The Project RED Signature Districts had the groundbreaking opportunity to implement best-in-breed professional learning approaches. Inherent to their 1:1 implementations were the creation of school- and/or district-level communities of learning for both teachers and principals. From these hamlets emerged planning, design, and development of their 1:1 programs. A collaborative culture was required for each district’s all-encompassing digital conversion. This guided the district’s ability to engage the most meaningful kinds of adult learning as underscored by national research.

In 2009, the School Redesign Network at Stanford University published findings regarding professional development in the United States.¹ Researchers found that, “high-intensity, job-embedded collaborative learning” is the most effective professional development related to student achievement progress (p.7).

Other national studies consistently point to effective schoolwide collaborative learning as critical to the school’s positive outcomes.² Collaboration models promote change that goes beyond brick-and-mortar settings and individual classrooms. They build powerful working relationships among educators. Effective professional learning is ongoing, focused, and consistently connected to practice.

Each of the 17 Project RED Signature Districts had to demonstrate
commitment to a high-quality, enduring professional learning component. The original Project RED research showed one of the keys to successful implementation of education technologies was consistent professional development for teachers and principals.

Numerous professional development studies cite the relationship between high-quality professional development and learner outcomes. As noted in the School Redesign Network study, “Since the impact of teacher learning on student achievement may not be immediate, and measures of student learning gains that can be linked to specific professional development are often difficult to secure, interim measures that examine practice are valuable, especially where the practices in question have been shown to influence student achievement” (p. 11).

What the Data Say

The Academic Report from Project RED III provides data regarding professional development and education technology implementation as well as student achievement gains in science, reading, and math.

The district/building administrator surveys showed that the culture of the school/district is crucial to quality implementation of education technologies leading to student achievement. Looking at science proficiency, relative to the state, mandated use of technology was not effective. A mandated scenario is one in which administrators would regularly schedule observations of teachers using technology in their classrooms. A culture where the teacher is naturally using technology in innovative ways is connected to increased science proficiency levels compared to the state. The practice of embedding what is learned in one’s work, making it relevant and applying it, matters greatly to changing practice. In practice, forcing changes might help create the path for real change, but actual applied learning and skill is what matters for adult learning. This is evidenced by these findings.

If administrators conduct regular classroom observations of technology integration, then they probably are not seeing innovative use of technology in non-scheduled times. Science proficiency levels appear to be tied to teachers feeling they can use technology when it seems natural verses being forced to use it at certain times during instruction.

Research tells us that professional learning for administrators and teachers should be a system. An effective structure for school leaders is when they learn from experts, mentors, and peers. Working with school/district staff, school leaders establish culture, frameworks, and foundations for ongoing professional learning. Incentives and support to provide continuous improvement for teachers allows for better identification of learners’ needs, as well as more effective data-driven decisions regarding curricula, instruction, learning activities, and measurement of student progress. These findings speak to the above results of mandated classroom observations versus the independent, innovative use of technologies in the classroom.

A point here is that the survey questions used, “effectiveness of technology integration” and “using technology in
innovative ways.” However, these definitions may not be interchangeable. It would depend on how the technology is actually being used. Meaningful use of technology goes beyond word processing and developing PowerPoint presentations. It involves helping learners develop new skills, acquire knowledge, and solve problems. The latter being a higher order skill associated with deeper learning.

Central office administrators were asked if they thought they were doing a good job, overall, in monitoring their 1:1 programs and making needed adjustments. While these administrators largely agreed with the statement, their schools, in fact, were underperforming in terms of reaching and actually achieving math proficiency as compared to the state. This is an indication that adjustments being made at the district level as a result of monitoring might actually be hurting student achievement. It may also indicate that careful monitoring and adjustments need more time before real results can be seen. These outcomes demand further exploration.

It is interesting to consider possible reasons for these findings. These are some questions to consider for deeper understanding of the issue:

- What was the communication system between schools and the district regarding monitoring the 1:1 program and processes? How were areas in need of adjustment identified, shared, and then acted upon?
- Does the school have a monitoring system? If so, how do their findings align with the district’s findings? Was there a process for integrating, sharing, and finding common ground to making needed changes?
- What were the adjustments made as a result of monitoring? Who led them? Who implemented them? Where and when were the changes made?
- How might those adjustments affect student achievement, pedagogy, or learning activities?

District administrators’ beliefs that they provided a good blend of leveled (novice, expert, etc.) professional development to meet teacher needs were significant and correlated with student achievement compared with state levels in math, reading, and science. At the elementary level, a statistically significant positive connection was found between the use of technology as a component of the teacher evaluation system and increased proficiency levels in reading, math, and science in comparison to the state. District leaders believe that effective and innovative use of technology should be an integral part of what comprises a good elementary teacher. However, another statistically significant and educationally meaningful result from the correlation indicates that districts might have a disconnect with their elementary schools on the best way to monitor and adjust the 1:1 implementations. This was discussed in an earlier section.

The study showed a different portrait for the middle schools. All of the statistically significant findings showed an inverse relationship between improvements the
central office saw in the 1:1 technology implementation and academic improvements the middle schools showed on their achievement tests relative to the state. Additional research is needed to understand the purpose behind these results. It could indicate a delay between improvements at the district level and the academic impact on the students. It could also indicate that perceptions of central office administrators do not reflect the reality of what schools actually experience in terms of implementation help from the district. With either scenario, consistent, clear, and focused communications between district and building-level personnel is required. This includes the need for a 360-degree approach where feedback loops are incorporated—with messaging/questioning going back and forth among all stakeholders.

High school data findings revealed that having a written plan inclusive of systematic data collection from teachers was positively correlated to increased reading and math scores as compared to state. A consistent professional development research finding is that using data to drive learning activities facilitates student progress. This is most profound when teachers work collaboratively when examining student work, artifacts, progress, and unique needs.

Signature District Professional Learning Model #1
This district provided details on its professional learning throughout the launch and expansion of the district’s 1:1 program.

Overview
In the district, students work collaboratively in digital-age learning environments on authentic problem and project-based activities which enhance creativity, critical thinking, communication, and problem solving. Through personalized, authentic, and collaborative experiences, students develop skills to prepare them for college and careers. The district’s 1:1 computing initiative put a personal computing device in the hands of more than 23,000 students in grades 3-12 and provided students with the tools and resources to be successful.

The district team engaged all stakeholders in the 1:1 planning process by bringing together administrators, teachers, district office personnel, students, and parents. By focusing on student achievement, 21st century skills for students, and equity of access, the planning team was able to successfully lead the effort to provide students with access to technology as well as provide teachers with quality professional development to fully integrate the technology into student learning.

Teachers have been involved in district-level and school-level professional learning, along with school-based Technology and Learning Coaches, to ensure that they are able to effectively integrate technology into teaching and learning. Teachers are encouraged to work collaboratively at the school level and in district groups to share best practices. In addition to providing professional development throughout
the school year, the district hosts an annual two-day conference (called Summit\(^3\)) which provides teachers with sessions that showcase best practices with technology.

**Training New Teachers**

The district has more than 300 new teachers each year. Teachers receive a day of technology integration training\(^4\) during the summer so they can learn the basics of using district technology resources. The district provides Technology and Learning Coaches in each school who follow up with new teachers and provide coaching.

**Technology Workshops and Courses**

The district provides a variety of workshops and courses throughout the school year. Some are face-to-face, some are blended, and some are completely online. Platforms include Google Educator Study Groups and Google Classroom. Workshops and courses include a variety of technology integration topics such as collaboration with digital tools, blended learning, creating ePortfolios, and more.

**District Staff Development Days**

The district offers days during the school year for district-level staff development and technology integration sessions are available to teachers on those days.

**School-Based Training**

Most of the district’s training is delivered by the school-level Technology and Learning Coaches. District teams provide a day of training for these coaches each month. These trainings focus on standards from the International Society for Technology in Education and personalized learning. The Technology and Learning Coaches offer sessions for teachers on a regular basis and also personalize the learning experience for teachers to meet their individual needs. The district also has a level-up badging system in place to encourage teachers to work on areas of need with small learning communities.

**Leadership**

The district develops leaders who can bring about positive change in their schools and departments. Principals and other administrators participate in a digital leadership program which prepares them to effectively model the use of technology and lead change in their schools. Leaders who have participated in the program are more likely to provide teachers with weekly time for collaboration and ongoing professional development opportunities.

Leadership sessions focus on integrating 21\(^{st}\) century skills into curricula and using technology to transform classroom learning environments for digital-age learners. Participants in the technology leadership sessions have follow-up reading and assignments to better prepare them for using technology resources and tools. A solid
understanding of the role of the principal in leading change has been established and principals engage in active discussions with their staff for continuous quality improvement.

In addition to modeling the use of technology, school and district leaders use the Effective Learning Environments Observation Tool™ (eleot™) to gather information about how technology is being integrated into instruction. Data gathered from observations, surveys, and focus groups is used to inform decision making about the professional learning needs of faculty and staff. By working closely with the school and the Technology and Learning Coaches, principals have been successful in bringing about second order change with teachers. Teachers are now becoming facilitators of learning who teach using both a blended and project-based learning approach.

**Signature District Professional Learning Model #2**

This district’s superintendent provided details on the district’s professional learning throughout the launch and expansion of the 1:1 program.

**Overview**

Prior to integrating technology, the school board reflected on what was important to students as well as the skills students needed to be successful in life. Recognizing that technology is a critical part of work, play, and learning, the board became committed to ensuring all students would have access to technology and that it would become a natural part of instruction. The board determined that while technology integration leads to important skill development, technology integration outcomes should not be about raising test scores. It was through this discussion and discovery that the board committed to no longer place an emphasis on test scores and school grades and focused on the following:

- Do what is best for students and not what it takes to make our school/district to look good.
- Encourage teachers to take risks and try innovative instructional methodology.
- Support teachers with these risks by reducing the weight of test scores in their mandated annual evaluation.
- Encourage innovation and support that growth by providing multiple professional development methods and opportunities. This includes providing dedicated Technology and Literacy Coaches in all buildings, a professional development budget focused on technology integration, online professional development, traditional professional development, and an annual EdCamp.
- Center conversation on the whole child and not on test scores. While language arts and math skills are critical to success, instruction and conversation is related to life success.
rather than test success.

The district continues to believe that investing in teachers is critical to student success. More than five years ago, when the district decided to bring technology into instruction for all students, district leaders knew that teachers needed support for this very short transition.

First, the district started with a volunteer group of K-12 teachers who were technology advocates and technology user “wannabees.” This group of teachers was approved to do “whatever it took” to support the needs of teachers. The teachers association would not allow the district to survey teachers to determine their skill level and needs. Without that information, the district’s professional development team created a priority list of technology skills teachers needed that ranged from the very basic to more advanced, sprinkled with some very “cool” tools. The district’s professional development team then provided training in small and large groups as well as individually to teachers. The district paid the team members to provide this training, and again used the mindset of “do whatever it takes.” The district believed, and continues to believe, that teacher support is critical.

When school began in Fall 2011, and all students had a device on the first day of school, teacher support continued by employing four full-time Technology Coaches to serve seven buildings. The district now has 4.5 Technology Coaches—one full-time at the high school, one full-time at the middle school, and one half-time at each of the five elementary buildings. The Technology Coaches are responsible for modeling, training, vetting applications, troubleshooting, conducting research on instructional pedagogy and new products, and supporting innovation in the district’s buildings. An important role is raising the bar on expectations and encouraging teachers to take risks with their instructional strategies. Teachers have organized, full-day professional development activities and they have also secured grants from the state to host a Summer of eLearning Conference. This conference is a teacher-led event that is open to teachers from inside or outside the state. Another role the Technology and Literacy Coaches have played is in the development of the district’s online professional development modules (known as Knight in Training7). Using Canvas—a learning management system—the coaches have developed approximately 25 mini-courses covering a variety of technology tools for K-12.

When the district first began the technology journey, it used grant money to employ the Technology and Literacy Coaches. The district quickly realized the investment in professional development and supporting teachers was more valuable than the investment it was making in hardware and infrastructure. The coaches are now a permanent part of the district’s budget.

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Teacher-Directed Professional Development

A consistent and statistically significant finding regarding achievement across the three content areas was that involving teachers in the planning of their professional development did not lead to student academic achievement as compared to the state. While it is a commonly accepted practice that teachers should identify their own needs for job growth and enhancement, could it be that when implementing dramatic transformations, such as those indicated by a 1:1 program, educators do not know what they do not know? In which case, relying on external and internal field experts, research, and replicable best practices would be mandatory for successful implementations.

Project RED’s first iteration identified such factors that stand as a model for successful program planning. It is important for districts to reexamine their professional development opportunities to ensure they are enabling teachers to effectively use and integrate technologies. Instead of reinventing the wheel, there is a plethora of expertise and high-quality models available across the country that those new to 1:1 planning can access and customize.

Addressing Technical Difficulties

It is common knowledge that uninterrupted access to technologies for teaching and learning fosters quality, successful integration. This study confirmed that limiting significant technical difficulties in the classroom was statistically significant to seeing increases in student math proficiency as compared to the state. Therefore, better performance in reading proficiency levels, in comparison to the state, is encouraged by clear technology expectations and the absence of significant technical difficulties. The implication here for professional development is that when learners and teachers have consistent access, the learning experiences are seamless and focused. When technical challenges persist, there is the human inclination to fall back to prior, known methodologies. Disruptions to the teaching and learning processes can delay and derail on-the-job learning for teachers.

Technology Engagement and Outcomes

A note related to the above, the use of technology in middle and high school math and science classes showed positive relationships to student achievement overall. This was not true for elementary schools. More questions emerge than are answered on this front. For example:

- What was the difference of usage in grades 6-12 compared to that of grades K-5?
- What were student and teacher preparation levels?
- How is use defined?

What we do know from other research over the past 10 years is that the extent to which teachers and students engage with technology regularly affects achievement outcomes. The more consistent/often the utilization the higher the rates of achieving goals.
When teachers used online formative assessments, this proved statistically significant for elementary achievement in reading, science, and math compared to state levels of proficiency. The same was true for reading at the middle level. Formative feedback regarding learner progress gives teachers and students concrete information from which next steps emerge. For teachers the internal and collaborative question becomes, “How do we know each student is learning?” in lieu of, “What does the curriculum/high stakes tests say we are supposed to teach today?”

The emergence of a collaborative adult-learning culture can be profound in accelerating student potential. Research is clear that collaboration, not isolation, is the best practice for professional growth for teachers.

Where principals were well trained in leading change in their schools, there was a positive relationship for proficiency levels for middle and high school math and science compared to the state. Additionally, it was found that the role of principals as leaders in the area of enabling online professional learning opportunities was educationally meaningful.

These findings are consistent with Project RED I results. One of the Key Implementation Factors (KIFs) for successfully implementing education technologies was professional learning for principals around how to lead change and shift practices and culture for school transformation. Another KIF was the facilitation of consistent professional learning opportunities for teachers by principals.

**Systematic Data Collection**

An important finding in this study is how the power of systematic data collection positively impacts student achievement as compared to state levels. This was found from Year 1 to Year 2 and from Year 2 to Year 3. Implementation surveys had respondents look at their 1:1 programs and reflect on their execution practices from year to year. The Signature Districts Central Office and Building Administrator surveys showed one question having a statistically significant increase in Spring 2014 over Spring 2013 and in Spring 2013 over Spring 2012.

An educationally meaningful effect size was found related to the school’s systematic collection of data about a variety of student outcomes associated with 1:1 programs. This finding was consistent with responses to the Academic Surveys.

In 2008, the U.S. Department of Education found that the probability of teachers using data in decision making is influenced by their confidence in their knowledge and skills in data analysis and interpretation. Consistent with other professional development research, this study showed how teachers’ abilities to understand and use data to drive decisions were greatly enhanced when they worked in groups to build on one another’s understanding. According to this report, training and professional learning around using data for decisions about student learning should include:
• Finding the relevant pieces of data in the data system or display available to them (data location)

• Understanding what the data signify (data comprehension)

• Determining meaning from the data (data interpretation)

• Selecting instructional and learning activity approaches that address the situation identified through the data (instructional decision making)

• Framing instructionally relevant questions that can be addressed by the data in the system (question posing)

A data-driven approach to instructional decision making must be part of an overarching system. Part of the system is the requirement for educators to look at alternative instructional, learning, and assessment strategies. Just as applying the scientific method, teachers develop skills in producing ideas, generating hypotheses, constructing a scientific investigation, collecting and analyzing data, extracting conclusions, and then repeating the cycle once again building new hypotheses.

Even though the process incorporates test driving concepts and practices (trial and error) it is more systematic, calling on high levels of reflection. This becomes part of a cycle where teachers pull data and continually use it to inform practice.

Professional learning for effectively using these data tools is imperative. Basic functionalities, inputs, and outputs are important for spot-on understanding of learner progress and the need for further academic growth.

Accompanying the positive reports about systematic data collection, the districts made a statistically significant increase in the number of laptops being used in instruction particularly in Year 2 over Year 1. Statistically significant and educationally meaningful increases were made in how often technology was being integrated into art and English Language Learner intervention coursework in Year 3 over Year 2. Noted earlier, the more teachers and students use their technology tools the better and more meaningful the integration with curricula and instruction. Consistent use of these tools increases the users’ understanding and skill levels. This is a good example of job-embedded professional learning.

The latter was further demonstrated by the educationally meaningful increases in technology usage from year to year. There were educationally meaningful increases in middle schools’ use of technology in social studies, Title I programs, math, and social studies. Collaboration tools, social media, presentation tools, and student response systems were demonstrated to have meaningfully expanded for instruction. When technology tools are embedded in day-to-day teaching and learning, there is evidence that expertise and utilization will increase. In this study, this was seen year over year.

Professional Growth and Roles of Principals/Teachers

Year 2 of 1:1 implementation showed an
increase in numbers of deployed laptops and program expansion. Professional learning approaches moved from traditional to more personalized and differentiated approaches. Two survey questions addressed the role of principal and teacher professional learning. From Spring 2013 to Spring 2014, there was an increase in principals enabling online opportunities and a decrease in consistency of regularly scheduled professional development activities. Interviews with several districts, including examples noted in the case studies in this brief, indicate that over time teacher professional learning became “just in time,” available through online options, versus the traditional days or events dedicated to one-time professional development experiences. From year to year, teachers became more collaborative with peers in identifying what they needed in order to grow in their education technology practice.

Qualities of high-quality teacher professional development include coherence (a logical alignment to the work), content focus (subject matter), collective participation (from the same school), active learning (inquiry-based activities), and duration (consistent and ongoing). The emphasis must be on teaching practices.

The Project RED III study found that in-class mentoring and teacher collaboration increased in regularity in Spring 2014. At the same time, the traditional, faculty/departmental trainings showed a decrease. Specific professional, differentiated, and embedded professional development practices for teachers emerged from year to year. This is good news because professional development utilizing networks, communities of practice, mentors, etc. are more effective than workshops, seminars, courses, and isolated events.

Signature District Professional Learning Model #3

This district provided the following summary of its professional learning throughout the launch and expansion of its 1:1 program.

Programs and strategies:

- External professional development organization/consultant group engaged
- Initial professional learning for the first group of teachers in the 1:1 transition, district’s high school (school years 2011-2012 and 2012-2013), and again with the teachers at the middle school during school years 2012-2013 and 2013-2014
- Nine months prior to rollout
- Face-to-face and virtual
- Driven by the district’s vision and goals for implementation
- Based on pedagogy and how that could change with the transformation
- Follow-up professional learning, throughout the 2013-2014 school year, led by the Instructional Technology Specialist
- Installation of 1:1 Lead Teachers to facilitate the learning during the district’s late-start professional learning communities (2012-2013)

- Core 1:1 Lead Teachers participated in their own professional learning in order to lead their content teams through the process of change as the district began implementation.

- Content teams of teachers collaborated during the late-start professional learning communities and the district’s professional learning days.

- Collaborations focused on understanding pedagogy in a 1:1 learning environment.

- Evolution of Peer-Ed Coach Model

- Transitioned out of the 1:1 Lead Teacher roles into the peer coach model during the 2014-2015 and 2015-2016 school years.

- Instructional Coaches (already established in grades K-6) and core teachers from the middle and high schools participated in a year-long professional learning collaboration with Les Foltos, Director of Educational Innovation at Peer-Ed. Participants learned and implemented the Peer-Ed coach model strategies and best practices. This collaboration was face-to-face and virtual.

- External professional development organization engaged.

- Consulted with outside evaluators for the purpose of determining how teachers and students were using technology to promote collaboration, communication, critical thinking, and the creative process while also empowering both to complete instructional tasks.

- Utilized feedback and data to inform next steps for the 1:1 transformation as it was expanded to lower grade levels.

- 1:1 implementation at lower grade levels and professional learning.

- Rollout grades 5-6 (August 2015) and grades K-1. The last building to rollout 1:1 was in August 2016. This was for grades 2-4.

- The district’s professional learning processes and practices have been implemented in a similar timeline and format, scaled to the age and grade level of students and the device selected for those grade levels.

- The district has built capacity among staff to become experts in different areas of education technology, offer relevant professional learning for teachers in ways that had not been considered prior to 1:1, and challenge the district’s thinking about a traditional school day with traditional courses and schedules.
Implications

Local Education Agencies (LEAs)

Best practices, boots-on-the-ground experience, and research demonstrates the key strategies for effective professional learning. A critical component of all professional learning activities must be the use of multiple data pieces to drive professional growth, decision-making, reflection, analysis, and inform practice. Following are key features to incorporate into LEA professional learning platforms:

- Job-embedded: Educators employ new learnings and skills within their day-to-day work. The techniques may emanate from peer observations and modeling, coaching, mentoring, and consistent opportunities to reflect on practice personally and in collaboration with principals and colleagues.

- Collaborative inquiry: Regularly scheduled/planned time to work with peers to ramp up expertise, explore student progress and artifacts, and to use that information to adjust pedagogies.

- Consistent and ongoing: ‘Drive-by’ and ‘one-shot-wonders’ had been hallmarks of education professional development. We’ve learned the ineffectiveness of these approaches. First, professional learning must be part and parcel of an educator’s work life. Second, it must be regularly scheduled and built into the life of practice. Third, communities of practice need to be established and supported by the school and district. These learning communities must reliably come together, with focus, to enhance the group’s and one another’s continuous improvement of practice.

- Focused vision: Teachers and administrators should jointly work to outline the various areas of emphasis for professional growth activities. Integrating these focus areas to ensure relevancy and meaningfulness to the core work of increasing student achievement is important.

Policy

It is a necessity for education policy to incorporate professional learning as a requirement for individuals who are maintaining credentials for teaching and leading. This need is magnified in our fast-paced information age which is being digitally transformed. Educators have ongoing and consistent needs for expertise in core curricula, digital and static content, meaningful integration of technologies, and universal skills for this and future centuries. Policies can offer templates for LEAs to develop their local strategies. Development of collaborative learning communities should be a foundational policy.

Industry

Noted in the opening paragraph of this brief, the School Redesign Network at Stanford University found that, “sustained, high-intensity, job-embedded collaborative learning” is the most effective professional development related to student achievement progress.

Research demonstrates that well-implemented education technologies matter
greatly to a district achieving increased learning and other noted outcomes. To successfully integrate technologies, educators require substantial professional learning opportunities on an ongoing basis. Professional learning communities are an effective way to ensure this occurs if the communities are focused on coaching, reflecting on practice, reviewing student work/progress, and setting expectations for continued growth for educators.

The education technology industry can support district engagement of high-quality professional learning by ensuring sales and development teams understand this need. Further, educational tech organizations can accompany sales with expected and funded professional development. Even at a rudimentary level, this focus can help schools understand the need for vision, strategy, and establishing student outcomes. When the district is successful, educational technology sales may increase. School leaders can give testimony to how their technology expenditures have increased established learner goals and objectives.

Conversely, when districts do not establish the above, their education technology initiatives fail miserably. This, in turn, affects school and community attitudes and beliefs about the efficacy of technology expenditures. As schools are subject to political winds and mores, the latter can and will affect district decisions about continued technology purchases.
References & Notes


3 For details see http://scmidlandssummit.blogspot.com/

4 For details see https://docs.google.com/document/d/1ZTE-OEHGPHFxz6lahTrfIOiaSyUjredSTPswNvRXa4/edit

5 The district notes that this was a fortunate choice as, after the decision was made to shift focus away from test scores, the state test and technology delivery systems changed annually for 5 consecutive years. This caused numerous issues and resulted in unreliable data with no value.

6 For a description of this model refer to http://www.edcamp.org/

7 Knight in Training was recognized by the state’s department of education as a Promising Practice in 2016.


Project RED Sponsors

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