TRAINING DATA–LITERATE TEACHERS

Insights from Pioneer Programs

Michael & Susan Dell
F O U N D A T I O N

INTRODUCTION

As a first-year teacher in a Baltimore public elementary school serving high-needs, high-poverty students, Brooke Nolin faces daunting, but common, challenges. It's her job every day to make sure that—no matter what happened at home; no matter whether a child had breakfast or slept; no matter what, *period*—each of her third graders learns what she's trying to teach.

In other words, Nolin's job isn't just to teach; it's to make sure that what she teaches is what kids actually learn. That task isn't as straightforward as it sounds. "Students don't automatically learn just because you teach," says Maria Dantas-Whitney, chair of teacher education at Western Oregon University's College of Education. "You have to make that connection that students are actually learning as a direct result of what you're teaching."

With just over a year of training under her belt, Nolin says she has the skills she needs to do exactly that. She has started to master basic pedagogical techniques and unpack education standards to help her students master academic concepts. Thanks to her Baltimore-based Urban Teachers preparation program she has also been trained in data literacy skills, which enable her to further individualize her teaching for each student. "I have third graders reading below a kindergarten level, and third graders reading at a fifth-grade level," Nolin says. "Data is how I decide, every day, what I am going to teach and how I am going to teach it. Without it, I would teach all my students the exact same thing, but the data help me differentiate."

EDUCATION DATA: MORE THAN TEST SCORES

In conversations about teaching and learning, the term "education data" often means test scores or assessment results and nothing more. In our view, and that of many others, education data should be understood far more broadly. It includes formative snapshots gleaned through quizzes, exit tickets and other learning checks. It includes data from standardized and formal assessments, as well as more precise understanding generated by the digital learning programs many schools now use. It also includes sociocultural information, insights into family and neighborhood life, observations of student behavior, attendance records and more. With the right training, teachers can more readily identify, capture and sift through this mass of disparate information to better understand and meet student needs.

Teachers like Nolin are caught in the midst of a tectonic shift in the education landscape that demands they provide measureable evidence of student academic growth against clear standards. The idea of using data in teaching—either to measure results or link teaching and learning—isn't new. But performance expectations have climbed and the sheer volume of data that teachers are now expected to parse and manage every day has swelled exponentially. Today, districts are mining the data they have collected for years (data that previously remained disaggregated and inaccessible, scattered among multiple programs and repositories) to reveal hidden patterns in student information. At the same time, myriad new teacher apps generate unlimited pinpoint insights into students' ongoing skill development, while less frequently administered high-stakes tests assess children's learning, teachers' proficiency and schools' overall effectiveness.

Teachers today are expected to use data as a tool to both measure and accelerate their students' academic growth. Data literacy is now commonly considered a core teacher skill. In 2010, then-U.S. Education Secretary Arne Duncan challenged teacher-training programs to "make sure teachers come into the profession not just with classroom management skills intact, and not just understand[ing] some of the philosophy of education, but being able to use data from day one to really drive instruction."

But a major gap exists: Teacher-preparation programs rarely teach would-be teachers these critical data skills.

Pressure in the years since Duncan issued his challenge—on educators as well as the institutions that train them—has only grown. Recent initiatives propose linking federal funding for teacher-preparation programs to those programs' ability to graduate candidates who can measurably demonstrate their classroom effectiveness. And yet it's difficult to find teacher-training programs that do a comprehensive job graduating teachers with the skills to help them connect what they teach and what their students learn. Even among teacher-training programs that say they train teacher candidates to be data literate, studies show few actually do.[1]

Why does this matter? What's at stake if the programs the nation relies on to prepare teachers fail to turn out data-literate teachers?

Most state policies seek to improve student results through quality teaching. Data literacy lets teachers see how to change their practice to become more effective. According to the Data Quality Campaign: "To

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1   An Analysis of the Survey of Schools of Education on Use of Data in their Teacher Preparation Programs: An Interim Report, Mandinach, E.B, Gummer, E.G., & Friedman, J.M. (2013)

DATA LITERACY: A WORKING DEFINITION

Over time, the Michael & Susan Dell Foundation has worked with researchers, educators, school leaders and others to frame the skills teachers need to systematically ensure they're able to help each student in their classroom achieve measurable academic growth. Data literacy comprises pedagogy, content knowledge and the ability to use data to meet students where they are, close any learning gaps and demonstrate students' achievement gains.

Data-literate teachers know how to:

1. Define "data" broadly to include academic data (both summative and formative) as well as socioeconomic, situational, behavioral and environmental data that affect student performance.

2. Understand how to identify and apply critical grade-level standards in the context of individual students' needs.

3. Prioritize and validate relevant student data as it relates to learning and standards mastery.

4. Develop high-quality informal and formal assessments in order to collect usable data on students' progress against those standards.

5. Administer assessments on an ongoing basis to monitor student understanding.

6. Develop responsive lesson plans and differentiate instruction based on assessment and other contextual data.

7. Use data-informed insights to communicate student achievement and needs to students and their families.

8. Understand that, although data is important, data alone does not define a student.

9. Appropriately use data, knowing what conclusions can be drawn from what types of assessments.

With some variation, each of the four institutions we visited in 2014 and 2015 defined the skills relevant to education data literacy along these lines.

improve teacher quality it is necessary to prepare and train teachers on how to effectively, ethically, and continuously use and apply data **before** they enter the classroom." The push to increasingly personalize learning depends on a teacher's ability to interpret and act on data. Effective data use lets teachers target where students are struggling and tailor needed help. If teachers aren't taught data literacy skills, they may simply see data as a burden rather than a powerful teaching tool. Just as we wouldn't expect students to walk into the first day of algebra class and solve a complex equation, we can't expect teachers to know and do what they haven't been taught when it comes to data. And research shows teachers won't use data if they aren't confident about using it.[2]

In 2014 and early 2015, the Michael & Susan Dell Foundation and WestEd went into the field to see what we could learn from a handful of teacher-training programs that have adopted an explicit focus on data literacy skills. These programs view data literacy as a key component of good teaching, and therefore, good teacher training. Over six months we interviewed dozens of administrators, faculty and students at four such schools, which we selected precisely because they are pioneers in cultivating data literacy among their graduates and building an institutional data culture:

- **Western Oregon University's College of Education,** a traditional university-based teacher-training program, has built a strong culture of continuous data-driven improvement over the last 30 years. Its curriculum focuses on ensuring graduates have a well-defined set of data literacy skills that enable them to measurably connect what they teach to what students learn. Under two successive deans, the program has evolved a particularly strong set of organizational structures and practices around ensuring data literacy.

- **Relay Graduate School of Education** is among a new generation of teacher-preparation providers that exist outside the conventional brick-and-mortar university system. Leadership and faculty see an educator's ability to help K-12 students garner measurable achievement as a non-negotiable indicator of teacher readiness. The Master of Arts in Teaching program's entire curriculum centers on skills and techniques Relay candidates must master to ensure students meet or exceed clearly defined targets.

- **Boston Teacher Residency** is an arm of BPE, a 31-year-old AmeriCorps service program that seeks to stem high teacher turnover in the Boston Public Schools and boost teacher quality. The program is a full-time teacher-preparation program combining a year-long classroom apprenticeship, or residency, in the Boston Public Schools with master's-level coursework. The residency program features a course called "Using Data" that gives teachers concrete tools and techniques and data skills.

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2   Means, et al. http://dataqualitycampaign.org/blog/2014/07/the-next-homework-assignment-data-use-into-teacher-preparation-programs/ (2011)

- **Urban Teachers** is a residency-based program founded in 2009 that places graduates in Baltimore and Washington, D.C. public schools. Urban Teachers offers a master's degree with a dual focus in special education and one other specialty. The program includes a year-long residency, followed by three years of mentorship and coaching. Because the program expects graduates to be "great" on day one in the classroom, Urban Teachers regularly assesses each candidate's ability to improve student learning and makes effectiveness a non-negotiable criterion to determine whether candidates are qualified to be placed in schools, graduate, and—ultimately—become licensed teachers.

As we studied how these four programs approached education data and teachers' ability to put it to work to help kids learn, several nascent "best practices" emerged. This surfaced a clearer picture of the key components a teacher-preparation program needs in order to offer would-be teachers quality data literacy training. Each case study tracks the features that stand out most—or that are best defined—in a given program from the list below:

- **Strong leadership and vision:** Strong, committed leaders are at the helm. They believe that if teaching candidates develop the right habits of mind and skills around student data, they will have the tools needed to ensure student academic achievement—even as newly minted teachers.
- **Clearly defined data literacy practices:** Program frameworks or rubrics clearly outline data-related skills critical to effective teaching. Three programs had one or more courses explicitly devoted to helping candidates understand and use education data to improve student learning.
- **Highly skilled faculty**: Faculty have exceptional track records as effective teachers in low-income schools or substantial experience in data analytics. Faculties in conventional teacher-preparation programs often have a skill gap: Instructors tend to be experts in traditional teaching methodologies, not data skills.
- **Operational supports for a strong data-use culture:** Multiple, integrated operational supports embed institutional data use. Staff is dedicated to analyzing data on the curriculum's effectiveness. Administrators regularly use data to improve operational practices and tweak coursework and curricula.
- **Defined outcomes for candidate success:** Leaders and staff hold an unapologetic conviction that teaching candidates should be held accountable for student learning, regardless of the teaching environment they enter. Candidates must show measurable evidence of both their own mastery of educational concepts and their ability to use a wide range of data to help their students achieve academic success.

PROGRAM HIGHLIGHTS

- **Strong leadership and vision**
- **Clearly defined data literacy practices**
- **Highly skilled faculty**
- **Operational supports for a strong data-use culture**
- **Defined outcomes for candidate success**

Taken together, we see these key elements as basic ingredients for teacher-preparation programs that can successfully turn out teachers skilled in using data to better serve students and improve student outcomes. Equally important is the institution's culture around data use, where programs both practice what they preach and practice what they teach with a faculty that "gets" it. That said, we see these elements as only a starting point. More work remains to further define essential data literacy elements in teacher-preparation programs. But we hope these emerging "best practices" can help guide policymakers, researchers, schools of education and other education philanthropies in designing, implementing and supporting more effective teacher-preparation programs that truly help aspiring teachers across the nation harness the power of data in service of their students.