



Back to School: Intel® Technology Transforms Education at Houston County High School

Solution Summary

Challenge

Located in rural Georgia near a large Air Force base, Houston County High School faced the challenge of educating a diverse and often transitory student body. Meeting the needs of 21st-century learners, little or no technology, and teacher morale were some of the issues.

Solution

In 1998, Houston County High School launched a strategic effort to bring technology into the classroom. Over the next six years, the school deployed more than 1,100 Intel® Pentium® 4 processor-based desktop and Intel Centrino™ mobile technology-based mobile PCs, connected over both wired and wireless networks. The school also issued a host of digital tools to teachers and staff, including Pocket PC PDAs, electronic whiteboards and tablet PCs. A significant effort went in to creating 21st-century learning environments, training teachers to use technology and change instructional pedagogy.

Business value

The introduction of technology as a tool for learning has redefined Houston County High School. Student enrollment has soared from 650 students in 1991 to more than 2200 students today, as families flock to the district to take advantage of its unique programs and improved educational outcomes. Teacher retention and recruitment have improved dramatically and student achievement has risen.

Challenge

Old School

When Mike Hall took over as principal of Houston County High School (HCHS) in 1997, he faced a big challenge. Located about 100 miles south of Atlanta, Georgia, the school serves a rural community dominated by Robins Air Force Base, the largest military supply base in the world.

The military base created a host of challenges for teachers and administrators at HCHS. The school's student body – a significant portion of which comes from military families – is both highly diverse and transient. High student transiency, tight budgets, and an infrastructure that was not built to handle technology initiatives helped create many issues for a school wanting to create 21st-century learning environments. With teacher recruitment nationwide becoming very difficult, a 9th-grade retention rate at 12.5%, and the use of technology for instruction at a less than minimal level, Hall decided it was time for a change.

“What you are doing is changing an instructional model that has been in place for 200 years. In most schools the classroom today is the same as the classroom in the 1800s,” Hall explains. “If you were to take an engineer, doctor, architect, and teacher from the 1930's and drop them in society today, all but the teacher would be lost. The teacher could simply pick up where they left off.”

Technology Vision

Hall's vision: Employ state-of-the-art technology to redefine the learning process and transform the role of teachers in the class room. Working with the school district's IT director, Wally Reeves, Hall drew up a technology strategy that promised to change a lot of long-accepted practices at the school.

It was an aggressive vision. Unlike most schools, where technology supports the existing curricula, Hall looked to transform the teaching and learning experience at Houston County High School with technology as part of the foundation.

The plan would introduce personal computers and software to a wide range of academic disciplines, from math and science to language training and woodworking. Perhaps most challenging: Hall needed teachers to build their lesson plans around the technology. Technology was to be a part of everyday instruction as opposed to an add-on. It was not a small task.

“I was challenging teachers and parents to change the way they looked at things. There were times during the seven-year period when it would have been a lot easier for me to say let’s just forget it,” Hall says. “People in the community and central office were questioning why I was doing this.”

Of course, the vision required the deployment of hundreds of PCs, as well as an extensive network infrastructure. But with budgets tight and support for the technology lukewarm at best, Hall found he had to improvise in the early going.

“We did a lot of different things. We got donations of old 486 computers and upgraded some of them. We were able to get some donations of workstations, and we scrimped and saved to get some more workstations as well.”

More importantly, Hall needed to ensure that teachers and administrators were both able and willing to use the technology. In a technology survey completed by teachers in the Fall of 1998, over 65% of the teachers in the school considered themselves to be less than beginning users. That required a sustained effort to educate and convince school staff as to the value of the technology.

All teachers were required to use technology daily through a locally designed classroom management system. Rather than simply dropping technology into classrooms and offices and mandating that all teachers accept it, Hall drew up a plan where PCs and software were introduced first to the teachers who asked for it. These targeted deployments allowed Hall to focus attention on the classes and staff that would make best use of the technology – and serve as a role model for those sitting on the sidelines.

The school encouraged staff ownership of new applications and hardware. A staff-advocate for each new deployment – for example, the music lab – would take the lead in mastering the new technology. Other teachers who wanted to adopt the tools had to attend training and show a compelling case for bringing the computing resources into the classroom. Over time, this approach created a great deal of demand for technology adoption among the teachers.

“Every time we rolled out a new technology, we started out with one teacher and we made him or her the expert on that program or solution,” Hall explains. “Before we would give it another teacher, we would provide training and make sure they truly were interested in using the technologies.” Just as importantly, the teacher-expert became a vital resource. Staff members could take questions and troubleshooting issues to the lead expert in a particular deployment. So a teacher working in the language lab could quickly turn to that lab’s advocate to get quick answers and guidance. That effort has greatly reduced frustration among faculty.

The effort has produced a groundswell of interest among staff and teachers. Hall found himself fielding complaints from teachers annoyed that they had not yet been provided the digital tools found in other classrooms. It was an astounding turn-around for the school.

“We always said that our plan required a culture change,” Hall says. “We knew the effort wouldn’t be easy. But we knew it would be worth it.”

Business Solution

School of the Future

It was April 2003 when Terry Smithson, Intel Education Marketing Manager, ran across Mike Hall during a presentation Hall was giving at the National School Reform Conference in Orlando, Florida. Smithson quickly learned that Houston County High School would be an outstanding candidate for an Intel program that helped schools implement technology by providing access to equipment and resources.

“I trusted the leadership of the school. I had all the confidence in the world they would make good use of the resources,” says Smithson. “The whole purpose behind the Intel program was to serve as a solution showcase. So many schools say, ‘I can’t do this.’ The Intel program demonstrated that a school can do it, and illustrates the impact technology can have on the students and the school.”

When Smithson met Hall, the school principal had already made one crucial move – deploying a wireless 802.11b network throughout the school. The wireless network made it possible for students and teachers to interact and share resources online, and provided the foundation for Hall’s technology-fueled vision. Just as importantly, Hall found that the 802.11 wireless network delivered enormous cost savings, while vastly improving flexibility.

“It would cost me \$100,000 dollars to wire the entire school,” Hall explains. “We made the whole school wireless for \$7,000. Just from a financial standpoint you’re talking about a huge benefit right there.”

Hall’s effort had centered on the Intel platform from the very beginning. Not only did Intel processor-based PCs and servers provide superior cost-performance to other platforms, they offered access to the broadest range of applications, hardware, and services.

For Houston County High School, where computers were being used to enhance everything from woodworking to flight training, this breadth of selection was paramount.

“Having overseen the deployment of nearly a thousand computers in this school, I can say that the Intel architecture has been absolutely critical to our success,” Hall says. “We work with so many different types of software and so many different types of mobile and handheld devices that I can’t imagine any other platform coming close to fulfilling our needs.”



The Intel program soon pushed the efforts at Houston County High School into overdrive, helping guide Hall's efforts to deploy more than 1100 desktop and laptop PCs in more than 20 wireless computing labs, which are integrated into classrooms. The school deployed 15 wireless-enabled laptop computers for the MIDI lab, 10 Intel Centrino™ mobile technology1-based notebook PCs for the woodshop, and another 10 Intel Centrino mobile technology-based PCs for the language lab. The ongoing infusion of technology revamped the learning landscape at Houston County High School and turned the school into a true showcase for technology in the classroom.

All the while, Hall worked to put technology into the hands of teachers and administrators. Hall provided administrators and counselors with wireless-enabled iPaq™ Pocket PC handheld computers for accessing student grade and attendance information. He also mandated the use of e-mail for communicating with parents and pushed teachers to use digital white boards and tablets to create an interactive 21st-century learning environment, where students and teachers alike could manipulate information projected on the classroom's projector screen.

Benefits Accrue

The benefits from the HCHS technology program have been nothing short of stunning. Enrollment has skyrocketed since 1991, from 650 students to more than 2,200 students as parents flock to the district. In fact the school has grown so fast that the district recently rezoned the area – a process that drew impassioned input from parents determined to keep their children in HCHS's technology-savvy learning environment.

And no wonder. Hall is seeing noticeably higher levels of achievement from students who have ready access to computing resources. The school recently completed a pilot that equipped 28 students with 24-hour access to wireless enabled tablet PCs for an entire school year. Some of the observed outcomes ranged from higher productivity of those students to changes in the way teachers structured their instruction strategies. For instance, the teacher can set up a 7:30 math chatroom to give all students the opportunity for dialog and tutorial services online. High school parents appreciate this opportunity for their children.

Even more importantly, the students have turned the technology into an engine for creativity. Students in the music lab use powerful Intel Pentium® 4 processor-based PCs and sophisticated music scoring software to write their own symphonies. In the woodshop, students use computer-aided design (CAD) software to create detailed tongue-and-groove furniture designs that can be modeled and assessed before anyone turns on a lathe. Hall singles out one girl who earned a full, four-year scholarship in furniture design from the Savannah College of Art and Design. Five other students went on to start their own successful cabinet-making business.

"The performance of the Intel Pentium 4 processor-based desktops and Intel Centrino mobile technology based laptops really open up the field for the students," Hall says. "The Hyper-Threading Technology2 in the Pentium 4 processor lets students quickly revise woodshop plans, or move between different modules in the music lab, even as they make use of a Web browser or e-mail."

Members of the Junior ROTC program even take flight training classes from an FAA instructor, using flight simulation software to master complex concepts. When 10 students took the FAA's ground school test this year – the first step toward a private pilot's license – all 10 passed. This very difficult test is simply another example of students entering the real world with usable skills.

"It's hard to argue with these kinds of results, especially when the kids are getting scholarships or succeeding in their own business," Hall says.

Why Consider Intel® Technology-based Solutions?

Technology Leadership: Intel is the world's leading supplier of advanced microprocessors used inside PCs, servers and wireless devices, and a leading manufacturer of communication and networking products. The company is a driving force behind the PC and Internet revolutions that have transformed business and society.

Commitment to Education: Intel contributes nearly \$100 million annually to efforts to improve education. Through the Intel IT Innovation Center and Intel® Innovation in Education, Intel is improving teaching and learning through the effective integration of technology. The Intel® Teach to the Future program has already introduced more than 2.5 million teachers in over 30 countries to creating in-depth, personal learning experiences with technology.

Understanding of Education: Intel is regularly collaborating with governments, academic institutions, NGOs and with the ICT industry to drive improvements in teaching, learning, administrative efficiencies and localized education-related technology solutions.

Established Ecosystem in Education: Intel is working with a "who's-who" of technology leaders to collaborate on e-learning programs, teaching methods, and effective integration of technology in education. These companies include Agilix, Blackboard, FutureKids, Pitsco, Primedia, Riverdeep, SAS, Scantron, Scholastic, SchoolNet, SMART Technologies, 21st Century Learning, CoSN, ISTE, SETDA, Dell, Gateway, HP, IBM/Lenovo, Microsoft, and others.

Reliable, Standards-Based Products: By basing its technology on industry standards, Intel enables solutions that are flexible, scalable, and interoperable, and allow for a broad-range of cost choices. In addition, standards-based solutions provide students with access to a wide range of academic resources, and exposes them to the software, solutions and platforms most businesses around the world use every day.

The benefits extend to the teaching staff. Despite ongoing teacher shortages across the United States, Hall says Houston County has been able to recruit highly-qualified teachers from across the country.

Teachers are literally seeking out the school because of its aggressive technology programs and the opportunity to work in this type of new learning environment. Just as importantly, community and parent involvement has increased because of these efforts.

Widening Scope

One of the key ingredients to the success at Houston County High School has been the adoption of wireless technology. A host of 802.11b access points enables the school to create mobile computing labs – literally tall racks of mobile PCs that can be rolled into the classroom at a moment's notice. Now the county government is working to become one of the first in the nation to deploy 802.16 WiMax fixed wireless access across the county. Within a year or so, students who today enjoy ready wireless access on school grounds may enjoy round-the-clock connectivity from schools, from libraries and public spaces as well as from home. It's a trend that Hall says can only make things better.

"Houston County is about to become the first WiMax location in the United States, and that should make the use of technology at the high school all the more effective," says Hall. "Already, the skills that our students have mastered in the classroom are vital in so many areas of professional life. The arrival of wide area wireless here and across the country will make these skills even more critical."

Working with Intel, Hall was able to put cutting-edge computing resources in the hands of students and teachers. It certainly is a far cry from the rebuilt 486 computers Hall started out with.

"When I came to the school there really wasn't much technology there. There was no network in place. There were about 100 computers in the building, all of which were restricted to vocational labs," Hall says. "You're talking about starting from scratch and moving forward."

Lessons Learned

- **Work with opponents.** Hall encountered a lot of early resistance to his plan, but he overcame the objections by exposing teachers and staff to the technology. Over time, that effort turned many opponents into vocal supporters.
- **Standardize on Intel architecture.** From day one, Hall and his team deployed Intel processor-based desktop and mobile PCs. That decision did more than give Houston County High School outstanding performance and capability for the price – it enabled the school to access an incredibly wide selection of software and solutions, from CAD design software to language training tools.
- **Take an incremental approach.** Hall had no illusions about turning Houston County High School into a technology magnet school overnight. Rather, he worked with teachers to transform one curriculum at a time, creating working examples of technology in action and allowing the school to refine its approach over time.
- **Consider wireless networks.** When it came to networking systems, there really was no question that wireless was the way to go. The 802.11b access points provided affordable, flexible, and comprehensive network coverage throughout the school. Integrated wireless capability in Intel Centrino mobile technology-based notebooks makes this approach extremely compelling.
- **Adapt the curriculum.** Hall knew that simply dropping PCs into the corner of classrooms would not help students or teachers. His effort was holistic, starting with rigorous teacher training and staff advocacy that helped overcome objections and build interest. Just as importantly, curricula were adapted to take full advantage of the technology. Teachers literally changed the way they taught in order to take full advantage of the interactive environment.

For more information about Intel technology-based solutions, go to: intel.com/go/education.

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¹Wireless connectivity and some features may require you to purchase additional software, services or external hardware. Availability of public wireless LAN access points is limited, wireless functionality may vary by country and some hotspots may not support Linux-Intel Centrino mobile technology systems. System performance measured by MobileMark™ 2002. System performance, battery life, wireless performance and functionality will depend on your specific operating system, hardware and software configurations. http://www.intel.com/products/centrino/more_info for more information.

²Hyper-Threading Technology requires a computer system with an Intel Pentium 4 processor supporting Hyper-Threading Technology and an HT Technology enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See <http://www.intel.com/info/hyperthreading/> for more information including details on which processors support HT Technology

Look for systems with the Intel Pentium 4 Processor with HT Technology logo which your system vendor has verified utilize Hyper-Threading Technology. Performance will vary depending on the specific hardware and software you use. See <http://www.intel.com/info/hyperthreading/> for more information including details on which processors support HT Technology.

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