BUILDING A DEEP-LEARNING CULTURE WHILE MAKING THE TECHNOLOGY THAT SUPPORTS IT INVISIBLE
One of the leading public schools embracing inquiry-driven, project-based learning is the Science Leadership Academy (SLA) in Philadelphia. It is a partnership between the School District of Philadelphia and The Franklin Institute. SLA provides a rigorous, college-preparatory curriculum focused on science, technology, mathematics and entrepreneurship. The first high school opened in Center City Philadelphia in 2006 and a second campus, SLA-Beeber, opened in the fall of 2013. SLA has a total enrollment of 700 students.

Founding principal Chris Lehmann and his team have created a dynamic teaching and learning community based on the core values of inquiry, research, collaboration, presentation, and reflection. These core values are integrated into all aspects of the school from the curriculum to admissions and hiring practices.

Over the past nine years, “we’ve been able to grow deep roots in these ideas, allow people to ramp up on them more quickly, and share them with other schools,” says Lehmann.

This white paper is the third in a series that explores SLA’s commitment to core values and the part they play in the school’s success. SLA leaders are finding ways to share their model and experience to help other schools create their own inquiry-based culture.

The first white paper in the series, A New Model for Teaching and Learning, reviewed how SLA’s core values are emphasized through student-centered, project-based learning. The second white paper, Core Values: How do you Build a Meaningful Vision of Education for School, focused on how the core values inform the vision of the school and how a model of distributed leadership is a key component to realizing that vision. This white paper examines how technology supports SLA’s core values, culture, and learning environment.

The Role of Technology

Within the framework of student-driven, inquiry-based learning, Lehmann likes to describe the technology at SLA as “ubiquitous, necessary, and invisible.”

“It’s got to be everywhere, it’s got to be part of everything you do and then you stop talking about it quite so much. We believe that technology can inform and then transform the pedagogy by giving kids the tools to be powerful content creators, to realize the vision of the kind of work that they want to be doing by harnessing these really powerful tools,” says Lehmann.

Many students are able to leverage their use of SLA’s technology tools to their work outside the school in internships throughout the city. Inspired by the STEM-focused curriculum, one senior chose...
to work at a city Maker space, where he used hardware and software to help design and build playgrounds. As a result of this experience he decided that he wanted to study industrial design. Through an internship, he met a graduate of the Rhode Island School of Design who helped him navigate the application and admission process. Without his experiences at SLA it is unlikely that he would have discovered this passion for industrial design.

At SLA, the conversation is not about the technology itself but about how the technology can enrich learning. The focus of their 1:1 Dell Chromebook initiative is how individual access to the web revolutionizes classroom research. It is grounded in the discovery of digital tools that allow students to become powerful content creators and to realize the vision of the kind of work they want to be doing.

The STEM-focused curriculum is full of opportunities to use technology for learning. Students are able to grow in their use of technology both inside the school walls and outside during internships with SLA partners.

“My job is to make sure that the technology just works and that whenever it needs to be used, it’s there. And whatever it needs to be used for, it just does what it needs to do so that it’s seamless and works to make learning easy,” says Mary Beth Hertz, SLA-Beeber campus tech coordinator.

Technology Tools

Even the tech tools SLA purchases must fit within the core values and their project-based learning environment. They are a Google Apps for Education school and use Dell Chromebooks. They have used Google apps since the founding of the school. “We chose the Google Apps for Education suite because of its profound capabilities for collaboration and co-creation,” said Lehmann. “We want students using the authentic tools that they’re going to use beyond the school environment.”

He continued, “Chromebooks give us the financial ability to be a 1:1 school without having to sacrifice teaching positions. Both from the initial cost and total cost of ownership, the Chromebooks are a powerful, powerful device that both students and teachers use.”

SLA has created an ecosystem that runs on a custom platform they designed themselves. There they host a number of tools that have single sign-on plugins. They also have a learning management system and other web-based systems that help bring order to their tech environment. SLA is also outfitted with interactive white boards, projectors, scanners, printers (including a 3D printer), microscopes and other lab equipment.

“I don’t think it’s hard for kids to learn how to use a tool. I think the harder piece is learning how to use
the tool in ways that are transformative. Learning how to use an app is a transferrable skill. Learning how to think critically about the way we create and consume information is harder,” says Lehmann.

Hertz agrees, “What’s really being taught here is not how to use a computer, pass a test, and go to college. It’s really about how you become a committed and successful citizen.”

Inspired by her inquiry-based explorations in the SLA science labs, one junior signed up for an internship at the Children’s Hospital of Philadelphia. Here she worked side by side with lab technologists using advanced technology for medical research. “At a hospital lab, things are for real,” she said. “I learned important skills there that built on the skills I learned in my school lab.”

How Technology Supports Instruction and Learning

The SLA curriculum is based upon essential questions, and the inquiry process drives the learning. Hertz describes the project-based environment from the student’s perspective: “I have a problem to solve, and I need to figure out how I’m going to solve this problem. No one is going to tell me how to solve the problem, but I need to figure out the path to get the answer.”

Along the learning path, students have to answer questions such as:

• How does this digital tool serve my purpose?
• What are the shortcomings of this technology?
• Which Google app best matches what I’m trying to achieve?

Both teachers and students value that projects are self-directed. The emphasis at SLA is on inquiry and content creation rather than content consumption. Student-directed projects begin with an essential question that leads to exploration and research. The students use digital tools for this process and report on their findings.

This project-based approach to learning is often a factor in the internship opportunity that students choose. They work with school partners in real world situations that expand their thinking and experience in ways that help shape their learning goals and aspirations.

Principal Lehmann believes that in addition to supporting authentic learning, technology is also a powerful communication tool. “It allows teachers and students to collaborate, not just in shared physical space, but across physical space. It allows them to collaborate asynchronously as well. They can share their research and reflections with each other. So it both enables and transforms the core values of the school.”

He notes that teachers collaborate with each other all the time. Hertz shares that the teachers develop all of their own teaching units. “The units are aligned to standards and are available to every other teacher in the building for cross-collaboration,” she says.

Onboarding into a New Culture

As the SLA culture is significantly different from most public schools, onboarding freshmen and new teachers is a deliberate, thoughtful process. For teachers it begins with a week of professional development in the summer. Veteran teachers work with newbies on unit planning and curriculum. There is a rich collection of support documents and primers on the different systems. An asynchronous space is hosted by the learning management system with a lot of “how-to” information so that new teachers are immediately welcomed into the school environment. Brand new teachers are assigned a mentor.

The onboarding process for new freshmen sets the stage for a student’s success at SLA. It is an introduction to the school’s core values-based culture and the technology tools that support student-driven, project-based learning. Learning how to take responsibility for their own learning primes graduates for success in college.

The orientation for incoming freshmen begins with a 3-day summer institute. They meet the other students in their advisory group and many upper class-
men participate so that even before the first day of school, freshmen are getting the feel of the culture and community in a low-stakes environment.

During the summer institute, freshmen work on a project-based learning activity together. Tech coordinator Marci Hull, of the Central City campus, describes it as “a big introduction where new students can just let everything wash over them and hear about what they’re going to be doing.”

“It’s a lot to take in at once,” says Hertz. “In the summer institute they get to explore the core values and get used to the vocabulary we use before they actually start in September. “It’s a thoughtful model so students can learn what it looks like to take more ownership of their learning…not just to seek the right answer, but rather to seek out their answers and to understand what process means in learning,” she adds.

First semester freshmen all take the introduction to technology course. Lehmann explains, “It helps them learn how to use the technology in a way that really transforms the way they think of themselves as students and scholars. So it’s not just ‘here’s the technology’ but rather ‘here’s the learning and here is the intersection of technology and learning.’

Hull reports that she and Hertz “systematically go through – not only what it is to be proficient at using the tool in the classroom, but also what it’s like to have a new appendage. We teach the kids that this is a new part of your body with you 24 hours a day. How are you going to deal with that?”

She notes that students also take a rigorous ethics course along with learning about the tools. Tool tutorials are steeped in real instead of arbitrary assignments. Students work on genuine projects so they learn how to transfer those skills. “It’s a very onion layered and purposeful introduction to what it means to be responsible with the technology tools in addition to being a good student.”

Hertz adds, “We don’t set the kids up to fail.” Freshmen don’t get their Chromebooks until the second month of school although all other students get their Chromebooks at the beginning of the year. During that first month, freshmen learn about the rights and responsibilities they now have along with the acceptable use policies of both the school and district.

“The other thing that we do,” said Hertz, “is that we read Matt Ivester’s book, Lol... OMG!: What Every Student Needs to Know about Online Reputation Management, Digital Citizenship and Cyberbullying.” Then Hull and Hertz supplement the book with examples from news headlines where real life people get tripped up because of what they share online. “It just shows that even people who are pretty smart can do dumb stuff,” Hertz says.

Students share that as soon as they receive their laptops in freshman year, they are conscious of their college-like freedom to pursue studies they’re interested in. But they are also aware of the responsibilities that they have to themselves, their fellow students and to the school. They appreciate that they work on serious questions and problems that are important in the real world and that their teachers share their passion about doing work that matters.

Why SLA Works
The SLA culture is a result of shared vision, shared language, and shared responsibility. This unique en-
vironment is created by teachers who feel empowered by the trust placed in them and students who feel empowered when they discover that critical thinking and collaboration result in deeper learning.

Here are some of the reasons why this school model is effective:

**Leadership.** “If I want teachers to care for children, I’ve got to take care of the faculty,” says Lehmann. “If I want teachers to be enabling moments of profound inquiry in the classroom, then when we do professional development, it’s got to be inquiry driven. If I want teachers to create empowering moments for students, then I have to believe deeply and walk the walk of distributed leadership. If I want teachers to understand that their role in the classroom is to be a mentor facilitator, then that’s the role I have to play with them.”

Tech coordinator Hertz notes that teachers take on a lot of the decision making. “As technology coordinators, Marci and I make many daily decisions we’re trusted to make... to know what we’re doing and to run things in the way they need to be run and support the school in the way that it needs to be supported. I would say that’s true for every staff member and not just us. It’s a breath of fresh air to be trusted to do what you know how to do.”

Lehmann believes that what they’re doing at SLA embodies the classic ideas of education, empowered by technology. “We stand on the shoulders of a lot of giants,” he says. “We have to own and honor the work of the people who came before us, without whom, I don’t think we could have created the model the way we did.”

**Student Choice.** “We want to teach transference of skills so we don’t do a lot of choosing for students. We’re also teaching critical thinking skills so there are many ways to solve a problem. There is no one right answer nor one right piece of technology,” says Hull. It’s up to the student to decide how they complete their assignments. For example, a common assignment is to create a presentation. A teacher might say, “make a slideshow of images with audio over it. I don’t care how it’s done, just send me the file.” Students can then choose how they make that happen and what makes the most sense to them.

Students also learn from each other as they collaborate. Peer-to-peer learning, as well as individual learning, is deeply embedded in the culture.

**Advisory.** This is one of the SLA elements that make it such a unique school. Each teacher is assigned 20-22 students whom they meet in the summer institute and guide until graduation. They meet twice a week for 50 minutes. This time is not correlated to any curriculum area. Hull describes her advisory role this way: “There’s the expectation that you will be taking care of these 20 kids for the next four years and that can look any way it needs to so those kids feel cared for and comfortable.”

She continues, “Our graduation rate is upwards of 95% every year. I think the small school model helps and it definitely helps to have a school mom whether it’s a male or female teacher. You have a mom at school that is following you around and asking you questions about what’s going on in your day.” This means that every family has someone in the school that is an advocate for their child.

One senior appreciated his advisor so much that he wrote her a poem titled “Mom.” That he has someone at school who listens and cares about him means a lot to him. “We’re surrounded by teachers who want to help us succeed, and I think of them now as part of my family.”

Another student described advisory as an “opportunity to talk about good things and solve problems as you go along so that you grow into a student to be proud of. It’s helped me understand myself better.”

**Technology.** SLA leaders believe that technology both informs and transforms their practice of instruction and learning. By using the same technology tools they will use in college and career, students are collaborating and creating content...
with guidance provided by their teachers. The skills they learn through this process are transferable to their lives after high school. Technology enables their investigations and the collaboration with peers to determine an outcome.

**Modeling.** Teachers actively model how they personally find technology tools that match what they’re trying to accomplish. They sometimes talk through their process. “First I was thinking I need a tool that does this.” Teachers have the exact same Chromebook as their students. Hertz tells her students, “I use my Chromebook for everything. Everything I need to do for my job, I can do on my Chromebook just to show that it can be done.”

**Assessments.** SLA students do not take the district’s benchmark tests, which are given six times per year. Instead, they create benchmark projects – one per quarter. As the curriculum is standards-based, SLA students have no difficulty achieving their benchmarks. The same rubric is used for all grades and classes throughout the student’s career. According to the rubric, students can: exceed expectations, meet expectations, approach or not meet expectations. This practice alone makes SLA very different from other high schools in the district. But it is evidence to support their philosophy that there is no one right way to do things – that you can accurately assess student learning by other means than standardized tests.

For his senior capstone project, one student is working with a computer hacker/coder to track bee colony collapse disorder to help find solutions. This is an important real-world issue and by using the skills he has acquired at SLA, he is adding to the body of knowledge about this disorder.

**Parents.** In most high schools, parents are expected to support their students from a distance. However at SLA, parents are expected to be part of the community. There are conferences twice a year with parents that the students actually run. “You get to see the dynamic between the parent and child and you learn a lot about a child and about them as a person when you see the interaction they have with their parents,” says Hertz.

**Can it Scale?**

It is a valid question. Not only within the School District of Philadelphia, but in other districts throughout the country. SLA took its time to live their school model before opening a second campus. Principal Lehmann believes that their success with Science Leadership Academy @ Beeber was a result of “giving ourselves time to learn what it took, to learn how to teach it well, to learn what professional development looks like, to learn how to take care of the kids in the model so that when we were ready to start another school, the pathways and habits of mind were so deep that we were able to articulate them powerfully.”

Hertz reports that their big mistake initially was trying to replicate the culture of the Center City campus. But they soon decided that they were a different group of people with different needs. Because they had the core values, however, they were able to build a similar culture but tailored for the Beeber campus. Hull added, “It’s a model so you conform to the core values and essential questions of your community, and not worry too much about how anybody else has done it.

“What’s expected of the children as far as collaboration is also expected of the adults. In the spirit of true learning and the ethics of care, it’s to be carried out in each individual building as the adults there see fit.”

The ability to scale is currently being tested. There are plans to expand the SLA values and culture to an elementary and middle school within the district. The middle school will open in the fall of 2016 after the principal has had year to plan and build his team.

For the elementary school currently being planned around the SLA model, leaders changed some of the words describing the core values to make them more age appropriate for elementary students. But the values are the same.

There are additional outreach activities that are helping to spread the SLA ingredients for success. A partnership between Dell, The Franklin Institute, and SLA – the Center for Excellence in Learning – will allow the Science Leadership Academy to share their model of learning with schools across the country. Professional development in both real time and online will be available to others who want to learn more about building this type of learning environment.

Each year, SLA holds a conference called Educon, which is hosted by students, teachers, and parents. Hundreds of educators from around the country attend this annual conference in order to learn more about SLA’s model of distributed leadership and the core values that are at the center of everything.
Conclusion
Some believe that it is only now in the evolution of technology in schools that we are on the verge of using it to transform learning in the classroom. To avoid making the technology the focus, it needs to be invisible. It’s a tool to be learned and mastered but it does not achieve learning by itself.

Chris Lehmann and his team of educators at Science Leadership Academy have created a culture steeped in the core values of inquiry, research, collaboration, presentation, and reflection. This culture is nurtured with trust, respect, and empowerment for both students and teachers. While technology enables their vision, it is not a primary focus of their vision. Their goal is to facilitate the process of creating intelligent, committed citizens who are invested in lifelong learning.

Students appreciate the special culture at SLA and are thankful for the opportunities the school provides them to connect with people across the city. One student stated, “We get to meet and work with people we would never meet otherwise. This is a diverse place where you can grow as an individual.”

Another student said, “SLA has prepared me for college in a way no other school could have. We’ve had to take responsibility for ourselves and demonstrate self-control – for example, trust that we will use the laptop only for schoolwork. I think college will be a lot like SLA.”

“I think students really see themselves as fully participatory members of the school community. They understand that they have profound agency in not only their personal learning but the learning of the entire community and in the sustainability of the community,” says Lehmann. “Then the work is to give kids the opportunities to see themselves not just as fully realized citizens of their school, but of their city, their country, of their world.”