Remarks from Joanne Weiss for the 2012 NCES STATS-DC Data Conference
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Good afternoon – I'm delighted to be here today. I spent the first 20 years of my career in education technology, so this is something of a homecoming for me.

I started in ed tech the year the Apple II was introduced, and my first government contracts were with the Office of Education in HEW – a sure sign that I've been at this work longer than I'd care to admit!

I promise that I will talk concretely today about the great promise and the considerable challenges facing the next generation of assessments now being developed by the Race to the Top Assessment consortia. But I'd also like to share some ideas here today—and hear your thoughts—about education data and technology writ large. I'd like to share with you why – after so many years of less-than-expected impact from technology in education – I'm optimistic today about both the near-term and long-term future of technology in education. The roles that each of you play are central to our continued progress.

As I see it, there are four forces at play in K-12 education that promise to dramatically accelerate data and technology as change agents. I'd like to spend a few minutes this afternoon talking about each one.

- First – and I won't belabor the obvious – technology is cheaper to buy and easier to use. Whether it's smart phones or tablets or the cloud computing that's eliminating the need for in-district servers staffed by IT teams, technology is finally getting through those seemingly impermeable school walls.
- Second, the data you all collect on behalf of your districts and states is not just being stored on the shelf. It's being used. And it's being used beyond the customary circle of policy analysts and researchers to create new information, products, and services that support parents, students, and consumers.
- Third, we're seeing the advent of cost-effective solutions that truly help teachers differentiate instruction for each of their students. And the abundance of data that results from these new solutions – these "big data" sets – will make a new type of fast-cycle research possible…driving continuous improvements in teaching and learning.
- And finally, the Race to the Top Assessments are powerful levers for far-reaching change. Because they have to be delivered online, they will drive devices and bandwidth into every school. And by measuring the 21st century skills that matter, they will drive instructional change as well.

So skipping the obvious "everything's getting cheaper" point, let's take the other in turn, starting with how "open data" is changing the face of education…But first, let's step back for a minute to think about how "open data" has changed other industries. It's a good analogy for where education could be heading.

Flash back to eight years ago. It's late 2004, and NOAA, the National Oceanic and Atmospheric Administration, has just announced that it will make all of its weather and forecast data publicly available in an open-access XML format.

Now, these data had, in fact, always been available. But the format was hard to decipher. The data needed to be massaged by experts before they made sense. Yet in 2004, that simple act of making useful data open and accessible to the public spawned an industry—and more than one of them. From websites like Accuweather and Weather Underground, to sophisticated crop insurance pricing, to widgets like the weather alerts on your plane tickets – they all owe their existence to these federal data.

That same year, Qualcomm, the cell phone company, announced the first successful tests of GPS for mobile phones. This innovation, too, was based on a decision by the federal government to open data to the public. This time, the government decided to allow civilians access to un-degraded global positioning signals.

Today, GPS data drives everything from complex navigation systems to Google Maps to apps like Foursquare to movie and restaurant locators. The GPS industry provides big public benefits as well as about $90 billion [dollars] per year in economic value. And it's another example of an industry spawned entirely off free data. Entrepreneurs envisioned uses for the data that the government never would have….

Policy analysts and politicians often warn of the law of unintended consequences, as if all unintended consequences are negative ones. But in the world of data, we should also be aware of the law of welcome surprises.

Today, "open data" is coming to education through the newly launched Education Data Initiative. The U.S. Department of Education leads that initiative, in partnership with the White House and other agencies. It will allow data owners, inside and outside of government, to make their information available, machine-readable, and accessible, while still ensuring that personal privacy is protected.

The Department held its first education "data jam" yesterday. At that event, private-sector entrepreneurs and innovators learned about our publicly available datasets – with an eye toward building products and services designed to improve student success. In about three months we'll see the results, when we host an "education datapalooza" to showcase what these innovators have created.

Soon, data from EDFacts, IPEDS, FSA, the Civil Rights Data Collection, and other sources will be "mashed" together in who-knows-what ways to provide new information, products, and services to students and parents. We'll see electronic backpacks where students can carry their own transcripts and portfolios, personalized college-choice tools, financial aid shopping sheets, and yes, more school and college scorecards.

We got a taste of those scorecards earlier this year when U.S. News released its high school rankings. We also got a cautionary tale. We got our first glimpse of how much data integrity matters in a world of open data.

For those who are unfamiliar with the back story here, a couple of high schools – one in Nevada and one in California – were near the top of the U.S. News rankings for the nation's best high schools – much to the delight and shock of the schools' leaders. It turned out that an incorrect number of enrolled students had been reported for both schools. For various reasons, neither the state nor the federal government caught the data errors.

Now, that may not sound like a big deal. But in the U.S. News rankings, the number of enrolled students was the denominator in several measures of high-performing schools – and that shot the schools to the top of the lists. Those mundane data elements that schools, districts, and states didn't used to spend a lot of time worrying about – well, they now have a way of ending up in all kinds of places that the designers never envisioned. In this new environment of "soft accountability," data quality at all levels matters — and the stakes will only continue to rise.

Today, parents and students are using data-rich decision-making tools to exercise choice and target areas for improvement. But the proliferation of data is also starting to change how teachers teach. We're on the verge of solutions that will allow teachers to manage truly personalized classrooms – classrooms where teachers differentiate their students' needs down to the student and learning objective, and then individualize the instruction appropriately.

Take, as an example, the School of One in New York City. It's a middle school math program used in traditional public schools. The typical School of One classroom – remember, this is middle school math – holds about 150 students and has about 5 teachers. When a student walks into class, she sees her tasks for that day posted on wall-mounted monitors, reminiscent of airport flight information displays. The large classroom is organized into spaces for individual work, tables for team work, and class settings for group instruction.

Students move among these "centers" according to their prescribed "flight" plans. And the night before class, each teacher gets his or her teaching assignments for the next day. The computer management system, behind the scenes, is orchestrating all of this to optimize each student's needs against the instructional resources on-hand and the teachers' collective capacity and capability.

Other promising models are taking hold, too. Some schools, for example, are experimenting with "flipped classrooms," where kids watch online lectures as their homework, then spend their class time doing problems when a teacher is there to answer questions and provide support. Makes some sense, doesn't it?

Making teachers and teaching more effective is partly about having better solutions to support them. And it's partly about thoughtfully enhancing teaching practice. But both remedies propel a culture of continuous improvement. And this is where "big data" comes in.

As technology is used to support instruction and assessment, we'll have more and more information available about what works, for what type of learners, under what conditions.

A professor at Stanford teaching his first ever "massively open online course" told me about one problem set that he'd been giving for years. In a class with 100 students, a few always got it wrong. But he never noticed any pattern. He recently taught that class to 100,000 students, and 2,000 got it wrong – all with the same misconception. Needless to say, he has now adjusted his instruction.

Then there's A/B testing – fast-cycle, randomly controlled trials. These will be easy to do online for the first time, and will allow quick, iterative improvements in quality.

Learn Zillion uses this approach in its program design. It's a new company that's developing content tied to the Common Core State Standards. Their goal is to get great teachers to develop suites of online lessons and make them freely available.

Not surprisingly, they're finding that the same teacher who has a 98% student success rate with some of his explanations, may have a 42% success rate with others – even though all lessons look equally "high caliber" to expert reviewers. Through quick A/B testing, they know exactly which content to make available, and where to head back to the drawing board.

All of these innovations will be coming your way…and the Race to the Top Assessments are likely to accelerate their appearance. Why? Because with PARCC and Smarter Balanced assessments being delivered online, technology – both devices and broadband access – will be driven into every school at high rates. And this, of course, will make technology available for instructional purposes on every day of the year that it's not being used to administer assessments.

Let me tell you a bit about the design of each consortium's assessment system.

PARCC, managed by Achieve, has 23 states as members. Its assessment system will have 5 components. It has 2 optional formative components.

- One is designed as a "diagnostic assessment" to provide teachers with information on each student's critical or foundational skills, so that instruction and support can be tailored.
- The other is a "mid-year" check-up that will focus specifically on those hard-to-measure critical-thinking skills.

Then, there are 2 summative components designed to be given toward the end of the school year.

- One is composed primarily of "performance tasks" – like writing for English/language arts and multi-step problem solving for math. These tasks are designed to be taken over several class periods.
- The other is an end-of-year comprehensive assessment. It will be computer-based and consist of innovative, machine-scoreable item types.

Finally, there is an assessment of students' speaking and listening skills. This component is required, but it's not used for accountability purposes.

Now for Smarter Balanced. The Smarter Balanced consortium includes 27 states. Its design has 4 components.

First, there is an item bank from which teachers can construct on-demand formative assessments. Teachers can use these to quickly determine whether their students have learned what they intended to teach.

Second, there are optional interim assessments that focus on small clusters of standards built around learning progressions.

Finally, like PARCC, there are two summative components.

- One consists of "performance tasks" in reading, writing, and mathematics.
- The other is an end-of-the-year assessment. The novel thing about this test is that it's computer-adaptive, so it selects items for each student based on his or her responses to previous questions. It effectively adapts to the student's demonstrated ability throughout the test.

The schedule for the two consortia is the same.

- Pilot testing will occur next spring, in 2013. Sample sizes will likely be quite small, but will test the technology platform as well as the items themselves.
- The full field test is planned for the following spring, 2014. This is when the consortia plan a "dry run" of both the test platform and the complete forms of the assessments.
- The first full administration of the summative assessments is planned for the spring of 2015. In 2015 and 2016, we expect there to be a mixture of computer-based and paper-and-pencil administration.

Now 2015 may sound like a long way off. In fact, it's not… As many of you know, the consortia have commissioned the development of a Technology Readiness Tool to gather information about school-level technology resources. Six data collections are planned – one fall and one spring for the next three years. Each state has identified a State Readiness Coordinator with whom the consortia work – if you don't know who that person is in your state, please find out, and provide all the support they need!

The first data collection window closed about a week ago – they collected baseline information on what kind of hardware is in schools, together with information on available bandwidth, network speed, network utilization, and number of test-takers.

Last April, the consortia came together and jointly issued common guidance on the specifications for the new hardware they will support. So the specs are the same for both consortia, which is good news. More good news…they have gotten commitments from industry partners to provide security supports for tablets – this is late-breaking news that some of you may not have heard. So in addition to the fact that virtually all new computers and laptops will be supported, 10-inch-class iPad, Windows, and Android tablets will be supported as well. You can find the "new hardware purchasing guidelines" online (here).

It's important to note, however, that neither consortium has yet issued overall specs or information on the legacy hardware they will support. They intend to use information gathered from the Technology Readiness Survey to inform their decision-making.

Now we know that most states won't have the technology in place today to meet the consortia's specs. But ignorance is not bliss! The survey data are critical to understanding where states and districts are okay, and where technology "gaps" exist. Please, ensure that the data collection efforts in your states are inclusive, timely, and accurate. Everyone needs the information to understand their gaps and develop plans for addressing them.

So…what does all of this change mean for you? I have a few big takeaway thoughts.

My first take-away is that data quality matters – more than ever. We need good, robust state longitudinal data systems. We need solid infrastructures to support critical data collections. And we need strong policies and processes to ensure data quality and accuracy. This is true from the student to the classroom to the school, district, state, and federal levels.

Second, technology policies need constant refinement as new products and services are introduced. For example, with the cost of devices dropping, but with budgets tighter than ever, we might want to rethink equity policies. We might, for example, want to say to kids, "Take your technology out of your backpack and let us count it as part of our inventory"—rather than saying, "Don't take that out while you're at school." Then we could use our scarce funds to provide technology for the students who don't have devices, rather than providing devices for everyone – or having none at all. Similarly, we need strong policies for cloud data storage, which can reduce support costs and increase access – as long as there are appropriate levels of security and privacy protection. There are lots of new possibilities on the horizon…and we need to think creatively but wisely about these.

Third, it's no secret that procurement policies and processes in many districts and states are antiquated. Too often, they prevent our educational institutions from being smart consumers. Products are bought based on relationships or unsupported claims. Solutions are adopted with the expectation that they'll remain unchanged for five to seven years. Procurement today must be nimble and allow for rapid updating. And it must do a better job of helping the buyer ensure that key goals are met – whether they're about improving teacher effectiveness, enhancing student outcomes, or increasing productivity. The only way to drive quality up is for buyers – all of you – to be able to identify quality products and services, then direct your dollars there.

Finally, your leadership and expertise matters. We're in a time of great change – that makes for both chaos and opportunity. Educators in your states, in your districts, in your schools need you to help them make the most of the opportunities, and tamp down the chaos and the noise.

So let me end where I began – on a note of optimism. Despite all of the challenges we face in education today, we have a huge opportunity to finally have technology play the change-agent role in education that it has in other areas of our lives.

Education is ripe – in fact, overdue – for improvement. You are all in positions to "own" this change, to lead this change, and to ensure that it happens in a way that improves educational outcomes for ALL students. Let us know how we can help. And thank you for all you do.

I'd love to hear your thoughts, so please let's throw this open for questions and discussion.