”

**Table 1. Goals and Objectives with Representative Measurements**

Goals	Objectives	Representative Measurements and/or Data
<p><b>Adapt instruction to realize technology benefits</b></p>	<p>Infuse curriculum, instructional methods, content, projects, and lessons with technology throughout daily classroom instruction</p>	<ul style="list-style-type: none"> <li>▪ Increase in digital content</li> <li>▪ Increase in teacher-reported change in curriculum, instructional methods, etc.</li> <li>▪ Increase in observed changes in curriculum, methods, etc.</li> </ul>
	<p>Ensure learning environment supports above objective</p>	<ul style="list-style-type: none"> <li>▪ Be in top quartile among peers for levels of hardware, software, peripherals, services and availability</li> </ul>
	<p>Develop staff skills and knowledge to support above objective</p>	<ul style="list-style-type: none"> <li>▪ 95 percent of teachers will progress from their initial state on the Apple Classrooms of Tomorrow (ACOT) scale to the Innovation stage and show progress from each stage to the next</li> </ul>
<p><b>Increase student achievement, engagement and ability to learn</b></p>	<p>Find inherent, unique advantages of one-to-one environment to increase achievement, engagement, and ability to learn</p>	<ul style="list-style-type: none"> <li>▪ Increase in scores on non-curricular tests and assessments of annual progress</li> <li>▪ Increase in graduation rates</li> <li>▪ Increase in attendance</li> <li>▪ Decrease in discipline issues</li> </ul>
	<p>Use an appropriate mix of educational strategies</p>	<ul style="list-style-type: none"> <li>▪ Increase in demonstrated and documented learning that results in credit being granted to the student</li> <li>▪ Increase in number or depth of alternative assignments</li> </ul>
	<p>Use technology to determine student achievement, engagement, and learning ability levels and respond appropriately</p>	<ul style="list-style-type: none"> <li>▪ Each student has an individualized education plan</li> <li>▪ Formative assessment results</li> <li>▪ Summative assessment results</li> </ul>
	<p>Motivate students to seek learning opportunities to use technology as extension of classroom</p>	<ul style="list-style-type: none"> <li>▪ Increase in time spent on learning outside the classroom</li> </ul>
<p><b>Create and support equitable opportunities for student learning through use of technology as extension of classroom</b></p>	<p>Students will know how to properly use technology as extension of classroom</p>	<ul style="list-style-type: none"> <li>▪ Increase in students demonstrating competence in using technology as an extension of classroom</li> </ul>
	<p>Achieve one-to-one student computing ratio beyond classroom for grades 9–12</p>	<ul style="list-style-type: none"> <li>▪ Number of computers and students</li> </ul>
	<p>Ensure all 9–12 students acquire Internet from home</p>	<ul style="list-style-type: none"> <li>▪ Parent survey</li> </ul>

### “A Different Place”

Nearly every adult we spoke with mentioned a noticeable increase in student engagement. “Technology is definitely a tool that engages students,” Morgan says. “When I walk through classrooms that are using laptops, the engagement of students is far greater on the whole. Students like that kinesthetic part of the program.”

Mandie Matheny, who teaches ninth-grade math at Auburn Junior High (AJH), lost fewer students to spring fever. “Kids are more engaged by far,” she observes. “Because they’re more engaged, they’re less apt to digress. There’s less chitchat, and when they are talking, it’s generally about what they’re doing on the computers.”

Another sign of engagement: Teachers report that in the past, roughly half their students would fail to bring textbooks to class, but almost no one forgets their laptop. “They know they’re toast if they don’t have their computer with them,” says AJH history teacher Mac Matthews.

What accounts for the changes? “Teachers have come an amazingly long way in this short length of time,” Media Specialist Ann Harrell states. “They have all become much more proficient and knowledgeable, even those who were resistant or somewhat negative. You can see it in the classroom—learning is more student-based.

There’s more going on, and less time being wasted. The students’ world is digital. They’re just naturally more interested. Auburn Junior High is a different place.”

Many believe greater student engagement helped produce a 29 percent school-wide decline in discipline problems at AJH. “The overall climate at our school has changed, and I believe the technology initiatives are key,” says Jason Wright, AJH principal. “Students become more engaged in lessons and learning. They’re not off-task and causing trouble. That’s true for ninth graders, who have the laptops, but also for eighth graders, who now have much greater access to our four computer labs. In addition, the dynamic of the classroom is changing. There’s much more inquiry-centered, exploratory learning and cooperative learning. I believe it has made our classrooms more engaging.”

Wright points to another factor. “We have placed a high level of responsibility on students,” he says. “We’re trusting them to handle a \$1500 piece of equipment. For many kids, that’s a powerful concept. Some of them seem like they have instantaneously matured in response to that responsibility. They have their own laptop, and they are thrilled.”



Mandie Matheny, Math Teacher, Auburn Junior High School

## Bridging the Divide



Kim Pennisi  
Auburn Junior High School  
Special Education Teacher

By giving all ninth- and tenth-graders equal access to technology, the ACS laptop initiative is taking steps to make sure the community's economic divide doesn't mean an educational opportunity divide. Children whose families don't have Internet access at home are still at a disadvantage, but the gap is not as great as when the students also lacked a computer—and ACS is working to engage the community in bridging the network-access divide.

Meanwhile, laptops and other in-class technologies are helping disadvantaged students broaden their knowledge of the world. "Retaining things in memory depends on background knowledge," says Debra Beebe, principal of J.F. Drake Middle School. "We have children whose families own a beach house, and children who've never seen the ocean. For that latter group of children, technology helps us build that background knowledge."

Technology also broadens opportunities for all students to learn more about the world. "Even tech-savvy kids tend to be focused on e-mail and instant messaging," Beebe continues. "At school, they learn all those other things they can do. Then, they branch out at home and start doing interactive science or other activities that help them learn more about what the world is about."

For all children, technology helps us open opportunities and provide a broader base of background knowledge. That's an important part of educating children for a global world."

Bottom line, ACS students are being better prepared for the world they'll live in. "They're very computer savvy and comfortable with technology, and they're better able to seek evidence, corroborate it, and make up their own minds, not just think or vote the way they're told," says Matthews. "They're better prepared for adulthood."

### Individual Needs

At all grade levels, ACS teachers and administrators say technology helps them accommodate varied learning styles more effectively and meet No Child Left Behind requirements.

"We're increasing the proficiency of our low-achieving students, and taking the advanced students far beyond what we've been able to do before in terms of writing, research, and critical thinking," says Matthews. "We are changing the learning experience."

Learners who need to "see it and interact with it" are more engaged by technology, and several teachers expressed a gut feeling that technology may engage boys at a deeper level. Students with ADHD or simply a short attention span seem to benefit particularly. "They stay on task more," says Harrell. "They're more successful because they're more involved."



Kim Pennisi, Special Education Teacher, Auburn Junior High School



Julie Wentworth, English Teacher, Auburn Junior High School

While nearly everyone approached the laptop initiative with some reservations, special-education teachers had particular concerns. They showed courage in following their conviction that every ninth-grader deserved and needed to participate in the laptop initiative. "Special-needs children are some of the least likely to have a computer in the home," says Kim Pennisi, an AJHS special education teacher who teams with Mac Matthews and English and language arts teacher Julie Wentworth. "That means we have the most work to do to get them comfortable and able to use the technology for learning—but it also makes it especially meaningful and exciting for them when they do experience success."

Pennisi and other teachers piggybacked on regular classroom activities wherever possible, and worked with students intensively during their resource periods. Teachers met individually with the parents of special needs students, to help everyone reach a level of comfort. Students began taking their laptops home only when Pennisi, the student, and his or her parents agreed the time was right.

Auburn teachers and administrators point to other technology-related changes that are particularly beneficial for special-needs and low-achieving students.

Junior-high students are more willing to ask questions. "Peer group approval is so important at this age that kids will often hold back rather than ask a question and have everyone see they're confused," Pennisi says. "With the laptops and DyKnow, they can chat back and forth with the teacher to ask a question, and it's all private. I can accommodate Mac and Julie's lesson plans to my students' needs, and no one realizes they're doing anything different. We can check their work in real time and perform immediate remediation if they need it. It helps with self-esteem and learning both, and we're seeing students developing more independence and ownership of their learning."

Kids are more organized. "If you stick a sheet of paper in the wrong physical notebook, you're lost," says Pennisi. "With laptops, it's right there on the system. It helps disorganized students stay on top of things."



Dr. Lili Land, Principal, Auburn Early Education Center

**“Reluctant learners love the technology. They participate more readily, and because they participate, they have more of a chance to be successful.”**

Debra Beebe  
Principal  
J.F. Drake Middle School

There’s a greater comfort level for students in exploring technology in their own classroom. “They have the laptop all the time and can work when they need to, not just when they could get into the lab,” says Harrell. “Our at-risk ninth-graders seemed particularly to benefit from this and really experience success. The laptop initiative truly provided equitable opportunities to access all those resources.”

Reduced note-taking saves time in class and eliminates a source of frustration for students with poor fine-motor skills. “Note-taking is very difficult for students with these needs,” Wentworth says. “With laptops and DyKnow, taking notes is a different experience, plus it’s easier for them to keep track of their notes. It helps level the playing field.”

Pennisi found that one student with nonverbal autism is communicating more effectively with the laptop than he did with his handheld assistive technology device. Why? He has more screen space. “He doesn’t handle change well and was one of the most resistant to using a laptop,” Pennisi says. “But he’s doing beautifully.”

Some low-achieving students also experienced anger and frustration from the technology. “If they don’t have technology at home, there’s a big learning curve to get over, and that can cause some frustration after the initial excitement

wears off,” Wentworth says. “In addition, being disengaged is a defense for some of them, and with the laptops, they lose a lot of excuses to disengage. They can’t claim the dog ate their homework, because I can just check their computer folder.” Nonetheless, in anonymous surveys at year’s-end, students overwhelmingly said they liked the laptops and that they made coming to school more fun.

In-room technologies help Dr. Shannon Brandt provide individualized experiences for her fourth-grade students at Wrights Mill Road Elementary School. “Kids who need remediation, kids who need a challenge, it’s all right there on the computer,” she comments. “There’s also free translation online. I have two students who speak no English, and two others who are English-language learners. The classroom computers definitely help me meet their needs.”

### **Energized Teachers**

Across the school system, new technologies and professional development have proven energizing for teachers. Sometimes, teachers who were initially the most reluctant end up being the most enthusiastic. “It is amazing to watch the ‘old school’ teachers get excited about technology and see their pride in what they are accomplishing,” Beebe says.

“People worry that older teachers won’t want to get engaged, but if you present it correctly and have great teachers to model and help them, they can become revitalized,” says Dr. Lilli Land, principal of Auburn Early Education Center (AEEC). “Our teachers have bought in. They’ve gone from being scared of their computer, to talking about postponing their retirement because they’re having too much fun. They have a great attitude about coming to work.”

Technology has also increased an already-strong spirit of sharing between newer and more experienced teachers. “Younger teachers tend to really take off with technology and be able to mentor older teachers,” says Morgan. “Then again, our more experienced teachers have a lot of wisdom to share in terms of classroom management and behavior issues, so it’s very reciprocal.”

Matheny feels teachers and students like the flexibility of the mobile lifestyle. “I can take my machine and work in a friend’s classroom, at a Starbucks, or on my couch at home,” she says. “I’m not confined to my desk. Kids are the same way. You’ll see them working on their laptops in the cafeteria, getting work done before they leave. If I’m going over a test they haven’t taken, they’ll be out in the hall using their laptops to work on another project.”

For all the time and energy that goes into learning about technology and revamping lesson plans, teachers and administrators say the technologies also bring new efficiencies. “Remember how much time you wasted when you had to run down to the office to use the phone?” asks Dr. Long. “With laptops, it’s like having your cell phone in the class. It’s just so much more efficient to get things done, and you can access so much more information so quickly.”

## Beyond the Schools

Parents are happy. “They’re ecstatic,” reports Matheny. “They’re as excited as we are.” The laptop initiative has given some parents their first opportunities to experience what computers and the Internet are all about. “That’s been a wonderful residual effect,” says School Board President Laura Cooper.

Organizations such as the Auburn Chamber of Commerce are also enthusiastic. “They understand the synergy between a vibrant school community and a vibrant business community,” Cooper adds.

### Results

- Greater student engagement in learning
- 29 percent school-wide drop in discipline problems at AJH
- Increasing use of inquiry-based exploratory learning and other pedagogical best practices
- Improved success in meeting individual needs
- Energized teachers
- Excited parents—some having their first experience with technology

## Looking Ahead

**“After coming this far, would I go back? No. Is it worth the time and the effort? Absolutely. If we truly are concerned with preparing students for the future, the laptop initiative is imperative. If we came to the point that we couldn’t reissue the laptops, I think both students and parents would say we were failing to provide the tools we need to provide.”**

Joyce Morgan  
Associate Superintendent  
Auburn City Schools

Auburn continues refining and evolving its use of technology. Among the opportunities that are under discussion or being implemented:

- Developing ways for students to submit work electronically
- Continuing to integrate technology fully into teaching and learning
- Collaborating to create a wireless community
- Taking time in students’ advisory period for technology coordinators and media specialists to cover technology basics

Above all, ACS wants to turn the laptop pilot into an ongoing program and extend it through grade 12. Even in a community as well supported as Auburn, funding remains an issue. An August 2007 tax referendum that would have ensured the initiative’s continuance failed by a 53-47 percent vote, causing the district to reassess the depth of support for the initiative among staff, students, and parents.



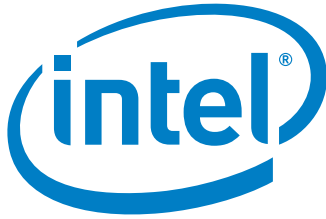
J. Terry Jenkins, ACS Superintendent

“Overwhelmingly, parents and other stakeholder groups are expressing a very strong desire to continue the initiative,” says Director of Technology Debbie Rice. “People who were previously lackadaisical are becoming vocal that having individual laptops for students and staff is an absolute necessity, not a luxury.”

No one wants to go backward. “I couldn’t do it,” Mac Matthews says. “It would be such a disservice to the students. When you know there’s an approach that’s best for the kids, it would be unconscionable to turn back from it.”

Rice says the negative vote is causing the district to redirect its efforts. “We may need more time to reach our goal of all ninth- through twelfth-graders having laptops, but we are convinced we will fully implement the original goals of the 21st century initiative,” she states.

ACS Superintendent J. Terry Jenkins remains deeply committed. “There are skeptics who are watching us and wondering if technology is just the latest education fad,” Dr. Jenkins says. “My answer is: Technology isn’t something that’s only happening in the schools. It’s happening in the world, and it’s an everyday part of many students’ lives outside of school. It’s a tremendously effective tool for grasping students’ attention and giving them the skills they need to succeed. It’s very gratifying to see the impact technology can have on teaching and learning—to see how excited our teachers are, to see our high-achieving students go further, and to see the learning curve light up for our disadvantaged students. We will put everything on the table, as well as seek outside resources, to look at continuing our funding for this program.”



## Learn More

What vision and policies drove Auburn's 21st Century Learning Initiative? How did the district lay the groundwork for success? Read parts 1 and 2 of Technology as a Tool for System-wide Transformation: The 21st Century Learning Initiative at Auburn City Schools on [www.k12blueprint.com](http://www.k12blueprint.com).

For more information, please see:

Auburn City Schools: [www.auburnschools.org](http://www.auburnschools.org)

K12 Computing Blueprint: [www.k12blueprint.com](http://www.k12blueprint.com)

Gateway in Education: [www.gateway.com/education](http://www.gateway.com/education)

Intel Schools of Distinction:  
[www.intel.com/education/schoolsofdistinction/index.htm](http://www.intel.com/education/schoolsofdistinction/index.htm)

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