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CREATING COHERENCE in the TEACHER SHORTAGE DEBATE

What Policy Leaders Should Know and Do

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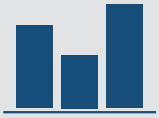
CREATING COHERENCE in the TEACHER SHORTAGE DEBATE

What Policy Leaders Should Know and Do

THE ISSUE

Recent media attention to teacher shortages in all but three U.S. states has raised significant concerns about our public school system's capability to staff all classrooms. Often, the problem is framed as "severe" or a "crisis." Meanwhile, others discredit the issue as "overblown" or "mythical." The fact remains—many districts have grave concerns about teacher shortages and their detrimental effect on student learning.



THE RESEARCH

Despite a saturation of research about why teachers leave the profession and the policy interventions that might convince them to stay, remarkably little research details the nature of teacher shortages—that is, how teacher shortages have been measured and framed over time, and how policy leaders have addressed them and to what effect. What we do know is that teacher shortages have been of great policy concern for decades, perhaps centuries, but clear-cut data depicting the problem have been hard to come by. Increasingly, states are stepping up their efforts to gather teacher supply-and-demand data to assess the severity of teacher shortages in their districts. But past efforts to report these data have too often painted a muddled picture of little use in policy dialogues and targeted policy development.

THE RECOMMENDATIONS

It's time to take the national policy dialogue on teacher shortages to the next level—to bring together researchers, policy leaders, practitioners, teacher preparation programs, and other stakeholders to look afresh at old and new data, so future policy dialogues on the nature of teacher shortages can be better informed, and so more targeted and impactful interventions can be developed to rectify teacher shortages where they exist. This brief provides a roadmap for policy leaders to make that happen.

THE ISSUE
Introduction

Some things never change. In 1557, an English knight named Sir Thomas Elyot wrote this about the country's education of noblemen:

> *The chief causes why in our time noble men are not as excellent in learning as they were in old times among the Romans and Greeks…are these: The pride, avarice, and negligence of parents, and the lack of sufficient masters or teachers.*
>
> **(Elyot, 1557, p. 36)**

Still today, shortages of teachers and parental disengagement are lamented as the reasons schools are just not what they were in days gone by. The consensus is that teachers are the most important within-school factor affecting student achievement (Barber & Mourshed, 2007; Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004). Yet U.S. student performance lags behind our international counterparts (Hanushek, Peterson, & Woessmann, 2014), suggesting that there are not enough sufficiently qualified teachers for all students. The recent policy focus on equity in education highlights how, lacking enough effective teachers for all, the most high-need students are systematically shortchanged (Glazerman & Max, 2011; Isenberg et al., 2013; Office for Civil Rights, 2014; Sass, Hannaway, Xu, Figlio, & Feng, 2012).

Since 2015, media reports of teacher shortages have appeared in nearly every U.S. state (with the exceptions of Kentucky, Virginia, and Vermont, and with only isolated concerns in Connecticut, Delaware, Maine, Massachusetts, and Tennessee). But is it just that people like to complain and media likes to sensationalize, or are the concerns about teacher shortages real? How can policymakers know?

To be sure, teacher shortages are not new in the U.S. public school system (see "Teacher Shortages of the Past"). Although some argue that the historical presence of teacher shortage concerns is cause for complacency (surely this cyclical issue will level out in time as others have), their recurrence also begs the question: Why over so many years have we not overcome this problem?

This brief's premise is that it may be precisely this lack of clarity about whether we have a teacher shortage or not that makes addressing the issue so challenging over the decades. To curb teacher shortages, policy leaders must navigate the teacher shortage rhetoric to (1) make the dialogue among policymakers and constituents more coherent; (2) improve access to meaningful teacher supply-and-demand data; and (3) if there are shortages, create an action plan to address them without delay.

TEACHER SHORTAGES OF THE PAST

Although the present-day teacher shortages in the United States are often presumed to result from the past half-century's opening of women's career options beyond teaching and nursing, (see Cohen-Vogel & Herrington, 2005, p. 8; Rothstein, 1993) or waning interest in the profession (Brenneman, 2015), in fact teacher shortages have been a historically recurring topic of concern. For example:

- An American educational historian described Colonial school committeemen as having had to search "high and low for an adult who could read and write and who was willing to become schoolmaster" (Illinois Association of School Boards [IASB], 1982/2006).[1]
- In 1937, based on a review of 55 reports related to teacher supply and demand in the prior three years, it was concluded that "The upward trend in employment [since 1931] continued through 1935 and 1936, with a shortage of teachers beginning to appear in 1936 in several states."
- In 1980, the outgoing Illinois State Superintendent of Education wrote, "Shortages of mathematics, science, and even English teachers have begun to appear" (IASB, 1980, p. 19).
- The seminal 1983 report *A Nation at Risk* noted:

  > Not enough of the academically able students are being attracted to teaching.... Too many teachers are being drawn from the bottom quarter of graduating high school and college students...a serious shortage of teachers exists in key fields.... Despite widespread publicity about an overpopulation of teachers, severe shortages of certain kinds of teachers exist: in the fields of mathematics, science, and foreign languages; and among specialists in education for gifted and talented, language minority, and handicapped students. The shortage of teachers in mathematics and science is particularly severe. A 1981 survey of 45 States revealed shortages of mathematics teachers in 43 States, critical shortages of earth sciences teachers in 33 States, and of physics teachers everywhere. (National Commission on Excellence in Education, 1983, p. 20)

Clearly, although concerns about teacher shortages have gained recent renewed prominence, the issue of teacher shortages is not a new one.

[1] See also Knight (1929, p. 358), Knight (1952, p. 250), and Peterson (1971, p. 229 and p. 233).

Lies, Damned Lies, and Teacher Shortage Statistics

Hundreds of news headlines take as given that there is a teacher shortage, or even a crisis in teacher supply, while more than a handful of articles question the assertion, with headlines like:

- "Cries About the National Teacher Shortage Might Be Overblown"
- "Why People Think There's a Teacher Shortage in Indiana and Why They're Probably Wrong"
- "Looming 'Teacher Shortage' Appears Largely Mythical"
- "Is There Really a Teacher Shortage?"

Amid the policy and media debates about whether there is a teacher shortage, the onus is on policy leaders to clarify the issue and help their peers and constituents understand *if, when, where,* and *why* teacher shortages are problematic. Without a clear, compelling, shared understanding of the problem's nature, policymakers can't muster the political will to address such an intractable issue. And if the problem is framed correctly, policy solutions can be targeted more precisely and will be more likely to succeed.

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With the challenge of teacher shortages framed well, policymakers can enter into a more robust dialogue that is data-driven and solutions-oriented. Too often, teacher supply-and-demand reports, where they are even produced, are reviewed cursorily by a handful of state leaders. Rarely, if at all, do they undergird in-depth dialogue among legislators, state education agency leaders, higher education, the business community, and others collaboratively interpreting the state of affairs and how best to make progress.

Sparking such a dialogue, however, requires navigating several common pitfalls that muddy and stall the conversation:

COMMON PITFALL 1 | Assuming there is a clear and simple answer as to whether there is a teacher shortage.

How do you *know* if your state has a teacher shortage problem? It might seem obvious at first, but conceptualizing and defining a teacher shortage is not straightforward and can be defined differently by different policy leaders:

- Is it the number of vacancies, or is it the number of applications per vacancy?
- Is it the number of teachers needed to maintain pupil-teacher ratios, or should these be reevaluated?

- Is the number of anticipated retirees a meaningful indicator of future teacher shortages on its own?
- What if this number is matched by the number of preparation program enrollees or unemployed certified teachers? But what if the preparation program candidates are interested only in such surplus areas as elementary education, and the unemployed teachers aren't interested in returning to the classroom, or at least not in the areas where there are shortages?
- How bad is it really if teachers have only emergency credentials?
- What if district leaders are *telling* you there are shortages?
- Does it count more if such reporting is captured in a formal statewide survey of district human resource directors? Or if shortages are reported in October versus September versus August?

There is no direct measure of "teacher shortage," but rather numerous indicators of it, each with its merits (see Table 1). Some capture whether classrooms are staffed with credentialed teachers, others capture only whether sufficient numbers of warm bodies are employed, and still others provide room to incorporate teacher effectiveness in the measure. Taking a holistic view of it all may at first seem reasonable. Yet, we can't forget that different measures of teacher shortage have resulted in wildly different depictions of the problem in the past (Behrstock-Sherratt, 2009).

Table 1. Examples of Various Indicators of Teacher Shortage and the Different Stories They Tell

Teacher Shortage Indicator	Considerations
Number of vacancies	Vacancies are easy to understand, but budget cuts (or teacher shortages themselves) may lead districts to reduce the number of classes offered, artificially reducing the measure of the shortage.
Number of applicants per vacancy	Applicant numbers provide some indicator of the pool districts can select from but say little about whether districts can fill their vacancies with sufficiently capable teachers. And, many districts do not track this information.
Pupil-teacher ratios	Pupil-teacher ratios necessarily rise with teacher shortages and so can usefully indicate trends over time. But without a clear benchmark for the *desired* ratio, this indicator does not clarify whether there is a shortage. Status quo pupil-teacher ratios have been used as the benchmark without consensus on whether the status quo is adequate. As such, pupil-teacher ratios aren't an accurate indicator of teacher shortage. Nor are they easy to disaggregate at the district level across subject areas. Overall numbers can mask teacher shortages or surpluses in particular areas.

Teacher Shortage Indicator	Considerations
Number of emergency certificates issued	In many states, emergency credentials can be issued only when a fully prepared teacher can't be found, so the prevalence of these certificates signals a teacher shortage. However, as an option of last resort, emergency certificates alone may not capture the full scope of a teacher shortage.
Number of preparation program enrollees	Preparation-program enrollment figures provide information about possible future teacher shortages (or surpluses) but could reflect changes in program admissions policies as much as interest in the profession. Because these programs may accept too many candidates in surplus areas or recruit too few in shortage areas, this number has only limited significance, particularly in light of evidence that many program completers never enter the teaching profession (Cowan et al., 2015). Also, without accompanying information on teacher attrition (see later), this number is of limited value, as there is less need for new teachers if current teachers stay put.
Number of (new) teachers certified	Newly certified teacher numbers provide a closer estimation of new teacher supply than program enrollees but don't reflect the fact that many certified teachers can't or won't teach in the subjects, grades, or locations where teachers are needed. On its own, this number does not indicate a teacher shortage (or surplus).
(Total) Number of teachers certified	As above, because many certified teachers can't or won't teach in the subjects, grades, or locations where teachers are needed, this number alone does not indicate a teacher shortage (or surplus) but does offer some useful context.
Number of teachers leaving the profession	Teacher attrition rates represent the flow of teachers in only one direction. If exiting teachers are easily replaced by new teachers, there is no teacher shortage, but there may be other problems.
Number of projected retirees	Same as above.
Perceptions of shortages by district superintendents or human resource directors	Perception surveys that calculate the percentage of district leaders who believe there is a shortage are easy to understand and can capture local and subject-specific information. But expectations among district leaders may vary, so there is a risk is that the more complacent district leaders' schools will appear to have fewer teacher shortages, and the least complacent more.

Source. Adapted from Behrstock-Sherratt (2009).

Numerous state legislatures have mandated the development of teacher supply-and-demand reports. In other states, task forces have funded them (see "Teacher Supply-and-Demand Reports"). Specifically, half of the U.S. states have produced detailed teacher supply-and-demand reports in the past 10 years. These go some way to addressing the previously mentioned issues and have the potential to go much further.

TEACHER SUPPLY-AND-DEMAND REPORTS

In 2009, researchers at the Regional Educational Laboratory (REL) Midwest at American Institutes for Research studied the methodologies used by seven Midwestern states (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin) to monitor teacher supply and demand. Of these seven:

- Two states used only a single indicator of teacher shortage.
- Three states gathered data from multiple sources beyond state administrative data sets to enrich their understanding of the issue.
- Two states went beyond reporting past trends to project teacher demand (although others did project student enrollment or teacher retirements) (Lindsay, Wan, & Gossin-Wilson, 2009).

The report provides rich information on the advantages and disadvantages of investing in teacher supply-and-demand reports and the models and data sources used.

A sample of recent teacher supply-and-demand reports can be found here:

- Minnesota: (http://archive.leg.state.mn.us/docs/2015/mandated/150084.pdf)
- Alaska (http://www.alaskateacher.org/supply_and_demand.php)
- California (http://www.ctc.ca.gov/commission/agendas/2015-04/2015-04-4D.pdf)
- Illinois (http://www.isbe.net/research/htmls/supply_and_demand.htm)
- Ohio (http://oerc.osu.edu/research/teacher-supply-and-demand-study)
- Oklahoma (http://www.okhighered.org/studies-reports/teach-supply)
- Massachusetts (http://www.air.org/sites/default/files/downloads/report/Massachusetts-Study-of-Teacher-Supply-and-Demand-December-2015.pdf)

The reports vary in comprehensiveness and rigor, but several offer strong examples. The best take the highly complex data and boil down key findings to a digestible, actionable portrait.

Minnesota offers one model. Historically, its teacher supply-and-demand report was statutorily required, but was not seen as producing useful data and was not used. In 2012, the Minnesota Department of Education (MDE) asked REL Midwest to help redesign its study and report. REL Midwest staff carefully reviewed methods for studying teacher supply and demand, specific research questions of relevance in Minnesota, the available data, and the related statutory requirements. The team then analyzed the data to address the research questions and highlight key findings in their report. This new version of the Minnesota Teacher Supply and Demand report is regularly presented to the legislature and used both by the state and other organizations to inform such policy decisions as changes to the state's teacher licensure system, loan forgiveness policy, and strategies for ensuring equitable access to excellent educators. The report is recognized by statute as the data source to be used for decision making aimed at addressing teacher shortages.

COMMON PITFALL 2 | A lack of consensus on the data that are indicative of teacher shortages.

What data would convince you that a teacher shortage was problematic enough to address or benign enough to ignore? Since addressing teacher shortages can be expensive, but not addressing them can be detrimental to students' ability to learn and succeed, what type of data would be compelling enough to sway your decision to invest in or ignore the issue? Would some combination of the indicators outlined in Table 1 cement the case for you? Too often in the policy dialogue, a single indicator of teacher shortage is offered, which on its own tells an incomplete story. By contrast, in more formal reports of teacher supply and demand, a laundry list of teacher shortage indicators is often presented without commentary on which are the most meaningful and relevant. The policy and research community must reach some consensus on this issue.

Besides building consensus around the ideal data needed to understand teacher shortages, more consideration must be given to what data are available and how they can be improved or built on to paint an accurate meaningful picture. According to the National Comprehensive Center for Teacher Quality (2007), "No U.S. state has particularly good data for tracking teacher supply and demand" (p. 6).

COMMON PITFALL 3 | Imprecise characterization of "subject-specific shortages" or "geographically specific shortages."

Teacher shortages are typically considered as confined mainly to specific subject areas and specific geographic areas (Aragon, 2016; Malkus, Hoyer, Sparks, & Ralph, 2015). To be sure, understanding the subject areas where teacher shortages are most problematic is critical to effectively targeting policy solutions given resource constraints. But how many "subject areas" must be "shortage areas" before you would say the problem is no longer confined to only certain areas?

It is not unheard of that nearly *every* subject has been deemed a shortage area while the issue continued to be represented as a problem restricted to certain subject areas (Behrstock-Sherratt, 2009). For example, in 1986 the dean of one teacher preparation program noted, "Illinois is already suffering from a teacher shortage, especially in areas such as physics, chemistry, math, foreign language, and English," suggesting that the only core high school subject not affected by teacher shortage was social studies (Matulis, 1986, p. 19). The U.S. Department of Education requires states to report annually on their teacher shortages and publishes those reports in its *Teacher Shortage Areas Nationwide Listing*.[2] This report shows that in 2015 every state (except Pennsylvania) viewed some subject areas as teacher shortage areas, with the average state having

[2] Federal guidance on how to calculate teacher shortage areas is extremely limited: http://www2.ed.gov/about/offices/list/ope/pol/tsa-checklist.html

shortages in 10 subject areas (U.S. Department of Education, 2015). When do these "shortages in a few specific subject areas" start looking to you like "widespread shortages with the exception of a few specific subject areas"?

COMMON PITFALL 4 | The misuse of teacher shortage terminology.

Too often key teacher shortage terminology is misused. Using correct terminology clarifies conversation and can draw attention to distinctions in the nature of a teacher shortage, such as whether it stems more from teacher recruitment challenges or from a "leaky bucket" (Ingersoll, 2003a). (See "A Glossary of Teacher Shortage Terminology.")

A GLOSSARY OF TEACHER SHORTAGE TERMINOLOGY

Teacher shortage—A situation where the teacher supply falls short of teacher demand

Teacher supply—The number of individuals willing and able to teach at prevailing wages and conditions

New teacher supply—The number of individuals willing and able to teach at prevailing wages and conditions who are newly certified each year

Teacher demand—The number of teachers that districts wish to employ at prevailing wages and conditions

Teacher attrition—The number or percentage of teachers who leave the profession in a given year (i.e., who exit from the teacher supply)

Teacher movers or teacher mobility—The number or percentage of teachers who leave a school or district to teach in another school or district

Teacher turnover—The rate at which teachers are replaced (due to teacher attrition or teacher mobility)

Reserve pool—The number of certified teachers not currently employed as teachers

Re-entrants—Members of the reserve pool who regain their interest or ability to teach, thus rejoining the teacher supply

COMMON PITFALL 5 | The absence of teacher shortage goals or targets.

In the teacher shortage dialogue, the goal or target is often unclear. To expect zero vacancies, emergency certification, or attrition is unrealistic. But what level of shortage is acceptable or realistic? Likewise, how many applicants per vacancy, how many teacher preparation program enrollees, how many certified teachers, and how many pupils per teacher are needed for you to feel confident that all students will have access to the teachers they need?

On the issue of teacher retention, scholars have debated whether teacher attrition, estimated at 8 percent nationally, is a problem (DeAngelis & Presley, 2007; Goldring, Taie, Riddles, & Owens, 2014). This number is higher than teacher attrition in some other countries (less than 3 percent in Singapore and less than 1 percent in Finland) (Darling-Hammond & Rothman, 2011). But looking across countries or across professions in the United States, researchers find no definitive benchmark on employee attrition. What levels of teacher attrition are acceptable in your state? Which countries or jobs make for the most meaningful comparisons, or does data need to be gathered on how disruptive and costly turnover really is?

Clearly, identifying and communicating about teacher shortages is a complex and nuanced endeavor. The temptation to launch into discussions about resolving teacher shortages through teacher recruitment, retention, or support initiatives must be resisted until a shared and accurate understanding of what the shortage is emerges. Yet waiting until the perfect data on teacher shortages appear may be too late.

THE RESEARCH

The literature is saturated with studies about teacher retention and how to improve it, but remarkably little research has explored the more fundamental questions of how to define and measure teacher shortages, and how policymakers ought to use teacher shortage data trends to inform their decisions (Behrstock-Sherratt, 2009). According to Ingersoll and Perda (2009, p. 4): "Researchers have rarely specified how to evaluate whether teacher supply and demand are, or are not, in balance and how to empirically determine at what point teacher supply is, or is not, sufficient to meet the demand for teachers." The challenge of teacher shortages thus seems to be fully understanding the problem.

Attempts to empirically track teacher supply and demand have taken place for nearly a century. Throughout the 1930s, 1940s, and early 1950s, the National Commission on Teacher Education and Professional Standards funded annual reviews of published state policy and research reports, with the goal of providing "a backdrop against which trends may be seen, comparisons may be made, progress measured, and a sharper view of unsolved problems obtained" (Maul, 1951).

Although the topic of study is not new, researchers have pointed out the paucity of high-quality teacher shortage data since the 1980s.

- In 1987, Rumberger noted, "There is a widespread belief that the United States currently suffers from shortages of teachers…although there is little concrete information on the exact nature and severity of teacher shortages" (p. 389).

- In 1991, the National Center for Education Statistics sponsored a national Conference on Teacher Supply, Demand, and Quality to update our national understanding of the issue, establish an agenda for future work, and provide policymakers with useful, actionable data. The then-Assistant Secretary for Educational Research and Improvement at the U.S. Department of Education wrote, "This field still is very much in its infancy. As seen in the papers presented at this conference, debate continues over such basic issues as what to measure, how to measure it, and even when to measure it" (Boe & Gilford, 1992, p. 3).
- More recently, Murphy et al. (2003) concluded that "a significant gap…remains in the teacher supply/demand data. It is still not possible to estimate the absolute magnitude of the shortage with any confidence" (p. 10).

The United States is not alone in its teacher shortage challenges (see "Teacher Shortages Around the Globe"), and the challenge of accurately identifying them is similarly noted by researchers overseas. In the United Kingdom, one leading scholar noted in 2002 that "In spite of the deepening crisis [in teacher supply]…, few of the policies developed are based on any secure evidence. Indeed, remarkably little research has been carried out into these matters over the years" (Menter, 2002, p. 3).

TEACHER SHORTAGES AROUND THE GLOBE

Teacher shortages today are described by media worldwide. And, according to the World Economic Forum, as many as 74 countries are facing teacher shortages (Myers, 2015). In many ways, the shortages in other countries resemble our own, but scratching beneath the surface, we see in other countries different versions of our teacher shortage problems that offer some perspective as we tackle the issue domestically:

- **Ensuring disadvantaged students have equitable access to teachers is a problem worldwide.** In the United States, the 2015 *State Plans to Ensure Equitable Access to Excellent Educators* highlighted how students from poor and minority backgrounds are shortchanged in their access to effective teachers. According to an Organisation for Economic Co-operation and Development study of 64 countries, teacher shortages are more prevalent in disadvantaged schools than in advantaged schools in 30 countries. The greatest gaps in students' access to teachers were found in countries spanning five continents: Australia and New Zealand; Ireland, Serbia, Sweden, the Czech Republic, and the Slovak Republic; Chinese Taipei, Indonesia, Shanghai-China, Turkey, and Vietnam; Brazil, Chile, Peru, and Uruguay; and Mexico and the United States.
- **The mathematics and science teacher shortage felt in the United States, not surprisingly, spans the globe.** In New Zealand, mathematics teacher recruitment is described as "hopeless," with physical education teachers are taking on mathematics

assignments. In Germany, there are nationwide shortages in mathematics, chemistry, physics, English and music, with the science, technology, engineering, and mathematics (STEM) fields seen as most critical. Mathematics teacher shortages are reported in Iraq and science teacher shortages in Togo.

- **As in the United States, foreign language teachers are in particularly short supply abroad; but unlike in the United States, it is either English that is the problem or a large range of languages we do not teach.** In Taiwan, a new requirement to incorporate Southeast Asian languages into the curriculum has meant a "significant" shortage of teachers of Khmer, Filipino, and Malaysian (they have Vietnamese, Indonesian, Thai, and Burmese covered). In Sweden, a law requiring every student have a teacher who speaks his or her same language has led to a massive foreign language teacher shortage with the influx of refugee children from many lands. In Cuba, Iraq, Germany, Sri Lanka, and elsewhere, English is among the shortage areas.
- **The rural teacher shortage is just as bad, or worse, elsewhere.** The United States is joined by Sri Lanka, Eastern Europe, China, Togo, and others in facing a rural teacher shortage. In all, less access to accommodation, transportation, lower salaries, and fewer school and social amenities are at fault. But far worse troubles, from lack of access to safe drinking water to pronounced differences in educational expectations to personal safety concerns (the same safety concerns that keep students coming to these schools), are in play. In Malawi, where each teacher is assigned a post but can be relocated to accommodate a spouse's job, female teachers reportedly look for city men as marriage partners to avoid having to work in rural schools.
- **What shortages are unique to the United States? Male and minority teachers.** Although the recruitment of minority teachers is perhaps the main point in most domestic discourse on teacher supply, the global media does not suggest a minority teacher shortage abroad. Recruiting more male teachers is of concern only in China. But there the need for male teacher role models is framed very differently, with the media reporting a need to "make boys men," "salvage masculinity in schools," teach "assertiveness, courage, and sacrifice," and "reinforce traditional gender roles and values in the classroom." And the financial bonuses given to support male teacher recruitment have not gone down well with women. African countries, in contrast, have a shortage of female teachers, even though, according to UNESCO, having fewer female teachers translates to fewer girls attending school in countries where access to education for girls is already limited.

What we do know from research is that:

- Teacher shortages have never been manifest across-the-board, in all schools and subjects but rather are unevenly distributed, plaguing certain students, schools, and subjects while elementary grade and other "surplus-area" teachers remain unemployed. Science, mathematics, special education, foreign languages, urban,

rural, high-poverty, high-minority, and low-achieving schools are where teacher shortages are most prevalent (Cowan et al., 2015; Ingersoll & Perda, 2009). Because they are most problematic in high-need schools, teacher shortages become not just an educational issue, but also an equity issue.

- There is a "revolving door" through which large numbers of teachers are entering but far smaller numbers are retained (Ingersoll, 1997, 2002, 2003a, 2003b; Darling-Hammond, 2000, 2007b; and Darling-Hammond & Sykes, 2003).
- Although the number of education degrees earned declined from around 1986 to 2010, this number has steadily increased and remains high in comparison to several decades ago; education degrees focused in STEM and special education, however, have remained flat (Cowan et al., 2015).
- Since the 1980s, only about half of the education degree earners have been employed as teachers (Cowan et al., 2015).

A 2016 brief from the Education Commission of the States details the findings and policy recommendations that emerged from the 11 states that created teacher shortage task forces or working groups since 2015. The author further suggests that because teacher shortages within a state are impacted by the unique education policies that govern that state, a national approach to addressing the issue is unlikely to succeed (Education Commission of the States, 2016).

However, the administrative data sets and surveys that inform the research do not fully capture the teacher supply-and-demand story. For example, numerous states do not systematically collect data about district leaders' perceptions of teacher shortages or perceptions of the types of teachers in short supply (e.g., teachers with specific subject expertise or other skills or dispositions, and teachers representing diverse backgrounds). Moreover, missing from any analysis to date are such factors as:

- **Interest in the reserve pool of former teachers to re-enter the classroom.** Are large portions of "teachers" currently unemployed or employed in other fields seeking teaching positions, or have they turned their backs to the profession?
- **Interest among education degree earners (or other college students) in becoming teachers.** Are these prospective teachers really set on pursuing a career in the field? And are they willing and able to teach in the schools where they are needed?
- **Interest among high school students in entering the teaching profession.** Are students turning their back to teaching as early as high school? What attracts or repels young talent from teaching in the earliest stages of navigating their career options?

TEACHER SHORTAGE PREDICTOR TOOLS

At a Glance: Projecting Teacher Shortages in Missouri and Arkansas

In 2014, the Missouri Department of Elementary and Secondary Education, collaborating with the Central Comprehensive Center, Regional Educational Laboratory Central, and Center on Great Teachers and Leaders (GTL Center), began developing a teacher shortage predictor tool. This tool is intended to provide districts with useful information to address predicted shortages—before they become problems. Such a tool can guide prospective candidates to subject and geographic areas where the most jobs are, guide teacher preparation programs to make more strategic admissions choices, and help target resource investments and policy interventions.

In 2015, the Arkansas Department of Education, in collaboration with the South-Central Comprehensive Center and the GTL Center, followed suit. Together, they engaged districts, educator preparation programs, educators, professional associations, and the business and civic communities in developing their own teacher shortage predictor tools. This critical first step gained broad-based support and increased the likelihood that stakeholders would use the new data on teacher shortages.

To discover the facts and set the course, each state's policy and educational leaders must put on their research hats and collaboratively address the questions raised here.

THE RECOMMENDATIONS

To overcome the teacher shortage pitfalls described here, legislative leaders must take their states' policy dialogue and policy-generation to the next level. Here are three suggestions for doing that formally and informally:

1. **Kickstart collaborative, constructive, data-informed policy dialogues to obtain consensus on the problem and the possible solutions.** This approach might include:
    - Cross-state dialogue among policymakers
    - Within-state dialogue among teacher leaders, school leaders, district leaders, higher education and researchers, parents, civic and business leaders, and policy leaders
    - Local dialogues within regions or districts struggling with teacher shortages, including conversations connecting district leaders with feeder preparation program leaders to encourage a better match between the supply of new

teachers and districts' demand for teachers in, say, certain subjects or with specific skills and abilities

- Informal dialogues within the legislative community and with constituents

Rather than endlessly debating the issue, examine the data and collaboratively chart a path forward in each state, keeping in mind those common pitfalls:

- The assumption that there is a clear and simple answer as to whether there is a teacher shortage or not
- The lack of consensus on the data that truly are indicative of teacher shortages
- The imprecise characterization of subject- or location-specific shortages
- The misuse of teacher shortage terminology
- The absence of teacher shortage goals or targets

Here is how to start this conversation:

Step 1: Invite participants representing all key stakeholder groups to join a teacher-shortage leadership team or task force and schedule meetings that include state education agency data chiefs who can speak to the availability and format of the teacher shortage indicators to be discussed.

Step 2: At the first meeting, review your state's teacher supply-and-demand report—or another state's if you don't have one. What are the key takeaways? What information seems confusing? What questions are not answered?

Step 3: Review the teacher-shortage indicators and related considerations in Table 1. Which are available in your state? Which mean the most to various leaders in your state?

Step 4: After selecting one or several key indicators that interest your state's teacher shortage leadership team, consensually decide on a realistic goal—Eliminating all teacher shortages? Having a vacancy rate of 1 percent? If 25 percent of district superintendents report medium-to-severe shortages in one or two subjects, is that acceptable? Recognizing that every labor market is imperfect, determine the scale of teacher shortage that is palatable in your state.

Step 5: Create a new or strengthened teacher supply-and-demand report (see Recommendation 2), allowing as much as six months or even more for the task and continually reconvening the group to review this report and discuss how to strengthen it, how to share it with other key decision makers, and how to best act upon the findings (see Recommendation 3).

2. **Support rigorous and usable teacher supply-and-demand studies.** These data can be used to inform, cross-check, or triangulate the dialogues noted previously. Many legislatures already require annual or biannual teacher supply-and-demand reports, but even in these cases, policy leaders can strengthen decision making around teacher shortages by:

    - Adequately funding the teacher supply-and-demand report. Though not explicitly referenced under the Every Student Succeeds Act's allowable uses of funds for supporting effective instruction, such reports might be an allowable use of funds under Title IIA.[3]
    - Incorporating a statewide survey of district leaders' perceptions of teacher shortages could lead to location- and subject-specific shortage information that also captures the *quality* of the applicant pool.
    - Looking within and across state teacher-tracking systems might enable your state to dig deeper into such issues as where teachers are recruited from and where they go when they leave.
    - Providing report authors with detailed specifications on the data and level of detail to include following the guidance in this brief.

3. **Don't wait for the perfect data to begin to resolve teacher shortages.** Data access and data quality are critical, and policy leaders and state education agency staff need to know *what* data are available, *where* the data are housed, *who* has access to the data, and *how* interested parties can access the data and help improve state-level data access. The best policy solutions will emerge when high-quality teacher shortage data are combined with coherent policy dialogue; these goals should be pursued alongside immediate policy action, where compelling evidence shows that student learning is at stake. To develop the best policy solutions:

    - **Review the research.** Numerous resources provide research-based guidance on policies aimed at reducing teacher shortages (see "Reviewing the Research on Solutions to Teacher Shortages").
    - **Take a comprehensive talent development approach.** Rather than seek a silver bullet to resolve teacher shortages, consider innovative approaches to looking across the policy spectrum and addressing the multiple critical policies, from recruitment and preparation to evaluation and retention (see "A Comprehensive Talent Development Framework").

[3] Specifically, Title II(A)(Sec. 2101(c)(4)(B)(v) allows for federal funds to be used for "Developing, improving, and implementing mechanisms to assist local educational agencies and schools in effectively recruiting and retaining teachers, principals, or other school leaders who are effective in improving student academic achievement, including effective teachers from underrepresented minority groups and teachers with disabilities."

- **Conduct a root-cause analysis.** The Carnegie Foundation for the Advancement of Teaching's root-cause analysis approach helps policy leaders and stakeholders identify the reasons behind teacher shortages, and target policy solutions accordingly (see "A Root-Cause Analysis").
- **Engage teachers broadly.** Teachers are perhaps best positioned to offer guidance on the types of policy solutions most likely to reduce teacher shortages and the best ways to implement these policies. One promising approach to engaging a wide spectrum of teachers in the dialogue is *Everyone at the Table* (see "*Everyone at the Table*").

Finally, a national task force on teacher shortages could jumpstart the process of exploring the issues described here. This task force would provide guidance to state leaders on the merits of various teacher shortage measures, best practices for collecting and analyzing the data, proposed shared definitions and protocols for making cross-state comparisons, and the research base on lessons learned from experiments aimed at resolving teacher shortages of various types.

Decades of debate haven't ended teacher shortages. Clearly, addressing shortages where they exist requires a clearer understanding of the nature of the problem and more constructive, data-informed policy dialogue about it. Although accurately identifying teacher shortages is a complex endeavor, it is within reach if policy leaders take steps to build our collective knowledge base and reshape the conversation.

REVIEWING THE RESEARCH ON SOLUTIONS TO TEACHER SHORTAGES

These resources provide guidance on policy solutions that address teacher shortages:

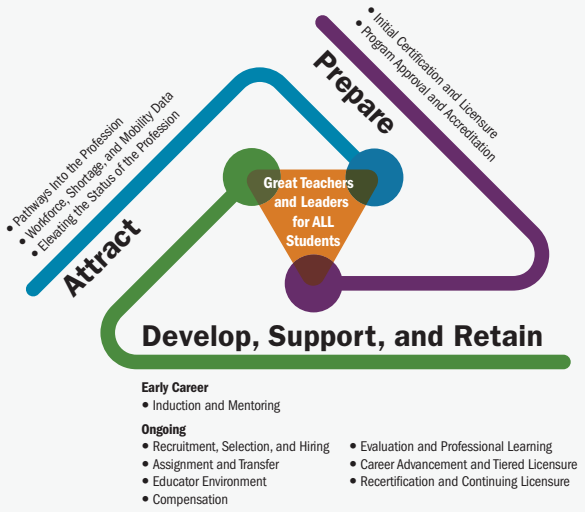
- The GTL Center's Innovation Station provides cutting-edge information, tools, and resources related to recruiting and selecting, retaining, rewarding, and extending the reach of effective teachers and school leaders.
- Public Impact provides resources on recruiting, selecting, and retaining teachers, including resources on building an "opportunity culture" that extends the most effective teachers' reach.
- Education Commission of the States brief series *Teacher Shortages: What We Know* examines state approaches to address teacher shortages through:
  1. Alternative certification
  2. Financial incentives
  3. Induction and mentorship
  4. Evaluation and feedback
  5. Teacher leadership

A COMPREHENSIVE TALENT DEVELOPMENT FRAMEWORK

Growing in prominence in recent years are human capital management systems approaches to addressing teacher shortages and teacher quality. Also known as talent development frameworks, these approaches help states coordinate and align their teacher and principal policies and use policy gap analysis to ensure that the full spectrum of policy issues are addressed. The GTL Center offers an example of a talent development framework. The policy areas addressed in this framework are represented in Figure 1 (see http://www.gtlcenter.org/sites/default/files/14-2591_GTL_Talent_Dev_Framework-ed_110714.pdf).

White (2016) provides a review of various other human capital management frameworks in education (see http://ierc.education/wp-content/uploads/2016/02/2016-1_Laboratories_of_Reform.pdf, pp. 9–11).

Figure 1. A Comprehensive Talent Development Framework



A ROOT-CAUSE ANALYSIS

When addressing teacher shortages, it is easy to jump straight to policy solutions before fully understanding the reasons ***behind*** the teacher shortage. Conducting a root-cause analysis is one way to ensure that the solutions are targeted the real reason behind the problem. Developed by the Carnegie Institute for the Advancement of Teaching, a root-cause analysis involves iteratively asking the question "why" a problem exists until a comprehensive set of root causes emerge. Ideally, root-cause analysis takes place with stakeholders and data on hand. A tool for conducting root-cause analyses can be found at http://www.gtlcenter.org/learning-hub/equitable-access-toolkit/root-cause-analysis-workbook.

EVERYONE AT THE TABLE

Addressing teacher shortages can result in heated dialogue or even acrimonious debate. Neither leads to optimal policy solutions, and either can dissuade policy leaders from engaging new stakeholders. The *Everyone at the Table* approach engages teachers and other stakeholders on hot-button teacher-quality policy issues in a structured, constructive, and solutions-oriented manner. It can involve numerous participants but doesn't require policy leaders themselves to hold dozens or hundreds of meetings. More information about *Everyone at the Table* is at http://www.everyoneatthetable.org.

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