Going Digital to Transform Teaching and Learning

How one U.S. school district is transforming education by integrating technology and 21st-century pedagogy
Executive Summary

Transforming education to meet the needs of 21st-century students and the global and digital world in which they live requires changing the relationship between teaching and learning. Teachers must teach students how to construct knowledge as they consume information from many sources in their always-connected/always-on world.

Giving students technology alone is not sufficient. Although they’re comfortable with technology, without guidance students most often use technology in only the most basic ways. Providing them with proper technology tools coupled with appropriate pedagogy can transform learning and prepare today’s students for a future in which they can thrive. Teachers also need skills with technology that can help them create engaging lessons and teach students how to construct knowledge inside and outside the classroom.

This white paper shows how one school district in the United States with 23,500 students has thoughtfully set out to transform teaching and learning across the district by integrating technology into everything they do.
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Introduction

It is more than a decade into the 21st century and many schools still struggle with providing education that is in tune with the lives of today's young people. What is needed is education that prepares them for the complex challenges—cultural, environmental, social, and economic—that they will face in their personal and working lives.

Students need education that helps them develop critical and analytical thinking, collaborative problem-solving and teamwork skills, the ability to generate and share ideas and learn through social networks, and Information and Communications Technology (ICT) literacy.¹

In the past, teachers had information and their job was to pass that information and knowledge on to students. The world of the 21st century sees the relationship between teaching and learning changing, and the role of teachers is also changing. Today, teachers no longer provide information; they must now teach students how to build, or construct, knowledge.

With information available everywhere, students experience much of their learning outside of the classroom. To be effective, teachers must teach students how to construct and deconstruct knowledge, including how to evaluate the source of information and how to integrate information into concepts, inside and outside the classroom.

21st-century learning requires the integration of individual learning styles, technology, and global information.

Technology already plays an important role in the lives of 21st-century young people, who often live their lives online with gaming, Facebook, Instagram, texting, and so on.

Today’s students live much of their lives online, but often in the most basic ways.

Although students are usually comfortable with technology, they most often use it in basic ways that do not build knowledge, creativity, or higher-level thinking and collaboration skills, as the figure above shows.

International Teaching and Learning (ITL) data has found that part of the problem is due to the difficulty educational institutions have faced in
integrating technology in effective ways. As the figure below shows, a recent survey reported that 25% of teachers surveyed cited lack of computers for students as being the most significant barrier, along with insufficient time for teachers to prepare and the lack of professional development time, as hindering the use of technology in the classroom.²

![Percent Teachers Citing Most Significant Barrier](image)

Teachers report barriers to integrating technology in their teaching.

Innovative education requires more than just providing more computers to teachers and students. Innovation occurs when education goes beyond reacting to or simply using technology as a trivial add-on and moves into new areas where collaboration, communication, problem-solving, critical thinking, and creativity are central to both teaching and learning activities. Innovation requires a change in teaching.

To be effective, education cannot simply “catch up” with the digital world. It requires more. To be effective, education must innovate and “leap into the future” so that students are better-prepared for the digital, globalized world of the 21st century.

One school district in California’s Central Valley is transforming their schools with a Going Digital initiative that will prepare teachers and students for 21st-century challenges.

This white paper showcases the Going Digital 2015 initiative in the Manteca Unified School District (Manteca USD) in Manteca, California. This paper outlines the thinking behind the initiative, notes some of the many considerations involved, and shows some of the key decisions.

necessary to implement a project of this type and scope. It can serve as a roadmap that other school districts can follow to integrate technology in teaching and learning as a way to transform education.

Going Digital 2015

It was simple: Manteca USD recognized that they did not have a system in place to support 21st-century learning initiatives, including the Common Core State Standards, which require a digital curriculum for all grades K–12.

As a result, Manteca USD designed the Going Digital 2015 initiative to not only meet mandated initiatives, but also to transform the relationship between teaching and learning in ways that can prepare students for a global future while also helping them thrive locally.

The Going Digital 2015 initiative is bringing forward-thinking education to teachers and students across the entire district. The initiative includes updating their network infrastructure, providing computers for all students and teachers, and delivering professional development opportunities to all teachers.

About Manteca Unified School District

Manteca, located in California’s agricultural Central Valley, is home to nearly 75,000 people living in approximately 18,000 households. Manteca is growing rapidly, with nearly 16% growth in 5 years and over 31% growth in the past 15 years.³

Superintendent Messer says, “Residing in the Central Valley of California, we are surrounded by communities that often make it on the top 10 lists published by major media outlets. Lists like: ‘The cities with the highest foreclosure rate,’ or ‘The least literate cities,’ or ‘Cities with the highest teen pregnancy rates,’ etc. And yet, our mission and my passion is to prepare our students for their global future while residing in this Central Valley. That being said, our biggest obstacle is to ensure that we do not allow our location, our environment, to define our expectations of our students and therefore prevent them from preparing for their future.”

³City of Manteca, CA Economic Development Division, Key Demographics site.
Manteca USD serves 23,309 students: 52% Hispanic or Latino, 23% White, 8% African-American, 7% Asian, 5% Filipino, 1% Native American, 1% Pacific Islander, 1% two or more races (non-Hispanic), 2% Other or not reported.4

The district has 20 elementary schools (K–8), 5 high schools (9–12), and 3 alternative schools (1 elementary and 2 high school), and 1 Dependent Charter High School. Going Digital will support a total of 32 sites across the entire district.

Since 2008, Superintendent Jason Messer and the Manteca USD Board of Trustees have led the district through significant budget cuts, increased class sizes, and reduced staff funding. Even with these challenges, they have remained focused on the future. They knew that technology would help the district overcome these and other challenges; they also knew that it would take more than just technology to help teachers and students succeed. Successful change on this scale and at every level demands collaboration and creativity from teachers and administrators, the very skills that students also need for the future. Engaging the community and parents was also essential.

With the going Digital initiative, Manteca USD is one of the first districts in California to give all students (23,079 K–12) digital access in their classrooms. Grades K–3 will use Microsoft Windows tablet-style laptops housed on classroom carts. Students in grades 4–12 will receive their own Microsoft Windows devices, which they will use in the classroom and take home to foster extended learning outside of the classroom. Teachers will all use Microsoft Surface Pro 2 devices. All of the devices have been pre-loaded with the latest version of the Microsoft Office suite and multiple educational apps and programs to assist in meeting the educational goals of Manteca Unified School District.

The Vision

Superintendent Messer and the leadership team had a clear vision of what they wanted:

The Going Digital 2015 initiative will change the relationship of teaching and learning in ways that prepare students for their global future while thriving locally.

4National Center for Education Statistics, ELSI Table Generator, April 22, 2014.
Going Digital 2015 will put Manteca Unified at the forefront of public education, with teachers and students being able to have wireless access to the latest and most timely educational materials and information available online.

Going Digital 2015 will be realized when the wireless network is continually and universally operational, reliable, and accessible to all staff and students, and when filtering does not inhibit age-appropriate learning and access to the digital world.

Success will be evidenced when teachers and students are accessing the richer and more dynamic digital resources on our internal network and the Internet the majority of their instructional day.

Raising test scores and other assessments are part of the overall vision, but the district decided to keep the vision general because they know it will evolve as the project develops. They know that they are entering a new, digital world.

**Getting Started**

In 2013, Superintendent Messer, Deputy Superintendent Dr. Clark Burke, and the Board of Trustees began discussing how to transform the teaching and learning process. With the state voting to adopt Common Core State Standards in 2012, and Common Core’s emphasis on including technology skills at every grade level, Manteca USD knew they needed to revamp their technology. A facilities master plan in early 2013 included a big push to upgrade their infrastructure. Superintendent Messer approached IT and Educational Services to see if having infrastructure in place for the start of the 2014–2015 school year was possible.

Manteca USD utilized existing budget dollars to prioritize projects and reallocate an estimated $30 million towards initial implementation of the district’s initiatives. The board reviewed many proposed initiatives and decided that the Going Digital 2015 initiative would be the most important investment. It would help them build the district’s infrastructure with the future (5–7 years) in mind while enabling them to meet the Common Core State Standards.

Going Digital 2015 is just one of 11 initiatives that the district is currently undertaking. These initiatives focus on a wide range of issues, from improving nutrition with a farm-to-table initiative, to improving student self-image as a way of improving test scores, to Going Digital.
The board and superintendent’s leadership and belief in what technology could provide to the district generated wide support for the project from the beginning. They quickly decided to commit the entire $30 million to the project, allocating $20 million to infrastructure and $10 million to student devices as a starting point.

The board approved the plan in December 2013, and work to select vendors began in earnest. In February 2014, the Technology Advisory Committee, composed of teachers, district administrators, site administrators, parents, union representatives, and IT professionals, was formed. Microsoft and Intel were included to answer technical questions.

The committee’s goals included:
- Selecting devices for teachers and students
- Determining how to train teachers and students to use the technology.
- Creating a plan for how to get community buy-in by including all stakeholders

The committee included a range of perspectives, and members voiced their different preferences as to which technical brands and products they preferred based on emerging Common Core curriculum needs.

Several action based sub-committees were formed and lead by the core Going Digital project team. The core team consisted of Superintendent Messer, Victoria Brunn, Director of Community Outreach and Innovative Programs, and Colby Clark, Director of Information Technology. The subcommittees focused on the following key topics of the Going Digital project:
- Deployment
- Community Outreach
- Student and Teacher Collaboration

**Promoting the Vision**

Manteca USD knew that it would be important to gain the support of teachers and the community early in the process. Teachers have had a crucial role at every stage of the project.

Victoria Brunn, Director of Community Outreach and Innovative Programs, developed a strategy to promote the District’s vision. A clear vision document helped people throughout the district understand the purpose and goals of the project. Community outreach to inform parents
and community leaders also helped. The district held informational meetings, and answered questions from parents and the community.

And it helped that teachers recognized that many (~90%) of their students already had some technology with them, and that Going Digital could use this familiarity to expand learning opportunities. Instead of asking “Why go digital,” teachers and the community asked “Why not?”

Early on, Superintendent Messer also brought in a Common Core State Standards technology coordinator, Peter Gale (a teacher on special assignment), to see that the project would align with the Common Core State Standards. The senior members of cabinet (including the Senior Directors of Elementary and Secondary Education), the full Technology Advisory Committee, and others got to work.

**Going Digital Pedagogy**

Transforming teaching requires building a strong pedagogical framework. Manteca USD required that the pedagogy of the project focus on Bloom’s cognitive process dimensions, which play a big part in the Common Core State Standards. The following figure details the Bloom’s taxonomy and shows which skills align with each stage.

<table>
<thead>
<tr>
<th>Bloom's Taxonomy</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Creating</strong></td>
<td>Designing, constructing, planning, inventing, making, programming, filming, animating, blogging, video blogging, mixing, re-mixing, making wikis, directing</td>
</tr>
<tr>
<td><strong>Evaluating</strong></td>
<td>Checking, critiquing, experimenting, creating hypotheses, judging, testing, detecting, monitoring, reviewing, posting, moderating, collaborating, networking, re-factoring</td>
</tr>
<tr>
<td><strong>Analyzing</strong></td>
<td>Comparing, organizing, deconstructing, attributing, outlining, finding, structuring, integrating, masing, linking, validating, reverse engineering, cracking</td>
</tr>
<tr>
<td><strong>Applying</strong></td>
<td>Implementing, using, executing, running, loading and uploading, playing, operating, sharing, editing</td>
</tr>
<tr>
<td><strong>Understanding</strong></td>
<td>Interpreting, summarizing, inferring, paraphrasing, classifying, advanced searching, comparing, explaining, tweeting, categorizing, tagging, commenting, annotating, subscribing</td>
</tr>
<tr>
<td><strong>Remembering</strong></td>
<td>Recognizing, listing, describing, identifying, retrieving, naming, locating, highlighting, bookmarking, social networking, saving favorites, searching</td>
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</tbody>
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Bloom’s digital taxonomy.

Goals were set using Bloom’s taxonomy.
Student Goals

Students will develop:
- Communication and collaboration skills.
- Critical thinking, problem-solving, and creativity to help them evaluate and use a broad range of information, including learning how to judge the value and veracity of information.
- Global awareness.

And students will learn:
- How to use devices, software, and applications.
- How to select the best tool for the task at hand.
- About digital responsibility, such as how to keep personal data safe and respecting and protecting copyrighted content.
- About personal responsibility, such as care of the device and basic troubleshooting skills.
- How to avoid plagiarism.
- What cyber safety is and how to manage cyber bullying.
Teacher Goals

Teachers will develop:

- Communication and collaboration.
- Critical thinking, problem-solving, and creativity.
- Global awareness.
- Personalized learning for students.

And teachers will:

- Become comfortable with technology and learn how to integrate it into their lesson plans to create interactive, personalized content that integrates the needs and interests of learners in the learning process.
- Provide formative feedback to students via applications such as Office Mix, Skype for Business, and Sway.
- Develop engaging teaching strategies and assessments (supported by applications) that captivate learners and help them flourish by instilling engagement and autonomy.
- Benefit from ongoing collaborative professional learning.
- Become more productive through the use of OneNote, Office 365, and other tools.

Timeline

The Going Digital project’s timeline spans a little more than a year from inception to full deployment (launch). The overall project has a 4-year horizon.

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<tbody>
<tr>
<td>Board approves $30M for Going Digital 2015 initiative.</td>
<td>Panasonic 3E chosen for students, Communication with families and community, Teacher professional development/training held, Tech Champions chosen.</td>
<td>LAUNCH</td>
<td>Deployment district wide (23,500 devices/students), Ongoing training and troubleshooting.</td>
<td>CELEBRATION</td>
<td>Students will know how to use the software and hardware resources for their future.</td>
<td>Schools will be demonstrating variations of five targeted instructional methodologies: Flipped, Project-based, Collaborative, Direct, and Differentiated Classroom Instruction</td>
<td></td>
</tr>
<tr>
<td>Common Core State Standards adopted.</td>
<td>Plan to update infrastructure, Tech. Adv. Committee formed, Fiber optic cable laid, infrastructure built, Community info, meetings held, Devices researched and tested, Windows platform and Surface Pro 2 for teachers.</td>
<td>Informal training with “Cup of Joe” sessions for teachers, System Center 2012 R2 Configuration Manager used for deployment, Images created for deployment to teacher and student devices, Test of small deployment (~50 device), Deployment dry-run (~50 devices).</td>
<td>Ongoing professional development/training/collaboration for teachers/students/parents, Ongoing tech support, Ongoing evaluation/adjustments, New students added each year, End of 4 years, parents can purchase student devices.</td>
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This timeline provides just the project’s major milestones in the first initial phase. For each timeline item, numerous people have been involved, research conducted, and hundreds of decisions required.

Engaging the Right Partners

As soon as the board approved the plan, Manteca USD also set out to find appropriate partner vendors. Colby Clark, Director of Information Technology, immediately began to work with several networking and infrastructure partners to evaluate and ultimately select a solution that would meet the Board and District objectives. Cisco Systems was selected to provide the wired and wireless network electronics and overall design of the network infrastructure. Several local vendors were used to perform the majority of the infrastructure construction and installation.

Intel and Microsoft had consulted with Manteca USD in the early stages, answering technical questions. The district had the vision, but now they needed a roadmap for how to implement the Going Digital initiative. Partnering with Microsoft, Intel, and Panasonic gave them the guidance, tools, and support needed to turn their vision into reality.

The Technology Advisory Committee evaluated possible partners who could help with training and deployment and post-deployment support.

Multiple teams from Microsoft were involved, including Microsoft Education and the Microsoft Store. Local staff from the Microsoft Store engaged with the district, including providing training and hosting community events. Microsoft representatives showed the importance of having Office skills in employment, and they showed how students without Internet access at home would still be able to use Office. Microsoft committed to delivering content to students and parents that will help them become skilled with Microsoft products, free of charge to the district.

Microsoft Store staff have delivered more than technical training and support—they have provided some unexpected and invaluable benefits. Staff from the local Microsoft Store in Palo Alto have formed a special relationship with Manteca USD as they have hosted community events and reached out to teachers and parents. Some store staff are Manteca school alumni—and they feel a special connection. At some of the events, many parents sought out the Store staff, who presented information and answered parents’ questions in Spanish in a neighbor-to-neighbor way.
In addition, the Microsoft Stores also played a role in the configuration and deployment of the Microsoft Surface Pro 2 devices that were issued to the teachers. The Microsoft Store team members also assisted in training the teachers on how to use their new devices and provided them with instruction on Microsoft Windows 8.1, OneNote, and Office 365.

This personal-touch connection has also led Microsoft Store staff to creatively initiate a unique program that will provide afterschool support with a 1-800 support line Sunday through Thursday for students and parents. This is a totally new venture, and they are working with a trusted vendor to create a system to handle what is expected to be a high number of calls.

Manteca USD has benefitted from the relationship with Microsoft at every level, and they have discovered that more than just supplying great products and technologies, Microsoft has a trusted, community side that can feel powerfully personal.

**Professional Development**

Professional development plays a crucial role in the success of any educational transformation by engaging teachers and helping overcome any apprehension or resistance to change. Manteca USD recognized this and built professional development into the project from the start.

Professional development time, especially collaborative time, has been found to be one of the best differentiators of high-performing schools. Effective professional development time has also been shown to increase teachers’ overall satisfaction. To be effective, professional development time must be job-embedded, continual, sustainable, and focused on student learning.

Recognizing the importance of ongoing professional development for teachers, Manteca USD negotiated with the teachers’ union and funded staff development.

In addition to providing staff development to teachers, Manteca Unified School District also invested in training the Information Technology Department staff and the school site housed technical support staff members, the Digital Support Technicians.

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Microsoft Education staff introduced the district to the 4C model that provides a systematic approach to education transformation with technology,⁶ and they worked with the district for more than 6 months as Manteca USD adopted and implemented the 4C model shown below. The model uses Champions, Communication, Content, and Celebration as key parts of integrating technology on a large scale.

Manteca USD is using the 4C model to evangelize and support Go Digital 2015.

Early on, Manteca USD strategically identified innovative teachers to serve as Tech Champions for the project and as mentors for other teachers. The 70 Tech Champions, some chosen for their technical capability and others for their leadership qualities, were the first to re-envision their coursework using technology, and they used their new knowledge to coach other teachers. They also received their Microsoft Surface Pro 2 devices early as part of evangelizing the project, and they demonstrated the devices for other teachers.

The second stage is Creation, when teachers begin integrating technology into their lessons, developing technical techniques and using applications to engage students in learning. Peter Gale, the CCSS Technology Coordinator has been instrumental in his role in supporting the teachers as they move through this critical stage.

The third stage, Communication, involves ongoing formal and informal professional development and communication. Teachers share their knowledge and brainstorm, troubleshoot, and collaborate with their peers on the school campus and in professional learning communities in person and online. As technology opens up the world for students, it also connects teachers to educators around the world.

At this stage, Tech Champions can facilitate collaborative time with their peers. For example, beginning in November, tech carts and "Cup of Joe" coffee carts began regularly visiting schools to support informal collaboration among teachers. The carts arrive an hour before students start class, and teachers can gather for a morning cup of coffee and informal training. Each tech cart has a theme: STEM (science, technology, engineering, math), STEAM (art/music), Media Production, Makers Technology (3D scanning and printing), and Robotics. Tech Champions were introduced to the different technologies so that they can explore and experiment alongside of their peers. In addition, Tech Champions share teachers’ feedback, successes, and challenges with project administrators so that the district can respond to the teachers’ needs ongoing.

In Manteca, a Celebration is planned for staff in February 2015. Another opportunity to celebrate and support teachers, and to gather information about the successes and challenges teachers have had since the launch it the Educator Conference, The Celebration. The Celebration will be festive like a fair, with booths and gathering spots where teachers can share ideas informally and collaborate. Teachers, techs, and other staff will volunteer to present ideas. To encourage sharing, formal and informal collaboration, and communication across the district, there will be no competitions, no judging, no winners or losers. Teachers will simply share and collaborate and celebrate their efforts. This day will form the foundation for their annual Educator Conference, where teachers share with teachers. Keynote presenters are notable leaders: Margo Day, Microsoft Vice President of US Education, Dr. Anoop Gupta, Microsoft Research Distinguished Scientist, and Dr. Ginno Kelley, Microsoft Director of Teaching and Learning, to excite and inspire teachers.

From spring to fall 2014, the Technology Advisory Committee also worked with Microsoft to deliver Microsoft in the Classroom training to every teacher. The district exceeded their goals for teacher training when most teachers attended training to learn about Windows, Office 365, and OneNote, and how to use these applications in their lessons. It was
critical to offer many opportunities to develop the staff, including Microsoft Innovative Educator trainings, after school trainings led by the CCSS Tech Coordinator, trainings from dedicated teaching staff, and webinars to name a few. Attendees also received their Microsoft Surface Pro 2 devices at the training session.

Building the Infrastructure

From the outset, Manteca USD Board of Trustees and senior leadership team, recognized the importance of upgrading their network infrastructure to provide an environment that would support their evolving teaching with integrated technology. Due to funding limitations, many schools within the district did not have Wi-Fi, and their existing network infrastructure could not support expansion or meet the demands of the Going Digital 2015 project. The IP-based campus security cameras also required a better network infrastructure. Manteca USD needed a robust and secure network that was stable and universal, with access to the Internet and availability across the entire district.

After the Board of Trustees approved the Going Digital Project, Colby Clark, Director of Information Technology, began working with Ungel Mamon, Network Support Supervisor, to design and implement a new network infrastructure that would meet the goals of the Going Digital project. Manteca USD has a modest IT department with only 6 staff members dedicated to support the network and server infrastructure, so it was essential that the district partner with network vendors early on and seek a solution that would automate network management tasks as much as possible.

They needed gigabit Ethernet and wireless-everywhere access. The wireless Internet access needed to be brought up to a level that could support at least 23,500 devices accessing the Internet from 32 sites simultaneously. They also needed a system that could grow as the district grows and be adequate for at least 5–7 years. Partnering with the networking vendors early was crucial because designing and creating a new substantial network takes time and they needed to ensure the District’s entire network implementation was completed by the start of the 2014/15 school year.

When planning device implementations in education settings, it is important to thoughtfully consider the existing site’s wireless environment and how to best provide connectivity that will support the number of devices students and teachers will use.
Manteca USD determined that they needed to install 802.11ac access points in every classroom at every school (more than 1,700 wireless access points overall), all connected to the district’s network with CAT6a cabling. In addition, Manteca USD decided to place a wireless access point in every empty classroom to ensure students have wireless access when new classes are added in the coming years. It was also important to provide wireless access outside of the classrooms as well, as learning often expands outside of the traditional classroom environment. Some of these locations include the gym, cafeteria, offices, and exterior areas. The 802.11ac standard provides a seemingly instantaneous data transfer experience even under heavy loads, and it enables multiple channels of high-definition (HD) content in high-density environments with scores of clients for each access point, while delivering enterprise-class speeds and latencies. The 802.11ac access points also provide connected devices with connectivity on the 5 gigahertz (GHz) band, avoiding potential conflict from wireless networks, Bluetooth devices, and unlicensed devices (such as motion sensors) using the 2.4 GHz spectrum. The district needed to use 5 GHz to support deployment.

In order to provide a robust wireless infrastructure, Manteca USD needed to redesign their existing network infrastructure. The redesign consisted of:

- Implementing a standard network equipment specification for 1/10 Gbps power over Ethernet (POE) switches, routers, and core networking equipment
- Replacing all network equipment throughout the entire District (including the District’s central data center, all MDFs, and all IDF)
- Replacing all network cabinets and racks that would hold and support the new network equipment and battery backup units
  - When network cabinets required to be moved, all cabling for each network drop was replaced and ran to the new network cabinet location
- Ensure that every IDF at every campus ‘home runs’ back to the MDF with single mode fiber optic cable at 40 Gbps
- Install a Cat6a cable to every location that would receive a wireless access point
- Expanding and adding additional pathway and conduit for new fiber optic and Cat6/Cat6a cabling
- A back-end software solution that would allow IT staff to manage, monitor, and control the new network system
  - The system also provides a way to track wireless devices on campus in the event there are lost or stolen
To meet the 5-7 year lifecycle goal of the Going Digital project, Ungel Mamon, Cisco Systems, and AMS.NET (a local partner) developed a logical network design that was unlike any other school district has used. The design used new, state of the art Cisco equipment that was brand new to the market. The design is similar to what is typically found in higher education and internet service providers (ISP). This design optimizes the student’s experience when all 23,500 devices (and personal devices) were using the wireless network. This new design would also allow Manteca USD to take advantage of emerging technologies such as Software defined networking (SDN).

To support the project, close to 40 miles of fiber-optic cable has been installed throughout the Manteca USD campuses.

The design and planning stages of the network infrastructure portion of the Going Digital project occurred from January 2013 through February 2014. During this time, Colby Clark assigned Ungel Mamon, Network Support Supervisor, as the construction and infrastructure project manager. During this time, the Information Technology Department partnered with several local vendors to ensure the new infrastructure was in place by the start of the 2014/15 school year (August 2014). In early April, the Information Technology Department, along with their local partners, AMS.NET, KMM Services, and Vanden Bos Electric, broke ground on the largest infrastructure project in the history of Manteca USD. In record time, the project team completed all of the construction an infrastructure before the start of the school year.

Choosing Devices

Manteca USD wanted a device for students that was durable, easy to use, reasonably priced (<$500), and would support the Smarter Balanced Assessment Consortium (SBAC) testing system. Choosing a device was not an easy decision, and there were many things that had to be considered.

The IT department ordered a wide variety of laptops and tablets and set up a lab to test and evaluate student devices. These devices ranged from Android tablets, Chromebooks, and Windows-based laptops and tablets. Teachers visited the lab, viewed the devices, and made their recommendations.

It was important that the students’ device have digital inking with an active stylus because Manteca USD knew that typing does not have the same learning benefit that writing does. When students listen and write
notes, the integration of movement and interpretation helps them build concepts and memory in a way that is more effective than when they type.

After researching and testing a variety of devices, the Technology Advisory Committee chose to partner with Microsoft, Intel, and Panasonic. They recommended Windows 8.1 as the operating system because of its power, flexibility, and security, and they were impressed by the number of apps for education available for Windows. They also liked that experience with Windows, the platform of business, would help prepare students for college and the job market. And Windows would simplify IT management of 23,500 devices.

The robust digital ink support in Windows 8.1 and Microsoft OneNote supported the district’s goals to build student note-taking skills and will allow access to the cognitive benefits that handwriting, sketching, and annotating can provide.

IT visited the Intel campus and they were shown the pre-release Panasonic 3E device, purpose-built for education. After evaluating the 3E, IT recommended the Panasonic 3E to the Technology Advisory Committee, and it was chosen as the device for students.

The 3E (for Engage, Empower, and Enable), was developed in collaboration with Microsoft and Intel, as a purpose-built mobile device for the K–12 education market. The 3E tablet has a 10-inch touchscreen, detachable keyboard, stylus, and features that support education-specific software.

Research has shown that quality pen interfaces that support writing numbers, symbols, and diagrams substantially increase students’ ability to generate hypotheses when solving science problems.*

It has also been shown that the more complex a problem is or the more creativity needed to solve it, the more important a pen or stylus becomes. A keyboard can even hinder a student from building appropriate cognitive strategies.**

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The Panasonic 3E includes:

- Windows 8.1 Pro.
- Interactive STEM-centric features, including a stylus for easy note-taking, an attachable magnifying lens that turns the camera into a microscope, and a temperature probe for lab experiments.
- Durability, including the capacity to withstand 3-foot drops. The 3E is rugged, built to be spill- and dust-resistant.
- A range of I/O ports, providing wide compatibility with Micro HDMI, Micro SD, micro SIM card, audio/microphone combo jack, USB 3.0, and power ports.
- A leading processor and operating system, built on an Intel Atom quad-core processor and running Windows 8.1 Pro out of the box.
- Long battery life, extending through a full 8-hour school day.

For teachers, Manteca USD selected the Microsoft Surface Pro 2, with a detachable keyboard and stylus, also running Windows 8.1 Pro. Surface Pro 2 provides the power and features of a laptop with the ease and convenience of a touchscreen tablet, and it has a 10.6” ClearType full HD display, Intel Core i5 processor for faster performance, and long battery life. It also delivers the familiar Windows and Office experience.

The Microsoft Surface Pro 2 teacher device.

Every classroom will have wireless connection equipment so that teachers can easily connect their devices with the LCD projectors in their rooms. Teachers will use Miracast to connect to their projectors, making it possible for them to easily share visual presentations and engage with
students in a dynamic way, projecting their Surface Pro 2 screen as they move throughout the classroom.

Pre-Deployment

In the months leading up to deployment, there was a concerted effort to keep attention and enthusiasm high about the Going Digital initiative. Manteca USD produced a daily video blog (available on the Manteca Unified YouTube Channel and Manteca Embrace the Race (to success in education), providing technical and troubleshooting tips, information about digital citizenship, and inspirational videos of those who embraced their personal race to success.

In addition to the Tech Champions and tech cart presentations (along with the “Cup of Joe” coffee carts), they established an Office 365 team site called the “Teacher Tech Center” that serves as a repository for information such as lesson plans, how-to documents, links to videos, and other support resources for teachers. The Teacher Tech Center is a vital element to encourage collaboration.

The district has also hired several new IT staff members to help support the Going Digital initiative. Manteca USD hired a Network analyst to work alongside the Network Support Supervisor to help support the new network infrastructure, a Technology Support Supervisor to supervise and oversee the District’s technical support technicians and the Help Desk, and a Digital Support Technician for each school. The Digital Support Technicians will provide training on OneNote and Office 365, and they will become application subject-matter experts (SMEs) and provide ongoing support at each school.

In addition to hiring IT staff members, Manteca USD also hired a Technology Coordinator that is responsible for providing technology-based staff development for teachers and other certificated staff members. The staff development is centered around using technology to enhance the learning experience in the classroom and to help teachers and students use the new technology as an additional tool.

There has also been ongoing community outreach, led by Victoria Brunn, Director of Community Outreach and Innovative Programs, including family information sessions held in strategic locations to meet the needs of the community. At these sessions, Manteca USD staff informed the community about the project and shared its status. Every partner had an informational booth, where families could see demos and learn more. District staff talked about deployment, the lease-purchase option for
devices, and more. Turnout was strong for these sessions. The district also sent leaflets to family homes to make sure everyone in the district is included in the project. As well, many of the school sites held individual information evenings led by site administration. A social media campaign was launched in anticipation of extending the reach to the community with the common hashtag #proudtobemusd. Subscribers embraced the Facebook presence and it continues to be a place of celebration for the District. A new website was launched and reconstructed to be a friendly mobile experience for users in the community to be able to reach out.

The district has learned that involving key community players early, such as the local newspaper editor and community leaders, is also important. Communicating the benefits of the project early and broadly can prevent the project being seen as simply providing each student with a computer (which some community people might – and do – question).

With such a tight timeframe, so many components to the project, and many activities happening all at once, it has been crucial that key players are in synch so that the project stays on course. Partner meetings are held weekly, and the project team (including the superintendent, head of IT, and others), meet daily for 30 minutes.

Other pre-deployment logistics include adding barcodes to devices (for sign in and sign out), laser etching the District’s logo on the device to prevent theft, and students receive a mandatory training in each classroom: a “digital driver’s license” process must be acquired prior to receiving a device (teachers receive similar training). This includes mandatory digital citizenship training that helps students understand expected behaviors and norms as they use their devices. Digital citizenship training teaches students:

- About privacy and how to protect personal information.
- Digital etiquette and appropriate online communication.
- How to use the technology responsibly, how to respect copyright and not use inappropriate or pirated content (including illegally downloading music and movies).
- How to avoid harassment or bullying online.

Before students receive a digital driver’s license, parents must sign the main document—an Acceptable Use Agreement. Parents have the option of participating in a Lease/Purchase Agreement and paying a lease of $5/month, which enables them to buy their child’s device for $1 after 4 years. The agreement also covers what happens if the device is damaged or stolen. A failure to return the device will result in financial liability to
the parents. Parents are responsible for the cost of replacing lost devices. Actual financial liability may vary depending on the deductible level the District is required to pay for its insurance at the time of loss, and whether or not the family participates in the lease/purchase program. During the initial implementation period of the device the 2014-15 Academic Year, each case will be handled by the site principal for evaluation.

Manteca USD will provide lesson plans for Launch Day 1 so that teachers will have a lesson plan specific to their grade level to help them launch the initiative in their classrooms. Students will receive informational cards that explain how to use Office, OneNote, and more. These cards were specifically designed in-house to support an easier transition for students and parents.

For support, Manteca USD developed a centralized helpdesk model that can centrally track support requests. Site techs are routed to incidents, but over time, teachers will receive troubleshooting and problem-solving training so that they can provide support in their own classrooms whenever possible.

In order to manage with a single support tech at each site, it has been decided that K–3 teachers will call helpdesk for support, and grade 4–12 teachers will submit online helpdesk requests. Support techs will be available for 15 minutes of in-person support. If a problem cannot be resolved within 15 minutes, the device will be reimaged.

**Deployment Dry-Run**

To test the deployment process and Day 1 curriculum, Manteca USD held a deployment dry-run with 550 students at a K–8 school in December 2014. The Going Digital partners, including Microsoft, the Microsoft Store, Panasonic, High Point, Cisco, AMS.NET, and Intel, were on hand to lend support and learn side-by-side with district staff.

In advance of deployment, students received their digital driver’s license. Acceptance of the license signified a commitment on the part of the student to practice good digital citizenship. Students were brought into the gymnasium two classrooms at a time and issued their initial identification card for their device.

Next, students in grades 4–8 were given their Panasonic 3E devices and device chargers. The students were then directed to a staff member, who
verified the device’s serial number and the student’s signature on the
digital driver’s license. A district library staff member then scanned the
device’s barcode to track that the device was issued to the student.

Students returned to their classroom where their teacher had Day 1
curriculum ready. Students were shown how to use their devices using
informational/instruction cards provided by the district.

Lessons Learned
The dry-run provided valuable information in advance of the full
deployment in January 2015.

• The dry-run gave the district the opportunity to observe the
  logistics of the handout process. They saw that signs identifying
  the four stations (digital driver’s license, device handout,
signature verification, scanning) are needed so that students can
  more easily find their way through the line.
• Teachers noted that the first thing students should be given is a
  tutorial on the device: how to take it apart, how to dock it, and
  where the power button and ports are. This can prevent
  inadvertent damage such as bending a hinge the wrong way.
  Delivery of the Student Deck Informational cards ahead of
  deployment became critical.
• Teachers also reported that students needed some time to
  become familiar with and play with their new devices. So while
  having a Day 1 curriculum is important, it is also important to
  build in some play time—as little as 10 or 15 minutes could be
  effective. After students have had time to be excited about their
  new devices, teachers can proceed with the lesson with fewer
  interruptions and more attention from the students.
• If students lose their power adapters, they will be unable to
  charge their devices, so the district will recommend that students
  keep their adapters at home.
• Parent messaging was developed to reinforce the delivery of a
  new tool in the classroom. Both broadcast messaging to parents
  using Blackboard Connect and a letter home were deployed after
  the dry-run.

Deployment
After months of planning and hundreds of decisions made, Going Digital
will be deployed across the district in the first quarter of 2015. Lessons
learned in the dry-run will be corrected before the full deployment.
Device Ownership

Students who are allowed to customize their devices are more likely to feel pride of ownership and take better care of their devices, so students will be allowed to personalize their devices. With Windows 8.1, students can customize their desktops and Start screen backgrounds and theme colors. Students will also be allowed to customize the case of their Panasonic 3E devices with removable stickers.

Asset Management

Manteca USD is using their library system to track devices issued to students. This enables the district to get additional value out of an existing system and gives them an easy way for tracking device ownership. The Panasonic 3E device is etched with a serial number on both the device and the keyboard dock, allowing both parts to be easily scanned, saving countless hours in the checkout process.

Student Identity

For identity, Manteca USD uses Windows Server Active Directory. The district has is using Aequitas Solutions Q Student Information System (SIS) as the authoritative source for student identity, including user accounts and class enrollment. Student user accounts and group membership are then replicated to Active Directory using a connector.

After accounts are provisioned in Active Directory, they are synchronized with Office 365 using Active Directory’s directory synchronization (DirSync). This identity solution saves IT staff time; previously, to keep all systems in sync, they had to run exports from single instance storage (SIS) and synchronize changes using merges or deletes. Now, as adds, drops, and changes happen in SIS, Active Directory and Office 365 are quickly updated so that students and teachers can log in and be productive at any time.

Teachers distribute login information to students. If a student needs a reminder of their login information, the student information cards have helpful tips about username and password formats.

Device Image

The device images, one used to provision the students’ devices and one for the teachers’ devices, are created to include the operating system and applications that all devices will have.

After the image is captured and ready to be deployed to devices, it can be deployed via System Center Configuration Manager or manually by
flash drive at each school. Microsoft and Panasonic supported Manteca USD’s IT team in developing the device images, including providing techniques for integration of applications and configuration of policy settings on the devices.

Classroom Management Software

Classroom management of devices is an important part of a successful device deployment. Manteca USD found value in the Intel Education Classroom Management solution included with the Panasonic 3E device. With the Intel Classroom Management solution, teachers can:

- Design and administer formative online assessments.
- Share their screen with the class, or choose a student’s screen to share.
- Monitor activity of an entire classroom full of devices by viewing thumbnail images of the students’ screens.
- Lock student devices, blanking out their screens if needed to get the students’ attention.
- Use the Classroom Manager Tech console, which enables IT staff to deliver remote technical support.
- Use question and answer functionality, from which they can gauge student interest and comprehension.

Teachers are excited about being able to control the student devices in the classroom. Students need freedom to use the devices to explore and learn, but the Classroom Management solution enables teachers to control the devices to get the students’ attention when necessary.

Device Management

With a small IT department and a huge job ahead, it became clear that using Microsoft System Center 2012 R2 and Windows Server 2012 R2 to manage and secure their devices would play an important part in lowering the overhead for IT and making their job easier with the Going Digital initiative.

System Center Configuration Manager will help IT automate organizational processes and thereby deliver predictable service levels, pushing out applications and updates, and managing the health of the devices throughout the environment.

Configuration Manager enables IT to deploy operating systems, desktop software, and Windows 8.1 applications. Configuration Manager also provides an inventory of hardware and software on the devices and centralized reporting of inventory information. IT can cross-reference Configuration Manager inventory data with the asset management
information in their library system to ensure that students have the same device they were issued, and they can monitor software on all devices to ensure that only appropriate applications are installed.

Configuration Manager also enables remote control support so a technician can take control of a student or teacher’s device for troubleshooting and repair. Configuration Manager also includes built-in anti-virus protection.

Configuration Manager Software Metering provides reporting on application and software usage on all devices. Information about what software is being used in the classroom can be used to inform future decision-making about lesson design and technology investment.

Using the self-service Software Center in Configuration Manager, teachers and students can install desktop and Windows 8.1 apps after IT publishes the software or app on the district’s network, greatly reducing the amount of time needed to deploy new software.

Manteca USD also uses Windows Server Update Services (WSUS) for device patching. WSUS simplifies the deployment of patches, which can be set up based on product or category, and it can target those updates to groups of computers. Students will also be encouraged to keep their devices up-to-date. The student information cards will provide instructions for students on how and when to check for updates.

**Application Deployment with MSADP**

The Microsoft Application Deployment Program (MSADP) enables top Education customers to deploy a selected set of free Windows Store applications in bulk. This temporary program is meant for top Education customers and is a pilot program to address bulk deployment of apps in Windows 8.

**Note:** The MSADP program is not available to all customers. If you have questions, please contact your Microsoft Representative or send email queries to msadp@microsoft.com.

Using MSADP, these Windows Store apps can be included in a device image and then be distributed through System Center 2012 R2 Configuration Manager or deployed via a Mobile Device Management (MDM) solution.
Using MSADP, Manteca USD is deploying selected Windows Store apps that have instructional value to all teacher and student devices in their Windows image as well as through Configuration Manager.

MSADP is also helping develop a Manteca USD store portal that students and teachers can access for applications. Although some school districts prevent store access, Manteca USD will permit store access.

**Secure Assessment**

The Panasonic 3E devices can be used for student testing, and Manteca USD is deploying the Smarter Balanced Assessment Consortium’s (SBAC) Browser for this. The SBAC Browser is integrated into the device image and deployed using System Center Configuration Manager, ensuring that the devices are ready for testing from the moment they are deployed.

**OneNote Class Notebooks**

With Office 365, Manteca USD has access to the OneNote Class Notebook Creator. This free tool works in conjunction with SharePoint Online to create OneNote notebooks that can be used by an entire class, shared by teachers and students.

The OneNote Class Notebook Creator creates notebooks with multiple sections:

- **Student notebooks**, where students have full access to their own notebooks. Teachers have full access to every student notebook, but students can access only their own notebook (they cannot access other students’ notebooks).
- **Content library**, where teachers have full read and write access and can post course materials for students to use. Students cannot modify information in the content library.
- **Collaboration space**, where anyone in the class can share and organize information, and students and teachers can collaborate on work.

The Class Notebook Creator was recently updated to add top features requested by educators, including the ability to add additional teachers to notebooks, supporting co-teachers, team teachers, student teachers, and substitute teachers. Class notebooks can be easily located by teachers and students from a Class Notebooks link in SharePoint Online.

**Post-Deployment**

The Going Digital 2015 initiative continues for 4 years. Manteca USD plans to monitor progress and adjust along the way as needed.
Success Measures

In addition to complying with Common Core State Standards requirements and looking for improved test scores and other educational assessments, Manteca USD sees success as evolving, and they will establish other success measures as the project develops. They want to avoid aiming low and succeeding, and aiming too high and failing.

Manteca USD currently defines success this way:

**Success for students** will occur when all students use their new digital devices a majority of the school day and have access to the right digital content and curricula (aligned to Common Core State Standards) online or downloaded to their devices, and when a majority of students in grades 4–12 have access to the digital world and the Internet at home to extend their learning day.

**Success for teachers** will occur when the majority of staff development can be accessed online (even when some staff members access a more traditional method of staff development), and when teachers use a variety of technologies in their lesson plans, including using available links to learning purposes, and using technology for individualized instruction.

**Success overall** will occur when the majority of students and families are surveyed and report that they understand the basic tenets of Going Digital initiative and its benefits. Later, success will be indicated by post-secondary academic and business representatives noting that Manteca USD students are better prepared due to their critical thinking, digital knowledge, and other skills.

Post-Deployment Support

Manteca USD has contracted with a trusted vendor to work with their IT department to provide ongoing deployment and support services, such as device imaging, application deployment, device delivery, repair, warranty and insurance device swaps, and so on.

Microsoft will also continue to work with Manteca USD to support the Going Digital initiative. Microsoft Store staff will continue to provide training to families and students, and they will monitor the implementation of the 1-800 support line. Other Microsoft teams will also provide support. All are looking at this project as a model that will enable them to work with other school districts with the benefit of lessons learned and best practices developed in Manteca.
Microsoft recently tapped 800 educators worldwide (40 in the U.S.) as Innovative Educator Experts for 2015. Three of the 40 in the U.S. come from Manteca USD. These educators become part of a global panel that works with Microsoft to help push innovation in education and assist teachers in learning Microsoft products and tools. The program works to build educators’ technology skills, and it helps them collaborate with other educators worldwide to share innovations and classroom successes. Manteca USD Superintendent Messer and teachers Tammy Brecht Dunbar and Kristen Messer join this prestigious panel that is helping transform education worldwide.

Summary

The newly instituted Common Core State Standards are causing school districts to rethink their curricula and teaching/learning approaches. The Common Core State Standards require students to develop technology skills in every grade K–12. Incorporating technology in the classroom requires far more than simply introducing computers in the classroom or curricula. What is needed is a new approach that alters the relationship between teaching and learning, integrates technology at every level, and prepares students for the complex, global challenges of the 21st century.

In just a little over a year, one U.S. school district, Manteca Unified School District in the Central Valley of California, has undertaken to transform their district with the Going Digital 2015 initiative.

Working in partnership with Microsoft, Intel, and Panasonic, the district planned, designed, and implemented a vastly updated and improved network infrastructure and the deployment of 23,500 devices to students and teachers across the district’s 32 sites. Teachers use the Microsoft Surface Pro 2 and students use the Panasonic 3E.

Microsoft System Center 2012 R2 with System Center Configuration Manager play a big part in making such a widespread deployment possible, and they will simplify IT’s task of providing ongoing support and updates.

Parents and the community continue to be involved in the ongoing vision. A series of classes and events, supported by the
Microsoft Stores, continue to roll-out to inform and educate. Teachers are learning new ways to share information and collaborate formally and informally. Many Microsoft teams have been involved throughout the process, and the Microsoft Store team has even created a unique 1-800 support line that parents and students can call after hours for support.

The district’s vision is to help students succeed and thrive, whether they remain local in the Central Valley of California or venture much farther afield. The Going Digital 2015 initiative is playing a major role in turning that vision into 21st-century reality.
Microsoft’s Education Transformation Framework

The Microsoft Education Transformation Framework is a guide for educators and leaders engaged in holistic education transformation. The critical conversations needed for effective transformation of education systems are the focus of the series. Each paper in the series presents a global perspective on the topic through the current thinking and evidence from research and practice, as well as showcase examples. Specifically, the papers document the contributions of anytime anywhere approaches to K-12 learning and explore the potential of new technology for transforming learning outcomes for students and their communities.
Microsoft in Education

www.microsoft.com/education/