

## Next Level Serious Address of Digital Equity in Education

Most school executives are not aware of a lack of digital equity beyond just making sure students have a computing device. Yet, a second-level inequity of both slow and completely unavailable network access requires a second-level seriousness. This is particularly important as schools unleash digital curriculum and thousands of websites among their students – many creating enormous drag on already slow networks with video streaming.

In a previous paper entitled “Determine Your Position on the Scale of Digital Equity,” research cited that only forty-two percent of district leaders ranked digital access outside of school as “high priority.” A little more than a year later, Valerie Truesdale, Associate Superintendent for Personalization and School Partnerships at Charlotte-Mecklenburg Schools, told the Learning Counsel that Wi-Fi availability was a challenge that her district had to face. Inhibited network access was a lack of learning access.

Next-level equity is emerging as a major issue across America. Michelle Murphy, currently the Superintendent of Rim of the World Unified School District in California, said in February 2017, “The statistics show that even though eighty to ninety percent of schools have network coverage, it’s not enough to support the burgeoning use of digital curriculum. Teachers are telling us that their Wi-Fi is not reliable or fast enough to support what the students need or expect. So, that is a number one concern—but one we’re finding is beginning to be addressed and considered as ‘emergency’ status.”

When Jerri Kemble, Assistant Superintendent of Innovation & Technology at Lawrence Public Schools, began asking about network access, what she found was a snapshot of the national digital equity challenge. One student told her, “We have internet at home and we do have a computer, but it’s my dad’s computer. There are five kids in the family, and one of my sisters goes to virtual school, and so I never have any time to get on it.” Kemble found that another of their students works on homework on her phone, but when her data package runs out, she stops doing homework. A third student told Kemble, “I would love to participate in some after-school activities. I’d like to be part of theatre and maybe some sports. But I



*“Some of the most advanced schools in the country realize they’re delivering so much via digital that they can change their physical structure, their schedule and the entire delivery mechanism. This is the point of real change.”*

—LeLani Cauthen, Author  
*The Consumerization of Learning*

*In this Brief*

Find out what education leaders and the industry are doing to solve the next level of equity concerns for all students’ learning – both their efforts and the rewards.

*Determine Your Position on the Scale of Digital Equity*  
[http://thelearningcounsel.com/system/files/papers/ruckus-fiscal-web-2\\_0.pdf](http://thelearningcounsel.com/system/files/papers/ruckus-fiscal-web-2_0.pdf)



can’t because when school ends I have to chase Wi-Fi all over town to get connected so that I can get my homework done.” Hearing those stories helped Kemble to realize just how deep-rooted the issue was. Following a carefully conducted survey to see how many students needed help with access, they found the number was 400 – a lot of potentially disadvantaged students.

One of the preeminent organizations in education, the State Ed-Tech Directors Association (SETDA) concurs that there is something to worry about, stating on June 16, 2017, “Access to online resources including digital content, interactive education apps and websites, videos, experts and peers is no longer a ‘nice to have’ but rather a necessity. Unfortunately, teachers and students are often unable to be sure there will be dependable, robust access outside of school depending on family and community circumstances.”

**What are leaders in schools and the industry doing to solve the next level of equity concerns for all students' learning? The actions taken are diverse, but the results are well-worth every effort.**

## **Educators in Action**

### **Coachella Unified School District**

When Darryl Adams, the then-Superintendent of Coachella Valley Unified School District in 2016 saw that he had a real problem with all the new devices and software he had rolled out with access from home, he did something unusual. He parked buses with 24/7 Wi-Fi connectivity routers on them in disadvantaged neighborhoods where students and their whole families could get online. “And we’re powering those buses with solar panels so students who live in our trailer-home parks and didn’t have access before, now have access. We brought the connectivity to them for homework, and we’ve seen great results from that,” he said. As noted in an article in *School Leaders Now*, Adams’ efforts paid off with graduation rates jumping from 74.4 percent when Adams started in 2011 to 83.6 percent in 2016 – the highest gains in California that year in one of the most economically depressed areas where some students were even living in abandoned railroad cars. In addition, nearly 60 percent of Coachella’s graduates were going on to some type of higher education, dropouts were down, and daily attendance up.



*Superintendent Darryl Adams, with bus router, 2016*

How did Adams accomplish all of that in a relatively short period of time? “We went to our parents and our public and asked them to vote for a general-obligation bond to fund the effort

#### **Coachella Unified School District**

- ✓ Gained public bond
- ✓ Devices for all students
- ✓ Crashed network, re-built infrastructure
- ✓ Wi-Fi on Buses
- ✓ Neighborhood bus distribution for evening homework
- ✓ Bus using solar power

#### **Results:**

Increased graduation rate, dropout rate down, attendance up, highest gains in California in 2016.

(the devices and software). It also paid for our whole Wi-Fi infrastructure, which is key to the whole connectivity issue. This may not be the funding option for everyone, but you’ve got to find the money, and this is how we did it.” Adam’s road to success wasn’t without setbacks – and a lack of network scalability was the complication.

“In California, our County Office of Education is usually the one that works with the carriers and the cable providers to provide connectivity to the School Districts. But when we launched with the 20,000 devices the first time, we had a little problem and crashed the system. So that’s something to consider –connectivity

and infrastructure is so important. Digital natives and teachers today expect things to work and for the internet to be fast. It's a different level of expectancy today. So that all needs to be ready and set," said Adams.

### Charlotte-Mecklenburg Schools, North Carolina

Truesdale, mentioned earlier, said in 2017 that Charlotte-Mecklenburg Schools received a grant from Sprint and launched 250 Wi-Fi hotspots. Since then the school culture has seen amazing improvements. One reason that the Wi-Fi implementation was so successful was that they were able to note any absence of student logins and use that data for intervention. Due to the success they have seen, they applied for and received another grant to implement an estimated 4,000 more hotspots each year for the next five years.

**Charlotte-Mecklenburg Schools**

- ✓ Obtained a grant for hotspots
- ✓ Used log-in data for interventions
- ✓ Pursued and won 2nd grant

**Results:**  
Increased interventions to personalize learning with timely remediations.

### Santa Ana Unified School District

Daniel Allan, Ed. D. Executive Director of School Renewal of Santa Ana Unified School District in California stated in a recent Learning Counsel video interview that "Over the past 4 years we've really invested a lot of resources into building our digital and technology infrastructure. We've gone from 8,000 to over 50,000 devices, virtually 1-1 across the district. We've invested a lot in terms of our infrastructure in wireless arrays, broadening our network, and really bringing the infrastructure into the 21st century as a district. Part of the theory of action from a leadership standpoint around the initiative was we need to democratize access for kids to learn. We're also part of the Sprint One Million program where they're giving hotspots to a million kids across the country. And I think about 4,000 of those hotspots are within our district. We've been checking them out through libraries, to really try to make connectivity ubiquitous across the city for all of our kids. "

Daniel went on to add that they have been able to go beyond regular adoption of technologies and into a redesign of their operations, "At the high school level, we do have a number of environments where we have classrooms with twenty-five kids in the room and they're all working on different courses or they're all working on four or five common courses, but they're all at different places in that space. You have a facilitator, a teacher in that room, who's working with the kids to help them move at the different paces. (This is the) way we think about a flex classroom environment (now) where it really is every student moving at their own pace. "

Susie Lopez-Guerro, Ed. D. Director of Community Relations, also at Santa Ana USD, mentioned that "Teachers and other staff have been able to personalize their own learning to ensure that as they're rolling it out and supporting their students, they're able to process what it means and apply it to their practices. "

**Santa Ana Unified School District**

- ✓ Invested in devices to be 1-1 across the whole district
- ✓ Invested in wireless and network to update for greater traffic

**Results:**  
Redesign of teaching and learning methods; personalized teacher professional learning; whole student-body access equity.

### Lawrence Public Schools, Kansas

Kemble, mentioned earlier, went with the information from her survey of all users and the school's technology system to make presentations to the city and county commissioners, urging them to come up with a county-wide plan for access. The school system also reached out to its own Foundation to explain how important digital access is for both the student and the student's family and get financing. "A lot of our communication, our grades, information about the school, everything is found online," said Kemble. "So, if we could solve providing kids with access to the internet, it opens up that world of communication for the family also. As a by-product, if a family member is able to get online to look for a job—think how

**Lawrence Public Schools**

- ✓ Surveyed all users to get a real estimate and evidence of equity issues
- ✓ Urged county-wide access plan
- ✓ Gained Foundation financial support
- ✓ Purchased 400 hotspots to distribute

**Results:**  
Established student and greater community internet access for equity.

many jobs are only listed online—then that’s an added bonus. ” With support from the local community and the Lawrence School Foundation they were able to purchase 400 hotspots for an immediate solution.

### Estella’s Brilliant Bus

Estella Pyfrom saw a need to provide a mobile instructional technology and a training system that creates opportunities for self-paced educational learning. As a retired veteran of fifty years at Florida’s Palm Beach County School District, Estella recognized a technology problem and decided to do something about it.

Students lacked the resources and digital know-how to meet the demands of today’s 21st century workforce and entrepreneurial opportunities. She dipped heavily into her pension fund and started



#### Estella’s Brilliant Bus

- ✓ Saw an inequity in student access to digital resources and did something about it – a mobile bus with learning stations
- ✓ Worked with local groups to deliver directly to students and families

#### Results:

100,000 underserved children over the past four years given access and learning.

a non-profit, state-of-the-art mobile technology and learning center, “Estella’s Brilliant Bus.”

The Brilliant Bus project networks with schools, businesses and community agencies to provide experiences that will enable families to become more productive – reaching over 100,000 in just four years.

### Willard Intermediate School, Willard, Missouri

The Willard Intermediate School recently started to change the furnishings and layout of their physical classrooms. Kim Harron, Fifth & Sixth Grade Teacher, asked her self how she likes to learn best as an adult. She realized she doesn’t sit at a desk most of the time. “When I’m at home, I’m either in the lazy-boy recliner with my iPad or I might be sitting in bed before sleep reading, or checking my email at the kitchen table, it all depends on where I’m most comfortable doing what,” Harron said. “That’s kind of what I wanted the students to have as a choice. So sometimes, depending on what they’re doing, they’re most comfortable laying on the floor. Other times they need a hard surface to set their device on and other times they can just chill out in the beanbag. ” It used to be that Harron’s classroom was a traditional computer lab with countertops all along the wall. All the students had desktop computers facing away from her, so she looked at the back of their heads most of the time while they were on a computer.

In order to achieve the flexible and mobile learning she wanted, Harron said, “We had to have good Wi-Fi, and we’d switched to Wi-Fi throughout our building a few years back, but it wasn’t very reliable. Then Ruckus came in and once that

#### Willard Intermediate School

- ✓ Changed furnishings and layout of their physical classrooms
- ✓ Upgraded Wi-Fi

#### Results:

Students taking less bathroom and go-get-a-drink breaks out of boredom; more flexible and mobile learning

was put in, we were able to have free reign wherever we needed the learning to be, no more cords hanging down, no more internet cables all over the place. ”

Harron also mentioned that she is getting very tangible results. “One of the things I used to see in my room when students were bored is everybody needs to go to the restroom, or everybody wants to go get a drink and those sorts of things, but they don’t want to go do those things now because they don’t want to miss what’s happening. And I think this freedom of choice is a huge part of that.

## Fresno Unified School

In late 2016, Fresno Unified School District implemented Wi-Fi for all students on all 99 of the district-owned buses. The Fresno USD Transportation Department cited that their buses log more than 1.5 million miles each school year, transporting 5 million riders to and from school. More than 60 percent of the district’s 74,000 students participate in arts, athletics, or activities, adding even more to ridership.

Former Superintendent Michael Hanson stated that the students now can “Consider a Fresno Unified bus ride a mobile study hall. ”

All web traffic on the school buses is content filtered to ensure students have an educational and safe web experience that aligns with student expectations around digital citizenship. “Bandwidth usage from district buses went from 9GB on the first day of school to 63GB after the first few days,” stated Kurt Madden, Chief Technology Officer of Fresno Unified. “Students love it – it’s a game changer for thousands of students who take the bus every day. ”

### Fresno Unified School District

- ✓ Created a gap-less connected experience during transportation
- ✓ Ensured filtered web traffic to ensure safety

#### Results:

Massive uptake of bandwidth use from 9GB on the first day to 63GB in the few days after

*(Continued on page 8)*



# THE STAGES FOR TRANSITION TO DIGITAL LEARNING

**80%** Of schools cite they can deliver common area access. This is where most schools stand today

## Stage 1: Wired Only

- Slows with mass users, crashes
- Class or lab centric
- Wired: 10/100Mbps edge

## Stage 2: Wireless Access Points



- Unreliable, "first-in" is faster unless newer technology
- Wired: 1Gbps edge
- Wi-Fi: Hot spot 802.11n

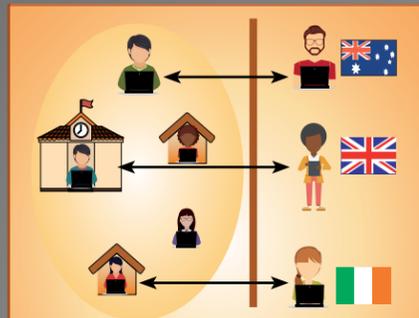
## Stage 3: Institution-wide Wireless/Remote



- More access points & remote
- Multiple-devices & streaming
- Wired: 2.5Gbps edge
- Wi-Fi: 802.11ac

**Address equity of access from home & wider campus area.**

## Stage 4: Social/Community Wide



- Community-wide & uninterrupted video streaming and conferencing
- Wired: 5Gbps edge
- Wi-Fi: 802.11ax

## Stage 5: High Density Net Ecosystem



- Web 3.0. Internet of Things
- Wired: 10Gbps edge
- Wi-Fi: 802.11ax + LTE + IOT

**Address equity of access while mobile in the community area.**

## Stage 3: Actions

- Changed furnishings and layout of physical classrooms
- Wi-Fi upgraded or expanded
- Gained Public Bond for Infrastructure
- User surveys for proof of inequity
- Filtered web traffic to ensure safety – from anywhere
- Right-sizing network infrastructure
- Getting students faster dedicated access
- Helping schools avoid over-spend on infrastructure



## Results

- More/faster web access
- Increased interventions to personalize learning with timely remediations
- Students take fewer breaks
- Students can access Wi-Fi "out in the football field bleachers" with no slows
- Lowered overall spending
- Safe curriculum access



## Stage 4: Actions

- Wi-Fi on district buses for homework during transport
- Neighborhood-parked district buses with Solar power for evening homework
- Citizen-run bus with learning stations
- County-wide access plan
- Filtered web traffic for security
- Built municipal Wi-Fi
- In just 8 months got more than 19,000 students broadband connections
- Future-proofing by making networks ready for the Internet of Things



## Results

- Increased graduation rates, dropout rates down, attendance up
- Equity gains with student and greater community internet access
- 100,000 underserved children given access and learning-connected experience during transportation
- Massive uptake of bandwidth use: 9GB on the first day to 63GB a few days after
- Over four-square miles of Internet connectivity
- Higher spelling proficiencies, powerful software accessed, more parent engagement
- Prepared for IoT-enabled STEM learning and building automation

Sources: Learning Counsel Digital Curriculum Strategy Survey and Assessment Tool 2016; Pew Research Center, 2014

## Newly Mobilized Commercial Efforts

Flanking the efforts of schools are major players in the mobile devices and telecom space – who are also mobilizing commercial efforts to bring serious address to digital access inequity, especially for schools.

### Ruckus Networks

When asked about how Ruckus helps get schools to face up to inequities of access, Greg Beach, VP Product Management, said “To address equity, I ask schools what types of applications do they run on the network? Do they need ubiquitous coverage for all the digital content as students walk from classroom to classroom? Is everybody trying to access it at the same time? YouTube takes up a lot of capacity, as do video sites like Discovery Channel or Disney. (I tell them) if you scale that video across multiple students, that has a big implication on the network.”

Beach also pointed out another area of great concern to schools, “Then as you add capacity, how expensive is it to do? That’s a major part of equity because it might be so hard to configure the network that you need somebody that’s skilled in the wireless IT space to be able to add versus just putting more access points relatively easily. With Ruckus, you just plug the access point in and it finds its brains in the cloud and just works. There are things like the consideration of how wireless access points get powered – is it by an ethernet cable to a network switch or do you just plug it into the wall which could be a big cost difference? Also, is the network switch itself powerful enough? In most environments, usually there’s a bigger expense associated with the switches versus the wireless and schools might be tempted to save money there, so if you bought the wrong thing it can really impact negatively down the road and not last.”

#### Ruckus Networks

- ✓ Right-sizing network infrastructure
- ✓ Getting students faster dedicated access
- ✓ Future proofing
- ✓ Helping schools avoid over-spend

#### Results:

Students can access “out in the football field bleachers” with no slows



To make a serious address to digital equity, the quality of the wireless deployment definitely matters in terms of the quality of access that people are getting and how far away they can be from the access point. “It’s the quality that matters for equity because students could get frustrated with slow access and turn off their homework. At the core of Ruckus’ value proposition is ‘best in class RF’, which is radio frequency. One of these is called BeamFlex Adaptive Antenna Technology that allows us to provide the best possible coverage on a per client basis. It’s done by automatically adjusting the radio coverage to the client (in an individual beam. ) This means that if some student is out on the bleachers pretty far away, we’ll adjust the antenna pattern to focus the signal to them for quality access.”

Ruckus also has a mind to consider future inequity because of things like the Internet of Things (IOT) – a time when school robot vacuum cleaners, security patrolling robots and more are hogging bandwidth. Beach mentions that, “School networks could be used to asset manage all your iPads, for instance, or send an alert if any are not allowed outside the building.”

Recently, Jay Ojeda, a Software Systems Analyst at Buckeye Union High School District in Phoenix, AZ, noted that their Ruckus Wi-Fi is so good that student’s can use access points from the main high school building out in the football field bleachers with no slows, where students may be waiting for an older sibling to get done with practice and need to do their homework. This sort of result is right at the point where in-building access starts to blur into out-in-the-general community – and necessary for schools to consider for creating equity.

## Sprint

Doug Michelman, President of the Sprint 1 Million Project Foundation has a mission to help one million high school students achieve their full potential by ensuring they have the connectivity they need to succeed in school. Sprint has committed to provide more than \$2 billion worth of high-speed mobile network access, including providing free mobile devices and infrastructure to deserving students. Michelman says Sprint is doing this because “Unconnected students are at a severe disadvantage in an education system that increasingly benefits the well connected. We meet students who have the drive to succeed and are finding creative solutions to get the access they need. They go to school two hours early to use their school’s network, sit outside fast-food restaurants late at night, or travel across town to a relative’s home just to access Wi-Fi. But, it doesn’t need to be this way.” Students, parents and teachers tell Sprint about the positive impacts of increased communication, ability to study for college entrance exams, conducting research projects, applying for jobs and college admission. School staff at the Sprint partner schools have said that student attendance and homework completion rates have improved – with nearly 68 percent saying that having a device has positively affected the likelihood that they’ll go to college. Administrative results include 90 percent saying student attitudes have improved along with higher homework completion rates.



### Sprint

- ✓ Mission to help 1 Million high school students with \$2 Billion worth of high-speed access and devices.

#### Results:

Students who aren’t chasing Wi-Fi late at night for homework, 68% saying more likely to go to college; 90% of administrators seeing improved student attitudes and homework completion rates.

## SmartWAVE Technologies

Al Brown, President and CEO of SmartWAVE Technologies said, “The lack of connectivity for students at home is becoming an increasing issue, as schools transition to an online environment. To overcome this issue, we are working with schools and cities to plan for and develop community networks to break these barriers. We think that student equitable access to the internet and all their digital materials and sites is a very serious issue, both for learning and for safety. Unfortunately, some of these neighborhoods where connectivity is lacking or unaffordable, are also the neighborhoods where gangs or street crimes are present. When a child’s only option is to hang out in the library parking lot after dark in order to get Internet connectivity for homework, it presents an opportunity for less desirable activity.”



To help, SmartWAVE has deployed two of the first and largest community-based networks, where the school district and city partnered for success. Brown said, “In Council Bluffs Iowa, the network covers over four-square miles and brings Internet connectivity to thousands of students. In the James Lick High School Attendance area for ESUHSD in San Jose, over 9000 clients were served within the first 30 days of network usage.”

### SmartWAVE Technologies

- ✓ Helping schools avoid student truancy with quality build-out of networks

#### Results:

Over four-square miles of coverage for thousands of students; large population coverage fast.



### T-Mobile

- ✓ In just 8 months helped get more than 19,000 students connected.

#### Results:

Double-higher spelling proficiencies, powerful software accessed, more parent engagement

### T- Mobile

T-Mobile is another company highly concerned about digital equity. “With 52 million children in Public Education, economic circumstance should never dictate the potential for even one student. T-Mobile is committed to bridging the digital divide, is and is committed to connecting students without mobile internet in the home, and ensuring they have quality devices to enable learning. In the past 8 months, T-Mobile has been proud to connect more than 19,000 students,” said David Bezzant, Senior National Director, Government Mobility Solutions.

The rewards of T-Mobile’s efforts have been touching, including, “Instances where spelling proficiencies have doubled in Grades 2-3 because children could use on-line learning each week to practice their twenty spelling words with the help of parents. Repetitive typing, the stimulus of being on line with powerful software like Razkids, parent engagement, and connectivity have made the difference,” said Bezzant.

### Take-Aways

Rich Nedwich, Global Director of Education, Ruckus Wireless said in a recent interview, “It’s important for policymakers, administrators and vendors to recognize that the transition to digital learning has created a Digital Equity gap in the U. S. We all need to take responsibility for addressing this issue in our own way. At Ruckus, we are committed to delivering innovative new products and services which can help keep our kids connected, because learning is a journey which extends outside of the classroom. ”

All of the examples in this paper from individuals, districts and companies, are working to solve the issue of equitable access. In addition to all of the methods they have used to get serious about digital equity in their areas, others are work-

ing to leverage community partnerships by working with libraries, community centers, mobile community hotspots, and local governments of cities and counties.

The first line of offense in the digital equity journey is having any access at all, then having it in a highly mobile way, and then having a real cognizance of the massive use of all the digital applications as schools distribute waves of digital knowledge.

What's at stake are students in communities who, with the right access, find meaning in learning – and find a successful path in life because of it. What's at stake is no less than the individual lives of tens of thousands of otherwise disadvantaged and perhaps brilliant students, and the possible Einstein, Galileo, Newton or Tesla among them.

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**13%**  
of **students** in grades  
6-12 say sometimes  
they cannot do  
homework because  
they lack internet  
access outside  
of school.

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Source: [Project Tomorrow, Speak Up Survey](#)

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The Learning Counsel helps our subscribing 215,000+ education professionals in the K12 and Higher Ed sector gain context on the shift to digital curriculum. Our mission is to help districts and schools reach real transformation through strategies for digital content & curriculum. Through consulting services and research to events, custom publishing and online editorial, the Learning Counsel provides dynamic and diverse opportunities for private and public-sector leaders to collaborate for positive change.



### LeiLani Cauthen CEO & Publisher

A Research Publisher and Media personality for 20 years, LeiLani conducts national research on digital curriculum trends and spend. She is well versed in the digital content universe, software development, the adoption process, school coverage models, and helping define this century's real change to teaching and learning.

### Dr. David Kafitz

#### VP School Relations, Digital Transition Specialist

Expert and charismatic change-agent helping schools move forward with a well-reasoned strategy for digital content and curriculum, professional development and IT strategy, David is a former Superintendent, Director of Technology Services, Principal, and Teacher in North Carolina Public Schools.



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## Underwriter for this Brief



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