# A HUMAN CAPITAL FRAMEWORK FOR A STRONGER TEACHER WORKFORCE

BY JEANNIE MYUNG, KRISSIA MARTINEZ, AND LEE NORDSTRUM

Carnegie Foundation
for the Advancement of Teaching

**Carnegie Foundation**
for the Advancement of Teaching

Carnegie Foundation for the Advancement of Teaching
51 Vista Lane
Stanford, California 94305
650-566-5100

**www.carnegiefoundation.org**

We invite you to explore our website, where you will find current information on our Board of Directors, funders, staff, programs, and publications.

# A HUMAN CAPITAL FRAMEWORK FOR A STRONGER TEACHER WORKFORCE

BY JEANNIE MYUNG, KRISSIA MARTINEZ, AND LEE NORDSTRUM

## EXECUTIVE SUMMARY

Building a stronger teacher workforce requires the thoughtful orchestration of multiple processes working together in a human capital system. This white paper refines and provides evidentiary support for a human capital system framework composed of four subsystems that ideally work together to build a stronger teacher workforce.

A comprehensive human capital system must attend to the need for districts to (1) Acquire (get the right teachers in the right positions on time); (2) Develop (support professional growth in school-based learning communities); (3) Sustain (nurture, reward, and challenge high-performing teachers); and (4) Evaluate (make evidence-based personnel decisions) the very best human talent they can. The Acquire, Develop, and Sustain subsystems have a strong, direct influence on enhancing the teacher workforce, while the Evaluate subsystem's main contribution is through activities that inform the other three subsystems.

## INTRODUCTION

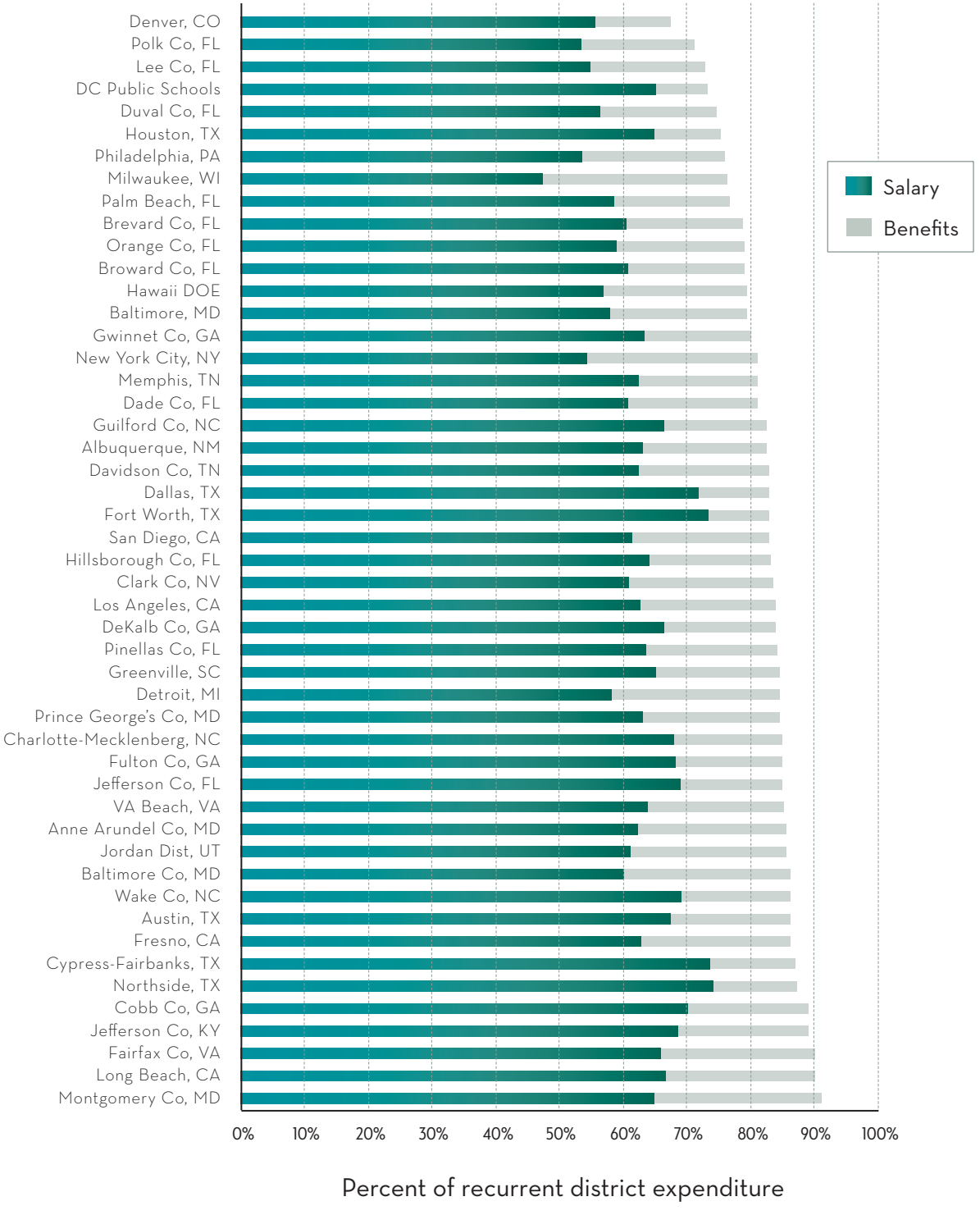
Human capital is the largest single investment K–12 districts make. Staff salaries and related benefits account for approximately 80 percent of current district expenditures[1] and 70 percent of total education spending. Figure 1, overleaf, shows recent data from the 49 largest US school districts,[2] where current expenditures range from 65 to over 90 percent of district operational spending. As such, the corps of instructional staff represents the most expensive lever districts employ to influence student outcomes. This has obvious and significant implications for educational budgets, but also gives districts powerful incentives to ensure that this lever (i.e., instructional staff) functions both efficiently and effectively.

Nevertheless, current policy debates in education tend to focus on outcomes-based evaluation and accountability for teachers or input-centered assessments of the qualifications, which are, at best, indirect

[1] Educational budgets are disaggregated into current and capital expenditures. Current expenditure is the budget allocation for line items that are consumed on a yearly basis (i.e., operation expenses). The largest proportion of current expenditure is comprised of staff salaries and benefits, but also includes consumables such as student stationary and workbooks. Capital expenditures, on the other hand, include assets such as buildings, construction, and school infrastructure. Staff remuneration and related benefits therefore consume approximately 72 percent of total educational spending, though there is of course variation between districts.

[2] Districts in Figure 1 represent 48 of the 50 largest school districts, plus Washington DC Public Schools, in the 2008-09 academic year. Chicago, IL and Prince William Co, CO are not included (data unavailable).

## Figure 1. Salary and benefits as a percentage of total district spending, 2009




**Source: Authors' calculations based on NCES databases (accessed 13 Dec, 2012)**
**Notes: Data from School District Finance Survey 2008-09**

influences on classroom practices and student achievement (Ball and Forzani 2009; Aslam and Kingdon 2013).[3] On the other hand, little attention is paid to the day-to-day operations of teacher human capital processes, which directly influence student outcomes. Remarkably little is done to manage the processes by which districts identify, acquire, develop, and sustain (or even evaluate expressly for the purpose of improving practice) teacher human capital. Data on these operations are scarce and, partially as a consequence, districts tend to focus single-mindedly on the few outcome measures that are readily available: student achievement scores and teacher retention rates.

Test scores and retention rates, however, are lagging indicators far down the causal chain from more direct human capital processes such as recruitment, hiring, and placement. As such, they provide little information on what districts can do to render these (and other) front line processes more effective. These lagging indicators measure how well our system is doing vis-à-vis certain outcomes, but they do not provide information about how to improve it. And while no single measure can capture the inherent complexity of the teaching and learning process or adequately inform the improvement of an entire system, a family of measures, tightly coupled to the efficiency and effectiveness of each system process, can inform the management of continuous improvement efforts.

To that end, this white paper develops a general framework of teacher human capital processes. We believe attention to this framework will engender a corps of teachers with the capacity and expertise to collectively facilitate enhanced educational outcomes. This framework and its constitutive subsystems form a set of inter-dependent processes that, if improved, would strengthen the teacher workforce. While the aim of these processes (i.e., a stronger teacher workforce) will inherently influence the four subsystems discussed below (acquire, develop, sustain, and evaluate), the focus here is a common understanding of and nomenclature for the overall teacher human capital system, as well as an appreciation of its inter-connected nature.

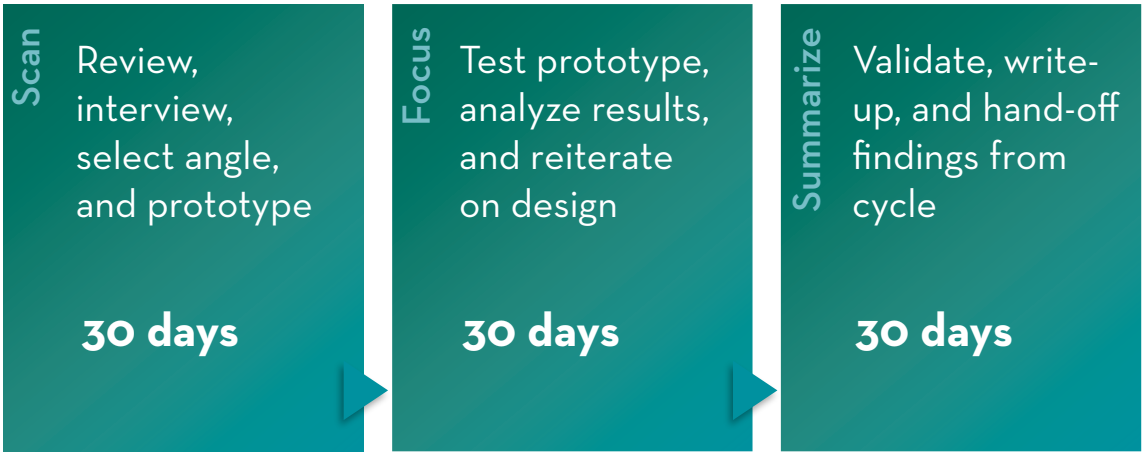
## METHODOLOGY

The methodology employed for this white paper followed a 90-day innovation process (Park and Takahashi 2013) adapted from the Institute for Healthcare Improvement (IHI n.d.). The IHI 90-day research cycle, depicted in Figure 2, is comprised of three distinct 30-day phases: scan, focus and test, and summarize and disseminate. Much of the first phase is spent reviewing literature, assessing prior evidence, or conducting initial interviews in order to survey the current landscape of the chosen research topic. This initial period will produce a project aim, a description of the environment, a theory (or set of theories) about how to solve the problem, and a hypothesis of an effective solution. Phase two subsequently tests the theories developed in the previous 30 days in a particular context (e.g., district, school, or classroom), refines hypotheses

[3] Accountability schemes operate as indirect levers of change because first they must motivate the teacher to change his or her behavior. Second, changes in instructional behavior must be made consistently and with fidelity to the spirit of the scheme. Third, this behavior change must bring about positive student outcomes. It is important to note that underlying the logic of the "indirect lever" is the large assumption that the teacher already has the capacity to make the desired behavioral change, or will be supported in her efforts to acquire that capacity.

concerning "what works," and identifies aspects of the system that "perform to specification." The final 30 days is devoted to summarizing findings, enumerating lessons learned through the process, and developing appropriate products for internal or external dissemination.

**Figure 2. 90-day cycle methodology**




**Source: Park and Takahashi (2012)**

This approach differs substantially from other research modalities typically found in education. It is intended to support improvement efforts by contributing to the re-conceptualization of problems and the conditions that create them, prototyping possible processes or tools to address these problems or testing specific nascent ideas about changes to practice (Park and Takahashi 2013). Cycles serve as a device to advance ongoing improvement work and build the organization's capacity and knowledge. To this end, every 90-day cycle has an explicit aim, a defined audience, and an initial conception of its final product that will be used to guide or support improvement. There are several defining features of 90-day cycles. All 90-day cycles

- aim to prototype an innovation, broadly defined to include knowledge frameworks, tools, and processes;
- leverage and integrate knowledge from scholars and practitioners;
- leverage knowledge of those within and outside the field associated with the topic;
- include initial "testing" of a product by at least one of several means;[4]
- consist of three phases, (1) scan, (2) focus, and (3) summarize;
- begin and end within a 90-day span and run in synchronization with other 90-day cycles organized into four, three-month waves during the year;
- are led by a Team Lead and supported by other team members and experts.

[4] At their core, 90-day cycles are designed to test new thinking or ideas. Simply put, they are a form of innovation. Inherent in all innovation is the prospect of failure. Inevitably, some ideas will fail to effect the intended change. At IHI, 30-40 percent of their 90-day cycles end in "failure." Yet failure generates important learning, and in an improvement frame, early testing at a very modest scale keeps the cost of failure low and prevents bad ideas from being widely implemented.

In preparation for the 90-day cycle conducted for this white paper, the Carnegie Foundation for the Advancement of Teaching convened a group of 20 leaders in the use of data for improving human capital systems in K-12 districts. The focus of the convening, held January 5-6, 2012, was the conceptualization of a teacher human capital system as a network of interdependent subsystems (i.e., Acquire, Develop, Sustain, and Evaluate) working toward a stronger teacher workforce.

During the subsequent 90-day research cycle we conducted literature scans and interviews, both within and outside the education field, to uncover the critical components of a human capital system. The literature scan revealed a broad but uneven research base for teacher human capital processes. Teacher professional development, for instance, has been a focus of considerable research extending over 50 years. Research on the processes for acquiring teachers, on the other hand, has just started to become a focus in the past decade. For the purpose of this 90-day cycle, we have included in our model only those teacher human capital processes supported by empirical evidence of a causal connection between the human capital process and a stronger teacher workforce. Studies in which quantitative data were collected via field research, interviews, or focus groups were also considered for inclusion. For some processes in the framework, research in education has not yet delivered results conclusive enough to warrant inclusion. In those cases, we referred instead to definitive out-of-industry research and evidence. The results of these literature scans are included below under "Basis for inclusion" and "Key considerations."

The resultant prototype framework of teacher human capital was tested with a diverse group of educational actors and experts (see Table 2). On April 26, 2012, the framework was tested again on the User Review Panel of the Carnegie Knowledge Network, a group of K–12 district leaders involved in developing and implementing teacher evaluation and support systems.[5]

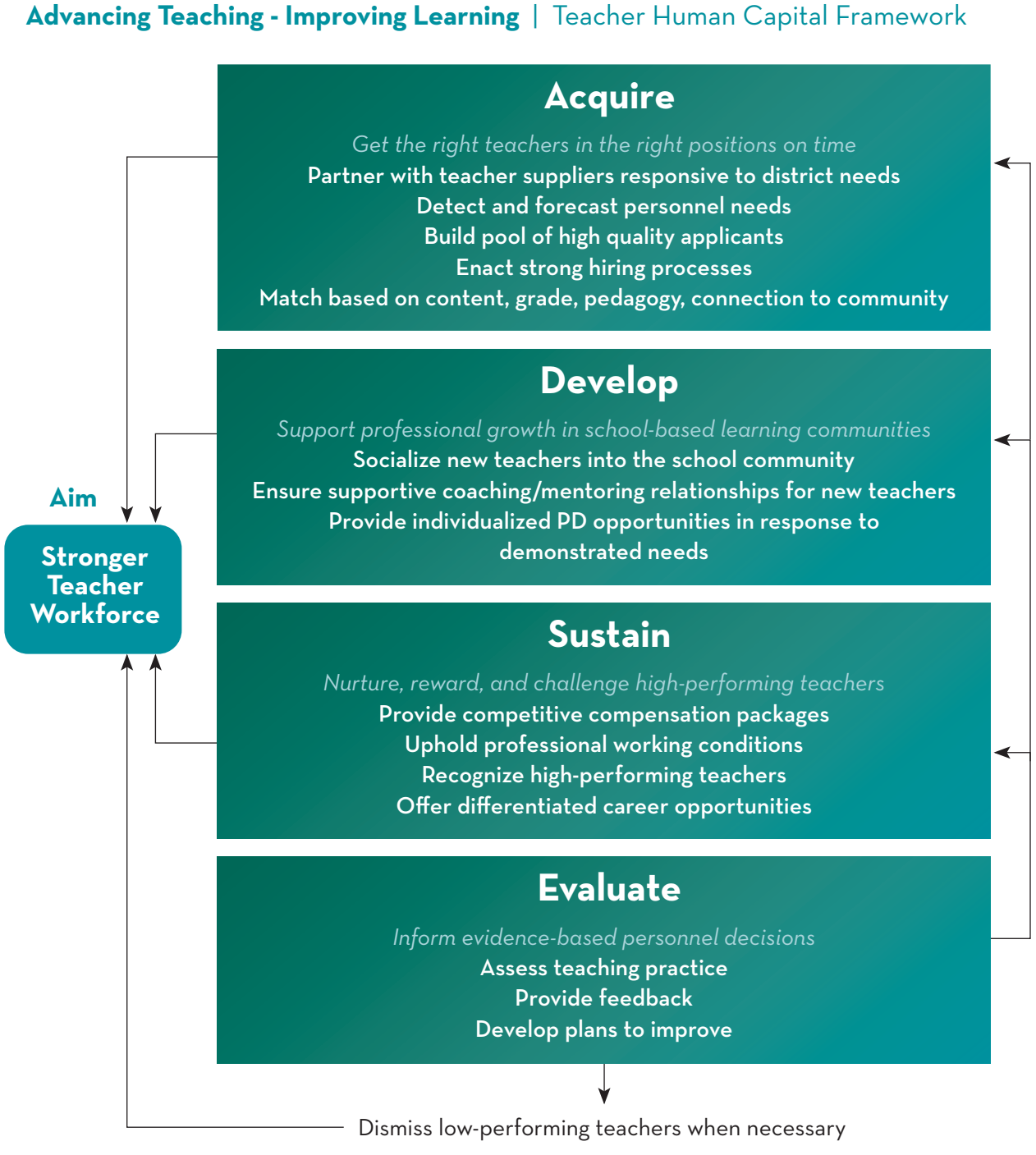
## RESULTS

The aim of a teacher human capital system is a stronger teacher workforce, a corps of educational personnel who have the collective capacity and expertise to facilitate enhanced educational outcomes. The scope of this 90-day cycle was limited to an understanding and unpacking of the critical subsystems that are intrinsic to any given teacher human capital system, regardless of the characteristics of a "stronger teacher workforce."[6] The framework is depicted in Figure 3 and elaborated in the following sections.

[5] For further detail, please see http://www.carnegieknowledgenetwork.org/user-review-panel/.

[6] Most likely, measures of a stronger teacher workforce will include evidence of student growth; evidence of improved teacher practice; retention rates of effective teachers; and a set of teacher skills, knowledge, and dispositions. Crisp measures of the characteristics that comprise a stronger teacher workforce will be essential to the development of a measurement model.

Figure 3. Teacher human capital framework



## Teacher Human Capital Framework

Our synthesis of human capital literature and practices aggregates human capital processes into the four interdependent subsystems that represent the four core functions of an effective teacher human capital system:

- Acquire: Get the right teachers in the right positions on time
- Develop: Support professional growth in school-based learning communities
- Sustain: Nurture, reward, and challenge high-performing teachers
- Evaluate: Inform evidence-based personnel decisions

A representation of the teacher human capital framework is shown in Figure 3. Embedded in this framework are the major pathways through which the subsystems influence the system aim, represented by bold green arrows. The Acquire, Develop, and Sustain subsystems have strong and direct influences on the aim. The Evaluate subsystem has a weaker direct influence on the system aim (informing decisions on the dismissal of low-performing teachers) and is represented by a thin green arrow. In general, however, the Evaluate subsystem acts indirectly to strengthening the teaching workforce. The arrows leading from Evaluate to the three other subsystems represent the influence of evaluation on the other mechanisms of advancing human teacher capital.

Two aspects of the teacher human capital framework as a system with interconnected processes deserve special emphasis. First, the systems aspect of the framework means no single subsystem taken alone can be expected to improve the teacher workforce. For example, one cannot simply evaluate one's way into making all teachers better at their jobs. All of the subsystems, along with their respective processes, are critical to the enhancement of teacher capabilities and classroom practices. As a result, it is not justifiable to rank them, either explicitly or implicitly, vis-à-vis their value to the improvement of system performance. From a policy perspective, the overall educational system does greatly benefit from focusing resources and efforts on one or very few processes (and improvement science suggests the importance of doing so as well). A systems perspective, rather, assumes that districts or educational organizations need to optimize multiple interdependent processes in order to create a stronger teacher workforce. That said, the systems perspective recognizes that different contexts suggest different needs and starting points, particularly for school districts with limited resources or capacity for work in one or another subsystem. In sum, the message is simple: all processes are equally valuable, but not all processes need to be worked on simultaneously. However, a "cafeteria" approach, by which educational actors pick and choose processes according to whim, ideology, or ignorance of the systems perspective, is not supported by the framework.

The second aspect of the teacher human capital framework that deserves special attention is the interconnectedness of the subsystems and processes that constitute the framework. Although the framework does not highlight these interconnections and their exploration is beyond the scope of this white paper, the framework should not be understood as an atomistic rendering of human resource systems. For example, the values and preferences of the teachers a district hires should influence their professional development.

In the language of the framework, the human capital the district acquires should affect the district's efforts to sustain its workforce. These interconnections and interdependencies are not explored here, yet this aspect of teacher human capital framework should be borne in mind throughout the following analyses.

## Acquire

Getting the right teachers into the system is a critical step toward building a stronger teacher workforce. The Acquire subsystem encompasses a number of components crucial to getting the right teachers into the right positions on time: influence on supply, detection of personnel needs, recruitment, hiring, and placement. By dedicating time and resources to this subsystem in the teacher human capital framework, districts can mitigate the time and resources lost due to high turnover rates. During this 90-day cycle a number of out-of-industry leaders who have made efforts in this area were identified, several of whom are discussed as case examples in the section "Organizations working in this area."

### Strengthening Relationships With Teacher Suppliers Responsive to District Needs

BASIS FOR INCLUSION

One high-leverage way for a district to ensure quality in its hires is to influence the professional preparation of its candidate pool. Unless a district is fortunate enough to be located near a high-quality teacher preparation program already sensitive to the district's needs, district leaders will need to be proactive in fostering relationship with teacher suppliers in order to ensure quality teachers enter the system. University-based teacher education programs have come under scrutiny for the inadequate preparation of teacher candidates graduating from their programs (Darling-Hammond 2007; Education Commission of the States 2000; ETS 2002; Finn 2003; Paige 2002). A number of studies have also indicated that most districts attract candidates from local teacher preparation programs (Boyd et al. 2003; Mihaly et al. 2012), which suggests the default supply of teacher candidates is relatively fixed and bounded by geography. It also suggests the potential for concerted and coherent action.

A core principle of Total Quality Management is that organizations ought to influence the quality of their suppliers in an effort to minimize variation in the quality of inputs (Deming 1986). In the case of district-level human capital management, teacher preparation programs are suppliers. Supply chain management applied to school systems focuses on a systems view of the supply of new teachers with an eye to ensuring the quality of their preparation by developing strong partnerships between supplier and recipient. Teacher preparation institutions should have the same aim as the district (i.e., building a stronger teacher workforce) and should collaborate toward that end. In order to do so, both the district and the teacher suppliers must consider their partnership mutually beneficial.

Relationships between districts and their teacher suppliers can vary widely. Barnett, Hall, Berg, and Camarena (1999) describe different types of partnerships based on varying levels of interdependence between organizations: cooperative partnerships, coordinated partnerships, and collaborative partnerships. In cooperative partnerships, organizations remain independent and agree to work together on short-term goals such as sponsoring a workshop. In coordinated partnerships, the partnership involves specific projects and tasks,

but interaction among organization members remains infrequent. By contrast, collaborative partnerships involve a high degree of interdependence between organizations. Partners provide one another mutual support and assistance, share equally in responsibility and authority, and view one another as having unique resources and strengths. The tighter the partnership, the more districts can influence the preparation of teachers who enter their applicant pool. Some districts do little to connect to teacher preparation programs, and some entirely absorb the responsibilities of teacher preparation, as in the Urban Teacher Residency model. Urban Teacher Residencies serve school districts by recruiting and training teachers to meet specific district needs. They prepare residents on-site and supplement their training with additional coursework targeted toward their new teaching assignments before placing them as "teachers of record" in their own classrooms. In typical urban school districts, approximately 50 percent of new teachers leave within three years. In contrast, the average retention rate for Urban Teacher Residency programs is 90 percent after three years and 85 percent after five years (Urban Teacher Residency 2012).

It is also the case that alterations in entry requirements for new teachers can significantly alter the teaching workforce through their impact on how teacher candidates are trained and licensed. Ball and Forzani (2009) assert that detailed professional training in teacher education centering on the characteristics of effective instructional practice could bring teacher preparation programs up to par with other professions that embrace demands for professional training. In this vein, a new, demanding teacher licensure model akin to medical bar exams could go a long way toward mitigating the current idiosyncrasies in quality and experience of teacher preparation programs. Boyd and colleagues (2005) also demarcate how the opening up of different avenues into teaching alters the composition and overall supply of the teaching workforce. These findings suggest that an alternative means of addressing the supply of teachers (i.e., limiting the variability in effectiveness) is for districts or states to define the characteristics of effective teaching practice and incorporate them into initial licensure. Teacher suppliers would subsequently be required to meet these new standards in order to place trainees. An alternative would be to facilitate tightly coupled relationships between teacher preparation programs and local districts to customize the preparation of candidates to the needs of specific partners.

### PROMISING PRACTICES

- Long Beach Education Partnership, an urban community partnership with California State University Long Beach, Long Beach Unified School District, and Long Beach City College, has worked to reform teacher preparation so that graduating candidates are better prepared to meet the needs of Long Beach Unified. The Partnership provides highly structured early field experiences in diverse urban classrooms, courses taught by Long Beach Unified School District teachers and administrators, strengthened science and math instruction for teacher trainees, and a full year of student teaching. Teacher retention, morale, and student achievement have all increased in conjunction with efforts to improve teacher preparation. In addition, the number of K–8 teachers in math and science increased from 10 to 200 within three years.[7]

[7] See http://www.csulb.edu/president/education-partnership/.

- Finding and Keeping the Best, a program of California State University, Chico, collaborates with 47 rural school districts in northeastern California to prepare and retain qualified special education teachers, thus addressing a critical shortage in the region. It is an on-the-job preparation program that provides web and television-based evening courses. Teachers are released 10 paid hours per year to attend a one-day class each month. The partnership is structured so that responsibility, fiscal resources, and personnel are shared in order to "recruit, select, educate, support, and certify the professional special education teacher" (Churchill et al. 2001, 3). Decision-making regarding the recruitment, admission, support, and certification of interns is shared equally between the participating school district and the university.

## Detect and Forecast Personnel Needs

### BASIS FOR INCLUSION

Conventional wisdom suggests a "hard-to-staff" district is one where teachers are unwilling or reluctant to work. However, the problem with staffing may not only be an issue of supply. High-quality applicants regularly apply for positions in traditionally hard-to-staff districts and are not hired. This is due at least in part to the simple fact that in order to fill a teaching position on time, a district must know in advance that the position will be vacant. Despite having hundreds of applicants in high-needs areas and many more total applicants than vacancies to fill, districts frequently fill openings near the end of the summer or early fall (Levin and Quinn 2003; Liu and Johnson 2006).

In a large-scale study of four hard-to-staff urban districts across the country, The New Teacher Project (2003) tracked applicant data, conducted telephone surveys with applicants who left for other districts, collected written surveys, and held focus groups to assess the effectiveness of districts' hiring processes. Between 31 and 60 percent of applicants withdrew their applications from the hiring process, often to accept jobs with districts that made offers earlier. The majority of the withdrawing applicants cited the late hiring timeline as a major reason they took other jobs. Many of the best candidates tended to be more sensitive to hiring delays and therefore more likely to withdraw their applications to pursue other offers. By the time the hard-to-staff districts were ready to extend offers in the late summer and early fall, they were forced to select from a smaller and less-qualified applicant pool than other districts with more streamlined hiring processes.

Districts hire new teachers late for a number of reasons. First, some districts have a difficult time predicting student enrollment, which in turn creates challenges in determining appropriate staffing levels. Second, collective bargaining agreements stipulate the completion of transfer process requests for tenured teachers before new teachers can be hired. Third, the date for notification of retirement is very late in the calendar year, making it difficult for schools and districts to accurately forecast their personnel needs. Fourth, many districts are dependent on state and local budget decisions, which are often characterized by year-to-year budget uncertainties. In addition, district personnel systems can be poorly organized, inefficient, or dysfunctional (Liu and Johnson 2006). Hard-to-staff districts start the hiring process with a disadvantage (namely, that fewer candidates desire to work there), and these reasons for the late hiring of candidates exacerbate this issue.

#### KEY CONSIDERATIONS

- Work to ensure earlier vacancy notifications and remove notification penalties.
- Expedite and grant more flexible transfer processes. Move toward early and equal consideration of all candidates.
- Promote earlier and more predictable budgets by moving up the timetable in which state and local budgets are completed.
- Improve projections and take action on budget and enrollment forecasts. Enlist demographers to improve forecasts and budgets.
- Begin hiring high-quality candidates for hard-to-staff schools even in the absence of budget certainty. Provide a financial cushion for hard-to-staff schools to mitigate the risk of budget shortfalls due to over-hiring.

#### PROMISING PRACTICES

- Clark County Public Schools developed a flexible transfer process in response to acute consequences of late hiring. The teachers' union contract specifies that the transfer process should run from April 1 through June 30, but after the end of April principals are free to meet with new applicants and consider them alongside transferring teachers. This allows the district to offer specific school placements to a majority of its applicants by May 31, well ahead of most urban districts. In addition, low-performing schools are given a two-month head start in hiring and receiving transfers. Over the past several years, the teacher turnover rate decreased by 10 percent, math and reading scores in grades 3–8 increased by as much as 14 percent, high school math scores also rose, and the high school dropout rate decreased (National Commission on Teaching and America's Future 2007).
- In Hamilton County, Tennessee, teachers who are considering not returning in the fall must notify the district by February so that schools may begin early to hire replacements (Achievement Alliance 2008).

### Build Pool of High Quality Applicants

#### BASIS FOR INCLUSION

Expanding the size of the pool of high-quality applicants for a position increases a district's odds of finding a high-quality teacher who is the right fit. Financial incentives are frequently used to attract and retain high-quality teachers in high-need, low-achieving, or hard-to-staff urban schools (Murphy and DeArmond 2003). The federal government will invest $1.2 billion over five years through the Teacher Incentive Fund program to attract staff to high-need and hard-to-staff areas, to reward excellent teachers and principals, and to provide quality feedback to teachers on their performance.

Some evidence suggests that targeted salary bonuses can act as incentives for teachers to accept jobs in high-need areas (Clotfelter, Ladd, and Vigdor 2005). However, studies on the impact of incentives on recruitment (Bacolod 2007; Milanowski et al. 2009; Winter and Melloy 2005) suggest that salary incentives may not be the most effective way to attract new teachers. More than pay, new teachers exhibit sensitivity to principal support, opportunities for professional development, and curricular flexibility (Milanowski et al. 2009). Given the diversity of job attributes new teachers are known to value, savvy districts craft recruit-

ment messages that speak to a range of incentives (Kimball 2011). In profit-driven industries, this is known as employer branding or the employee value-proposition. Recruiting New Teachers, a non-profit that advises that schools and districts, focuses marketing efforts on teachers' primary concerns: compensation, community (culture and core values), colleagues, and curriculum (The Center for Comprehensive School Reform and Improvement 2005).

Changing entry requirements can also help enlarge the pool of teaching applicants by drawing non-traditional candidates into teaching. Alternative routes, such as Teach for America (TFA) and the New York City Teaching Fellows recruit thousands of college graduates who would be less inclined to enter teaching through traditional routes. In 2010, 46,366 candidates applied to TFA and 5,827 were admitted to teach in 40 districts across the country. In New York City, 11 percent of current teachers in the district came through the Teaching Fellows program (NYC Teaching Fellows 2012). Numerous studies have explored the relative effectiveness of teachers with traditional versus alternative certification (e.g., Loeb et al. 2007; Kane, Rockoff, and Staiger 2006). Research on the outcomes of alternative programs cites mixed results but finds that, on balance, alternative route teachers are not significantly worse than the teachers whom they are displacing.

In terms of specific recruitment strategies, Balter and Duncombe (2010) examined the relationship between recruitment practices and the qualifications of recently hired teachers and found that most New York school districts advertise in local newspapers, work with local colleges to recruit, post job notices on their school web site, recruit substitute teachers, and use extra compensation for extracurricular or administrative functions as a recruiting incentive. Relatively few districts, on the other hand, advertise outside their local areas, work with nonlocal colleges, search for job candidates on the Internet, or offer signing bonuses, assistance with home purchase, or compensation for hard-to-staff fields and schools as recruiting incentives. The authors found that using a limited set of recruitment practices is negatively related to teacher qualifications. The broad use of recruitment practices was associated with higher teacher qualifications.

### KEY CONSIDERATIONS

- Employ numerous recruitment strategies in multiple sites.
- Recruit from multiple sources.
- Automate algorithmic recruitment tasks to the extent possible.
- Develop a customer service orientation toward candidates (candidates are treated as red-carpet customers).
- Craft a compelling recruitment message based on candidates' primary concerns.

### PROMISING PRACTICES

- Clark County has instituted a number of creative recruitment strategies. First, to recruit as widely as possible, it uses the Internet to advertise on 92 different websites. Second, the HR team automates analyses of applicant trends in order to fine-tune recruitment strategies. Third, rather than relying on a full-time recruitment staff, the district relies on current and retired school administrators to recruit candidates or conduct screening interviews part-time. Finally, Clark County has instituted and widely

publicized its alternate route program, which targets its areas of highest need, including bilingual and special education (National Commission on Teaching and America's Future 2007).

- North Carolina Teaching Fellows program recruits 500 academically outstanding high school seniors a year to enroll in state teacher education programs. Fellows are given a $6,500 scholarship per year in exchange for agreeing to teach at least four years in a North Carolina school. In keeping with the goal to recruit males and minorities, each year approximately 20 percent of the program's recipients are minority and 30 percent are male (North Carolina Teaching Fellows 2008). Similar programs are underway in Chicago, South Carolina, and California (Alliance for Excellent Education 2008).

## Enact Strong Hiring Processes

### BASIS FOR INCLUSION

By strategically streamlining hiring processes, districts can select more qualified applicants (Levin and Quinn 2003; National Commission on Teaching and America's Future 2003), and these teachers are more likely to remain teaching long enough to become effective (Johnson and Birkeland 2003). However, the teacher hiring process has been criticized as bureaucratic, cumbersome, inefficient, late, and rushed (DeArmond and Goldhaber 2005; Liu and Johnson 2006). Research also suggests that schools may not be hiring the best applicants (Ballou 1996; Ballou and Podgursky 1998).

In their review of the research on effective hiring strategies in other industries, Ryan and Tippins (2004) found work samples, cognitive ability tests, structured interviews, and job knowledge tests to be among the tools most predictive of work outcomes such as job performance, turnover, and absenteeism. The interview, however, is considered the most important and common tool in the selection process. Interviews can be structured as individual or group interviews. Structured interviews have been found to be more successful than unstructured interviews (Kogan, Wolff, and Russell 1995).

In a random sample survey of 500 first- and second-year teachers in California, Florida, Massachusetts, and Michigan, relatively few new teacher candidates reported interviews with other teachers, department chairs, students, or parents at the school; the vast majority were interviewed by administrators or district human resource staff (Liu and Johnson 2006). Further, the authors found that the hiring process was characterized by a reliance on paper credentials and district-level interviews, with little use of observational data such as demonstration lessons or videos of instruction.

No single metric has the ability to reliably identify large differences in prospective teacher effectiveness among teacher candidates. Rockoff and colleagues (2008) have found that schools and districts wishing to increase the effectiveness of their teacher workforce may be aided by the systematic use of broad information sets on new candidates, particularly if they gather information outside the realm of traditional teaching credentials.

### KEY CONSIDERATIONS

- Determine hiring goals based on data.
- Allow applicants flexibility to apply directly to schools or to the district.

- Define clear hiring deadlines.
- Streamline the application process.
- Treat applicants professionally.
- Reduce bureaucracy.
- Strategically address all HR functions in a comprehensive and aligned manner.
- Create an information-rich hiring process that conveys to applicants an accurate view of the district, including its strong HR policies and practices (Campbell et al. 2004; DeArmond and Goldhaber 2005).

#### PROMISING PRACTICES

- Austin Independent School District (AISD) works with HireVue, a web-based technology company that offers on-demand interview services using pre-recorded interviews. AISD sends candidates a link to ten online interview questions. Candidates then complete the interview using a webcam over a broadband Internet connection. Interviews are recorded, saved, and evaluated by the committee during their initial screening meeting. AISD saves an estimated 40 minutes for each candidate eliminated in the screening process using HireVue, and the district estimates that half those candidates would have merited review by the screening committee based on their resumes alone, saving the interview committee roughly 17 interview hours per position.[8]
- Fear of over-hiring prevented the San Diego school district from starting the hiring process until July, even during times of district growth. As a consequence, the district lost strong applicants and often wound up unable to make teacher assignments before the school year started. To combat this, the district's human resources department initiated a year-round recruitment and hiring plan. Recognizing the importance of accurate enrollment and staffing projections for earlier hiring, they enlisted a sophisticated group of demographers and budget staff to project forecasts and staffed according to the projections. Other districts offer extra funds to cushion the hardest-to-staff schools against the costs of over-hiring (Campbell, DeArmond, and Schumwinger 2004).

### Match Based on Content, Grade, Pedagogical Perspectives, and Connection to Community

#### BASIS FOR INCLUSION

Teachers matched in positions with good fit are more likely to stay. In Liu and Johnson's 2006 study of the teacher hiring process, the authors found that the hiring process is information poor, allowing for only a moderate-to-good fit between new teacher skills, interests, and values with their teaching positions and schools. Furthermore, Loeb, Kalogrides, and Bateille (2009) find evidence that within schools, novice teachers are systematically placed in the most challenging assignments. Teachers are also often placed in positions for which they lack subject-specific certification or training (Dee and Cohodes 2009; Ingersoll 2001, 2003; Ingersoll and Curran 2004).

In an academic investigation of the concept of fit in the school context, Rutledge, Harris, Thompson, and Ingle (2010) summarize the different types of job fit discussed in organizational literature (Borman et al.

[8] See http://new.hirevue.com/customers/austin-independent-school-district/.

2003; Kogan, Wolff, and Russell 1995; Werbel and Johnson 2001). School districts should be sensitive to each of these different types of fit in order to find the best match between teacher and position, teacher and school, teacher and team, and teacher and community. Specifically, they identify four forms of fit: (1) Person-job fit (P-J) focuses on how specific strengths of the worker match job requirements. Employers use this strategy to seek applicants with the knowledge, skills, and abilities that are needed to perform a specific job. (2) The person-organization fit (P-O) implies that employers seek candidates who are compatible with the culture and values of the organization and are concerned about retention rates and general work attitudes (Werbel and Johnson 2001). (3) Person-group fit (P-G) is a variation on the P-O theme, focusing not on the fit with the organization, but with the group of workers with which the employee will most closely interact. With the growth of workplace teams (e.g., teachers grouped by grade or subject), it is not surprising that hiring has also become a team activity, rather than one strictly run by individual managers or human resources staff (Gatewood and Field 2001; Kogan, Wolff, and Russell 1995). (4) Districts should also attend to person-community fit (P-C), or the candidate's knowledge and appreciation of his or her prospective students' culture, background, and place in the community. Research has found links between these measures of fit and work outcomes such as job satisfaction and intentions to quit (Cable and Judge 1996; Chatman 1991; Kristof 1996; O'Reilly, Chatman, and Caldwell 1991; Rynes, Bretz, and Gerhart 1991).

### KEY CONSIDERATIONS

- Create an information-rich hiring process to detect a good two-way fit between new teacher skills, interests, and values and teaching position/school.
- Decentralize hiring to grant more decision-making at the local level.
- Increase number and quality of interactions between candidate and school personnel. Provide teaching candidates and schools with more and better information about one another.
- Accept higher costs. Teaching demonstrations and group interviews are more resource intensive than resume screens and phone interviews, but provide richer information to inform better matches.
- Hire early. By the end of the summer, most high-quality applicants have already withdrawn their applications. At this point the process is generally rushed, less interactive, and information-poor (Liu and Johnson 2006).
- Involve other teachers in the hiring process in meaningful ways (P-G fit).
- Involve parents and students in the hiring process (P-C fit).
- Design interviews with built-in opportunities for the candidates to learn as much about the school and community as the school learns about the candidates.

### PROMISING PRACTICES

- Broward County Public Schools in Florida prepares high-school students for careers in urban education. This grow-your-own model provides successful program graduates with a scholarship at one of the district's higher education partners, enhancing P-C fit. While in college, these students major in education with opportunities for field experience in local schools (P-O fit). After finishing college, graduates are guaranteed a teaching job in the district (Loeb and Myung 2010).

- DreamWorks, an internationally recognized animation studio, is known as a difficult place to land a job. By investing time and resources in their hiring process, DreamWorks ensures that their hires are not only well qualified for their jobs, but are the right fit for the company's lifestyle (P-C fit) and cut out for the intense commitment of working as animators (P-J fit) in the studio (P-O fit). This rigorous hiring process, developed by Dan Satterthwaite, Head of Human Resources at DreamWorks has proven successful, maintaining the company's annual employee retention rate at 97 percent (HCI Summit 2012).

## Develop

Once teachers are hired and placed, they enter a profession notorious for its sink or swim approach to new teacher development. The medical profession stands in sharp contrast in its approach to novice development. Many teachers receive only a few weeks of training before becoming full teachers-of-record. Physicians, on the other hand, hone their skills in intensive years-long residencies during which they apprentice under competent veterans. Further, in the recent *New Yorker* article "Personal Best" (October 3, 2011), physician Atul Gawande explores the continual development of even veteran physicians through coaching. Socialization into the school community, coaching, mentoring, and professional development can be enriching processes that deepen teacher instructional capacity. Below we describe the research base for the core processes involved in supporting professional growth in school-based learning communities.

### Socialize New Teachers Into the School Community

#### BASIS FOR INCLUSION

Although teacher induction programs are common in districts nationwide, induction that is intensive, comprehensive, structured, and sequentially delivered in response to teachers' emerging pedagogical needs is rare (Berry et al. 2002; Smith and Ingersoll 2004). In a study of the nationally representative Schools and Staffing survey, Ingersoll and Smith (2004) found that beginning teachers who were provided with mentors from the same subject field and who participated in collective induction activities, such as planning and collaboration with other teachers, were less likely to move to other schools and less likely to leave the teaching occupation after their first year of teaching. As the number of reported components of induction increased, teacher turnover was reduced. Frequently, however, induction components, while adequate in theory, are delivered inconsistently and in many cases inadequately in practice (Foote et al. 2010).

In addition, Reed and colleagues (2006) found that Beginning Teacher Support and Assessment programs in the early 1990s in California reduced the probability of transfer and exit among new teachers. Glazerman and colleagues (2008) conducted a randomized control study on the impact of comprehensive teacher induction programs and did not find any positive or negative effects. However, given the prevalence of induction supports reported by control teachers, Glazerman and colleagues ran regression analyses and positive associations were found between induction supports and math test scores and teacher retention.

#### KEY CONSIDERATIONS

- Provide high-quality mentoring with rigorous mentor selection criteria and training.
- Organize common planning time for regularly scheduled interaction with other teachers.
- Allow for participation in intense, ongoing, job-embedded professional development.
- Ensure ongoing communication with and support from school leaders (Smith and Ingersoll 2004).

#### PROMISING PRACTICES

- The Flowing Wells Teacher Induction Program for Success in Tucson, Arizona, was one of the first induction programs in the country and has continued to receive national recognition as an exemplary staff development program. The three-year program begins with four days of intensive training in early August focused on classroom management and instructional strategies. First-year teachers receive mentoring throughout the year from both a program mentor and a school-site mentor. The induction program kicks off with several days of activities for novice teachers before the start of the school year. Induction activities include:
  - A bus tour—the district superintendent acts as a tour guide on a chartered bus trip through the school district.
  - Demonstration classrooms—master teachers set up their rooms to model the first day of school in an effective classroom. Afterward, the new teachers can discuss with the master teacher the strategies they found useful.
  - Day with a mentor—new teachers and their mentors observe each other teach. Afterward, mentors and protégés have lunch together (Wong 2003).
- The California Formative Assessment and Support System for Teachers (CFASST) is a structured, two-year program for beginning teachers and a key component in the state's Beginning Teacher Support and Assessment (BTSA) induction program. Under the guidance of a trained teacher, beginning teachers plan lessons, reflect on their teaching, and apply what they have learned in their classrooms. They also participate in ongoing formative assessment, in which beginning teachers assess their teaching practice under the guidance of trained supporters and set goals for professional growth. A quasi-experimental study by Thompson and colleagues (2005) assessed the impact of BTSA and CFASST on classroom practices and student achievement by comparing teachers who had "high exposure" to the intervention to those with little. Even when controlling for school-level effects, the authors found that "high exposure teachers were better at instructional planning and analyzing their practice, more likely to ask students higher-order questions, and were more likely to provide substantive, specific feedback to students. The students of teachers who engaged with BTSA/CFAST at a high level outscored the students of low engagement teachers by an average of 0.25 standard deviations across six standardized tests" (Thompson et al. 2005, 2).

### Supportive Coaching and Mentoring Relationships for New Teachers

#### BASIS FOR INCLUSION

A supportive relationship with an expert teacher can bolster a new teacher's capacity and her retention in the profession. The first years of teaching are often viewed as a time of survival (Athanases and Achinstein 2003). New teachers rely on trial and error to work out strategies to help them survive, and continue

to depend on these strategies throughout their careers (Lortie 1975). In addition, novices face personal concerns about acceptance, control, and adequacy that must be resolved before they can move on to issues of teaching and learning (Kagan 1990). Expert mentors can interrupt the tendency among new teachers to focus on their own individual development and survival, helping them focus instead on the learning of individual students (Athanases and Achinstein 2003). The quality of novice teachers' experience in the mentoring relationship depends on the selection, resources, and training of mentors (Feiman-Nemser and Parker 2003). Rockoff (2008) found that teacher retention within a particular school was higher when a mentor had previous experience working in that school (although subject match made no difference), while student achievement in both reading and math were higher among teachers whose mentor put in more hours overall. While mentors can be assigned through formal mentorship programs, teachers also develop informal mentor and coaching relationships with expert teachers in their local school setting; these relationships can provide more effective support than formalized mentorships (Foote 2010).

In a study of the use of instructional coaching in a well-specified and well-resourced context, Biancarosa, Bryk, and Dexter (2010) looked at student literacy learning over three years of implementation of the Literacy Collaborative program, a five-year comprehensive school literacy program that provides 40 hours of professional development training for teachers followed by ongoing observation and coaching as they begin to implement the instructional framework. Results demonstrated increasing and persistent improvements in student literacy learning during program implementation. Other studies (Marsh et al. 2008; Garet et al. 2008) have not found positive effects of coaching on student outcomes. However, the context in which the coaching occurred in the Biancarosa, Bryk, and Dexter (2010) study differed from that of the other studies in a number of important respects, particularly training, strategies, and explicit grounding in an instructional program.

### KEY CONSIDERATIONS

- Coach and new teacher work together to identify skill needing improvement.
- Coach models skill for new teacher.
- New teacher executes skill; coach observes and collects data.
- Coach and new teacher reflect on and review data and teacher's use of skill.
- Coach and new teacher determine one or two actionable next steps (Park, Morales, and Takahashi 2012).

### PROMISING PRACTICES

- The Literacy Collaborative is a comprehensive school improvement project that seeks to improve children's literacy achievement through the introduction of a comprehensive literacy framework and by supporting teachers to develop expertise in its classroom enactment. The program is organized around six pedagogic practices: (1) interactive read-aloud; (2) shared reading; (3) guided reading; 4) interactive writing; (5) writing workshop; and (6) word study. The Literacy Collaborative is committed to the idea that teachers need both training in particular procedures and opportunities to analyze their teaching with a coach in order to improve their practice over time. Literacy

Collaborative trains coaches to work one-on-one with teachers in their classrooms, observing, modeling, and acting as catalysts for teachers' development toward more expertise in core pedagogic practices.

- America's Choice, founded by the National Center for Education and the Economy, is another comprehensive school reform that offers specific design principles about the purpose of schooling and how schools should operate, along with a set of tools to implement these principles (Poglinco et al. 2003). One such principle is that each America's Choice school hire a full-time literacy coach responsible for leading school-embedded, on-going teacher professional development. "The America's Choice design explicitly requires that coaches take an active instructional role working with teachers, not only passing along information about the model and generally being supportive, but actually modeling instructional techniques in the classroom" (Poglinco et al. 2003: 5-6).

## Provide Individualized Professional Development Opportunities in Response to Demonstrated Needs

### BASIS FOR INCLUSION

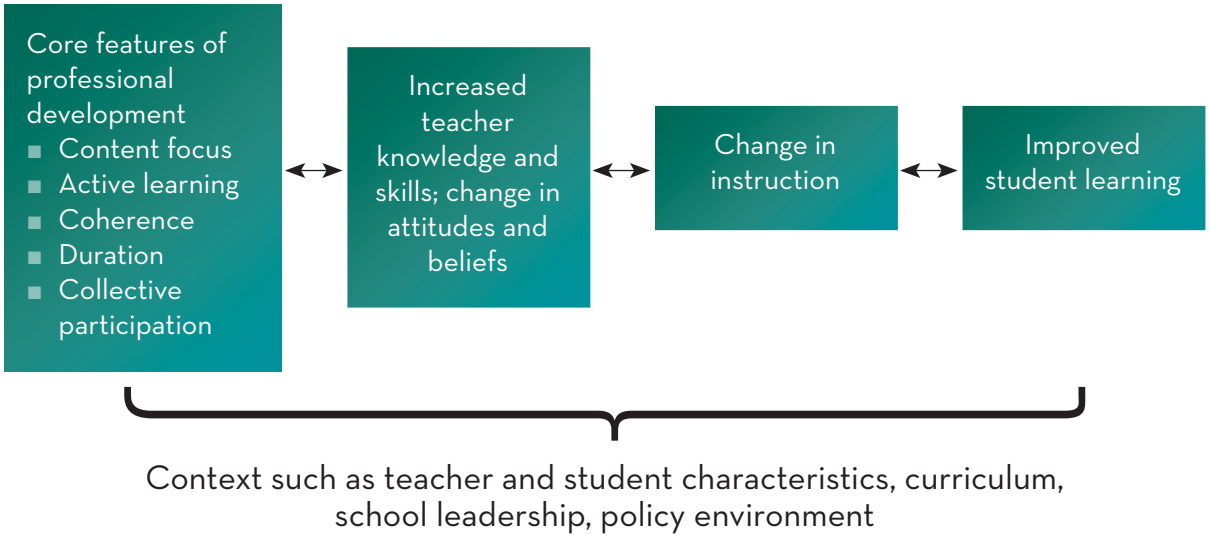
Generally, research finds little benefit to the average professional development program, although professional development is ubiquitous across school districts. In 1999–2000, 99 percent of teachers surveyed reported having participated in professional development activities over the past year (NCES 1999). Teacher learning has been described as "a patchwork of opportunities—formal and informal, mandatory and voluntary, serendipitous and planned—stitched together into a fragmented and incoherent curriculum" (Wilson and Berne 1999, 174). However, studies do show positive effects from professional development at enhancing teacher practice and student learning (Darling-Hammond et al. 2009; Carpenter et al. 1999; Guskey 1986, 2000; McCutchen 2001; Stigler and Hiebert 1999).

For decades, research on teacher professional development has documented self-reported teacher satisfaction, attitude change, or level of commitment, rather than its effects on student learning or the processes by which it helps teachers improve their classroom practice (Desimone 2009). In a study aimed at distinguishing effective from ineffective professional development, Garet and colleagues (2001) used a national probability sample of 1,027 mathematics and science teachers to provide the first large-scale empirical comparison of different characteristics of professional development and their impact on teachers' learning. Three core features of professional development were found to have significant, positive effects on teachers' self-reported increases in knowledge and skills as well as changes in classroom practice: (1) focus on content knowledge; (2) opportunities for active learning; and (3) coherence with other professional learning activities for teachers. It is primarily through these core features that additional structural features— including the form of the activity, the activity's duration, and the collective participation of teachers from the same school, grade, or subject—significantly affect teacher learning.

Below is a simple framework for thinking about the causal pathway through which core features and structures of professional development impact student learning (Desimone 2009). Commonly, the field implements a change in professional development, looks for evidence of improved student learning, often does

not find it, and then implements a different change. As this framework indicates, each of the links in the chain must be attended to in order to leverage the impact of professional development for improved student learning.

## Figure 4. Core conceptual framework for studying the effects of professional development on teachers and students




**Source: Desimone 2009**

### KEY CONSIDERATIONS[9]

- Appropriate content—PD should focus on subject-specific content and pedagogical content knowledge.
- Collaborative and collegial culture—teams of professionals should work together on substantive PD projects.
- Active engagement—PD should create opportunities for active, hands-on learning.
- Job-embedded training—PD should be classroom-based and integrated into the daily life of teaching.
- A systems perspective—PD should show coherence with other learning opportunities, as well as instructional goals and curriculum materials in teachers' schools.
- Ongoing and sustained efforts—PD should be long-range in nature, recognizing that learning is incremental and meaningful learning needs to be supported over time (LeMahieu et al. 1996).
- A focus on student outcomes–PD should be centered on the analysis of actual student work and outcomes (Garet et al. 2001; Hill 2007)

[9] The majority of these key considerations are adapted from LeMahieu, Roy, and Foss (1996).

- Time to reflect—PD should provide opportunities to reflect on professional practice.
- Development opportunities—PD should be client-focused (targeted to the explicit needs of teachers).
- Adaptive design—PD should be subject to change based on evidence of its effectiveness.

#### PROMISING PRACTICES

- Success for All (SFA) provides intensive initial training combined with extensive ongoing coaching through school visits and national conferences. SFA provides on-site school visits as well as phone and Web consultations designed to provide teachers, administrators, and staff further training and support for the implementation of each program. SFA coaching support assists staff and leadership in gaining confidence, expertise, and success in achieving their goals. Highlights of the support systems offered to schools include a coach to partner with school leadership; kick-off workshops and ongoing training to provide learning opportunities throughout the year; phone and e-mail support; targeted on-site observations and discussions with school leadership and teachers; embedded professional development; regularly scheduled webinars; goal setting and progress monitoring; and access to online program resources.
- The Boston Teacher Residency (BTR) provides graduates with individualized support throughout their first three years in the classroom. BTR offers school-based, customized courses in subject areas to enable teachers to expand their teaching repertoire. These courses are facilitated by Clinical Teacher Educators, who conduct classroom observations and work with individual teachers to determine areas for improvement.

## Sustain

Once the right people are in the right place and well supported in doing the right things, a subsequent step is keeping them there. Historically, the field of education has done little to differentiate opportunities and recognition for high-performing teachers. In other industries, corporations have come to recognize that career development is crucial to retaining talent. High-performing employees need to know that growth opportunities exist within their organizations and that their managers will work with them to make the most of those opportunities (Sheahan 2005).

### Provide Competitive Compensation Packages

#### BASIS FOR INCLUSION

While salary is not always the main reason individuals enter the teaching force, it does have an impact on who enters the profession (Milanowski 2003) and who stays (Hanushek and Rivkin 2007; Goldhaber 2006). Salary can also be associated with retention. Approximately 15 percent of public school teachers who decided to move to another school in 2004–2005 reported having done so for better compensation (Marvel et al. 2007). Murnane and Olsen (1990) found that teachers who are paid more stay longer in teaching, but that salary influences retention less for teachers with high standardized test scores than for teachers with lower scores.

Numerous studies have documented the existence of compensating wage differentials required to attract teachers to particular districts, such as those with a large concentration of minority students or those located in a market with a high cost of living (e.g., Levinson 1988; Stoddard 2005).

#### PROMISING PRACTICES

- The Equity Project (TEP) Charter School is a 480-student middle school in the Washington Heights neighborhood of New York City that opened in September 2009. Teachers at TEP are paid annual salaries of $125,000 in an effort to attract and retain master teachers. TEP uses a three-pronged strategy that it terms the three R's: rigorous qualifications, redefined expectations, and revolutionary compensation.[10]
- Chicago Public Schools has attempted to attract high-quality candidates into the teaching profession by offering higher starting salaries than those of other large urban districts (i.e., more than $50,000 annually), with increases to approximately $100,000 annually depending on experience and additional credentials. These salaries are comparable to median starting salaries of professionals with analogous credentials in other fields.

### Recognize High-Performing Teachers

#### BASIS FOR INCLUSION

The current leading mechanisms of school districts for recognizing quality teachers are incentives and tenure. The empirical exploration of incentives, most often in the form of merit/performance-based pay, is extremely limited and has mostly focused on the effectiveness of merit pay to motivate teachers to increase student outcomes. The two randomized field experiments conducted abroad indicate that incentives can help enhance school outcomes under certain conditions, but that they often encourage "teaching to the test" (Glewwe, Ilias, and Kremer 2003; Muralidharan and Sundararaman 2008). In contrast, the two randomized experiments carried out in the US showed no significant results in student outcomes (Springer, Hamilton, and McCaffrey 2010; Goodman and Turner 2009). The field lacks conclusive empirical evidence to support limiting professional recognition of teacher performance to pay increases.

In general, teachers oppose pay reforms that link rewards to performance, but their opinions differ across groups. Veteran and female teachers are, on average, less supportive of pay reform while secondary teachers are more supportive. In addition, support for merit pay is higher among teachers who have positive impressions of their principals and negative impressions of their fellow teachers, and lower among teachers who hold their fellow teachers, but not their principals, in high regard (Goldhaber et al. 2011).

While merit-based pay rewards teachers for student outcomes, knowledge- and skill-based pay compensates teachers for the acquisition of new skills and knowledge in areas related to better instruction (Odden and Kelley 1996). This alternative approach represents a policy compromise between proponents and opponents of performance-related compensation in education. Salary increases are tied to external evaluations

[10] TEP was recently in the press following the release of NYC value-added results for lackluster value-added scores. See http://www.wbez.org/series/front-center/top-dollar-top-teachers-nyc-charter-school-104277.

and assessments of competency. Evidence to date suggests that input-based pay systems may have only a negligible impact on student outcomes (Ballou and Podgursky 2001; Hanushek and Rivkin 2004).

Tenure for teachers was originally intended to protect them from arbitrary or unfair terminations. Currently teacher tenure is often viewed by non-educators as more of an entitlement than a reward, one that prevents principals from removing bad teachers (Kersten 2006). Studies have shown that teacher tenure status is statistically uncorrelated with measures of teacher quality (Aaronson et al. 2007). Nevertheless, shorter probationary periods have been shown to be more attractive to teacher candidates than longer ones (Brunner and Imazaki 2010). As such, lengthening tenure policies could have ramifications on districts' ability to attract teacher candidates, particularly if they neighbor other districts that have shorter probationary periods.

Many states have considered reforms to their tenure policies, focusing largely on increasing the length of the probationary period and streamlining the dismissal or appeals process. For example, in New York, 99 percent of teachers eligible for tenure received it in 2006, including those who received "unsatisfactory" ratings from their principals. Under tighter district standards in 2011, however, only 58 percent of teachers eligible for tenure received it, while a decision on tenure was deferred for 39 percent of eligible teachers (Otterman 2011).

#### PROMISING PRACTICES

- Denver Public Schools' merit pay plan, the Professional Compensation System for Teachers (ProComp), was designed in partnership with the Denver Classroom Teachers Association. Implemented in 2006, ProComp provides school-wide and individual teacher incentives in areas such as school performance and growth, student growth, earning advanced degrees, professional-development units, serving in hard-to-staff schools, and tuition reimbursement.
- With help from The New Teacher Project (TNTP), the New York City Department of Education categorized tenure-eligible teachers as "tenure likely" or "tenure in doubt" based on existing student achievement data and provided principals with monthly reports. Instead of having tenure as the default, principals are required to back up their tenure decisions with evidence of each teacher's performance, and their regional supervisors personally review any tenure recommendations that contradict the tenure guidance provided in the reports. To encourage consistent decisions, the district provides trainings on the assessment of teacher performance data and teaches principals how to write a clear rationale for their decisions and avoid common pitfalls. It also holds principals' managers directly accountable for both rejecting unfounded tenure recommendations and supporting good ones (TNTP 2011).

### Uphold Professional Working Conditions

#### BASIS FOR INCLUSION

Working conditions are strong and significant factors in predicting rates of turnover. The extent to which a school is well organized and supportive of its teachers is a critical factor for new teachers deciding whether to persist in the school and in the career (Darling-Hammond, Loeb, and Luczak 2005; Johnson et al. 2004).

The school as a workplace has many features that together create the context for individual teachers' work (Johnson 1990), including the following:

- The physical features of buildings, equipment, and resources that serve as a platform for teachers' work (Darling-Hammond, Loeb, and Luczak 2005).
- The organizational structures that define teachers' formal positions and relationships with others in the school, such as lines of authority, workload, autonomy, and supervisory arrangements (Valli and Buese 2007).
- The sociological features that shape how teachers experience their work, including their roles, status, and the characteristics of their students and peers (Scafidi, Sjoquist, and Stinebrickner 2002).
- The political features of their organization, such as whether teachers have opportunities to participate in important decisions (Shen 1997).
- The cultural features of the school as a workplace that influence teachers' interpretation of what they do and their commitment to their jobs, such as values, traditions, and norms (Kardos et al. 2001).
- The psychological features of the environment that may sustain or deplete them personally, such as the meaningfulness of what they do day to day or the opportunities they find for learning and growth (Johnson and Birkeland 2003).
- The instructional features, such as curriculum and testing policies, that may enhance or constrain what teachers can teach (Milanowski et al. 2009).

Among the working conditions that most strongly predict teacher attrition is dissatisfaction with administrators (Hirsch and Emerick 2006; Marvel et al. 2007). Weiss (1999) found perceptions of school leadership to be among the strongest variables associated with whether first-year teachers considered it worthwhile to exert their best effort, their level of commitment to the career path, and their intentions to stay in teaching. An effective principal may have the ability to create a positive working environment for teachers, even at a school with attributes typically associated with high turnover.

### PROMISING PRACTICES

- Since 2002, the Office of the Governor, the North Carolina Professional Teaching Standards Commission, and the North Carolina State Board of Education, together with the New Teacher Center, have made a sustained commitment, known as the North Carolina Teacher Working Conditions Initiative, to listen to educators and reform schools in order to create the working conditions necessary for student and teacher success.
- The Organization for Economic Cooperation and Development (OECD) has developed the Teaching and Learning International Survey (TALIS) to examine the working lives of new teachers, the conditions in which they work, and the climate of the schools that employ them. TALIS reports on comparisons of how schools are organized (or not) to meet teachers' development needs, the time teachers spend teaching, and the types and extent of on-going professional support.

## Offer Differentiated Staffing and Career Opportunities

### BASIS FOR INCLUSION

In theory, teacher retention could be enhanced by allowing paths for teacher promotion (i.e., career ladders) or differentiating roles. Career ladders divide the teaching career into stages by increasing responsibility and leadership, or by rewarding outstanding teaching practice (e.g., mentor teacher, master teacher, etc.). Career ladders have the potential to increase the job satisfaction of promoted teachers by adding professional challenges and rewards, thus increasing their likelihood of staying at the school (Ingersoll 2004). Career ladders also have the built-in potential to increase retention among less-experienced teachers by presenting a challenging and rewarding future career prospect attainable without leaving the school. Differentiated staffing offers specialized roles for teachers based on specific expertise (e.g., literacy specialist or technology coach), and can enhance motivation by coupling organizational roles with staff interest and background.

By examining the relationship between teachers and school administration, Brewer (1996) found evidence to suggest that late career opportunities affect quit decisions among teachers. A study by Booker and Glazerman (2009) found that teachers in schools participating in the Missouri Career Ladder Program were less likely to leave the district or to leave teaching entirely, as compared to those teachers in districts without career ladder programs. However, because the Missouri Career Ladder Program included bonuses with advancement, it is difficult to disentangle the impact of the monetary incentives on teacher retention from the impact of career differentiation itself. Evidence of the effects of differentiation on teacher retention is mixed.

Variations in the design and implementation of career ladders influence teacher experiences with career ladders. Rosenblatt (2001) found that differentiated staffing can decrease the likelihood of burnout and increase teachers' intention to stay in their schools, as long as teachers are given roles well matched to their skills. However, programs that do not successfully match teachers' skills to their position or that offer no variety can induce additional anxiety and stress for some teachers (Henson and Hall 1993). As with most retention and recruitment policies, there is little convincing causal evidence on either the advantages or disadvantages of role differentiation (Loeb and Myung 2010).

### PROMISING PRACTICES

- The Career-in-Teaching (CIT) program in Rochester, New York, allows teachers to advance along several levels during their careers, earning additional pay and recognition along the way. Teachers begin as interns, for up to four years, during which time they must acquire a master's degree. Professional teachers are those who receive tenure after serving successfully as an intern. Lead teachers must have at least seven years of experience, a proven ability to work with high-need students, and an ability to work cooperatively with colleagues. Lead teachers are competitive and selective positions that enable experienced, effective teachers to mentor intern teachers. Over the course of ten years, CIT has retained 95 percent of participating teachers (Koppich et al. 2002).
- The Pittsburgh Public Schools Career Ladder program, begun in 2011, attempts to use multiple career pathways to make greater impacts on student achievement. Teachers are eligible and may apply for differing roles (Promise-Readiness Corps in 9th and 10th grade, K-8 Instructional Teacher

Leaders, and Secondary Instructional Leaders) based on experience and certification, and are selected by the district. Roles last for two to three years, include annual salary bonuses of approximately $10,000, and entail the assumption of unique school-level responsibilities (e.g., coaching and evaluating peers, providing site-based professional development).

## Evaluate

### Assess Teaching Practice, Provide Feedback, and Develop Plans to Improve

BASIS FOR INCLUSION

Evaluation is the process that helps identify development needs and provide feedback. It can be a powerful lever for system and individual improvement. If effectively coordinated, the processes that assess teaching practice, provide feedback, and develop plans to improve can be powerful levers to: (a) improve teaching practice; (b) recognize and motivate high performing teachers; and (c) inform personnel decisions regarding professional development, recognition, or dismissal. Regular feedback on classroom practice can increase a teacher's instructional capacity and improve his or her capacity for self-reflection, build professional confidence, and foster a collegial community (Biancarosa et al. 2010; Kardos et al. 2001). In a longitudinal interview study of 50 new K–12 teachers, those who persisted in the profession after three years overwhelmingly indicated that receiving regular feedback about classroom teaching was a major reason for their decision to stay (Johnson and Birkeland 2003).

Currently, the feedback teachers receive is too often sporadic, vague, and not actionable. Feedback is best given and received on a foundation of trust, yet often trust is lacking in the relationships between new teachers and their principals, coaches, and peers. Organizational and structural challenges at the school and the district level result in feedback that is incoherent or even conflicting. Furthermore, ambiguity around the purpose of the feedback (to evaluate or to improve teacher performance) raises additional challenges. As a result, new teachers do not receive the consistent, focused, and actionable feedback they need in order to improve their practice (Park et al. 2012).

The positive impact of teachers administering formative assessments of student learning has been well documented (Black and Wiliam 1998; Brookhart 2005; Leahy et al. 2005). In their synthesis of the literature on formative assessment given to students, Black and Wiliam (1998) conclude that effective formative assessment involves teachers adjusting their classroom practice in repsonse to assessment results of their students' learning; students receiving feedback about their learning with advice on what they can do to improve; and students' participation in the process through self-assessment.

The research base on formative assessment of teacher practice is not as rich, but many of the findings pertaining to student formative assessment can be applied to teachers as well. It follows that effective formative assessment of teachers should involve observers/administrators making adjustments to teacher support and professional development in response to assessment evidence; teachers receiving relevant and actionable feedback about their learning; and teachers' participation in the process through self-assessment.

Nolan and Hoover (2004) advocate strongly for the separation of formative and summative assessment. Marginal teachers, those identified as in need of improvement through formative assessments, need additional support and oversight to improve. Embedded in this oversight is summative judgment of progress. In addition, the due-process rights of marginal teachers require that attempts at improving teacher practice be directly connected to the deficiencies identified through summative evaluation.

#### PROMISING PRACTICES

- Teach for America (TFA) recruits recent college graduates and places them in urban and rural public schools for two years. The work of the organization includes training these teachers, supporting their development during their years of teaching, and fostering the leadership of alumni. The first phase of training takes place during the summer institute and includes 8–16 teachers. Lesson planning and classroom management are key areas of development in the first few weeks of teaching. One coach oversees 12–35 teachers once they have begun teaching in their respective regions. TFA coaching includes competency-based coaching, which focuses on pedagogical skills, as well as adaptive coaching for leadership skills. The focus has recently shifted from teacher competency to adaptive leadership skills, which includes knowledge of the community, connections with students and their families, understanding what's at stake for the students of that community, and the discerning use of key classroom assets to improve classroom practice. Data are an important aspect of the coaching work and include anything from test scores to what students are saying in the classroom. The frequency of coach interaction with new teachers depends on the level of competence or struggle exhibited by each teacher. A high performing new teacher may be visited by the coach just once a semester, while a struggling teacher may have visits once a week or every other week.
- The New Teacher Center (NTC) focuses on helping coaches and principals think about how to engage in a feedback conversation using different approaches (e.g., instructive, collaborative, facilitative). NTC uses videos, case studies, and role-playing to help coaches develop these skills.

## Initial Reactions to the Teacher Human Capital Framework

Over the course of the 90 days undertaken for this research, the teacher human capital framework was modified slightly but remained largely intact. Educational experts who reviewed the framework consistently endorsed its representation of the critical high-leverage processes required to build a stronger teacher workforce. The challenges that did arise during testing of the framework principally centered on how best to display the connections between subsystems. Some of the experts we consulted thought more process arrows were needed because the relationships between the components of the system are more interdependent than the framework depicts. Others were concerned that the framework placed too much visual emphasis on the dismissal of low-performing teachers. In response to these concerns, the framework was adapted slightly to emphasize a weak relationship between dismissing low-performing teachers and enhancing the teaching workforce, as well as the indirect effect of the evaluation subsystem itself on the system aim. Overall, our interviewees agreed the framework fulfilled its purpose to illuminate the elements of a comprehensive human capital framework and, by doing so, guide improvement efforts aimed at those elements. Experts also agreed a critical next step will be to develop a measurement model to help districts ascertain not whether

schools are carrying out these processes, but how well the processes are being put in place, and what districts can do to improve their process outcomes.

## CONCLUSIONS AND RECOMMENDATIONS

Developing and supporting teacher human capital is arguably one of the most important functions of a school district, according to both economic and educational rationales. Instructional staff remuneration comprises the vast majority of educational budgets (approximately 70 percent of total district spending) and teachers as well as other instructional staff embody districts' main levers to improve student achievement and educational outcomes. Building a stronger teacher workforce is not a straightforward task. This white paper presented a complex human capital framework composed of many interdependent factors. In our conception of the framework, we strove to strike a balance between, on the one hand, representing the many connections between processes, and on the other, preventing the model from becoming overly specific and visually cluttered.

In addition, this white paper aimed to bring attention to the role evaluation plays in building a stronger teacher workforce. Currently, a tremendous amount of policy attention and funding are dedicated to teacher evaluation, but teacher evaluation sits within a larger human capital system. And as the framework indicates, the direct connection between summary judgments about teachers' performance and a stronger teacher workforce is weak. The power of evaluation to affect the quality of the teacher workforce is best leveraged through its capacity to inform the processes to acquire, develop, and sustain teachers—in other words, its capacity to contribute to improvements in classroom practice.

The framework as presented here does not represent a "cafeteria" approach to enhancing the teaching workforce. A systems approach is essential. Interventions cannot be picked at random in hopes of realizing the aim of the framework. Rather, the subsystems are interconnected to form the greater system; thus any intervention designed to impact one part of the framework will produce effects that ripple across other subsystems within the teacher human capital system. Though our emphasis in this white paper is placed firmly on describing and depicting a teacher human capital framework and developing a common nomenclature around it rather than exploring the interconnections between subsystems and processes, we do not mean to imply that building a stronger teaching workforce simply entails selecting a process and developing an intervention to fit within the framework.

In addition, the teacher human capital framework is intended to challenge the way districts currently acquire, develop, sustain, and evaluate their instructional staff rather than rationalize the status quo. Given the imperative of a systems perspective mentioned above, there is no justification for jerry-rigging the framework to confirm processes that are already in place. Though there are certainly good practices to be found in these areas, as exemplified by the organizational case examples provided throughout this white paper, no district or educational organization can yet claim to be addressing all human capital processes discussed here.

## Recommendations

1. As is, the framework can be used to take stock of current efforts to enhance the teacher workforce in school districts or educational organizations. Districts can employ the framework to determine how well they are attending to the elements of the four distinct human capital subsystems described above.

2. The framework can also be used to evaluate school districts' or educational organizations' theories of change. To what extent are districts reliant upon mechanisms only weakly associated with building a stronger teacher workforce, such as the identification and dismissal of low-performing teachers? These theories of change could be made more robust by attending to other elements of the acquire, develop, and sustain subsystems and incorporating them into staff development plans.

3. This white paper presented and substantiated the evidentiary bases for the elements and interrelationships of a teacher human capital framework. Identifying the actual work districts must engage in to develop a stronger teacher workforce is a critical next step. It requires articulating the work that goes into activities such as, socializing new teachers within the school community and delineating measures to define quality in these processes, monitoring progress, and measuring the impact of the work. It also means using the framework to guide the articulation of processes and, by doing so, focus improvement efforts in order to make them more effective across contexts.

4. The aim of the teacher human capital framework (i.e., what constitutes a "stronger teacher workforce") must be rigorously delineated. While some contemporary research is working toward a common taxonomy of effective teaching practices and instructional pedagogy (e.g., Ball and Forzani 2009; Education International 2012), the field of education as a whole lacks a deep and authoritative knowledge of standard practices in teaching. Until this is definitively addressed, human resource policy interventions will remain blunt instruments for enhancing the quality of the teaching workforce. Future work in this area should focus on synthesizing existing knowledge about effective teaching practices in certain content areas and around specific learning outcomes, and amassing this knowledge into a coherent and accessible knowledge base for teaching practice. Where such knowledge does not yet exist, a robust R&D agenda should be undertaken in collaboration with experts and practitioners to feed into a knowledge base, inform future practice, and guide human capital processes.

5. The interconnections between the teacher human capital subsystems and processes, which were only referred to here, should be explored in detail, both in terms of explicating the manner of their interactions and the empirical relationships between them. Means of nurturing, rewarding, and challenging teachers, for example, should be investigated vis-à-vis their impact on the acquisition of more and better teachers, the socio-political attitudes toward teaching as a profession, and the overall pool of teaching candidates. This requires the identification and regular collection of "balancing measures" in data and measurement systems. Evaluative activities that support the acquisition,

development, and sustenance of the teaching workforce, rather than those that simply attempt to classify "low-" and "high-performing" teachers should be undertaken also. In-depth case study analyses of districts implementing interventions designed to improve their teaching workforce would aid in building a knowledge base around the other sub-systems of the human capital framework and enhance the field's understanding of which interventions work for whom and under what conditions.

## REFERENCES

Aaronson, D., L. Barrow, and W. Sander. "Teachers and student achievement in the Chicago public high schools." Journal of Labor Economics, 25(1), 2007: 95–135.

Aslam, M., and G. Kingdon. "How teachers' pedagogic practice influences learner achievements: A study from the Punjab, Pakistan." In Teacher Education and the Challenge of Development: A Global Analysis, edited by R.E. Moon, 164–182. Abingdon, UK: Routledge, 2013.

Athanases, S. Z., and B. Achinstein. "Focusing new teachers on individual and low performing students: The centrality of formative assessment in the mentor's repertoire of practice." Teachers College Record, 105(8), 2003: 1486.

Bacolod, M. "Who teaches and where they choose to teach: College graduates of the 1990s." Educational Evaluation and Policy Analysis, 29(3), 2007: 155.

Ball, D. L., and F. M. Forzani. "The work of teaching and the challenge for teaching education." Journal of Teacher Education, 60(5), 2009: 497–511.

Ballou, D. "Do public schools hire the best applicants?" Quarterly Journal of Economics, 111(1), 1996: 97.

Ballou, D., and M. Podgursky. "Let the market decide." Education Next, 1 (2001): 1–7.

Ballou, D., and M. Podgursky. "Teacher recruitment and retention in public and private schools." Journal of Policy Analysis and Management, 17(3), 1998: 393-417.

Barnett, B. G., G. E. Hall, J. H. Berg, and M. M. Camarena. "A typology of partnerships for promoting innovation." Journal of School Leadership, 9(6),1999: 484-510.

Berry, B., P. Hopkins-Thompson, and M. Hoke. Assessing and supporting new teachers: Lessons from the southeast. Chapel Hill, NC: Southeast Center for Teaching Quality, 2002.

Beteille, T., D. Kalogrides, and S. Loeb. "Effective schools: Managing the recruitment, development, and retention of high-quality teachers." Working paper No. 37. National Center for Analysis of Longitudinal Data in Education Research, 2009.

Biancarosa, G., A .S. Bryk, and E. R. Dexter. "Assessing the value-added effects of literacy collaborative professional development on student learning." The Elementary School Journal, 111(1), 2010: 7-34.

Booker, K., and S. Glazerman. The effects of the Missouri Career Ladder Program on teacher mobility and retention (MPR Reference No. 6333–400). Washington, DC: Mathematica Policy Research, 2009.

Borko, H., and R. Putnam. Handbook of educational psychology (No. D. Berliner & R. Calfee (Eds.)). New York: Macmilla, 1996.

## REFERENCES

Borman, W. C., J. W. Hedge, K. L. Ferstl, J. D. Kaufman, W. L. Farmer, and R. M. Bearden. "Current directions and issues in personnel selection and classification." In Research in personnel and human resources management, edited by J. J. Martocchio and G. R. Ferris. Stamford, CT, 2003.

Boyd, D., H. Lankford, S. Loeb, and J. Wyckoff. The draw of home: How teacher preferences for proximity disadvantage urban schools, 2003.

Boyd, D., P. Grossman, H. Lankford, S. Loeb, and J. Wyckoff. "How changes in entry requirements alter the teacher workforce and affect student achievement." NBER Working Paper No. 11844, Cambridge, MA, 2005.

Brewer, D. J. "Career paths and quit decisions: Evidence from teaching." Journal of Labor Economics, 14(2), 1996: 313–339.

Campbell, C., M. DeArmond, and A. Schumwinger. From bystander to ally: Transforming the district human resources department. Daniel J. Evans School of Public Affairs, University of Washington, 2004.

Carpenter, T. P., E. Fennema, P. L. Peterson, C. P. Chiang, and M. Loef. "Using knowledge of children's mathematics thinking in classroom teaching: An experimental study." American Educational Research Journal, 26(4), 1989: 499.

Churchill, L. R., M. C. Jensen, and M. Cepello. "Finding and keeping the best: A rural regional partnership." Paper presented at the Growing Partnerships for Rural Special Education Conference, San Diego, CA, 2001.

Clotfelter, C., H. F. Ladd, and J.L. Vigdor. "Who teaches whom? Race and the distribution of novice teachers." Economics of Education Review, 24(4), 2005: 377.

Community Training and Assistance Center. Catalyst for change: Pay for performance in Denver final report. Boston, MA, 2004.

Darling-Hammond, L. "Building a system for powerful teaching and learning." In Building a 21stCentury U.S. Education System, edited by Bob Wehling and Carri Schneider, pp. 63–72. Washington, DC: National Commission on Teaching and America's Future, 2007.

Darling-Hammond, L. (2007). Standards, Accountability, and School Reform. In Christine Sleeter (ed.), Facing Accountability in Education: Democracy and Equity at Risk, pp. 78-111. NY: Teachers College Press.

Darling-Hammond, L., and J. Bransford. Preparing teachers for a changing world: What teachers should learn and be able to do. San Francisco: Jossey-Bass, 2007.

DeArmond, M., and D. Goldhaber. "The back office: A neglected side of teacher quality." Education Week (2005): 31.

Dee, T. S., and S. R. Cohodes. "Out-of-field teachers and student achievement evidence from matched-pairs comparisons." Public Finance Review, 36(1), 2008: 7–32.

## REFERENCES

Deming, W. E. Out of the crisis. Center for Advanced Engineering Study, Cambridge, MA, 1986.

Denver Public Schools. "ProComp." Accessed July 19, 2012. http://denverprocomp.org/

Education Commission of the States. "Two paths to quality teaching: Implications for policymakers." 2000.

Education International. Quality Educators: An international study of teacher competences and standards. Brussels: EI, 2012.

Education Testing Service. A national priority: Americans speak on teacher quality. Princeton, NJ, 2002.

Feiman-Nemser, S. "What new teachers need to learn." Educational Leadership, 60(8), 2003: 25-29.

Feiman-Nemser, S., and M. Parker. "Mentoring in context: A comparison of two U.S. programs for beginning teachers." International Journal of Educational Research, 19(8), 1993: 699–718.

Garet, M. S., A.C. Porter, L. Desimone, B.F. Birman, and K.S. Yoon. "What makes professional development effective? Results from a national sample of teachers." American Educational Research Journal, 38(4), 2001: 915–945.

Gatewood, R., and H. Field. Human resource selection (5th ed.) Mason, OH: South-Western Thomson Learning, 2001.

Glazerman, S., S. Dolfin, M. Bleeker, A. Johnson, E. Isenberg, J. Lugo-Gil, and E. Britton. "Impacts of comprehensive teacher induction: Results from the first year of a randomized controlled study." (No. NCEE 2009-4034). Washington, DC: U.S. Department of Education NCES, 2008.

Glewwe, P., I. Nauman, and M. Kremer. "Teacher Incentives." MIMEO, Harvard, 2003.

Goldhaber, D. Teacher pay reforms. Washington, DC: Center for American Progress, 2006.

Goodman, S., and L. Turner. "Group incentives for teachers: The impact of the NYC school-wide bonus program on educational outcomes." Working paper. Columbia University: New York, 2009.

Hanushek, E. A., and S. G. Rivkin. "How to improve the supply of high-quality teachers." In Brookings papers on education policy, edited by D. Ravitch, 7–25. Washington, DC: Brookings Institution Press, 2004.

Hanushek, E. A., and S. G. Rivkin. "Pay, working conditions, and teacher quality." The Future of Children 17 (1), 2007.

Harris, D. N., and S.J. Adams. "Understanding the level and causes of teacher turnover: A comparison with other professions." Economics of Education Review 26(3), 2007: 325–337.

Harris, D. N., S. A. Rutledge, W. K. Ingle, and C. C. Thompson. "Mix and match: What principals really look for when hiring teachers." Education Finance and Policy, 5(2), 2010: 228–246.

## REFERENCES

Henson, B. E., and P. M. Hall. "Linking performance evaluation and career ladder programs: Reactions of teachers and principals in one district." Elementary School Journal 93(4), 1993: 323–353.

Hill, H. C. "Learning in the teaching workforce." Excellence in the Classroom, 17(1), 2007.

Hire Vue. Austin independent school district. Retrieved, 2012, from http://new.hirevue.com/customers/austin-independent-school-district/.

Hirsch, E., and S. Emerick (with K. Church and E. Fuller). Arizona teacher working conditions: Designing schools for educator and student success. Results of the 2006 phase-in teacher working conditions survey. Hillsborough, NC: Center for Teaching Quality, 2006.

Horowitz, F., L. Darling-Hammond, J. Bransford, J. Comer, K. Rosebrock, K. Austin, and F. Rust. "Educating teachers for developmentally appropriate practice." In Preparing teachers for a changing world: What teachers should learn and be able to do, 2005: 88–125.

Huston, L., and N. Sakkab. "Connect and develop." Harvard Business Review (March 2006): 58–66.

Ingersoll, R. M. Teacher turnover, teacher shortages, and the organization of schools. Seattle: Center for the Study of Teaching and Policy, University of Washington, 2001.

Ingersoll, R. M. Is there really a teacher shortage? A research report co-sponsored by the center for the study of teaching and policy and the consortium for policy research in education. Seattle: University of Washington, 2003.

Ingersoll, R. M. Why Do High-Poverty Schools Have Difficulty Staffing their Classrooms with Qualified Teachers? Washington, DC: Center for American Progress, 2004.

Ingersoll, R. M., and B. K. Curran. Out-of-field teaching: The great obstacle to meeting the "highly qualified" teacher challenge. National Governors Association, Center for Best Practices, 2004.

Institute for Healthcare Improvement. 90-day research and development process. Cambridge, MA, n.d.

Johnson, S. M. Teachers at work: Achieving success in our schools. New York: Basic Books, 1990.

Johnson, S. M., and S. E. Birkeland. "Pursuing a 'sense of success': New teachers explain their career decisions." American Educational Research Journal, 40(3), 2003: 581–617.

Kagan, D. M. "Ways of evaluating teacher cognition: Inferences concerning the Goldilocks principle." Review of Educational Research 60(3), 1990: 419–469.

Kagan, D. M. Professional growth among pre-service and beginning teachers. Review of Educational Research, 62(2), 1992:129–169.

Kane, T. J., J. E. Rockoff, and D.O. Staiger. What does certification tell us about teacher effectiveness? Evidence from New York City. 2006.

## REFERENCES

Kardos, S.M., S.M. Johnson, H.G. Peske, D. Kauffman, and E. Liu. "Counting on colleagues: New teachers encounter the professional cultures of their schools." Educational Administration Quarterly, 37(2), 2001: 250–290.

Kersten, T. A. "Teacher tenure: Illinois school board presidents' perspectives and suggestions for improvement." Planning and Changing 37(3/4), 2006: 234.

Kogan, D., K. Wolff, and M. Russell. "Changes in the hiring process: New actors, new practices, and new challenges. Final report, volume 1: Findings and implications." Social policy research associates. (No. 143). Menlo Park, CA: Social Policy Research Associates, 1995.

Koppich, J., C. Asher, and C. Kerchner. Developing careers, building a profession: The Rochester career in teaching plan. Washington, DC: National Commission on Teaching & America's Future, 2002.

LeMahieu, P., P. Roy, and H. Foss. Elements of quality professional development. University of Delaware and Delaware Department of Public Instruction, 1996.

Levin, J., and M. Quinn. Missed opportunities: How we keep high-quality teachers out of urban schools. New York: The New Teacher Project, 2003.

Levinson, A. "Reexamining teacher preferences and compensating wages." Economics of Education Review, 7(3), 1988: 357–364.

Liu, E. Hiring, job satisfaction, and the fit between new teachers and their schools. Cambridge, MA: Project of the Next Generation of Teachers, Harvard Graduate School of Education, 2005.

Liu, E., and S. M. Johnson. "New teachers' experiences of hiring: Late, rushed, and information-poor." Educational Administration Quarterly, 42(3), 2006: 324–360.

Loeb S., L. Darling-Hammond, and J. Luczak. "How teacher conditions predict teacher turnover in California Schools." Peabody Journal of Education 80(3), 2005: 44–70.

Loeb, S., and J. Myung. "Economic approaches to teacher recruitment and retention." In International Encyclopedia of Education, edited by B. McGaw, P. Peterson, and E. Baker, 3rd Edition, 473–480. San Francisco: Elsevier Press, 2010.

Marsh, J. A., J. McCombs, J. R. Lockwood, F. Martorell, D. Gershwin, S. Naftel, et al. Supporting literacy across the sunshine state: A study of Florida middle school reading coaches. Santa Monica, CA: RAND, 2008.

Marvel, J., D. M. Lyter, P. Peltola, G. A. Strizek, B.A. Morton, R. Rowland, et al. Teacher attrition and mobility: Results from the 2004-05 teacher follow-up survey. NCES 2007-307: National Center for Education Statistics, 2007.

Mihaly, K., D. McCaffrey, T. Sass, and J. R. Lockwood. "Where you come from or where you go? Distinguishing between school quality and the effectiveness of teacher preparation program graduates." RAND Working Paper, 2008.

## REFERENCES

Milanowski, A. T. "An exploration of the pay levels needed to attract students with mathematics, science and technology skills to a career in K–12 teaching." Education Policy Analysis Archives 11(50), 2003.

Milanowski, A. T. "Strategic measures of teacher performance." Phi Delta Kappan, 92, (2011): 19-25.

Milanowski, A. T., H. Longwell-Grice, F. Saffold, J. Jones, K. Schomisch, and A. Odden. "Recruiting new teachers to urban school districts: What incentives will work?" International Journal of Education Policy & Leadership 4(8), 2009: 1–13

Murphy, P., and M. M. DeArmond. The teacher shortage and its implications for recruitment policy. Seattle: Center on Reinventing Public Education, University of Washington, 2003.

Muralidharan, K., and V. Sundararaman. Teacher Performance Pay: Experimental Evidence from India. UC San Diego and the World Bank, 2008.

Murnane, R., and R. Olsen. "The effect of salaries and opportunity costs on length of stay in teaching: Evidence from North Carolina." Journal of Human Resources, 25(1), 1990: 106–124.

National Commission on Teaching and America's Future. The high cost of teacher turnover. National Commission on Teaching and America's Future. Policy brief. 2007.

New Teacher Project. Hiring, assignment, and transfer in Portland public schools. New York, 2007.

National Institute for Excellence in Teaching. "Multiple career paths." Accessed May 17, 2011. http://www.talentedteachers.org/tap.taf?page=element1.

North Carolina Teaching Fellows. "The teaching fellows program." Accessed June 11, 2011. http://www.teachingfellows.org/theprogram/.

NYC Teaching Fellows. Retrieved (2012) from NYC Teaching Fellows Program. https://www.nycteachingfellows.org/about/overview.asp.

Odden, A., and C. Kelley. Paying teachers for what they know and do: New and smarter compensation strategies to improve schools. Thousand Oaks, CA: Corwin Press, 1996.

Otterman, Sharon. "Once nearly 100%, teacher tenure rate drops to 58% as rules tighten." The New York Times, 2011.

Park, S., L. Morales, and S. Takahashi. Collecting high quality teacher observational data: 90-day cycle report. Stanford, CA: Carnegie Foundation for the Advancement of Teaching, 2011.

Park, S., D. Smiley, and S. Takahashi. Developing an effective teacher feedback system: 90-day cycle report. Stanford, CA: Carnegie Foundation for the Advancement of Teaching, 2012.

## REFERENCES

Park, S., and S. Takahashi. 90-day cycle handbook. Stanford, CA: Carnegie Foundation for the Advancement of Teaching, 2013.

Paige, R. "Meeting the highly qualified teachers challenge: The secretary." US Department of Education, 2002.

Paige, R. "An overview of America's education agenda." Phi Delta Kappan, 83(9), 2002: 708–713.

Peske, H., and K. Haycock. Teaching inequality: How poor and minority students are shortchanged on teacher quality. Washington, DC: The Education Trust, 2006.

Peterson, K. D. Effective teacher hiring: A guide to getting the best. 2002.

Poglinco, S. M., A. J. Bach, K. Hovde, S. Rosenblum, M. Saunders, and J. A. Supovitz. The heart of the matter: The coaching model in America's Choice Schools. University of Pennsylvania: CPRE. 2003.

Reed, D., K. S. Rueben, and E. Barbour. Retention of new teachers in California. Public Policy Institute of California, 2006.

Rockoff, J. E., B. A. Jacob, T. J. Kane, and D. O. Staiger. Can you recognize an effective teacher when you recruit 0ne? 2008.

Rosenblatt, Z. "Teachers' multiple roles and skill flexibility: Effects on work attitudes." Educational Administration Quarterly 37(5), 2001: 684–708.

Rutledge, S. A., D. N. Harris, and W. K. Ingle. "How principals 'bridge and buffer' the new demands of teacher quality and accountability: A mixed-methods analysis of teacher hiring." American Journal of Education, 116(2), 2010: 211–242.

Ryan, A. M., and N. T. Tippins. "Attracting and selecting: What psychological research tells us." Human Resource Management, 43(4), 2004: 305–318.

Scafidi, B., D. Sjodquist, and T. R. Stinebrickner. Where do teachers go? Department of Economics, University of Western Ontario, 2002.

Sheridan, J. E. "Organizational culture and employee retention." Academy of Management Journal, (1992): 1036–1056.

Shen, J. "Teacher retention and attrition in public schools: Evidence from SASS91." Journal of Educational Research, 91(2), 1997: 81–88.

## REFERENCES

Smith, T. M., and R. M. Ingersoll. "What are the effects of induction and mentoring on beginning teacher turnover?" American Educational Research Journal, 41(3), 2004: 681–714.

Snow, C. E., P. Griffin, and M. S. Burns (Eds.). Knowledge to support the teaching of reading: Preparing teachers for a changing world. San Francisco, CA: Jossey-Bass, 2005.

Springer, M., L. Hamilton, and D. McCaffrey. "Teacher pay for performance: Experimental evidence from the project on incentives in teaching." Working paper. Vanderbilt University: National Center on Performance Incentives, Peabody College, 2010.

Stoddard, C. "Adjusting teacher salaries for the cost of living: The effect on salary comparisons and policy conclusions." Economics of Education Review 24(3), 2005: 323–339.

The Achievement Alliance. "It's being done: The Benwood initiative." 2008.

The Center for Comprehensive School Reform and Improvement. "Things to remember during the teacher hiring season." (May 2005).

Thompson, M., P. Paek, L. Goe, and E. Ponte. "The impact of new teacher induction on teacher practices and student learning." Paper presented at the Annual Meeting of the American Educational Research Association, April 13, 2005, Montreal.

Valli, L. and D. Buese. "The changing roles of teachers in an era of high-stakes accountability." American Educational Research Journal, 44(3), 2007: 519–558.

Weiss, E. M. "Perceived workplace conditions and first-year teachers' morale, career choice commitment, and planned retention: A secondary analysis." Teaching and Teacher Education 15 (1999): 861–879.

Werbel, J. D., and D. J. Johnson. "The use of person–group fit for employment selection: A missing link in person–environment fit." Human Resource Management 40(3), 2001: 227–240.

Wilson, S. M., and J. Berne. "Teacher learning and the acquisition of professional knowledge: An examination of research on contemporary professional development." Review of Research in Education 24 (1999): 173.

Winter, P. A., and S. H. Melloy. "Teacher recruitment in a school reform state: Factors that influence applicant attraction to teaching vacancies." Educational Administration Quarterly 41(2), 2005: 349–372.

## AUTHORS

**JEANNIE MYUNG** is a director of the Carnegie Knowledge Network and research associate for Carnegie's Learning Teaching programs.

**KRISSIA MARTINEZ** is a research assistant for Carnegie's Learning Teaching programs.

**LEE NORDSTRUM** is a research associate for Carnegie's Learning Teaching programs.

Funded through a cooperative agreement with the Institute of Education Sciences. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.