CENTER FOR TEACHING QUALITY
TEACHERS TRANSFORMING TEACHING

TEACHING 2030: Leveraging Teacher Preparation 2.0

By the CTQ TeacherSolutions Teacher Prep Team

Foreword

Debates continue to rage among analysts and researchers over whether university-based education schools should prepare teachers and how much training is needed before a new recruit teaches independently. Media outlets often portray teacher education as irrelevant at best. I am certain there is some truth that some education schools are guilty of emphasizing how children learn to read at the expense of making sure they know the mechanics of reading. But the critique of education schools often goes beyond the evidence—as well as beyond the pale. For example, *New York Times* columnist Nicholas Kristof recently made the claim that there are no special skills acquired in teacher training courses, only "snake-charming" ones.[1] And there are "inside-the-Beltway" think tanks—using questionable research methods—that seem to make a decent living bashing education schools.[2]

America is home to more than 1,200 university-based education programs. Too many of them are not up to par for a variety of historical, political, and economic reasons. However, there are large numbers of excellent programs that prepare future teachers for the schools of today and tomorrow. Even the harshest teacher-education critics would have to pause from their usual rants if they had heard from education school graduates Lauren Harvey (East Carolina University), Katie Miszewski (Alverno College), and Keisha Soloman (Morgan State University), who spoke recently at a national conference about the power of their university-based pedagogical training. Lauren, Katie, and Keisha all talked about how their university professors, working closely with expert PK-12 teachers, prepared them to differentiate instruction and use formative assessments in teaching math and literacy skills to students in high-needs schools. They also spoke of the positive influence of having to pass the edTPA, a rigorous performance assessment for student teachers that is being advanced by the American Association of Colleges of Teacher Education (AACTE). It was the edTPA that pushed them to learn and think about their practice so that they could demonstrate their expertise in planning, instruction, assessment, and analysis of teaching and academic language.

Granted, we know that there is often more variation within "traditional" and "alternative" approaches to teacher education than between them. But as described in the report that follows, written by some of the nation's best teachers, serious clinical preparation matters for early successes of new recruits. None of the top-performing nations in the world, such as Finland or Singapore, tolerates shortcuts into teaching. At the

same time, our universities must continue to find innovative ways to ready nontraditional recruits for the rigors of teaching. Preservice teachers need customized preparation for the 21st-century pedagogical skills demanded by not just the Common Core State Standards, but the global economy in which students must participate.

Too much of today's criticism of teacher education is driven by politics, not substance, and focuses on outdated issues instead of ones unique to the demands of 21st-century teaching and learning. Teacher preparation of today and tomorrow needs to equip new recruits to teach highly mobile students, develop their own assessments, improve data systems, engage parents and policymakers, and lead the transition of many of our high-needs schools into 24/7 community hubs. I encourage you to dive into this report, written by educators who work with students every day. Their insights on "Teacher Prep 2.0" provide a much-needed antidote to the current debate, and their thinking on "Teacher Prep 3.0"—led by Emily Vickery—should lead the next generation of discussions and action around teacher-education reform. TEACHING 2030: Leveraging Teacher Preparation 2.0, penned by 17 classroom experts, transcends the current divide and sets a path for ensuring that every teacher is ready to teach what students need to know, now and in the future. We are grateful to MetLife Foundation for its support of this work and steadfast belief in the value of a teacher "action tank" and CTQ's future-focused ideas and products. You cannot create what you cannot imagine.

—Barnett Berry, CEO & Partner, CTQ

1 Kristof, N. (2006, April 30). Opening classroom doors. New York Times. Retrieved from http://select.nytimes.com/2006/04/30/opinion/30kristof.html?_r=1
2 Thomas, P. (2012). NCTQ Unmasked. Huffiington Post. Retrieved on March 8. 2013 at http://www.dailykos.com/story/2012/06/01/1096454/-NCTQ-Unmasked; Benner, S. (2012). Quality in student teaching: Flawed research leads to unsound recommendations. Retrieved on March 8, 2013 at http://nepc.colorado.edu/thinktank/review-student-teaching

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Introduction

TEACHING 2030: Leveraging Teacher Preparation 2.0 explores what research tells us about teacher preparation and applies the thinking and ideas of classroom experts. Moving to a new framework demands jettisoning 20th-century debates over teacher preparation and executing a bold vision for change. The time to think and act differently is now.

This report draws on what works today in isolated pockets of teacher preparation, but dares to rethink the profession to better serve tomorrow's students.

The vision expressed in what follows transcends typical debates over the merits of traditional university-based teacher education versus "shortcut" alternative certification programs. Today's policy environment reinforces a false dichotomy between the two. We find some strength—and plenty of room for improvement—in each.

We selected this publication's title, TEACHING 2030: Leveraging Teacher Preparation 2.0, because it's time to change what "teacher preparation" is and does. We need to transform current federal and state preparation policies—teacher preparation 1.0—which tend to focus on training teachers to teach using a narrow set of pedagogical skills rather than preparing them to lead.

Simultaneously, we must change our approach to school organization where each teacher plays pretty much the same role as anyone and the only to way lead is to leave the classroom. To attract and retain a talented workforce, the teaching profession must offer diverse opportunities for satisfying, impactful, and rewarding career growth—within and beyond the classroom. We must not only improve preparation programs but also build demand for the teacher leaders they must produce.

Our Teacher Preparation 2.0 framework comes directly from the source: We are effective teachers who work with at-risk students in high-needs schools and districts. For example, in our framework we ask

Peering at the future of teaching and learning

The year is 2030 and teacher recruitment and preparation look a lot different. No, we are not flying around on jetpacks like George Jetson—but we are experiencing a variety of clinical placements for a profession that demands varied roles. The teacher credentialing programs of 2030 involve a more honest introduction to the challenges and rewards of teaching, while also more accurately predicting a candidate's future ability to teach. Teacher recruitment and preparation programs in the early 21st century were all about counting courses. But the programs in 2030 are all about finding and preparing teachers who possess the three Cs: content, communication, and character. Teacher candidates undergo performance assessments (not multiple-choice tests) to see who should teach what —and under what conditions. By 2030, teacher credentialing programs have become differentiated—clearly focused not only on quality but on matching teachers to the verified needs of the marketplace. These programs lure folks from every profession to share their knowledge. And while there is flexibility about the paths candidates can travel to achieve a credential, the programs have become more rigorous gatekeepers for the profession as a whole. Individuals who achieve a teaching credential no longer hear, 'oh, you're just a teacher?' at parties but are treated with appropriate awe. Hey, it's my fantasy, right?

—Heather Wolpert-Gawron,CTQ teacher leader, as quoted in TEACHING 2030

you to think about cohort-based residencies that take place in and out of cyberspace and teacher preparation that takes place across universities and school districts bound by fused resources. We are hopeful that new teacher performance assessments—launched of late by the American Association of Colleges of Teacher Education (AACTE) and Stanford University—will lead to a more unified approach to preparing future teachers in both traditional and alternative settings.

Our bold recommendations are influenced by research and based on our own experiences in teacher preparation—but, most critically, are informed by our deep understanding of what knowledge and skills new recruits to teaching need to be effective in our schools, now and in the future.

Finally, we offer some hints about Teacher Preparation 3.0—where we imagine the profession and teacher preparation are headed by the year 2030—a marker for CTQ and its mission to support a high quality public education system for all students driven by the bold ideas and expert practices of teachers. In less than 17 years we must prepare and "badge" teachers for 21st-century pedagogical skills in (1) connectivism; (2) digital literacies; (3) gamification; (4) analytic, playlist, and long tail teaching; and (5) Open Educational Resources (OERs) and Massive Open Online Courses (MOOCs). We see far more teacher specialists and generalists needed for the public schools in the not-so-distant future.

In this report we highlight a handful of promising programs that are already preparing the teachers that students need. But based on our classroom experience and the research evidence we've examined, we believe our nation can—and must—stop raising standards for university-based prep programs while lowering them for alternative certification programs. As in top-performing nations like Finland and Singapore, all full-time teachers must meet high standards before they begin to teach.

It's time to reboot America's approach to teacher preparation. Join us.

Who are we? And how were we prepared?

As accomplished educators, we have come together of our own initiative, connecting with other members of the CTQ Collaboratory—a virtual community where thousands of classroom experts can connect, ready, and mobilize to transform the profession.

Several of us are co-authors of *TEACHING 2030* who seek to expand on our initial ideas and highlight new evidence. Some are National Board Certified Teachers and State Teachers of the Year. Each of us has achieved success in teaching and learning. However, we took different paths to prepare for the profession, including traditional university-based programs; residency programs following undergraduate degrees; innovative programs in research or liberal arts institutions; or alternative certification routes. Our sense of readiness varied widely, but we all can identify positive and negative ways in which our preparation pathways have shaped our classroom careers.

Our Influences

- *TEACHING 2030: What We Must Do for Our Students and Our Public Schools… Now and in the Future* (Teachers College Press, 2011), by Barnett Berry and 12 classroom experts (including some of us);
- "Transforming Teacher Education Through Clinical Practice: A National Strategy To Prepare Effective Teachers" by the National Council for Accreditation of Teacher Education (NCATE);
- "Transforming Teaching" by the Commission on Effective Teachers and Teaching (CETT), an independent group of teacher leaders convened by the National Education Association;
- Dozens of additional research studies, including the National Bureau of Economic Research's "Teacher Preparation and Student Achievement" (Boyd, Lankford, Loeb, Wyckoff);
- Our own teacher preparation experiences;
- Investigation of teacher preparation policies and programs at the state level;
- Structured dialogue with researchers and teacher preparation faculty;
- And, last but not least, our expertise in teaching high-needs students.

How did we collaborate?

In 2006, CTQ launched the TeacherSolutions process—a unique approach to elevating the voices of accomplished teachers on education policy issues.

The TeacherSolutions process includes:

- A diverse team of 10 to 20 expert PK-12 teachers engaged in research and analysis around a particular policy area, investigating relevant theory and current best practices;
- Open conversations with leading researchers and key policy stakeholders to further inform the team's thinking and refine their insights; and
- Collaborative authorship of an informative product (report, infographic, video, presentation, etc.) that draws on research, best practices, and team members' experience, outlining innovative recommendations and insights.

TEACHING 2030: Leveraging Teacher Preparation 2.0 is the fifth TeacherSolutions report supported by CTQ. Previous reports have examined performance pay, National Board Certification, teaching and working conditions, as well as the future of teaching.

Teacher Preparation 1.0

Understanding our past is critical to paving a path to the future. The history of the teaching profession in America is stormy and convoluted, framed by the struggle to determine who teaches what and how teachers are prepared (or not prepared). And let's face the facts: Teachers' salaries have not been competitive, making it difficult, if not impossible, for education schools to attract top talent to teaching. Historians like David Labaree and James Fraser have pointed out that since their early days, many universities treated education schools as "cash cows" and continue to do so, making it difficult for them to invest deeply in training new recruits. We encourage you to read the work of these historians, but what follows are some of the lessons we learned about the roots of teacher education in the U.S.

Normal schools

The origins of Teacher Preparation 1.0 can be found in the mid-19th century with the advent of "normal schools," where women and a few men were trained and certified to efficiently teach children to work in America's industrializing economy.

Although teachers-in-training were expected to pass muster on certain pedagogical skills before entering classrooms, local school board members routinely increased or lowered entrance requirements for the teaching workforce. They more often did the latter. Some created their own teacher institutes, truncating teacher preparation. Early on, these institutes "reflected the dominant view that good teachers were born not made, hence need[ing] only a modicum of training to sharpen and refine their natural abilities."[1]

James Fraser's Preparing America's Teachers: A History *and David Labaree's* The Trouble with Ed Schools *provide an in-depth examination of teacher preparation in the U.S. and how the history of preparation has shaped the current system—and the teaching profession as a whole.*

Underfunded profit centers for universities

Over the years, normal schools expanded into university-based schools of education. But university presidents and provosts tended to use schools of education as "cash cows." They admitted almost anyone who wanted to earn a teaching credential, then trained these candidates at as low a cost as possible.

Teacher education programs have long been ridiculed for low standards. Over time, state certification standards increased (e.g., more intensive requirements and testing of recruits), but teacher education programs have never been taken seriously.[2] Not surprisingly, it became clear that there was a lack of coherence among programs. By the 1960s, education schools were portrayed in unflattering terms, as "puerile, repetitious, dull, and ambiguous."[3] This legacy is still with us today.

In 1996, the National Commission on Teaching and America's Future (NCTAF) argued that, historically, teacher education in the United States has suffered many failings, including inadequate time for candidates to learn how to teach and fragmentation of coursework in both liberal arts schools and education schools with clinical training. NCTAF also identified the prevalence of uninspired teaching methods, superficial curriculum, and traditional views of schooling—including "pressures" from school districts to "prepare candidates for schools as they are."[4]

Some schools of education produced candidates who were well-prepared for teaching. Yet the unevenness among training programs persists. National policy leaders continue to complain about teacher education, but local ones rarely do anything to improve them.

In a CTQ webinar with Linda Darling-Hammond, we learned that among the 1,200 colleges and universities that prepare teachers, only about 300 have instituted serious standards for entry; fully integrated theory and practice throughout the academic program; and demanded serious clinical training (up to a full year) under the tutelage of specially trained master teachers. We have since discovered that Darling-Hammond's work as a teacher educator has been used in top-performing nations like Finland and Singapore to fuel their own reforms of university-based preparation.

Additionally, in 2008, researchers found that preparation programs requiring well-supervised, full-year student teaching, with strong "congruence" between the training experience and the first-year teaching assignment, produced more effective recruits into teaching.[5] However, the results of this and similar studies have *not* led to a spate of investments in programs that require intensive internships. In fact, federal and state policies continue to ignore these findings, offering more shortcuts into teaching that increase the likelihood that poorly prepared recruits will leave the profession. Ideology seems to trump good policy.

Accreditation of teacher education schools

Under increasing pressure to improve, the teacher education community has continued to mold quality control through national accreditation and address the hodgepodge of training programs.[6]

The National Council for Accreditation of Teacher Education (NCATE), which began in the 1950s, has been the major vehicle for ensuring this quality control. In the 1990s, under the leadership of Arthur E. Wise, NCATE began to enact tougher standards. However, except in a few states, the NCATE accreditation remains voluntary, in part because state policymakers have not wanted to invest in all teacher education programs, or take on the politics of closing down a moneymaker for one of their favorite universities. As a consequence, the bar for passing muster on national accreditation standards has advanced only marginally.

The newly formed Council for Accreditation of Educator Preparation (CAEP) promises to focus less on narrow inputs and more on valid outcomes to assess future education programs. CAEP's focus on using evidence of candidate learning gives us hope. However, as long as the accreditation process today remains voluntary, we worry about the "teeth" that can be applied to traditional and alternative preparation programs alike.

Alternative routes

As the 20th century came to a close, critics of education schools seemed to get louder, and more alternative programs emerged to offer shortcuts into teaching. Today about a third of newly minted teachers enter the profession through alternative pathways.[7] Alternative certification routes now produce about 60,000 new teachers per year,[8] representing a nearly 200 percent increase since 2000-2001.[9]

While alternative certification programs have attracted much-needed and sometimes talented recruits into teaching, they have not proven effective in supplying well-prepared teachers who will remain in the profession

long enough to close the achievement gap. When less-prepared recruits appear to be as effective as other teachers, they are often being compared to those who have as little training as they do.

Recent analyses from AACTE suggests that about 88 percent of new teachers are prepared in universities—including those in alternative certification programs. Critics call for nonprofits and school districts to prepare teachers, but it appears they cannot produce all the teachers that need to be hired each year. High rates of turnover continue to beset our public schools, especially ones with the most high-needs students. Instead of a simultaneous focus on fewer programs, more rigorous clinical placements, and incentives for top talent to get prepared and stay in teaching, it seems that policymakers would rather judge teacher education programs on how well their graduates' students perform on a once-a-year standardized test.

Value-added accountability

In the last few years, policymakers began to promote the use of value-added statistical data to hold education schools accountable for the standardized test-score gains of the students their graduates taught. More than a dozen states plan to use the value-added metric, following the lead of Louisiana, which has made claims that the data have helped programs improve. However, researchers point to the fact that the differences in the effectiveness of graduates across programs are very small and that the data are unstable due to statistical error. They also note that new teachers from any one college or university teach under vastly different conditions, variables for which statisticians cannot control.

Despite these problems, policymakers are forging ahead with the single measure, built from one annually administered standardized test, to judge teacher education programs. Under the Obama administration, the U.S. Department of Education has crafted regulations mandating states to use value-added statistical data in order to be eligible for higher education funding.

Teacher education programs should be judged on student learning outcomes, customer satisfaction, and placement and retention rates—but we have learned that there is a lot of capacity-building needed inside of universities and school districts in order to assemble accurate data on these measures. And we wonder about how a once-a-year standardized test score can be used to judge teacher education programs when graduates teach in so many different contexts.

Lessons from another profession

Contrast teaching with other professions in the United States—medicine, for example—that have created preparation programs and licensing systems to ensure readiness to begin professional practice. These fields' standards and requirements vary little from state to state, and national exams ensure quality control. Interestingly, the structure of preparation programs for these professions (including their design, timeline, and approach) tends to be consistent, too.

For example, almost all medical students must participate in a four-year program followed by approved residency programs with consistent time frames and expectations before taking national boards in specialty areas. Before taking the national boards in specialty areas, all prospective doctors must pass a state licensing exam that is influenced by what the profession believes new practitioners need to know and be able to do. There is some experimentation with a three-year design for medical education. Interestingly, these

designs demand more intense clinically based programs. Another new design feature is the inter-professional cohort model, where candidates from different fields are trained together so they enter practice knowing how to work collaboratively to support all aspects of a patient's treatment.

In stark contrast with these professions, teaching preparation programs and licensing requirements for teaching vary greatly. Even those teachers who are hired for similar teaching positions in the same state may have been prepared in very different ways.

Unlike top-performing nations like Finland and Singapore, the United States does not have a common teacher-education and licensing system. Instead, our teachers come through myriad programs run by universities, school districts, and nonprofits. State-specific regulations determine who enters teaching, how, and when.

For example, a new middle school teacher may be expected to have only seven weeks of training, or a full year with a range of tightly supervised clinical experiences. In Mississippi, one alternative certification route allows a middle school teacher to have less than four weeks of preparation without any classroom experience. This teacher would be labeled "highly qualified," while in Massachusetts, a teacher must have a master's degree to be "highly qualified."[10] Of course, even states with "high bars" often waive them in the face of teacher shortages.

To make matters more complicated, the federal government has not enforced the "highly qualified teacher" provisions of No Child Left Behind. This means that new recruits, still in training, can be labeled as "fully certified." While policies to ensure that every student receives instruction from appropriately prepared personnel are laudable, there has yet to be a standardized determination of "highly qualified" within the teaching ranks.

Toward 2.0: Where are we now?

Students of today—and tomorrow

Teacher preparation programs in the U.S. must prepare candidates for students who will grow up and work in an interconnected world. Marc Prensky points out that technology, and its impact on knowledge development and use, has created students who "do not just think about different things, they actually think differently."[11] Students today have access to new types of information, can connect and collaborate with others constantly, and have the ability to create and share products. They process information and content very differently than previous generations. Today's successful teachers understand how best to reach these 21st-century learners.

Of course, today's students and teachers have access to new technologies that can dramatically change learning environments. But evolving technologies are only effective when teachers know how to use them to help students meet specific instructional goals.

The Common Core State Standards—adopted by 46 states to date—emphasize knowledge and skills students will need to succeed in the global marketplace. The CCSS call for the mastery of interdisciplinary knowledge as well as critical thinking, collaboration, and communication. Teachers need to be ready to create curriculum and design ongoing assessments of student learning that are aligned with these standards.

What's more, today's teachers must also be prepared to work with an increasingly diverse group of students. According to a recent report from the Alliance for Excellent Education, "In a dozen states during School Year (SY) 2009–10, students of color and Hispanic and Native students made up the majority of the student population. Such complexities extend throughout the nation. In ten additional states, students of color made up between 40 percent and 50 percent of K–12 enrollment."[12] By 2030, it has been estimated that 40 percent of students will come to school speaking a language other than English. With such dramatically shifting demographics, the ability of teachers to engage learners from a variety of cultural backgrounds will remain a priority.

Meanwhile, teachers serve an increasing number of students in poverty. The 2010 census report estimated that 44 percent of children in the U.S. live in low-income families, with nearly 22 percent of U.S. children living in poverty. The current child poverty rate is 50 percent higher than it was in the early 1970s.[13] Additionally, the number of students who are homeless—now more than 1.5 million—is on the uptick.[14]

More districts, schools, and nonprofits (like Harlem Children's Zone) are working to provide wraparound support systems, offering social services and health care within the school setting. But these programs can only work well when classroom teachers know how to make the most of existing and potential partnerships, integrating PK-12 instruction with parent education, medical care, nutrition and well-being services, neighborhood safety, and community development services.

Today's preparation programs

When examining what today's students need, we hinted at something important: Teaching is as challenging a field as ever. Research shows that several qualities contribute to or detract from the likelihood that a teacher will be effective, but preparation program is a critical component to success.

As we've described, insufficient preparation programs of today are not preparing teachers with the skills and knowledge they need to effectively teach diverse students in a wide range of learning environments, including face-to-face, blended, and virtual. Too few programs prepare recruits to teach highly mobile students, develop their own assessments, and improve data systems. Not enough programs prepare recruits to engage with parents or work in schools as 24/7 community hubs.

Despite marked improvements, too many university-based programs do not directly connect coursework to the realities of students and communities. Alternative routes, often serving as shortcuts to the profession, attempt to make this connection, but ignore the needs of new recruits to master deep knowledge of child development and content-specific pedagogies.

Let's be clear: different programs have varying strengths and no one type of program appears to be "the only" solution for teacher preparation.[15] And—as we've outlined—teaching is a demanding profession. But while teachers may not be able to enter the profession as experts, they can be much more prepared for the demands, expectations, and students of the 21st century.

Alternative routes

Programs providing alternative routes to certification can be housed in nonprofit organizations, school districts or education "service centers," and within colleges and universities. These alternative pathways are often more nimble in redesigning and adapting their structures for diverse recruits, many of whom are not the traditional population of college-age students preparing for their first jobs.

Well-designed alternative certification programs offer faster ways to enter teaching, while also ensuring quality by requiring graduates to meet specific standards before they take on a full-time teaching load. Perhaps most importantly, successful alternative programs connect 1) what recruits learn before they begin to teach; and 2) what recruits must do on the job. Typically this is accomplished by hiring expert practitioners to teach recruits.

The best alternative pathway programs have demonstrated that they can recruit academically able young people interested in devoting at least a few years to urban teaching and that they can more flexibly meet the needs of non-traditional candidates in the prospective teaching pool.

However, many alternative pathway programs face challenges and exhibit shortcomings:

- Abbreviated curriculum that doesn't adequately address how to teach diverse learners;[17]
- Insufficient clinical experience prior to full-time teaching positions;
- Too few opportunities to simultaneously learn content and how to teach it;
- Overemphasis on preparing teachers for a singular context (e.g., a particular district) or a limited, pre-scriptive curriculum;

- Limited resources and structures for providing systematic induction support for graduates; and
- Lack of accountability for graduates' effectiveness.

University-based programs

When traditional university-based programs are carefully designed and well-supported financially, their graduates (and their graduates' future students) reap the benefits. University programs can offer prospective teachers opportunities to learn content and pedagogy simultaneously.

They can also connect theories of teaching and human development to clinical training. Research has shown that well-prepared novices with intensively supervised clinical experience are more likely to stay in teaching longer than those who enter the profession through programs with limited clinical experience.[17]

Sound university-based programs offer significant clinical experiences in carefully selected schools and classrooms. And they also ensure that prospective teachers are prepared to teach more than a specific district's curriculum du jour. New evidence reveals that teacher education students are more academically able. However, many traditional, university-based programs face challenges and exhibit shortcomings:

- Too few opportunities for prospective teachers to be taught by exemplary classroom teachers;
- Failure to target district needs for teachers of math, science, special education students, and English Language Learners (ELLs);
- Limited resources and structures to provide systemic induction support for graduates once they begin teaching; and
- Lack of accountability for graduates' effectiveness.

Urban teacher residencies

The good news is that there is a small movement afoot to build on lessons from medicine. Driven by collaboration—not competition—among universities, nonprofits, and school districts, urban teacher residencies (UTRs) have emerged as a powerful example of how to overcome the shortcomings of both traditional and alternative teacher preparation. UTRs support qualified candidates in a yearlong internship, under the mentorship of master teachers, with specific pedagogical training for teaching in high-needs schools. As is the case in top-performing nations, UTR recruits are supported financially in their training year, as well as in their first few years of teaching, and are prepared as career teachers.

Administrators who hire candidates from UTR programs rate them highly—but often no more highly than those who matriculate from "traditional" education schools that require a full year of student teaching. But because of the incentives offered, UTRs are more likely to recruit and retain teachers—including more minorities, who are much needed in our inner-city schools, than traditional teacher education programs.

A recent study shows that the Boston Teacher Residency (BTR) attracts candidates who are more likely than other district recruits to be racially diverse, more likely to teach math and science, and more likely to remain teaching in the district through their fifth year. The researchers found that BTR graduates, who have value-added student achievement data for their classrooms, initially are no more likely to increase test scores than other novice teachers. However, BTR graduates improve at increasing rates over time, and by their fourth and fifth years outperform veteran teachers. This study, while more sophisticated than most others, suggests

to us how complicated it is to measure the effectiveness of teacher education programs, especially ones that send their graduates to many different schools in various districts around the nation.

We do know that UTRs, which number fewer than 50 in the U.S., prepare fewer than 1,000 recruits annually. In addition, they operate on very shaky financial ground, relying on philanthropy rather than traditional local, state, and federal funding formulas.

And while UTR programs are rightfully touted for their in-depth preparation and mentoring for teaching in increasingly diverse inner city students, many are still focused mostly on training teachers for today's schools, not tomorrow's.

Teacher preparation as investment

Traditional and alternative teacher preparation programs in the U.S. produce more than 200,000 new teachers each year. However, these programs face significant challenges to developing and supporting effective teachers who are likely to stay in the profession after the initial few years.[18]

In contrast, top-performing nations like Singapore and Finland recruit and prepare teachers with the long haul in mind. In addition to producing classroom-ready graduates, these countries develop graduates who are committed to teaching as a career.

And both countries attribute their students' success to their investment in teacher preparation.

Significantly, teachers' careers in top-performing countries offer many opportunities to specialize and take on leadership roles. These countries prepare teachers as action researchers who know how to diagnose student learning difficulties (Finland) as well as leaders who serve in specialized roles without having to abandon classroom teaching (Singapore).[19]

Why do students in Finland and Singapore outperform American students? A primary factor is that both countries view teachers and teacher education as a paramount investment, not a nagging expense. They invest heavily in teacher preparation.

In Singapore as well as Finland, all recruits are from the "top of

What can we learn from other countries?

'We should look beyond the United States for promising practices,' says Marc Tucker in "Standing on the Shoulders of Giants: An American Agenda for Education Reform," an article derived from his recent book, Surpassing Shanghai.

Tucker examines education systems in countries where students tend to score significantly higher on international assessments than do American students: Canada (focusing on Ontario), China (focusing on Shanghai), Finland, Japan, and Singapore.

Tucker defines teacher quality based on: "1) a high level of general intelligence, 2) solid mastery of the subjects to be taught, and 3) demonstrated high aptitude for engaging students and helping them to understand what is being taught."[22]

The countries he studies use a set of connected strategies to address three areas related to recruiting and retaining teachers: status, compensation, and working conditions.

Tucker identifies several key strategies that could work in the United States:

- *Raising standards for entry into teacher education;*
- *Increasing compensation so that it is not a deterrent for top students;*
- *Increasing the profile and quality of schools of education;*
- *Aligning teacher education and induction;*
- *Ensuring that teachers are only teaching within content areas for which they have had substantial preparation and mentorship;*
- *Setting licensure standards that are not waived due to shortages; and*
- *Continuing professional development in instruction and career development.[23]*

their class" and have their preparation paid for by the government.[20] In the U.S., policymakers like to talk about the need to recruit top students to teaching, but they have yet to commit to this ideal by actually paying for it.

In Finland, all practicing teachers complete a rigorous, six-year course of study in very selective schools of education. Less than 10 percent of highly qualified applicants earn entry into the nation's eight schools of education.

Emerging from the Soviet shadow, Finland created a teacher preparation system that integrates theory, research, and practice as well as problem solving, inquiry, and critical thinking.[21] The nation has only eight teacher education programs, all adhering to the same standards for entry, training, and certification. All teachers are expected to earn a master's degree from one of these programs, where they gain in-depth knowledge of child development while learning about multiculturalism and diversity and conduct research alongside university faculty.

Once enrolled, candidates complete coursework that requires mastery of their subject area, as well as instructional preparation and practice under the guidance of master teachers. Higher education faculty are selectively recruited from the classroom to ensure that teaching candidates are learning from practitioners who have recent instructional experience.

And now the Finns are pushing further. Finland is transforming its teacher education curriculum, familiarizing teachers with social media projects, virtual worlds and modeling, edugame programming, and strategies for educating highly mobile students who might not attend one school routinely.

The U.S. cannot afford to continue preparing teacher candidates for an outdated Industrial Age. Those who will drive our nation's economic future need teachers who have the knowledge, skills, and resources to help all students meet 21st-century demands.

The Teacher Preparation 2.0 framework

Teaching cannot be transformed into the profession students deserve without a dramatically different approach to the teaching profession and the system that prepares candidates for the demands of 21st-century classrooms. We must reorganize how schools are structured to transcend an outdated model that limits the innovation of our best teachers while providing few opportunities for them to lead without leaving the classroom and students. We must create a profession that attracts and retains talent while offering meaningful and rewarding career paths. We must improve preparation programs by ensuring demand for the teacher leaders required for a rapidly changing educational and social climate.

Our bold recommendations, informed by our firsthand understanding of what knowledge and skills new recruits to teaching need to be effective in the schools of today and tomorrow, focus on changes to the teaching profession and the paths that prepare candidates for the classroom.

- **Professionalization:** Let's face it. Public perceptions of the teaching profession are directly related to the ability of teacher preparation programs to attract and produce the most effective teachers. Improving the prestige and economic attractiveness of the profession could help teacher preparation programs attract the most capable candidates. So could better working conditions, diverse opportunities for career growth, and rigorous, consistent expectations and assessments. Teacher education must be based on larger efforts to build **powerful partnerships**, **fuse resources**, offer competitive **incentives**, transformation of **career pathways** (and preparation for those new pathways), **integrate research and practice**, and change how **teacher preparation programs** operate.

- **Teacher preparation programs**: The structure, components, and philosophies of teacher preparation programs affect candidates' experiences, effectiveness, and morale as they enter the profession. As **systemic factors** are fine-tuned, preparation programs can do a great deal to model the instruction, collaboration, and leadership that they want their candidates to practice as teachers. For example, preparation programs can recruit candidates who have sound **interdisciplinary** backgrounds. We can make a variety of preparation pathways available to candidates. And focusing on competencies instead of seat time will ensure that candidates' preparation experiences are tailored to their individual needs. While **cohort-based residencies** will expose candidates to students similar to those they will teach, candidates can also benefit from **blended lesson studies and virtual networks** that presage the future of teaching and learning. **Performance-based assessments** will enable teachers to more accurately demonstrate their readiness to take on their own classrooms.

As we discuss each component, we'll provide a topline view of relevant data, comments, and recommendations.

Components of an Effective Teaching Profession

This section details recommendations for enhancing conditions of the teaching profession to ensure that talented candidates are entering supportive careers conducive to professional growth, advancement, and leadership.

Fusing resources

Currently, teacher preparation programs and local districts in the U.S. tend to operate separately. For many preparation programs, collaboration with local school districts is minimal at best. Only rarely do policymakers and administrators coordinate licensing, recruitment, teacher preparation, and retention programs.

Schools (and the students they serve) could benefit from collaboration with preparation programs to accomplish complementary objectives:

- Aligning licensing or certification requirements with teacher preparation and state education goals to optimize the recruitment, preparation, and ongoing growth of strong teachers.
- Coordinating the needs of teaching's labor market so that incentives can be used to encourage teachers to prepare to teach in particular areas of expertise or geographic locations; and
- Fusing fiscal and human resources to increase effectiveness of teacher preparation programs, enabling more substantial residency or hands-on experiences for candidates, coordination with teacher certification programs, and alternative roles for teachers.

Aligning licensing with preparation

Teacher licensing or certification plays an important role in the Teacher Preparation 2.0 vision, as requirements may guide teacher preparation coursework, student teaching experiences, teacher effectiveness evaluation, and professional growth for all teachers.

Teacher licensing and certification is controlled by states. While many states' requirements resemble others', they often require teachers to go through different steps and processes for licensure. In most cases, a certified teacher in one state has to reapply and become relicensed to teach in a different state, and this often requires additional courses and/or exams.

Finding the experts at their source: classrooms

Teacher experts still in the classroom should be our 'go-to' sources for teacher educators. Often we hear the complaint that those preparing our new teachers are too far removed from the PK-12 setting to understand 21st-century candidates' challenges and needs. Utilizing teacher experts (still working in the field) in this role makes so much sense that it seems ridiculous that it is not already the practice of choice. And having new and pre-service teachers working with practicing teacher experts is a perfect set-up for action research.

If new teachers were prepared on site in PK-12 schools, perhaps the role of higher education could be more that of contributing faculty who serve in residencies in the PK-12 setting. These faculty members could serve as research resources working with the practicing teacher experts. Their role would be more one of support.

— Linda Reid

This situation is particularly problematic for online teachers. iNACOL, the International Association for K-12 Online Learning, shares in its "Promising Practices in Online Learning: Funding and Policy Frameworks for Online Learning" the challenges of teacher certification in the U.S.:

> "… very few states have made the next logical observation that online teachers should not be restricted to teaching within state lines…. States could easily balance the supply of highly qualified teachers by creating reciprocity with other states—recognizing each other's certification of qualified online teachers. The result would be increased access for students who otherwise might not be able to easily take a course in a subject such as physics, chemistry, or a foreign language—online or otherwise."[24]

The Commission on Effective Teaching and Training (CETT) goes a step further, recommending national standards for preparation, licensure, and certification. Specifically, CETT states:

> "If teachers are to be held accountable and responsible for student learning, the profession must take responsibility for the performance of its members. In order to ensure that every child—regardless of family income, location, or other factors—is taught by effective teachers, it is crucial to set national standards for the preparation, licensing, and certification of educators. Today, individual states establish their own standards for teachers, and some states have established standards for teacher educators. These standards range widely, from highly demanding in some states to insignificant in others. Furthermore, effective teachers and talented teacher candidates often find it unnecessarily difficult to relocate from one state to another because of inconsistent or conflicting licensure policies."[25]

Models do exist for such national standards. For example, the National Board for Professional Teaching Standards (NBPTS) has developed an in-depth, performance-based process for identifying teachers as National Board Certified if rigorous requirements and expectations are met.[26]

Several on our team have pursued and achieved National Board Certification. Tellingly, districts, schools, and individual teachers see the certification process as a significant asset due in part to the professional learning that occurs during the process (and the subsequent impact on students).

We are hopeful that recent efforts—primarily edTPA, which will be profiled later—will serve as a bridge to align preparation with licensing and development toward highly accomplished practice.

Coordinating the needs of teaching's labor market

Just as licensing and certification requirements differ among districts, so do incentives to enter the field of teaching. A number of states do offer incentives for teachers in high-needs areas, such as math and science. Yet state departments of education rarely work with teacher preparation programs and districts to analyze the labor market and needs. What are the consequences of this lack of coordination?

Too many teaching candidates in America are trained in subject areas for which demand is low. Subsequently, they may have difficulty finding employment, or may be placed in subject areas or grade levels for which they have little or no training.

Meanwhile, students in many states don't have access to enough qualified teachers in other subject areas. To name just one example, the Alliance for Excellent Education reports that the state of Georgia has only 88 physics teachers for its 440 high schools.[27]

Coordination could improve candidates' chances of securing appropriate positions, help ensure that students have qualified teachers in every class, and distribute education funding effectively.

And—to return to certification and licensing momentarily—even if a state cannot meet its teacher shortages by coordinating with in-state preparation programs, certification across state lines could provide short-term relief via online instruction.

Fusing resources

Independently, a teacher preparation program or a district may not be able to institute key elements of effective preparation: residency programs, community internships, performance-based assessments, or induction programs.

But what if teacher preparation programs, state policymakers, districts, and nonprofit organizations got creative? What if they fused financial and human resources to combine recruitment and preparation components?

Currently, nearly 50 percent of teachers leave the profession within the first five years,[28] with many citing the lack of support and preparedness as their reason for leaving. Imagine how much states and districts would save in the long run by ensuring that teachers are ready for the students, communities, and subject areas in which they will teach.

Similarly, districts can work together with teacher preparation programs to ready candidates for strategic hybrid roles, so that they are primed to serve as classroom teachers but also to share their expertise in other ways in the future. For example, as teacher preparation programs work with candidates, they can identify and begin to cultivate future teacher educators.

Indeed, by combining resources to fund hybrid positions, districts could supply teacher preparation programs with accomplished practicing teachers

Economics of teaching

It does seem odd that we continue to "preach" to young people (of diverse backgrounds) in schools that education is the gateway to economic advancement and opportunity, yet the economics of going into teaching as a profession seem to steer young people away from it. Why would the brightest and the best join our ranks when they can do so much better financially in another avenue? Elevate the profession? Yes… but also elevate the economics of the profession.

— Curtis Chandler

Attracting, preparing, and retaining the best teachers

A teacherpreneur is a practicing teacher who spends part of his or her workweek outside the classroom working on efforts to transform education. A teacherpreneur, with one foot firmly rooted in teaching students, works to transform public education. And while American policymakers continue to divide the world of teachers and those of reformers, teacherpreneurs do much of what Peter Drucker said of entrepreneurs almost 50 years ago: They "search for change, respond to it and exploit opportunities."[34]

Teachers seeking opportunities for professional growth often leave the classroom completely due to a lack of alternatives. They take full-time administrative roles, or even turn to other professions. And our students lose some of their best and most innovative teachers.

Recruiting and retaining a competitive teaching workforce—and making the best possible use of their talents—will require us to think differently about the roles teachers can and should play in the United States.

Teacher preparation programs can and must prepare candidates for the kind of hybrid teaching roles demanded by the public education system of today and tomorrow.

who keep one foot in the classroom while also mentoring candidates or new teachers.

Neither teacher preparation programs nor school districts can change the future of teacher preparation alone. And policymakers have a critical role to play in resource-sharing as well. Collaboration among these stakeholders is critical to ensure the development of effective, meaningful preparation for the teachers who will serve our students, schools, and districts.

Variety of preparation paths

Approximately 200,000 candidates complete a wide range of teacher preparation programs each year in the U.S.[32] While some programs provide training through a more traditional four-year college experience, other programs serve career-switchers, content area experts who want a teaching certification, or recent graduates looking to teach in hard-to-serve areas.

As referenced previously, alternative certification programs produce approximately 60,000 new teachers, and traditional, college-based programs graduate approximately 120,000, or 65 percent of the new teachers annually, with the remainder completing a graduate teacher education program.[29] Historically Black Colleges and Universities (HBCUs) play a significant role in the preparation of African-American teachers. "They graduate 50 percent of African American teachers with bachelor's degrees" and are responsible for helping diversify America's predominantly white teaching force.[30]

Research provides mixed results on the effectiveness of various programs. Some studies indicate that teachers' pre-service training and full certification are predictors of effectiveness and student achievement.[31] And some research finds that alternative certificate holders are less effective than traditionally-prepared teachers,[32] while other studies show that recruits from some alternative-route programs produce slightly greater achievement gains for their students.[33]

Yet there is more variation within the categories ("university-based programs" and "alternative routes") than between them. The reality is that programs in each category have room to grow and improve.

Given our country's high demand for teachers—and the importance of matching students and schools with motivated teachers who are well-equipped to serve them—our nation will continue to need a diverse set of options for teacher preparation programs.

One type or model of teacher preparation will not meet the needs of all candidates, schools, or districts in the United States. Instead, all preparation programs must ensure that candidates are ready to take on their own classrooms.

Incentives for recruitment and retention

Many factors influence whether an individual chooses to enter a teacher preparation program and, ultimately, the teaching profession. General public perceptions of the profession make a difference—is teaching respected and valued? Is it a competitive profession that attracts strong candidates?

Working conditions and salaries for teachers matter, too.

Other countries, such as Finland, provide incentives for individuals to enter teaching: high professional status, autonomy in the classroom, positive working conditions, and emphasis on research as part of the teaching role.[35] As a result, teaching is such a desirable and competitive profession that only 15 percent of applicants are accepted to teacher preparation programs.[36] Similarly, Singapore provides incentives for entering and staying in the profession of teaching. After seven years of service, teachers in Singapore receive a six-month sabbatical opportunity and a $9,000 stipend for travel to foreign countries to learn something new.

What are other incentives that could encourage more individuals to consider teaching a viable career choice? In the United States, many teachers graduate from teacher preparation programs with substantial undergraduate and/or graduate student loans that are challenging to repay on a teacher's salary. Education scholarships, loan repayment, and job placement support could motivate students who are interested in the profession.

The salary and benefits offered to teachers also contribute to how the general public views the profession. Unfortunately, highly qualified candidates in the United States are often discouraged from entering the profession because of its relatively low salary and level of prestige.

As Scott Storm explains, teacher preparation programs and districts can also provide opportunities for potential candidates—college, middle, and high school student—to gain a better understanding of the profession before committing to it:

> "Something teachers can do—especially teacher leaders in high-needs schools who care deeply about these issues—is to create structures that allow students to experience a taste of what teaching can be like. For example, I teach an elective called "Introduction to Education," which gives students a little bit of teaching theory, a little bit of practical experience, and a lot of inquiry-based discussions around race, class, culture and education in America. Teacher prep programs themselves could create summer programs (similar to Upward Bound) that

could focus on teaching. If we want our teaching force to represent a diverse and pluralistic American society, then we need to create avenues of access for all."

Studies show that the teaching profession in the United States is dominated by white females, and recruitment efforts may not be sufficient to increase interest for male and minority students who could enter the field. Many potential barriers may contribute to the lack of males and minority students who opt to enter teaching. Renee Moore reminds us that the widespread misuse of standardized exams as criteria for teacher licensing serves as a significant barrier to increasing the number of teachers of color:

"Today, ETS (maker of the Praxis) and other testing companies continue to confirm with their own data that the overwhelmingly African-American and Hispanic teacher candidates score significantly below their white counterparts on these tests—AND those differences are consistent regardless of the socioeconomic background or the quality of the teacher preparation program of the minority candidates. Balancing such exams with other, more performance-based methods of assessing candidates' pedagogical knowledge and teaching ability would not only improve the overall certification process but also remove an unnecessary barrier to hiring African-American teachers."[37]

Policymakers, preparation programs, and districts must work together to attract more capable candidates into teaching. Another attractant for highly qualified candidates is to offer multiple pathways and roles for teachers as they progress through their careers.

Preparation for hybrid and teacherpreneur roles

Many lifelong teachers who are closing out their careers in the early 21st century had basically the same job description on their first day on the job as they do now, 30 or 35 years later.

Others who began as teachers have left the classroom to "advance in their careers" (becoming school administrators) or have left the profession entirely.

The *TEACHING 2030* coauthors have outlined an alternative trajectory. They describe future teachers who spend time working directly with students but who also design curricula, conduct research, prepare teacher candidates, advise policymakers, coach or mentor other teachers, analyze data, leverage community resources, develop new technologies, or undertake other efforts to improve schools.

The *TEACHING 2030* vision goes beyond the most common form of teacher leadership, dating back to the early twentieth century: teachers who sit on school improvement teams or lead committees in addition to full-time teaching responsibilities.

It also goes past the current definition of "hybrid roles." According to the 2010 MetLife Survey of the American Teacher, about half of principals and teachers indicated that teachers in their schools currently teach in the classroom at least part-time while also having other roles in the school or district.[38] In some

schools, this practice is limited in scope, involving only a few teachers. And many teachers are maintaining a full teaching load, fulfilling the duties of their "hybrid roles" on their own time, on top of other responsibilities. And MetLife's most recent survey revealed that about one in four teachers are extremely or very interested in hybrid roles that would allow them to both teach and lead outside their schools, districts, and states. [39]

A true hybrid role provides the necessary time and support for teachers to take on official responsibilities within the school, district, or education community. This allows them to "progress" in their roles while remaining in the classroom for some amount of time. (As introduced in *TEACHING 2030*, a teacherpreneur serves in a hybrid role that is split between teaching students and working to advance the profession.)

Benefits for students and schools

Hybrid roles could make a big difference in teacher retention, making it possible for accomplished, ambitious teachers to continue to work with students even as they extended their influence.

Nearly 40 percent of teachers say that they would welcome opportunities to teach part-time in the classroom while having other district or school responsibilities.[40] Teachers who are less satisfied with their careers are especially likely to welcome such hybrid opportunities, presumably because they desire new challenges and spheres of influence.

Additionally, teachers eligible to retire might be more likely to stay in education if they had other options. "Three-quarters of teachers (75 percent) say they would like to continue to work in education beyond traditional retirement from classroom teaching."[41]

But hybrid roles could do much, much more than improve retention rates. Communities, districts, and teacher preparation programs could use hybrid roles to effectively tap into teachers' expertise to make significant gains in improving education. Imagine that we redesign schools, establishing a range of generalist and specialist teaching roles and creating career pathways that allow expert teachers to teach, mentor, and lead. Then we could make sure that no new recruit teaches independently before he or she is ready. As Art Wise noted almost ten years ago, school "must be liberated from its antiquated design." Building 21st-century teaching teams could "solve the problem of teacher quality in hard-to-staff schools." The job of teaching is so complex that no candidate can know all he or she needs to before beginning practice.

Teachers with the time and space to lead

My vision of a re-made profession includes hybrid roles for teachers, so that they have time for research, reflection, and mentoring. I think that our teacher preparation programs are a good place to begin in planting the seeds for this vision. If teachers begin their careers as empowered thinkers, reflective practitioners, and aspiring leaders, then I think teachers themselves will be able to lead the evolution of the profession.

— Kathleen Melville

As just one example, consider what could happen if greater numbers of practicing teachers were involved in education reform as part of their roles. Teacherpreneurs could help policymakers and education leaders stay grounded, ensuring decisions are informed by practical considerations and students' daily experiences. Meaningful policy roles for teachers would not only yield more informed discussions and decisions—but also contribute to wide-scale teacher buy-in for systemic transformation.

The prep connection

Clearly, hybrid roles—including teacherpreneurs—will succeed only if districts and policymakers understand how to effectively draw upon teachers' expertise and are prepared to support new trajectories for teachers' professional growth. In the book *TEACHERPRENEURS* (Jossey-Bass, 2013), Barnett Berry, Ann Byrd, and Alan Wieder tell the stories of eight teacher leaders and how they have come to lead outside their classrooms, and in doing so, demonstrate key attributes of teacherpreneurism.

Teacher preparation programs—especially those grounded in universities and research and development centers—have an important responsibility to ensure that candidates are ready for a career that might include hybrid roles. Programs can expose candidates to teachers who teach while also serving as peer mentors, data analysts, curriculum designers, and so on. All districts do not yet offer such positions, but candidates could later choose to seek out (and even advocate for the creation of) hybrid roles.

Meanwhile, teacher preparation programs can benefit from collaborating with districts to create hybrid roles that boost programmatic efficacy and advance research goals. Many preparation programs do not take advantage of their most powerful resource: practicing classroom teachers (who are arguably the best-equipped professionals to serve as a teacher educators). Hybrid roles could help connect students with accomplished teachers.

Practicing teachers can speak frankly about the challenges that candidates will face when they begin teaching, and they are well-versed in the curriculum, assessment systems, and other communication platforms that candidates would eventually be using. For candidates, close work with a practicing teacher can also open the door for future collaboration and networking opportunities.

And by recognizing and drawing on practicing teachers' expertise, teacher preparation programs can encourage teacher candidates to advance the profession.

Working together to create hybrid roles, policymakers, districts, and teacher preparation programs can encourage innovation, make better-informed decisions, improve retention rates, and attract ambitious candidates. They can also ensure that teacher candidates are prepared for the realities of teaching as well as the promising opportunities that await them. Kathleen Melville detailed the dilemma that too many teachers face: choosing between teaching and leading—a false dichotomy for a 21st-century teaching profession:

> "I'm really pleased to see more and more teacher leadership roles emerging because I agree that there is a large gap between the role of seasoned teacher and the role of professor of education. I think we need to do our best to open up more spaces in between these roles for people who will be willing to do the work of drawing the PK-12 classroom and the ivory tower closer together. As someone who is really interested in education reform, I definitely face a dilemma—stay in the classroom where I'm connected with the lived experiences of students and teachers? Or leave the classroom to take on a more formal leadership role —probably by getting a Ph.D. and working in a university? My hope right now is that I won't have to choose."

Research integrated with practice

The TeacherSolutions team identified an additional systemic change that will help our nation better leverage teachers' expertise: research, integrated into practice and policy.

More of America's PK-12 education research must be led by (and at the very least include meaningful involvement of) practicing teachers who have access to its results as well as opportunities to implement what they learn. Few teachers have the time and collaborative opportunities necessary to analyze others' research and integrate findings into their daily work.

Of course, some of today's effective teachers already conduct research—even if they don't call it that. On a daily basis, they observe the impact of various instructional strategies and apply what they learn from student outcomes. But the knowledge gained from this day-to-day experimentation remains siloed—held in individual teachers' practice, perhaps occasionally spread to colleagues in their building. And too many are not prepared at all to conduct research—unlike in Finland, where all new recruits to teaching are specially prepared to engage with university faculty in a scientific inquiry of educational practice.

Meanwhile, formal "education research"—conducted by our nation's think tanks and universities—rarely draws upon teachers' expertise.

Research and practice: bridging the gap

It seems that many teachers see research as something done by professors in higher education institutions and disconnected from the classroom. Research is happening every day in our classrooms, and if teachers better understand this reality coming into the profession, perhaps this stance toward inquiry, study, reflection, and changes in practice might become more transparent. The presence of clinical faculty and the use of hybrid roles might also lessen the current divide between higher education and PK-12 settings.

— Katy Cortelyou

Effective teachers are "close to the source," aware of the many variables that affect student learning, and motivated to improve their own practice. Why not look to teachers as a significant asset for research design and implementation?

Teacher preparation programs and research

The "rift between theory and practice" begins, of course, with teacher preparation programs, which often emphasize theory or focus almost entirely on content or subject areas.

Graduate education policy and leadership programs often include research courses or experiences, but research is given short shrift in most teacher preparation programs.

Studying research and its outcomes could be part of teacher preparation and professional learning opportunities to improve practice. For example, Abilene Christian University, highlighted in the Promising Programs section of this report, provides students with the opportunities to participate in university research in PK-12 settings.

Practitioners in other fields—like medicine, to name just one—expect one another to follow, take part in, and apply relevant research. As Shannon C'de Baca considered, "My doctor has three services that send her the latest information from cutting-edge research, all curated and organized for easy reading and for deeper

exploration....and she can add her voice to the discussion by adding her patient information to any of that data. We need to follow that lead."

Today's electronic updates and online communities offer user-friendly, accessible entry points for teachers interested in recent research. However, many teachers are unaware of these and other tools for integrating research and practice—a situation that teacher preparation programs could help to change. And, as Shannon suggests, such updates only go so far. They provide information to teachers but not routes for participation in research or decisions about its implications.

Changing PK-12 teachers' and candidates' perspectives on research could help spread the expertise of accomplished educators, strengthening the profession and our schools. As teachers document and share effective practices through publications and virtual networks, this "de-siloed" wisdom and knowledge will benefit students across the country.

And integrating research into PK-12 teachers' daily practice could push the entire field toward innovation and cutting-edge solutions for education's most difficult challenges, helping to ensure that policy is based on sound evidence.

Moving from object to participant

David Hawkins (1966) said: 'We are probably at a time in the history of education when there is more, and indeed even a distinctive, wisdom about teaching among practicing teachers than there is among academic educators.' More recently, Marc Tucker (Standing on the Shoulders of Giants: An American Agenda for Education Reform), *among many others, argued that 'In the U.S. teachers are generally objects of research rather than participants in the research process itself.' True professions do not have such a rift between theory and practice.*

— Renee Moore

Components of an effective teacher preparation program

This section expands on how improvements to the teaching profession require different approaches to preparing candidates for the demands of tomorrow's classrooms. Evolving learning environments and increasingly diverse student populations elevate the necessity and urgency of dynamic training efforts that leverage research, technology, and insights from other fields.

Cohort-based residencies

Here's how teaching used to look (and still does, in many schools): teachers work in isolation, closing their classroom doors to focus on their own instruction and students, rarely (if ever) collaborating or reflecting with their colleagues.

Research—and our own experience—tells us that this is not the most effective environment for teaching and learning. Instead, peer learning "among small groups of teachers" is the most "powerful predictor of improved student achievement over time."[42]

Teacher preparation programs can play a critical role in eradicating the old paradigm of "teaching behind closed doors." By encouraging, supporting, and modeling collaboration, programs can ensure that future teachers develop the mindset and "soft skills" necessary to be effective practitioners.

In particular, a cohort-based model can provide candidates with an immediate group of peers who can offer support and share ideas as they plan and reflect together. A well-designed cohort program ensures that observing one another and providing feedback are comfortable, constructive aspects of the teacher preparation experience. Learning to collaborate and learn together is important for future teaching and improving student outcomes. As Caitlin Moore describes, we believe that teacher preparation has a responsibility to model this peer-to-peer interaction:

> "The greatest strength of Bowdoin College's undergraduate teacher certification program was teaching preservice educators how to be reflective practitioners. From Education 101 to our senior curriculum and instruction course, we were engaged in teaching our peers, writing reflections on our experiences, and writing feedback for each other. I wonder to what degree this was a unique experience. In a small cohort of about ten, it was an intense and personal process."

Cohort-based approaches are common in preparation programs that include intensive residency programs: Candidates support one another as they gain clinical experience.

Residency programs have a demonstrated impact on teacher candidates' future student outcomes: a 2009 study of teacher education found that teachers with more extensive clinical training and at least a full-year internship prior to their first teaching assignment produced greater student achievement gains.[43]

The design and implementation of the residency model affects the outcomes. Of course, many programs have some in-school, job-embedded training—but candidates' experiences vary widely in terms of scope, time spent in classrooms, and support.

Frequent, consistent observation of candidates is critical to residencies' effectiveness. Many of today's teacher preparation programs include only two or three scheduled observations throughout the clinical experience. Obviously, observations can help to ensure a candidate is ready to teach—but, conducted properly, they can also provide invaluable opportunities for feedback, discussion, and reflection on lessons presented.

Medicine provides a helpful model for teaching residencies. Medical students are observed almost daily by practicing doctors and medical school faculty, who serve as supervisors during the clinical training. Students have the opportunity to complete a range of clinical experiences prior to specialization—and then to negotiate (with supervision and guidance) the daily practical challenges of their chosen fields.

We believe that candidates are best prepared when residencies are designed as truly immersive experiences. That way, candidates can participate in a wide range of day-to-day teaching responsibilities, including planning with colleagues, designing or analyzing curriculum, and using data to inform instruction.

Research suggests that residencies are most effective when candidates are placed at high-functioning (rather than low-functioning) schools. A study conducted by Matthew Ronfeldt found that teachers who completed student teaching in high-functioning urban schools posted higher student test score gains in their first several years of teaching and were less likely to leave teaching in their first five years. Additionally, the impact on student outcomes and retention did not vary based on whether the schools in which teachers took their first jobs were high- or low-functioning.[44]

A traditional four-year teacher preparation program might include a residency as a key component, but some teacher residencies operate independently, serving as alternative routes to certification.

Some residency programs gradually increase candidates' responsibilities in a school and also provide salaries for teachers as they go through this internship period. This gradual model provides opportunities for current teachers to serve as teacher educators for residents directly in the school. Candidates take part in frequent observations, discussions, and reflection alongside experienced practitioners in a realistic, job-embedded setting.

Preparation programs that incorporate cohort-based residencies can help candidates sharpen their collaborative skills, fine-tune their instructional techniques, and nurture reflective practice. As significantly, such experiences can shape candidates' long-term expectations about effective teaching and learning, readying them to develop collaborative cultures in the schools where they will one day teach. Renee Moore expands on this idea in *TEACHING 2030*:

> "A team of six to eight teachers of varying expertise and experience (and with different career intentions) might work with 150 to 175 students over a number of years. Among the team might be several highly accomplished teachers who will supervise and work with a selection of novice teachers...supported by teacher assistants, content specialists, virtual mentors, community experts....Instead of continuing to pursue the impossible dream of finding a single, seasoned teacher expert for every classroom in every school, district-college-community compacts would focus on cultivating these close-knit teacher teams.... The work of 21st-century teaching is too much to fall on the back of any one teacher. We need a fluid profession that allows different types of teachers, all well-prepared, in scaffolding a career lattice to focus collectively on the needs of students."[45]

The proliferation of residency programs in urban centers like Boston, Chattanooga, Chicago, Denver, Los Angeles, and San Francisco signals the emergence of cohort-based residencies as a reliable preparation pathway that ensures that a high-rate of quality classroom professionals remains in the classroom.

Interdisciplinary education

As 21st-century students prepare for college and career, they face daunting expectations: in-depth understanding of content and well-developed abilities to think critically, communicate, collaborate, and innovate.[49] In this data-saturated global marketplace, students must find, analyze, and apply information at a rapid clip.

To help today's learners succeed, teachers must bring a broad range of competencies to the classroom. Teachers must themselves be able to model 21st-century skills—even as they speak and act from a solid base of content knowledge and pedagogical techniques.

An interdisciplinary education is critical to ensuring that teachers know how to think critically, analyze situations, and apply what they know in a wide range of school environments, tailoring instruction to meet individual students' needs along the way. But many of our universities—and public policies—expect teachers to earn degrees in a single content area. This needs to change.

Adaptability—which we believe an interdisciplinary education can nurture—is key. Stephen Lazar reflected on the diverse experiences, learning environments, and students that he has encountered:

> "I have now student-taught or taught in three high-needs urban schools in Providence, the Bronx, and Brooklyn and in two suburban schools in East Greenwich, RI, and Fairfax Co, VA. There are radically different cultures and contexts in each school. Some things transferred between urban schools, some things transferred between suburban to urban, and some were new in each environment. Well-prepared teachers have a diverse toolbox, a clear vision they are trying to implement, and the judgment necessary to figure out which tools work best in which context to work toward that vision… a combination of vision and judgment."

Scott Storm notes that effective teacher preparation programs can draw explicitly on the tools of other disciplines to equip candidates for diverse settings:

> "While I strongly support having preservice teachers have fieldwork and coursework in many various settings (I did practicum work in rural, urban, suburban, public, charter, private, elementary, middle, and high schools in my teacher prep), I think it is even more vital that we explicitly give preservice teachers tools to make sense of the intricacies of any context in which they begin teaching. For example, teacher preparation should include work in ethnographic methods of observation and recording like those used by cultural anthropologists. In my first teaching job, I spent time with my mentor (who was provided through my teacher preparation program) thoroughly collecting field notes and describing the ways I was seeing strengths in my students and my school. But this work could just as easily be done with a professional learning community or a peer coach. This intellectual way of approaching issues of context really helped me not only to negotiate the micro-politics of my school, but also to become a better teacher of my specific students' own cultural strengths. In this way then, I urge us to give preservice teachers the tools to work through the process of context instead of merely grooming teachers for a context that may or may not ever match their lived professional realities."

An interdisciplinary education can also strengthen the ability of a candidate to be an integral part of a team that meets the needs of individual students while also equipping them with a wide set of skills and the ability to think analytically regardless of the context in which they are teaching.

Blended learning and collaborative networks

Candidates and current teachers can learn a great deal by observing lessons being taught in an authentic learning environment, whether in a face-to-face, blended, or virtual setting. Reflecting on and discussing what did and did not work in the lesson can be invaluable, informing future planning and instruction.

Unfortunately, many programs do not provide candidates with opportunities to observe and discuss a range of lessons. The result? Candidates could begin their careers in a setting that they have never experienced or even observed during teacher preparation. For example, a candidate who is going to teach high school science may have never spent time in a ninth-grade classroom or a physics class. A new fifth-grade teacher may have had just one student-teaching experience in a first-grade classroom. Candidates in some programs enter their careers with no in-classroom experience.

Preparation programs must employ digital tools to expand candidates'

Bricks and clicks

In 2030, new teacher recruits would have been taught by teachers knowing the 'how' of orchestrating and assessing student learning and understanding the nuance of student behavior by creating effective online experiences in synthetic and augmented reality environments, as well as hybrid worlds—a blend of physical space and virtual interactive characters, objects, and media.

— Emily Vickery

access to in-depth observation experiences, expose candidates to best practices in online and blended learning, and connect candidates and teachers for ongoing professional growth.

Digital tools for observation and simulation

The range of candidates' observation experiences vary greatly—and so does the context in which observation occurs. Many candidates only observe lessons while physically in a classroom as part of a more formal student teaching or practicum experience; in such cases, discussion often takes the form of a one-on-one conversation between the candidate and the person delivering the lesson.

Technology has made it easier than ever to record and virtually observe lessons. With access to videos in libraries and online collections, candidates and practicing teachers can witness many more lessons, gain exposure to different teaching styles and instructional strategies, and hone in on videos that are grade-level- or content-area-specific. Teacher preparation programs can tap into rich resources. For example, the National Board of Professional Teaching Standards (NBPTS) has assembled a substantial collection of videos demonstrating lessons by certification candidates. Of course, videoconferencing and other technologies can be used to allow for live lesson observations while nonprofits like the Teaching Channel offer a powerful venue for teachers to learn from one another's lessons in a 24/7 environment.

Some programs have even implemented technologies that allow candidates to participate in instructional simulations with PK-12 student "avatars" played by specially trained college students. Candidates can try out different tactics, instructional strategies, and behavioral management techniques in a "safe" setting before implementing them in a classroom with students.

Programs usually employ these simulations as just one aspect of a more well-rounded clinical experience. However, some teachers express concern about whether a simulated setting can represent the range of student personalities, backgrounds, challenges, and abilities in an actual classroom. As Katheen Melville explained, "I don't think anyone can be trained to respond like a typical student because I don't think there is a 'typical' student in our diverse society. I think we need to be really careful about the ways in which technology obscures the importance of context, class, and culture."

While they must be used mindfully, technological resources and tools do expand the opportunities for teacher candidates to explore, reflect on, and discuss how they will interact with students and what instructional strategies they will use. Groups of candidates (and their mentors or instructors) can observe, analyze, and reflect on authentic lessons together—without cramming a crowd of visitors into a classroom. Virtual lesson studies can also help candidates focus on specific components of curriculum, instruction, and assessment before tackling the complex work of teaching.

Preparing to teach in and out of cyberspace

But there is another reason preparation programs should make use of virtual lesson studies.

Virtual and blended learning environments are becoming more and more common in our PK-12 schools. Many of today's candidates will teach in such settings immediately—and nearly all will eventually be expected to use online tools for instruction, collaboration with colleagues, and assessment of student learning.

Meanwhile, many of today's schools still offer limited access to technology, make little use of digital content, or lack useful data systems. If candidates' clinical experiences take place exclusively in under-resourced traditional environments, they miss out on opportunities to prepare for future settings.

Many states have made their initial foray into online learning so that they can meet the needs of students who are unable to attend classes in a traditional setting due to medical or disciplinary reasons; to provide equitable access to advanced coursework; and to supply on-demand support for struggling students.

The North Carolina Virtual Public School (NCVPS) requires prospective teachers to complete courses on teaching online. But NCVPS also requires all candidates, even those with many years of experience teaching in a traditional face-to-face environment, to work with a mentor teacher as a volunteer teacher assistant for one semester.[46] By ensuring that teachers are prepared for their new setting, NCVPS increases the likelihood of effective online teaching and learning.

The experience of teaching online often has positive effects on teachers' face-to-face instruction. For example, many Alabama teachers who deliver instruction online via the Alabama Connecting Classrooms, Educators, and Students Statewide (ACCESS) program report that they also transfer the use of collaboration tools and digital content to traditional or blended classroom settings.

Collaboration as cost-saving

There are many excellent teachers whose work is limited to one school building or district. Why not share the expertise of outstanding teachers among schools or districts? We could connect them into teams that could work across sites, or between PK-12 and teacher education by physically moving between sites or virtually. When I teach dual enrollment, I get paid by the community college, but I'm considered as faculty at the high school and counted toward their accreditation standards. Certainly, we could do the same with teacher education. PK-12 teachers or teams could serve as teacher educators, especially within residency type programs. The personnel savings to the cooperating institutions would be significant.

— Renee Moore

This is not surprising. While virtual learning continues to grow rapidly, blended learning is becoming commonplace. Blended learning is defined as "…any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace."[47]

Teachers who practice "blended learning" use technology to change the way they teach, better meeting more students' individual needs. They don't just use technological tools to replace physical ones—an interactive whiteboard in place of a blackboard, or a quiz app in place of a worksheet.

Instruction in a blended classroom is more student-centered, with students working at a pace appropriate for their abilities and achievement. Lesson design, curricular resources, and communications methods tend to

be different in a blended environment. Preparing candidates for blended learning environments requires meaningful exposure to and experiences with successful instruction.

The TeacherSolutions team believes candidates could benefit greatly from in-depth lesson studies of blended teaching and learning—and/or clinical experiences in virtual or blended classroom environments.

Virtual networks for professional growth

Today's teacher preparation programs often operate separately from the school districts or schools in which candidates will have clinical experiences or their first job placements. Districts and preparation programs rarely share resources or connect teachers and candidates beyond the one-on-one relationship of candidate and supervising teacher.

Thanks to these disparate systems, candidates often feel isolated, as if their preparation programs and clinical experiences exist in two different universes. Meanwhile, even if they have been prepared in cohorts, new teachers are likely to feel isolated from peers during their first few years of teaching.

But it doesn't have to be this way. Technological tools make it possible for districts to partner with teacher preparation programs to create virtual networks for teacher candidates and in-service teachers.

If well-moderated, such networks can provide meaningful, job-embedded opportunities for collaboration, resources, and peer-to-peer mentoring. Currently, about 25 percent of educators in the U.S. participate in an online professional community to collaborate and share information with colleagues.[48] Consider how much expertise could be spread in this way if virtual networks were a formal part of the preparation experience.

Robust virtual networks could allow candidates to continue to connect and collaborate with their cohort, teacher preparation program faculty, and the master teachers who guided them through their clinical experiences. In other words, these networks could be lifelines for teachers who might otherwise feel isolated and ill-equipped to teach effectively. By supporting teachers at this critical time, such networks could improve teacher retention and ensure a better-prepared workforce.

Meanwhile, teacher preparation programs could mine such networks for information about the typical challenges, questions, and successes of new teachers. Preparation programs could look to this data as they work to ready candidates for the education system's current needs and realities.

One size does not fit all

If we are to improve teacher preparation, we need to take a hard look at additional means of aligning preparation programs to the unique needs of the students and schools where teachers will serve. Rural schools, urban districts, and virtual schools all possess distinct challenges. Therefore, it seems logical to design experiences that prepare educators in differentiated ways to best serve a rural, urban or virtual school.

Of course, there will be several common denominators that include a sound foundation in research and practice, and understanding of learning, etc… This serves as the core of the first couple years of teacher preparation.

Beyond that, however, preparation programs should offer multiple opportunities to specialize in specific learning environments. They could/should be designed much like medical schools that provide avenues for doctors to specialize in radiology, pediatrics or as surgeons. These opportunities for specialization, however, must be flexible enough to allow for continual readjustment based on schools' ever-changing needs.

— Curtis Chandler

As Shannon C'de Baca outlines, candidates could learn from those who have gone before them:

> "We need to spend a bit of time listening to folks while they are in the thick of it. I have read volumes of teacher experience books and none of them cut a clear path…. Instead, imagine a blog for teacher preparation candidates in which a first- or second-year teacher shares challenging moments and is advised by a master teacher. Meanwhile, a cohort of candidates follows this new teacher's path, with the guidance of a master teacher or professor. I can tell a candidate to 'learn more science' until I am blue in the face—but seeing what happens when a new teacher without deep content knowledge faces a classroom full of kids… that would be powerful learning motivation."

A virtual network that includes digital content, assessments, and professional learning opportunities (like rich conversations and blogs) could maximize the value of district resources for candidates, teachers, and ultimately students.

Performance assessments

Currently in the United States, a candidate is deemed ready to teach when 1) he or she graduates from a university-based program or completes an alternative program; and 2) he or she is certified to teach in the appropriate state.

Speaking broadly, America's schools rely on a seat-time measurement of progress—not a performance-based assessment of whether a candidate is able to demonstrate that he or she is prepared.

Indeed, completion of a preparation program may mean little, considering the wide range of quality and types of programs. Does a candidate have the skills and competencies that will enable him or her to be a successful teacher? Perhaps a candidate has been observed two or three times by supervising teachers or professors, but were these observations pre-scheduled? Did the observations provide candidates with the opportunity to demonstrate their ability to skillfully teach in a variety of situations?

While some preparation programs have taken steps to ensure that all candidates are ready for the work ahead of them, others have not. In the majority of states, achieving licensure requires candidates to complete a preparation program and pass a multiple-choice exam, such as the Praxis. But the validity of the exams has been questioned.

A bar exam for teachers?

We need multiple pathways that allow a teacher to demonstrate their readiness for the classroom, and then they should enter. I'm probably getting ahead of myself here, but I would argue that teaching should be like the bar exam in many states: You don't actually have to go to law school to take it and pass it, but law school is the best way to do it. Why not have rigorous performance tasks for teachers to enter the profession and then offer different options to prepare for those tasks: residency, university-based teacher education, private school teaching, other career experience, etc. If teachers have a higher bar to meet and universities need to publish how their students do on the tasks, university programs will either improve or find themselves without students.

—Stephen Lazar

The Educational Testing Service (ETS) and the National Education Association (NEA) have recognized that disparities in performance between African American and white teacher candidates on the Praxis exam may be limiting the matriculation of African-American candidates into the teaching profession, finding significant gaps on selected Praxis I and selected Praxis II tests."[49]

And how much can any multiple-choice assessment show about how a candidate will respond to the real-world challenges of teaching? Members of the TeacherSolutions team believe performance assessments provide more objective means to ensure that teachers are prepared to teach students of a particular age and range of abilities, in a particular content area.

When woven throughout candidates' preparation experience, performance assessments are viewed as instructive rather than punitive. They provide opportunities for constructive feedback from program leaders, master teachers, and peers. Performance assessments also allow teachers to enter the teaching force more genuinely prepared for their first teaching role.

Additionally, if adopted on a broad basis, performance assessments can provide a reliable means for evaluating teacher preparation programs. If a particular program does not produce candidates that demonstrate readiness to teach, the program should no longer be educating future teachers.[50]

The Teacher Performance Assessment (edTPA) developed at Stanford University is designed to measure the readiness of teacher candidates. The edTPA looks like an assessment of the National Board for Professional Teaching Standards built for novices as they are engaged in supervised clinical settings or internships. The edTPA is available nationally and was field-tested in 2012. We are impressed with the unprecedented participation of 7,200 candidates at 165 universities and colleges across 22 states. Six states are already planning to adopt edTPA as part of their licensure requirements: Illinois, Minnesota, New York, Tennessee, Washington, and Wisconsin. And we are hopeful the edTPA, which will cost about $300, will be a serious vehicle for a more unified approach to preparing future teachers in both traditional and alternative settings.

"Certification should not be contingent solely on completion of a certain 'approved' degree and successful passage of a pen and paper test. Certification should be contingent on preparedness—not the amount of time spent in the classroom."

—Linda Reid

One teacher preparation program that focuses heavily on performance assessments and peer-to-peer observations is Abilene Christian University (ACU) in Texas. Over the course of the ACU program, candidates become increasingly comfortable with learning from their peers' and professors' feedback on lesson design and instruction. They also become adept at providing constructive feedback and reflecting on their practice. Not surprisingly, many ACU graduates seek out collaboration opportunities and peer-to-peer networks to continue their professional growth once they begin teaching.

ACU's approach is consistent with the recommendations from the NCATE Blue Ribbon Panel on Clinical Preparation and Partnerships for Improved Student Learning[51] and the Commission on Effective Teachers and Teaching (CETT). CETT states: "In our vision, anyone who receives a teaching license has demonstrated

specific skills and knowledge and has significant school-based experience."[52] Among CETT's recommendations that Renee Moore appreciates most:

> "A set of national standards created by teachers for the preparation, licensing, and certification of educators at all levels rather than the ridiculous patchwork of requirements across states now. All teacher preparation programs, regardless of format, would have to ensure their graduates meet those standards. The commission also outlined an extensive list of knowledge, skills, school-based experiences, and dispositions teacher candidates should exhibit before becoming a teacher of record."

Competency over seat time

Even if a common performance assessment is eventually adopted, preparation programs should not teach all candidates the same way, at the same pace. Instead, programs (and the clinical experiences they facilitate) should fit the the needs, potential, and abilities of individual candidates. For example, some candidates may enter a program with very strong content knowledge but little knowledge of pedagogy or how to use student data. Some candidates might be ready for extensive residency opportunities before others are.

Like their future PK-12 students, candidates will benefit from personalized programs that use achievement rather than seat time as the critical variable for determining progress.

Too often, new teachers—and even practicing teachers—are placed in positions for which they are neither prepared nor comfortable, in order to fill a gap or vacancy in a school. Teacher preparation programs and districts must work together to ensure that candidates are prepared for the specific positions or responsibilities for which they are being hired. This should not simply be determined through a licensure, but rather should include a competency-based assessment for readiness.

Districts, teacher preparation programs, and policymakers can work together to fill teacher openings with qualified candidates by, for example, coordinating incentives to encourage candidates to specialize in high-needs areas. They can also ensure that teaching and leadership positions are earned based on competency rather than seniority or other measures.

Promising preparation programs

There is not as much data about the effectiveness of teacher preparation programs as we'd like. But the U.S. does not necessarily take advantage of the knowledge that we do have about what makes a difference when preparing teachers.

A massive review of teacher preparation by the American Educational Research Association (AERA) in 2005 found that there was no superior program structure (e.g., four-year undergraduate programs, fifth-year baccalaureate programs, or alternative programs). However, the group of scholars pointed out that certain strategies can yield positive outcomes for teachers and their students. Practices that matter include the careful oversight of the student teaching experience and the use of specific tools and practices that connect to clinical experiences.[53]

A 2008 examination of evidence on teacher education found that teachers with more extensive clinical training (including a full-year internship) produce higher student achievement gains.[54] In a study of both traditional and alternative pathways into teaching, researchers —using a large and sophisticated database—found that teacher preparation programs that produce higher student achievement gains (in their graduates' first year of teaching) had the following characteristics:

- Extensive and well-supervised student teaching, with strong "congruence" between the training experience and the first-year teaching assignment;
- Opportunities "to engage in the actual practices involved in teaching" (e.g., lesson studies with colleagues);
- Opportunities to study and assess local school curricula; and
- A capstone experience in which action research or data-focused portfolios are used to make summative judgments about the quality of the teacher candidate.[55]

"We try to model for our teacher candidates the type of teaching that we want them to ultimately do. Integrating technology is not a separate thing–it's rolled into all of the projects in all of their classes. We give a lot of 'voice and choice' as we'd expect them to do."

— Dr. Billie McConnell

Several innovative teacher preparation programs in the U.S. share these characteristics—but by no means have Americans yet fused resources and valued the teaching profession to the degree necessary for the spread of these best practices. Still, consider these promising teacher preparation programs, which exhibit several of the components outlined in the Teacher Preparation 2.0 vision outlined above:

- Digital and blended learning for candidates and students
- Residencies
- Liberal arts teacher preparation programs
- Research centers

Digital and blended learning for candidates and students

The teacher preparation programs that follow focus on the needs of 21st-century students (who will be expected to compete in a global economy) as well as the potential of digital and blended learning to influence teaching and learning. Additionally, they train their teacher candidates for hybrid roles as teacher leaders within the school, particularly in regard to digital learning.

Abilene Christian University

Abilene Christian University (ACU), in Abilene, Texas, provides what may seem like a traditional undergraduate approach to teacher preparation. However, its programmatic components and philosophy are anything but traditional. ACU's mobile learning initiative provides every student with a mobile device (either an iPhone or an iPod Touch). Mobile learning and education technology are woven into many courses, including those offered by the college of education. Most courses have class blogs, and some professors have opted to flip the use of classroom time and implement project-based learning with college students.

Interdisciplinary education for the 21st century

Coursework in the college of education models the type of instruction that teachers are expected to implement in their PK-12 classrooms. ACU emphasizes that instruction isn't about the technology—it's about creating 21st-century schools in which students can collaborate, communicate, and think critically about rigorous content standards. Interdisciplinarity is expected.

Teacher candidates at ACU undertake a great deal of collaborative project-based learning throughout their coursework. Students often choose the tools they use to address a challenge or prompt, and they know they must be prepared to defend their approach with their own voices. Similarly, ACU professors expect teacher candidates to encourage their PK-12 students to use "voice and choice" as well.

ACU recognizes that teacher candidates, despite being 21st-century students with unprecedented access to technology, often come in with a predetermined understanding of teaching and education. After all, it's what they've experienced: the old model of lecture, memorize, regurgitate. ACU works to teach them a new view and philosophy for education, to understand that there is not only one correct answer, but many.

Partnerships and leadership with local school districts

ACU is committed to connecting its teaching preparation work with the needs and goals of area school districts. A "teacher education group" focuses specifically on the teacher preparation work with schools.

ACU has partnerships with local school districts, especially with the elementary school program. In almost every course, teacher candidates have "in-the-field" work that goes beyond the traditional observation opportunities and student teaching. For example, candidates provide additional support for struggling students at high schools with block schedules. Candidates also engage in research at the local schools as part of their program.

Another group, Connected Consulting, works directly with school districts to help them move toward the type of progressive learning environments for which candidates are being prepared. ACU has even purchased technology for local schools so that teachers and teacher candidates have the resources to better

meet the needs of students. ACU also offers Digital Learning Institutes for districts within—and beyond—Texas to visit the university and learn more about how digital learning works "on the ground."

Culture and community understanding

ACU's program helps teacher candidates develop a deep understanding of culture and community. Because some students come into the program with preconceived ideas about high-needs students, ACU facilitates opportunities for candidates to get out into the community to better understand the families with whom they will be working.

Teacher candidates also go through a one- or two-day simulation of living in poverty, using Ruby Paine's materials. Candidates are assigned a particular job, salary, and family situation for the duration of the exercise and must contend with a variety of simulated events: How are you going to manage working with the welfare department? How will you get to work without a car? How will you handle child care? What will you do if your child is sick? Candidates begin to understand how families think, gaining insight into realistic explanations of parents or student behavior. When a parent doesn't attend an event at school, is the only explanation that he or she "doesn't care" about education?

Preservice and post-graduation connections

ACU stays connected with students during pre-service and student teaching opportunities through onsite visits, blogs, and emails; and mobile learning also keeps them connected with one another and professors.

The program is dedicated to keeping in touch with alumni as well, offering Summer Institutes that graduates can attend free for the first five years to gain certification credits. ACU is also creating an online community for alumni and professionals within districts.

Performance-based all the way

ACU's preparation program incorporates performance-based assessments throughout all four years of instruction. All courses for elementary teaching candidates require performance-based testing in the field. Secondary teaching candidates complete performance-based assessments in the field and take part in simulations addressing collaboration, communication, or lesson design.

Secondary teacher candidates also process a great deal of self-assessment and peer-assessment. They receive feedback from the professor only after their peers have provided feedback. Over the course of the program, candidates learn to be effective "assessors," learning to deliver and receive constructive criticism as a means to improving their instruction. Many courses also integrate lesson studies.

Candidates at ACU are prepared for technology-rich, 21st-century learning environments that simply do not yet exist in many districts. Fittingly, the program prepares students to be change leaders as part of their teaching roles, exercising creativity and consensus-building.

ACU is currently exploring the possibility of offering a master's program that adds a fifth-year residency to the ongoing clinical experiences currently in place.

University of Central Florida TeachLive

TeachLive is a program at the University of Central Florida (UCF) that provides classroom management simulation for teacher candidates, with avatars controlled by drama students. UCF's College of Education, in partnership with the Institute for Simulation and Training and the College of Engineering and Computing, piloted TeachLive in 2005 and has since expanded the innovative program to many partner universities, including Pace University, the University of Kansas, West Virginia University, and several others. In 2012, TeachLive received a Bill & Melinda Gates Foundation grant to expand the program to include 30 sites in the U.S. during the next three years.[56]

TeachLive allows the teacher to "teach" a screen of avatars (controlled by a drama student in a remote studio). This allows preservice and in-service teachers the opportunity to practice their lessons before "students" while being observed and receiving feedback from peers and coaches. TeachLive uses a "mixed reality" teaching environment to support teacher candidates and veteran teachers in their work with content and pedagogy, enabling opportunities for hands-on experience, coaching, and reflection.[57]

Based on the Technological Pedagogical Content Knowledge (TPACK) framework, the TeachLive platform focuses on the skills required to transfer learning to an actual classroom.

In a typical school environment, a teacher candidate or in-service teacher may only have the opportunity to try a lesson, strategy, or interaction with a group of students or an observer one time. TeachLive allows candidates to reflect and try again until they have mastered the goal, strategy, or content. The simulator was initially created to support candidates for math and science teaching positions who had other careers besides teaching, but wanted to transition into education.

The simulation depends on the variable factor of live actors. "A trained 'interactive actor' at UCF controls the avatar students, whose personalities reflect those of typical or atypical pre-teens, depending on the objectives of the experience. The actor watches the participating teachers in action. If a teacher fails to use best practices in content or instruction, the avatars act up, creating a scenario that could happen in the average classroom environment."[58]

The drama student has been trained to respond as students typically would or as the goal of the simulation session specifies. For example, an avatar can imitate students with a particular disability, behavioral issue, or acceleration need. Additionally, the program is planning to develop an earpiece that will provide real-time feedback to the teacher as he or she works with a class of avatars.

Through its work with other universities, UCF has demonstrated that TeachLive is replicable and perhaps scalable to a large number of programs, teachers, and candidates.

Residencies

Increased collaboration and clinical experience are merged in urban teacher residencies (UTRs), in which aspiring teachers selected by school districts integrate master's-level coursework with a full-year, intensive classroom residency alongside an experienced mentor. An advantage of the UTR model is close alignment of recruitment and preparation processes, so that residents are uniquely well-prepared to meet the needs of students in a particular district. While residencies are still too new to have much effectiveness data, one study shows that 90 to 95 percent of these residency graduates are still teaching after three years.[59]

Academy for Urban School Leadership (AUSL)

AUSL works to transform low-performing schools within the Chicago system through whole-school transformation and intensive teacher training. The typical AUSL overhaul includes a new principal, new teachers (many trained through AUSL), renovated space, and revised curriculum.

AUSL utilizes an intensive, one-year teacher residency program that is specifically designed to help turn around struggling schools in Chicago by creating teams of teacher who are trained for the challenge of transforming an urban school's culture from one of failure to success.[60]

The program combines a full year of coursework with one year of residency, leading to a master's degree from National-Louis University. The one-year urban teacher residency (UTR) program takes place in one of the AUSL Training Academies in Chicago Public Schools. The residency includes a full year of teaching with a master teacher in a high-needs, urban school; and candidates are paid for the yearlong commitment. Candidates have opportunities to observe master teachers, practice instruction, and reflect and discuss during and after school on a regular basis.

AUSL specifically aims to increase teacher retention—a significant issue in urban schools—and has found success through the intensive residency-based program: "89 percent of [the] program's graduates are still in the classroom two-plus years after graduation, and 77 percent are still teaching five-plus years after graduation."[61]

Currently, only 10 percent of applicants are admitted to the intensive, one-year AUSL residency program.

Cycles of reflection

At AUSL, our mentor teachers assess their resident's performance every four weeks based on our curriculum for that particular four-week cycle. The resident also assesses their own performance. These cyclical conversations between mentor and resident are crucial. We want our residents to become very comfortable with the idea that their performance is going to be discussed frequently. From the beginning, we communicate to our residents that our program is ambitious and that we have to prepare them for the work of our turnaround schools within a given timeframe. It's not right for everybody. Some preservice teachers may need a program with a different structure that provides more time to meet certain benchmarks.

— Carrie Kamm

Boettcher Teacher Residency

The Boettcher Teacher Residency (BTR), based in Denver, Colorado, represents a fusing of resources and collaboration of several entities (including Adams 12 Five Star Schools, Aurora Public Schools, the Boettcher Foundation, Mapleton Public Schools, Public Education & Business Coalition, Regis University, and SOAR Charter Schools) to provide residency opportunities for teacher candidates. The program considers itself a hybrid of a traditional graduate certification program and an alternative certification program and includes recruitment, preparation, and induction.

Upon being accepted into the program and making a commitment to teach in urban schools for five years (including the residency year), candidates participate in a yearlong residency program and coursework, earning a master's degree and an alternative certification from the Colorado Department of Education. Tuition is partially paid and candidates receive a stipend. Teachers participate in the residency program during the first year and are then full-time teachers in years two through five. They earn their master's degree by the end of the second year and then participate in an induction program to support them in their full-time teaching.

Culture and equity

"[Boettcher Residency] readings and discussions always had the undertone of 'what is the cultural impact of teaching.' They ensured that candidates developed an awareness of power and privilege and how it can be used to lift or repress our students. Finally, it seemed during my experience in the application process that they were not only looking for skills, but also a drive for equality."

— Carrie Keahey

Boettcher places significant emphasis on recruiting motivated and talented candidates to participate in the program, including teachers who have already earned their certification, career changers, and highly qualified college graduates. Boettcher's philosophy centers on these primary components:

- Theory and practice are interwoven throughout the program, and candidates have an opportunity to apply theory during authentic experiences in the classroom;
- Reflection is an integral part of teaching and professional growth for both Boettcher residents and mentors;
- A small, cohort-based model (20 candidates per cohort) provides a safe and supportive group during preparation and induction;
- Modeling and practice of effective instructional strategies is consistent from the residents, mentors, and instructors, including performance-based assessments through a portfolio and project-based capstone project;
- Focus on diverse learners is constantly emphasized in theory and practice and includes use of data to identify and address students' needs.[62]

The Boettcher Teachers Program relies heavily on the support and collaboration of several entities and organizations. The commitment to five years in a high-needs school (including the yearlong residency) ensures that these new teachers remain in the classroom longer than do most new teachers in urban areas.

Liberal arts teacher preparatory programs

In an era evolving as rapidly as the 21st century, preparation programs that balance deep content knowledge with a broad understanding of the social, political, economic, and historic contexts of education offer candidates a path toward teacher leadership that is informed by theory, research, practice, and critical thinking.

Wheaton College

The Wheaton College Teacher Education Program (WheTEP) is an experience-oriented program embedded in a liberal arts education. WheTEP focuses on developing thoughtful problem-solvers who meet the holistic needs of students. Faculty members educate students in academic content and "are responsible for developing the character of students in four dimensions:

- Intellectual: Habits of mind;
- Moral: Desire for goodness;
- Civic: Community and global engagement;
- Performance: Dispositions, virtues, and qualities to accomplish goals."[63]

Consistent with development of the multiple dimensions of a student's character, WheTEP supports and facilitates students' participation in teaching opportunities that match their specific, often diverse interests. For example, candidates can work in Chicago Public Schools, diverse suburban schools, or overseas in countries ranging from India to Tanzania to Ecuador. Most importantly, students begin these cross-cultural experiences during freshman year, and have increasing responsibilities with students during the four years of their undergraduate degrees.

Linking practical experiences with more than 70 hours of general education requirements (including foundational and pedagogical courses) is a powerful way to develop competent new teachers. Nearly all Wheaton College student teachers are supervised by the same professors who taught their methods courses, solidifying the link between theory and practice.

In order to understand the links between disciplines, theory and practice, and learning and life, a sufficient breadth of learning is necessary. John Henry Newman described this in 1852. A liberal education teaches a person "to see things as they are, to go right to the point, to disentangle a skein of thought, to detect sophistry and discard the irrelevant."[64] This type of education develops the ability to master subjects and understand differing perspectives.

The rigorous liberal arts education that undergirds WheTEP is essential to preparing teachers for classrooms we cannot yet imagine. Moreover, in our rapidly changing education landscape—with increased accountability, blended learning, and diverse roles—teachers need a broad base of knowledge and skills.

Education majors at Wheaton have identical general education requirements. Secondary education candidates pursue a double major in their discipline and in education. Elementary education candidates benefit from their liberal arts background, an education major, and a concentration of at least 18 hours in a discipline that will deepen their knowledge and skills. For example, students can now use a linguistics

concentration to achieve an endorsement from the state of Illinois in bilingual education or English as a second language.

Wheaton candidates' student-teaching experiences include specific embedded assignments. For example, candidates teach a month-long unit with pre- and post-tests. They learn how to analyze the data in the aggregate and then disaggregate it to focus on subgroups and individual students. Students taught by Wheaton candidates consistently demonstrate significant gains across all subgroups and ethnicities.

A unique mentoring initiative at WheTEP has dual aims: to extend support to graduates during their first two years of experience and to gather valuable data to inform the teacher preparation program.

Undergraduate education majors work with a professor to develop quantitative and qualitative research skills, obtain Institutional Review Board approval, and track first and second year graduates through surveys and interviews. This provides a strong link between students, graduates, and the program as evidenced by the 95 percent response rate on surveys to collect data from 2010 and 2011. Wheaton also interviews about 40 percent of the graduates to solicit information and ideas from the context of experiences in the field.

Consortium of Excellence in Teacher Education (CETE)

The Consortium of Excellence in Teacher Education (CETE) is an association of 18 liberal arts colleges and universities (primarily in the Northeast U.S.) dedicated to improving the quality of individuals entering the teaching force. The institutional members network for the purpose of ensuring that teacher preparation programs continue to offer the training and support their students need. CETE members share an emphasis on social justice and inquiry-based teaching.

Teacher preparation programs at CETE institutions are often smaller than traditional university-based programs. While several CETE schools have master's programs, many CETE graduates earn their teaching licenses in their undergraduate work. The programs in each college or university vary, but Lisa Smulyan, a professor in Swarthmore College's Department of Educational Studies, clarifies that CETE members have a common philosophy concerning education and the role of teacher preparation:

> "A key component of our programs is that we embed the study of educational practice in a broad understanding of social, political, economic and historical contexts. This happens because 1) the education departments and programs in CETE institutions are firmly rooted in the liberal arts; 2) all students major in the discipline(s) they teach; and 3) students take educational studies courses that engage students in the study of theory, research, and practice. Our programs all emphasize teaching for social justice, and we do so with a clear understanding of the complexities involved. Our graduates become critical, reflective practitioners, aware that education can both contribute to and challenge inequities and dedicated to improving educational practice, institutions, and policies so that they better meet the needs of all students."

Kathleen Melville, a graduate of Swarthmore College, notes the importance of the CETE network for her as a practicing teacher leader:

> "For me, CETE has been a great help in making teaching a sustainable profession. CETE seems to take very seriously its role in continuing to support and educate teachers after the initial preservice training. For example, I am gearing up now for a project with my alma mater that will include a seminar for education majors paired with teacher-research projects in urban classrooms. The undergrad students in the seminars will serve as research assistants to teachers in their classrooms. This arrangement will allow undergrads to gain valuable field experience while also supporting teachers in undertaking more research and reflection.
>
> I'm really excited about having an undergrad research assistant in my classroom, and I love the way that these undergrads will be introduced to the profession—as a blend of teaching, research, and reflection. A newer development is a teacher leadership group for urban teachers with five to eight years of experience. I do think the rigorous academic and theoretical grounding that CETE institutions provide for teacher candidates is crucial to the sustainability of the profession. My experience in Swarthmore's Department of Educational Studies taught me that teaching is complex work at the intersection of theory and practice, and that's why it continues to engage and challenge me."

While the programs may differ across the CETE member schools, several common characteristics emerge from these examples: liberal arts education, meaningful student teaching experiences, and emphasis on reflection and mentoring as strategies for growth. Additionally, ongoing opportunities to connect with other CETE graduates extend support and professional learning options.

Research centers

Though readers may associate historic universities with traditional teacher preparation, the highest quality education research centers are at the forefront of incorporating cognitive and behavioral science into the teaching and learning environments of tomorrow. Much like the renowned tenets of Finland's preparation route, candidates in these programs are trained as action researchers who contribute to the collective expertise of the profession.

Stanford Teacher Education Program (STEP), Stanford University

Stanford Teacher Education Program (STEP) is a somewhat small, 12-month program in which elementary and secondary candidates earn a master's degree in education. "STEP seeks to prepare and support teacher leaders working with diverse learners to achieve high intellectual, academic, and social standards by creating equitable and successful schools and classrooms."[65]

STEP goes beyond ensuring that teachers understand the pedagogy and content: The program encourages a student-centered approach to learning, emphasizing higher-level thinking skills and inquiry-based opportunities. The program also strives to develop candidates with an understanding of families, communities, and the political contexts of education, as well as a commitment to social justice and equity.

The program views the clinical experience as a critical part of teacher preparation and carefully selects cooperating teachers, only placing candidates with teachers whose philosophy and effectiveness of practice align with STEP. The program also ensures that cooperating teachers want the opportunity to mentor a candidate and that they have at least three years of teaching experience.[66]

STEP includes coursework as well as extensive clinical work. Secondary teaching candidates spend the summer in a middle school setting and then transition to full-year placements in middle or high schools. On average, candidates spend four hours per day in a field setting. Elementary candidates have semester-long placements: at least one in a lower-elementary classroom and one in an upper-elementary classroom.

The careful meeting of theory and practice in the intensive one-year program provides many opportunities for candidates to observe, reflect, discuss, and apply what they learn.

TeachingWorks

TeachingWorks is an organization that evolved from the University of Michigan's Teacher Education Initiative (TEI), launched by Deborah Ball to overcome the haphazardness of teacher preparation programs across the nation and raise the standards for teaching practice.

Deborah Ball points out the discrepancies between the preparation of teachers and the training of practitioners in other professions, such as medicine, nursing, and even cosmetology. These professional training periods are very different, especially at the point when candidates practice on actual human beings. Other professionals typically have more opportunities for observation, discussion, and practice before working with someone in need of their services.

TeachingWorks advances a "true professional system for the practice of teaching" by drawing on:

- "A common curriculum for professional training that focuses on high-leverage practices and on the subject matter knowledge needed for teaching;
- Performance assessments of teachers' readiness for the responsibility of independent classroom teaching;
- Resources and learning opportunities for the wide range of professionals, including university faculty, master teachers, and non-profit staff who work with new recruits; and
- Trustworthy information and data about responsible teaching for student achievement."[67]

While this effort grew out of the work at the University of Michigan, TeachingWorks partners with organizations and universities across the country to develop more effective teacher training programs, form authentic laboratories in which to develop resources, and benefit national teacher preparation efforts.

TeachingWorks focuses on responsible teaching, defined as "complex and depend[ing] on a combination of a teacher's characteristics: knowledge, orientation, and commitment."[68] To support responsible teaching, TeachingWorks strives to identify high-leverage teaching practices that make a significant difference, especially for beginning teachers. These include practices such as "recognizing common patterns of students' thinking in specific content domains; conducting a whole class discussion; establishing and developing relationships with individual students; choosing and using representations, models, and examples; and assessing students' learning within and across lessons."[69]

The organization also recognizes the important role that professionals who train new teachers play, and provide several different types of professional development for teacher educators and supervising teachers.

TeachingWorks advocates for several teacher preparation strategies that address these goals and challenges. For example, TeachingWorks recommends that preparation programs enable groups of candidates to observe a teacher who is specifically strong in one or more of the high-level teaching practices. The group experience provides opportunities to discuss and reflect with colleagues on the teacher's practice. The observation should not be a one-time experience, but rather one of several opportunities to observe, reflect on, and discuss a particular practice. Candidates also practice teaching strategies and instructional practices on one another before leading a lesson in front of a class or with a group of students. Similarly, TeachingWorks also emphasizes a gradual approach to interaction with students. A teacher can first be asked to talk with students as they enter the classroom in the morning, which is a beginning point for eventually discussing work with a student.

Researchers at TeachingWorks are studying teaching practices and training approaches to identify effective strategies and influence how to best prepare teacher candidates. TeachingWorks is also developing more valuable candidate assessments, including performance assessments on specific skills and practices that help to identify a candidate's strengths and any areas in need of improvement.

Virginia Commonwealth University

Virginia Commonwealth University (VCU) takes a systemic approach to developing and launching new teachers and supporting their ongoing professional growth as classroom teachers. In all its efforts, VCU engages the expertise of local teacher leaders. Through the Metropolitan Educational Training Alliance (META), VCU has developed and sustained a collaborative network of teacher leaders in the Richmond metro area to act as a safety net for new teachers in area classrooms.

With the support of VCU's Center for Teacher Leadership (CTL), local school districts have created an interlocking system of programs and initiatives to provide high-quality pre-service experiences, student teaching placements, new teacher mentorship, and teacher leader development within area schools.

These interlocking programs generate a continuous stream of teacher leaders who are highly motivated to guide new teachers, just as they too received support when entering the profession.

VCU's interlocking systems for induction and professional growth include:

- Local teachers apply to become cooperating teachers for student teaching placements. Teachers accepted into the program become Level I Clinical Faculty for VCU. These teachers receive mentor training using the Santa Cruz New Teacher mentoring model. This model relies on observation, open ended questions, and a sophisticated rubric of teacher development to support and challenge student teachers to speed up the journey to effectiveness. Participation in this model develops key habits of reflection in cooperating teachers and student teachers.
- Cooperating teachers can then take a university course in student teacher supervision, based on the Santa Cruz model, to become site-based University Supervisors. These teachers become Level II Clinical Faculty and become eligible to participate in university programs and lend their expertise to VCU projects.
- META and CTL have also launched a new teacher mentor program that provides new teachers with two years of additional support from a Beginning Teacher Advisor (BTA) trained in the Santa Cruz Model. BTAs are released from teaching for two years to serve as full-time mentors, with a guaranteed classroom assignment afterward.
- VCU's CTL provides support and graduate level credit to area teachers who attempt National Board Certification. Often, these teachers later become cooperating teachers, serve as Beginning Teacher Advisors, support other teachers attempting the NBC process, or contribute in other ways to VCU's professional development and new teacher induction efforts.
- Last year, VCU, CTL, and Richmond Public Schools launched an urban teacher residency program for candidates who have earned a bachelor's degree in biology, chemistry, geology, physics, math, history, political science, or English. Students enter a one-year residency that incorporates graduate course work, co-teaching with master teachers, seminars, Santa Cruz model mentoring, and housing in loft-style apartments with other teacher residents.

Peering toward 3.0

As we peer toward Teacher Prep 3.0, we see a wide variety of providers readying and badging teachers for 21st-century pedagogical skills in connectivism; digital literacies; gamification; analytic, playlist, and long tail teaching; as well as Open Educational Resources (OERs) and Massive Open Online Courses (MOOCs). As a result, we see the need for far more teachers who are prepared very differently, some highly specialized (e.g., teaching fractions in cyberspace) and others who are the expert generalists in any number of domains and contexts (e.g., connecting teacher colleagues to the most germane professional learning network).

The informed and innovative thinking in this section is owed largely to the writing of TeacherSolutions team member and *TEACHING 2030* coauthor Emily Vickery, who blogs about the cutting edge of teaching and learning at *Running the Digital River of Learning*.

Connectivism

"To teach is to model and demonstrate; to learn is to practice and reflect." That's one way to describe connectivism, a model positing that learning occurs through the navigation of networks, through exploring connections. Teachers can best understand this model by undertaking it themselves, by creating personal or professional learning networks (PLNs) that allow them to learn from others, share their own experiences, and collaborate.

The concept of the PLN is spreading rapidly: The U.S. Department of Education declared August 2012 as "Connected Educator Month," launching an initiative to encourage professional connectivism. Resources for creating a PLN include books like *The Connected Educator* and online communities like the CTQ Collaboratory. As teachers build their networks of colleagues, they are also creating networks of information by using web curation tools like Learnist, Pinterest, and Scoop.it.

And connectivism benefits teacher candidates, too. In *The Networked Teacher*, Kira J. Baker-Doyle outlines research and theory on the importance of connectivism as she follows "the stories of four first-year teachers, illustrating the significant impact that social support networks can have on teachers' lives and challenging common misconceptions of professional support." Today's teacher candidates must understand how to assess their professional learning needs, develop appropriate PLNs, and locate relevant high-quality resources.

Forecast:

As professional development becomes more job-embedded via PLNs, more focused on competency rather than "seat time," learning badges will become standard units of professional growth transforming the way we think about certifying teachers of the future. Correspondingly, if "teacher preparation" is still housed by institutions of higher education in 2030, it will focus on connectivism. Teacher candidates will "hack" their own education—developing far-reaching PLNs and sophisticated personal learning environments (PLEs). Virtual apprenticeships to teacherpreneurs will be sought-after opportunities.

Digital literacies

It was one of the most influential education blog posts of 2007—and it still packs a punch in late 2012. Colorado high school teacher Karl Fisch answered this troubling question: Is it okay to be a technologically illiterate teacher in the 21st century? If a teacher today is not technologically literate—and is unwilling to make the effort to learn more—it's equivalent to a teacher 30 years ago not knowing how to read and write.

Teacher preparation must extend to include technology and new media literacies, responding to the emergence of what American media scholar Henry Jenkins has called our "participatory culture." Jenkins calls on teachers to model the use of new media skills and integrate them in daily instruction, preparing students to be active participants in and creators of their own futures. In a recent iteration, Kathy Schrock outlines the 13 literacies she deems necessary for students' 21st-century survival and success.

So—if students are expected to master more "literacies" than ever—what does that mean for teacher preparation? The International Society for Technology in Education (ISTE) has developed the National Educational Technology Standards for Teachers (NETS-T) to outline "the skills and knowledge educators need to teach, work, and learn in an increasingly connected global and digital society."

Forecast

In 2030, students and their teachers will approach a wide range of digital literacies within sophisticated learning ecosystems. Teacher candidates will need to be able to use a variety of tools, including the descendants of today's gesture-sensing and voice-recognition technologies; 3D video mapping; augmented reality; and the Internet of Things. The emergence of immersive virtual reality and holography will play an important role in student learning and assessment. Teacherpreneurs will serve as models in understanding and implementing new literacies for learning.

Gamification

Gamification is "applying game design thinking to non-game applications to make them more fun and engaging."[70] Gaming is not new to education, but video game and app development is growing.

Some teachers are on top of the trend—even finding educational purposes for games that were not created with learning in mind. Joel Levin, a private school teacher who co-owns Mindcraftedu, is working in conjunction with the creators of the blockbuster game Minecraft and educators from across the globe to use the game for learning.

Meanwhile, initiatives like Technovation Challenge and Youth APPLab are spurring students to become creators of their own apps and games. Easy-to-use programs (including 3D Game Lab, Alice, Codecademy, GameSalad, Gamestar Mechanic, Globaloria, iBuildApp, Scratch, and many more) enable students to dig deeper into content as they create learning games and digital stories. Students can then share their creations with a global audience and remix games created by others.

Gaming is gaining legitimacy among policymakers as well. In September 2011, the White House appointed gaming researcher Constance Steinkuehler as a senior policy analyst for the White House Office of

Science and Technology Policy. The next month, the White House convened representatives from two dozen agencies to discuss the potential of games as a tool for addressing challenges in education and other areas.

As game-based learning increases, so will the use of mobile devices in and out of schools. The UNESCO Working Paper Series on Mobile Learning has outlined five essential conditions for successful mobile learning programs and highlighted examples of effective initiatives. Yet as Sharon Robinson, president and CEO of the American Association of Colleges for Teacher Education, has noted, few teachers in the United States have been prepared to integrate mobile learning in the classroom.

Forecast

By 2030, there will be many teacherpreneurs who develop new learning games, lead their students in doing so, or otherwise spread their expertise in technology-based pedagogies. Teacherpreneurs and game designers will fine-tune this new model of learning. Meanwhile, teacher preparation will routinely address the skills, tools, and pedagogical approaches relevant to game-based learning and mobile devices. Guided by preparation program leaders and teacher mentors, candidates will know how to draw upon gaming technologies to better help students meet learning outcomes.

Analytic, playlist, and long tail teaching

As technology grows more sophisticated, so does our capacity to harness data and develop learning analytics that enable teachers to make targeted decisions about individual students' instruction.

Interest in learning analytics is on the uptick, and more researchers are investigating the effectiveness of data-driven instruction. Of course, for effective data use to occur on a meaningful scale, teachers must be assessment experts who are informed by the data, not driven by it. Teachers must be able to design appropriate, effective measures of student learning and interpret the results based on their knowledge of children and communities, not just a spreadsheet. The ultimate "data-informed instruction" (the optimal end of surgical learning analytics) will take place when teachers can design customized learning experiences for each student using analytic, playlist, and long tail teaching.

Learning playlists already exist, offering both teachers and learners the ability to queue personalized lists of lessons. However, surgical learning analytics will enable teachers to create individualized learning playlists that tap into students' interests and passions while leveraging digital tools to aid in mastery of specific skills and concepts.

The School of One—which customizes the pace, vehicle, and trajectory of learning to the individual student—is an early experiment in applying surgical learning analytics to practice. In the years to come, teacher preparation programs will turn their attention to helping candidates make sense of surgical analytics to develop learning analytics as well as playlists, sharpening their assessment and data utilization skills.

Widespread data-informed instruction will require new information systems. And more sophisticated platforms aren't so far away. With encouragement from the Council of Chief State School Officers (CCSSO) and funding from the Carnegie Foundation and the Bill & Melinda Gates Foundation, researchers are developing the Shared Learning Collaborative (SLC) in nine states to house student data in the cloud.

Eventually, next-generation learning platforms will integrate data related to student services, teacher services, school services, and back-office services. They'll capture everything from learning profiles to productivity tools to instructional content.

Also relevant to this discussion is the distinction between the traditional economic model ("the head model") and the "long tail model," a term popularized by Chris Anderson. Put simply, the "head model" privileges selling more units of fewer items, while the "long tail model" refers to selling fewer units of more items. Steve Hargadon clarifies the distinction, considering educational technology:

> "The head is about scaling and scope, and success is more of the same. The tail is very horizontal, as it is about as breadth and depth, and success in the tail is differentiation, diversity, and choice. The head requires hierarchy, corporate decision-making, and control. The tail requires networking, an entrepreneurial ecosystem, and freedom. The head is about money, by which approval is conferred. The tail is about passion, and approval is less about the financial and often more about relationships and fulfillment."

The long tail model seems most likely to fill the needs of tomorrow's education ecosystems. Not coincidentally, it will require a diverse range of differentiated roles for teacherpreneurs—and therefore a teacher preparation system that is responsive to candidates' strengths and interests.

Forecast

By 2030 teachers will have grown up with (and learned via) early renditions of learning playlists. Their first-hand knowledge—and their study, during teacher preparation programs, of best practices in surgical learning analytics—will position them to refine technologies and pedagogies that individualize learning.

In keeping with the prevalent long tail economic model, teacher preparation will not be designed around scope-and-sequence curricula or higher education's hierarchal systems. Instead, a teacher candidate's course of study will be based on his or her passions, networks, relationships, and the projected needs of learners. It is possible that "spiky" regions—where the blending of "technology, talent, and tolerance" has created hotbeds of innovation—will prove the most fertile sources of teacher preparation.

Learning architects: Driving OERs and MOOCs

Learning and crowdsourcing—it's a natural match. But there will still be a place for teachers—if we get smart about what "teachers" are, know, and are able to do. Teachers as learning architects will be needed for driving Open Educational Resources (OERs) and Massive Open Online Courses (MOOCs).

Open Educational Resources (OERs) are modules, texts, videos, and other "learning objects" available to all who teach and learn. And iTunesU isn't the only platform for OERs, by any means:

- Connexions, housed by Rice University, includes tens of thousands of materials, used by more than two million people each month.

- Learning Registry, where the educational community can publish and retrieve OER resources.
- Open CourseWare Consortium has published "materials from more than 13,000 courses in 20 languages," available through its website.
- Open Educational Resource Commons offers access to more than 40,000 openly licensed, free resources for PK-12 and higher education.
- YouTube EDU is a popular platform, and a beta version of TED Ed is now available.

Even some district and state departments of education have created learning channels, and a few preparation programs are exposing candidates to these resources.

The rise of Massive Open Online Courses (MOOCs) is another sign that the disaggregation of learning is escalating. MOOCs go beyond providing sets of resources that a learner can explore—they also integrate (to varying extents) community interaction and synchronous experiences.

Several elite higher education institutions—including Duke University, Johns Hopkins University, Princeton University, Stanford University, and the University of Virginia—have partnered with hosting service provider Coursera to offer MOOCs. In spring 2012, MIT and Harvard announced a joint venture called edX, which will offer online courses at no cost. Harvard President Drew Faust called it "an unprecedented opportunity" for the two schools "to dramatically extend our collective reach by conducting groundbreaking research into effective education and by extending online access to quality higher education."

"It's a natural progression of the Internet influencing and impacting what we thought was a pretty stable field," observed George Siemens, a pioneer in MOOC design and delivery who currently serves as associate director of Athabasca University's Technology Enhanced Knowledge Research institute. "All it takes is six months of pretty surprising announcements in terms of open-course initiatives, and all of a sudden you can start to picture that education seems to be at the threshold of a very dramatic change."

One factor that might play into the rise and spread of MOOCs is the escalation of student debt. Some analysts are beginning to talk about a "college debt bubble" that is akin to the housing bubble. For example, PayPal cofounder and seasoned investor Peter Thiel "believes that higher education fills all the criteria for a bubble: tuition costs are too high, debt loads are too onerous, and there is mounting evidence that the rewards are over-rated."

No wonder the idea of free courses is so attractive to the traditional student-age population. And courses open to everyone—with passion-based enrollment—possess appeal that extends past this population, and can be provided by a variety of institutions.

Of course, much investigation remains to be done, in terms of what MOOCs will and won't do. Many are skeptical about MOOCs, both in terms of their ability to foster authentic learning experiences and their long-term roles in university models. And some—like Martin Snyder of the American Association of University Professors—have questioned what MOOCs mean for educational equity: "If this kind of a system takes off, you might have a situation where the very wealthy students go to a campus to interact with real professors, while the rest of the world takes online courses… what appears to be a democratization process might be more aristocratic than democratic."

Forecast

By 2030, teacher candidates will be expected to leverage open content and digital tools to construct and deliver learning experiences. Preparation programs will call upon candidates to apply their curricular, pedagogical, assessment, and learning management skills in fresh, individualized ways to meet students' needs.

Some candidates will eventually become teacherpreneurs who serve as learning architects: creating games, podcasts, 3D video maps, online assessments, and collaborative spaces where learning takes place. Other teachers will look to them for advice on how to bundle learning objects, activities, and assessments for customized, passion-based educational experiences.

Most teacher preparation candidates will have participated in MOOCs during their own PK-12 and adult lives —although these experiences will be more sophisticated than emergent versions. Preparation programs will make some use of MOOCs, and will offer explicit instruction in the pedagogical ramifications of teaching MOOCs. Some teacherpreneurs—in the role of learning architects—will specialize in establishing and nurturing effective learning cultures in MOOCs.

TeacherSolutions team members

Megan Allen

Teacherpreneur, Florida

Megan Allen is a teacherpreneur who splits her time between teaching fifth grade and advocating for the teaching profession. Previously, Megan worked as the educator-in-residence at the University of Central Florida (UCF) to bridge the UCF teacher prep program and public school classrooms.

This is Megan's ninth year as a professional educator. She began teaching at a constructivist-based, ecology-focused charter school in downtown Atlanta and then taught at a recreation center in a small coastal New Jersey town, working with babies and their moms through pre-K. Next, she served as a fourth grade teacher for three years at a rural Title I school in Plant City, FL, then moving to Tampa, teaching fourth grade at an urban, Title I school. She was named the Florida Teacher of the Year and made the transition to a career as a special education teacher for a K-5 self-contained class of students with varying exceptionalities.

Megan did not begin her post-secondary education intending to teach. She went to school for chemical engineering, graduated with degrees in Spanish and International Trade, then went to law school. After life-changing events, she registered in a dual-track program, preparing her for Florida's classrooms with a two-year master's degree.

Daniel Braunfeld

Program associate for special projects, Facing History and Ourselves, New York

Daniel Braunfeld currently works for Facing History and Ourselves, a nonprofit educational organization that works with schools, teachers, and students to analyze historical case studies of racism, anti-Semitism, and prejudice as a way to better understand moral decision-making. The organization also strives to prepare students to be educated and active participants in their own communities. Previously, Daniel taught high school history in urban settings for seven years, including two years in Santa Monica, CA, and five years at the Facing History School in New York City. Daniel completed his formal teacher preparation at Brandeis University, where he majored in history and minored in education.

"What I enjoyed most about my undergrad preparation was how practical it was. It was not overly grounded in theory or hypothetical scenarios. Rather, we were taught to understand the supportive structures of teaching; to understand ourselves as teachers; and to use a variety of methods to understand our students and how best to meet their needs."

Shannon C'de Baca

Online chemistry and teacher preparation teacher, Iowa

Shannon C'deBaca is an online chemistry and teacher preparation educator who works in Iowa, but spends much of the year living in Nebraska and New Mexico. Shannon has over 35 years of teaching experience, the first 28 of which she spent in a face-to-face classroom with the subsequent seven years in a blended face-to-face/online model.

Four times a year, Shannon facilitates eight-hour face-to-face "wet labs" with students in each region of the state. She collaborates with instruction supervisors (who are certified teachers, although not in chemistry) at each school site. These instruction supervisors check in with students daily about technological issues, motivation, and other challenges. Students connect with Shannon via video conferencing at least three or four times each week using Skype, Adobe Connect Pro, or an onsite video conferencing room (ICN). Shannon also uses the online course to help under-certified teachers get their chemistry endorsement while learning the pedagogy.

Shannon is a lifelong learner who actively searches for new ideas and people who can teach her something or challenge her thinking. In her first years of teaching, she formed a Friday breakfast group, the "craft guild," so that her colleagues could learn from one another. The craft guild still meets every Friday at a local cafe.

She is a coauthor of *TEACHING 2030: What We Must Do for Our Students and Our Public Schools… Now and in the Future* and will soon have her leadership featured in *TEACHERPRENEURS: Innovative Teachers Who Lead but Don't Leave* (Jossey-Bass 2013).

Curtis Chandler

Eighth-grade language arts teacher, Kansas

Curtis Chandler is an eighth-grade language arts teacher in a rural school and the Kansas Teacher of the Year for 2011.

He has also taught video game design courses and consults with school districts and university education programs on using innovative, effective methodologies in classroom instruction and assessment. Curtis works with the Southern Regional Education Board (SREB) and Mid-America Association for Computers in Education (MACE) on professional development and STEM curricula, advising the Kansas state department of education on similar matters. He blogs for the Council of Chief State School Officers (CCSSO) and publishes his own blog, *Better Learning for Schools.*

Curtis has been in the classroom for about ten years in the U.S. He previously taught and trained teachers in Brazil for two years in a religious setting. His first teaching job in the U.S. was on a military installation as a reading intervention specialist and reading instructional coach.

Curtis has an undergraduate degree from Kansas State University, where he studied secondary education. He earned his master's degree in instructional design and technology at Emporia State. He is currently working on a doctoral degree at Kansas State University.

"In all honesty, the greatest teacher preparation I experienced didn't come through the formal teacher preparation program as much as it did from the exceptional teachers that I was able to work with in my mentoring experience and in my first few years of teaching. Out in the field, it didn't take long to figure out who was effective, exceptional, and continually seeking to improve themselves and the profession. They were 'teacherpreneurs' in every sense of the word. These are the folks that I continually seek out."

Katy Cortelyou

K-2 intensive reading teacher, Florida

Katy Cortelyou is in her 16th year of teaching and in her third year as a K-2 intensive reading teacher in a high-needs elementary school in Tampa, Florida. Prior to her current position, Katy worked as a Reading First Coordinator, serving as a site-based instructional coach while providing support to in-service teachers/reading coaches for as many as 43 schools in the Tampa area. She began her career teaching kindergarten, then first grade and third grade.

Katy earned her elementary education degree from Florida Southern College, a small private liberal arts college in Lakeland, FL, where she graduated with a National Championship ring for softball. She secured her first teaching position at an elementary school with very little economic or cultural diversity.

Susie Highley

Media specialist, Indiana

Susie Highley has been a media specialist for the past eleven years and was a middle school science teacher for 23 years. She attended the teacher preparation program at Purdue, where she also earned a minor in science. Her school has gone through significant changes since she started teaching there in 1980. In 1980, the student population was 98 percent white, with about 25 percent qualifying for the federal free and reduced lunch program. Today, the population is about 65 percent African-American and 10 percent Hispanic, with 65 percent qualifying for the federal free and reduced lunch project. Following recent budget cuts at the district level, Susie covers five different schools in four different buildings.

Susie is a coauthor of *TEACHING 2030: What We Must Do for Our Students and Our Public Schools… Now and in the Future*.

Lauren Hill

AP language and composition teacher, Kentucky

Lauren Hill is a National Board Certified Teacher who teaches AP English Language and Composition and serves as the school technology coordinator at Western Hills High School in Frankfort, Kentucky. Lauren is part of CTQ's Common Core Lab and has written about the Common Core standards for regional and national publications, including *Education Week Teacher*. Lauren also works with the National Math and Science Initiative in Kentucky (AdvanceKy) to prepare students for the AP Language exam and trains pre-AP teachers in the Laying the Foundation program. Previously, Lauren taught middle school language arts in Joelton, Tennessee, and adult basic education at a prison in Nashville.

Lauren graduated from Barnard College at Columbia University, where she majored in history. She then earned her master's degree in curriculum and supervision, as well as certification in English and social studies at Peabody College at Vanderbilt University. She also earned her Rank I and technology concentration at the University of Kentucky and has worked in education for 22 years.

"Coming to education from a traditional preparation program but from untraditional classrooms, I have learned that the best way to improve one's practice is to keep asking questions, even when the answers seem obvious; things are not always what they seem. Take advantage of every new idea and new relationship. Unexpected epiphanies are everywhere if one chooses to find them."

John Holland

Hybrid Head Start teacher, Virginia

John Holland is a Board Certified hybrid teacher of 17 three-year-olds in the inner city of Richmond, VA. He is also a child development specialist providing service-area supervision and support to 15 Early Head Start (prenatal to age three) teachers. Prior to holding this hybrid role, John spent 12 years in the classroom, then a couple of years in other education roles. John holds a Ph.D. in Educational Leadership from Virginia Commonwealth University.

John has maintained a strong relationship with his alma mater through working with VCU's Center for Teaching Leadership (CTL). Through CTL, he received training in student teacher and collegial mentoring; teacher leadership; and university supervision. He has also participated in and subsequently provided training in National Board support programs there. John says that his work as a supervisor of new and seasoned teachers changed his perspective on what it takes to be a successful teacher in urban schools. He believes that the ability to connect with parents, community, and students will be a key to how we prepare teachers of the future.

John is a coauthor of *TEACHING 2030: What We Must Do for Our Students and Our Public Schools… Now and in the Future*.

Carrie Kamm

Mentor-resident coach, Academy for Urban School Leadership (AUSL), Illinois

Carrie Kamm is a mentor-resident coach for the Academy for Urban School Leadership (AUSL), Chicago's teacher residency program. She works at National Teachers Academy, a K-8 school in Chicago's South Loop neighborhood, where 98 percent of students qualify for the federal free and reduced lunch program. Prior to her role with AUSL, Carrie was a fourth-grade mentor teacher at Chicago Academy Elementary School (Chicago Public Schools), a racially and economically diverse school on Chicago's North Side.

Carrie earned graduate degrees from Northwestern University, where she also received her elementary teaching certification. At Northwestern, Carrie was part of a program that sought to give teacher candidates opportunities to learn in suburban and urban schools. Since Carrie was committed to being well-prepared for an urban context, she insisted that all her preparation occur in urban schools. Unfortunately, that often meant being placed in classrooms where the cooperating teachers were not well-versed in supporting the learning of new teachers. That being said, she worked to build relationships with teachers throughout the entire school and learned much from her time there.

"The big lesson I taught myself was that, as a teacher, I am responsible for my own professional development. And that first starts with being brutally honest about one's practice. By dismissing my fears and my willingness to take risks, that is how I became the teacher who ultimately was worthy of serving my students." Carrie is a coauthor *TEACHING 2030*: *What We Must Do for Our Students and Our Public Schools… Now and in the Future.*

Carrie Keahey

First-grade teacher, Colorado

Carrie Keahey is a first-grade teacher at Federal Heights Elementary School in Colorado's Adams 12 Five Star Schools. She completed her bachelor's in accounting at the University of Colorado in Boulder. Before deciding to pursue a career in education, Carrie was a teacher in many other aspects such as aerobics and ski instructing and volunteer teaching in Nepal. Carrie was selected as a Boettcher Teaching Fellow in 2008 and completed her master's in curriculum and instruction at the University of Denver. Carrie is bilingual in English and Spanish and uses this to communicate and connect with students and their families. Carrie is known for creating an environment that promotes student efficacy and trust.

Stephen Lazar

Social studies and English teacher, New York

Stephen Lazar is in his eighth year of teaching high school social studies and English. After his first year of teaching in Fairfax County, VA, Stephen taught for six years at the Bronx Lab School, where he was a social studies department chair, instructional coach, and union chapter leader. In 2011-12, he taught at the Academy for Young Writers, but due to a location change, he is pursued an opportunity to co-found Harvest Collegiate High School, which opened with 108 ninth graders in September 2012. He serves as a humanities teacher there, as well as oversees the school's curriculum and professional development.

Stephen also writes for *New York Times' Schoolbook* site, serves on the executive board of ATSS/UFT, and is a National Board Certified Teacher.

Stephen praises the Undergraduate Teacher Education Program (UTEP) at Brown University, which allows a small number of undergrads to complete its master of arts in teaching program during their senior year (though they do not earn the master's degree by doing so). The program was run by "clinical" professors, each of whom had at least 20 years of classroom experience.

Stephen's leadership will be profiled in *TEACHERPRENEURS*: *Innovative Teachers Who Lead but Don't Leave*.

Kathleen Melville

English and Spanish teacher, Pennsylvania

Kathleen Melville is in her eighth year as a teacher. She currently teaches high school English, Spanish, and drama at a small urban public school in Philadelphia. She serves on her school's leadership team and as a consultant for Philadelphia Young Playwrights and the Philadelphia Writing Project. She also blogs for *Teaching Tolerance*.

Kathleen completed her teacher preparation at Swarthmore College. After she graduated (with a double major in English and education), she took a job teaching at a large private bilingual school in Guatemala City. When she returned to the U.S., she taught language arts for a year at a Friends school for students with language-based learning differences (mostly dyslexia). During her second year there, she taught Spanish and took the Curriculum and Methods seminar at Swarthmore to earn her certification.

During her fifth year as a teacher, Kathleen taught a traditional English curriculum for the first time—at her current school in Philadelphia. She found her jumps from school to school and subject area to subject area made developing skills and confidence difficult. She never had any formal mentors and actually credits her husband as the first teacher who really reached out to help her with her teaching. (She jokes that this is the reason she married him!)

Caitlin Moore

Eighth-grade social studies teacher, Massachusetts

Caitlin Moore is a seventh- and eighth-grade social studies teacher at an urban charter school in Massachusetts. She teaches ancient civilizations to seventh graders and government to eighth graders. She also serves as the social studies department head and Model United Nations co-advisor. This is Caitlin's sixth year in the classroom, and her fifth at her current school.

She became certified as an undergraduate at Bowdoin College in Maine. It took a fair amount of advanced planning to become certified as an undergraduate, since Bowdoin only recognized education as a minor. She was part of a small cohort and appreciated the intellectual approach to teaching and the ability to practice in a supportive environment.

Renee Moore

English teacher, Mississippi

Renee Moore has been teaching English in the Delta region of Mississippi for over 20 years. She now teaches full-time at a community college and part-time in four high schools and online.

After moving to Mississippi, Renee switched careers from freelance journalist to teacher. Building upon her two years of college, she enrolled in the teacher education program at the local four-year public state university. All her instructors were white, Southern, and had not taught in a PK-12 classroom in over 20 years. Renee cites three important experiences that shaped her as a teacher:

Her last year in college, she worked in the Writing Center as a tutor. Practical experience in helping struggling writers carried over directly to her high school teaching.

The summer after she graduated, she attended her first National Writing Project session.

About four years into her career, she earned her master's degree at Bread Loaf School of English in Middlebury, VT. There she was exposed to one of the top graduate programs for teachers of writing, and also started what would become a ten-year classroom research project on teaching Standard English to African-American students.

"Since then, I've been blessed with one adventure after another," she says.

Renee is a coauthor of *TEACHING 2030: What We Must Do for Our Students and Our Public Schools… Now and in the Future* will be featured in *TEACHERPRENEURS*: *Innovative Teachers Who Lead but Don't Leave*.

Linda Reid

Executive director, Oklahoma Commission for Teacher Preparation, Oklahoma

Linda Reid is the executive director of the Oklahoma Commission for Teacher Preparation (OCTP), the agency responsible for teacher certification testing and for the accreditation and approval of all state university pathways to teaching. Previously, she was OCTP's state director of program accreditation. Her most challenging current task is to serve on the state's Commission for Teacher and Leader Effectiveness. This group has been charged with recommending how Oklahoma will implement a new legislature-mandated teacher evaluation system.

In 2007, Linda was the Oklahoma Teacher of the Year, a full-time position. Linda taught seventh- and eighth-grade Spanish and English for thirteen years, including eight years at a school that predominantly served low-income minority students. She attained National Board Certification in world languages and coached basketball and track.

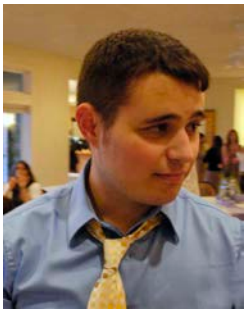
Linda prepared for her teaching career through a traditional university route at Oklahoma Northeastern State University, the state's largest teacher prep institution.

“To be honest, the best 'teacher education experience' I had was my National Board Certification process.”

Scott Storm

High school English teacher, Pennsylvania

Scott Storm teaches high school English in a high-needs urban district in Chester, Pennsylvania, just outside Philadelphia. He works in a small public high school where he has served as a teacher leader: designing curriculum, creating professional learning communities, doing teacher research, and working very closely with students. Scott began teaching his current cohort of students when they were in ninth grade and has “looped up” with them each year through graduation. This is Scott’s fourth year of teaching—and his current cohort’s senior year.



He helped found—and now runs—an innovative after-school program at his school. The Arts, Academics, Action: Radically Transforming School (or AAARTS) program offers performing arts instruction experiences for students who would otherwise have limited or no access to such opportunities.

He is part of the Consortium for Excellence in Teacher Education’s (CETE) Teacher Leadership project, which offers accomplished teachers the opportunity to experiment with various forms of educational leadership.

Scott grew up in rural Pennsylvania—and knew from the beginning that he wanted to be a teacher. Coming from a working-class farming and service-oriented family, becoming a teacher was seen as an admirable career move, and an act of social mobility toward the middle class. Scott attended Swarthmore College, a small liberal arts school where he completed extensive coursework and practicum work in PK-12 schools.

Emily Vickery

21st-century learning specialist, Florida

Emily Vickery is the 21st-century learning specialist at an innovative parochial school in Pensacola, Florida, that has a 1:1 laptop computer program. There Emily supports teachers in curriculum design, pedagogy, assessment, learning orchestration, and the appropriate use of digital tools in learning (face-to-face and online). She serves as department chair for the English and foreign language departments, undertakes teacher observations and evaluations, leads professional development, and spearheads various other projects assigned by her principal.

Emily came to teaching in an “alternative” fashion. While earning her bachelor’s degree in communication, she became a professional whitewater river guide, which she says served her well when she became a "traditional" teacher. She subsequently earned a master’s in education and has been teaching "formally" since 1991. Her background includes teaching in an economically disadvantaged urban high school in Montgomery, AL; teaching college English; and teaching technology. While in Montgomery, Emily co-designed several PK-12 schools that remain successful today.

From 1997 to 2003, Emily served as a private educational consultant with a focus on leveraging technology in learning. Her clients included the Governor of the State of Colorado, the Education Commission of the States, and Apple, Inc. When she worked with Apple, Inc., she visited schools across the nation and worked with hundreds of teachers in rural, urban, and suburban settings. In 2003, she accepted a fellowship with the award-winning Teaching Tolerance Project of the Southern Poverty Law Center, where she spearheaded a special project on reporting Columbine High School's story of healing five years after the tragedy. Emily served on the design team for the League of Innovative Educators, an initiative of the Office of Education Technology, U.S. Department of Education. Emily is a coauthor of *TEACHING 2030*: *What We Must Do for Our Students and Our Public Schools… Now and in the Future*.

Mary Ann Wolf

Education consultant, North Carolina

Mary Ann Wolf, Ph.D., is the CEO of Wolf Ed and has 15 years of experience in education and education technology. She currently serves as an independent adviser and consultant to several education organizations, including ASCD, the Alliance for Excellent Education, the U.S. Department of Education, and EDC. She focuses on connecting policy and practice for innovative education reform and instructional practices, and grounds her perspective in her teaching experience and work with students. She is a member of the North Carolina eLearning Commission and serves on several advisory boards for NSF and the new U.S. Department of Education epic-ed Community of Practice. Previously, Mary Ann was the Executive Director of the State Educational Technology Directors Association (SETDA).

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