IMPROVING TEACHER QUALITY IN THE UNITED STATES
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ABSTRACT

This paper briefly studies the current state of teacher quality in U.S. and gives a broad overview of the literature. The literature review is scoped for teachers from grades K through 12, in both the local and international contexts. Several factors could explain the general poor teacher quality in the U.S. This includes low bar for entry, heterogeneous teacher preparation programs, lack of strong mentoring programs in all schools and the egg-crate model of teaching. For those who eventually join the profession, this is compounded by an absence of sufficient opportunities in professional development, compensation and career progression for teachers in the system. Drawing on the findings, the recommendation is a multi-fold approach. To achieve greater success in enhancing teacher quality, NCLB requirements alone might require supplement from international success stories. First steps required would be: enhancing the perception of teaching, improving teacher preparation, establishing a collaborative culture through effective professional development and long-term mentor-mentee relationship, as well as offering teachers intrinsic motivators such as career progression and effective feedback through a comprehensive evaluation system.
1. BACKGROUND

The issue to be addressed in this policy analysis paper is that of poor quality of K-12 teachers in the U.S. The paper offers a brief historical sketch of the issue and discusses the magnitude and urgency of the problem. This work offers an analysis of the extant research on teacher quality issues accompanied by proposed approaches. This includes: (1) pre-service recruitment, hiring and teacher education; as well as (2) in-service programs and structures such as induction, professional development and teacher evaluation. This paper highlights policy alternatives for enhancing teacher quality through the teaching pipeline, from pre- to in-service. In the presentation of literature review on policies pertaining to teacher quality, local and international examples will be drawn upon for comparative purposes. Based on the research synthesis, an analytical framework and a set of recommendations is put forth to the U.S. Department of Education and the respective States with the goal of helping them gain greater success in their pursuit of higher teacher quality in the system. Please see Chart A-1 and Table A-1 for problem tree analysis and roadmap of the recommendations.

2. HISTORICAL PERSPECTIVE

2.1 The Landmark Coleman Report

The Coleman Report of 1966 was a study based on 60,000 teachers in over 3,000 schools. It finding suggested that most of the bulk of student achievement is attributed to their socioeconomic background rather than to schools – i.e. teacher quality did not affect student performance. Today, this finding has been reversed (e.g. Goldhaber, 2002; Darling-Hammond et al., 2002) as Coleman’s methodology had been seriously flawed, given that analyses were performed on data that had been aggregated to the school level e.g. the average score for all teachers in a school was related to the average test score for all children in a school (Whitehurst, 2002). Despite the flaw in its conclusions, the Coleman report was considered critical in directing many education researchers’ attention at examining the role of school resources in determining student achievement (Hanushek, 1999).
2.2 Turning the Nation’s Attention to Teacher Quality

Historically, teacher quality has been an issue under purview. Today, it remains a relevant policy issue. The 1996 report from the National Commission on Teaching and America's Future (NCTAF) highlighted teacher quality as the key to improving American education. The 2003 Report to Congress by then Secretary Rod Paige had indicated the government’s commitment to raise the academic standards for teachers while lowering barriers that were keeping many talented people out of the teaching profession (Townsend et al., 2007, p. 5). As President Obama has emphasized, the single most important factor determining whether students succeed in school is not the color of their skin or their ZIP code or even their parents' income -- it is the quality of their teacher (Vallas et al., 2010).

3. Definition of Teacher Quality

What precisely does one mean by “teacher quality”? The two possible interpretations are qualitative and quantitative in nature. For the former interpretation, quality teachers refer to those with high intellect, sound subject mastery, classroom behavior, academic ability, advanced degree work and great aptitude for engaging students while (Laczko-Kerr & Berliner, 2002; Tucker, 2011). Those who gave more weight to its quantitative aspect had considered teacher quality as an output measure based on student performance (Hanushek, 1999) or had described “well-qualified teachers” as those holding state certification and the equivalent of a major in the field taught (Darling-Hammond, 1999).

Cohen (2010) argued that for the teaching profession in the U.S., there is an absence of national common standards against which teachers’ performance or could be judged. Indeed, there is no universal definition or measurement of teaching quality. However, studies typically design indicators such as years of experience, certification and mastery in teaching subject, for the purpose of their research. This paper embraces a holistic definition of teacher quality, which refers to educators’ ability to add growth to students’ learning experiences, as indicated by students' performance, as well as teachers’ passion for engaging students (i.e. includes both quantitative and qualitative measures).
4. MEASURES OF TEACHER QUALITY

4.1 Factors Affecting Student Achievement?

Rowe (2003) reported that students’ general academic achievements, attitudes and experiences of schooling are influenced by students’ background and intake characteristics. It is indeed important to give due considerations to other factors that can affect student achievement, such as student characteristics, socio-economic status of student’s family, students’ access to resources outside of curriculum hours, classroom factors and school factors. In studying the impact on student performance, Hanushek (1999) recognized that there were innate inputs (e.g. student characteristics, family background, peers), as well as inputs directly controlled by policy makers (e.g. school, teacher, curricula).

4.2 Teacher Quality as the most significant in-school policy

Teacher quality had been hailed as a key component of school quality (Hanushek, 1999; Sanders & Rivers, 1996; Gates 2011). Among the school-related characteristics that educational policies can influence, teacher quality is a main driver that has salient influence on student achievement and their cognitive, affective, and behavioral outcomes of schooling. (Asia Society, 2012; Barber & Mourshed, 2007; Goldhaber, 2002; Ingersoll, 1999; Darling-Hammond et al., 2002; Rowe, 2003; Tucker, 2011; Wenglinsky et al., 2000).

In one of the most widely studied education experiments in the United States, named the Project STAR, 11,571 students in Tennessee and their teachers were randomly assigned to classrooms from kindergarten to third grade. Research based on data from Tennessee showed that if two average 8-year-old students were given different teachers, one of them a high performer, the other a low performer, the two students’ performance would diverge by more than 50 percentile points within three years, as illustrated in Chart A-2 in Appendix A (Barber & Mourshed, 2007; Sanders & Rivers, 1996).
The magnitude of non-schooling effects paled in comparison with class and teacher effects, with the latter being more significant (Rowe 2003). Similarly, findings by Darling-Hammond (1998) indicated that the impact of teacher qualifications on student achievement was approximately five times as high as that of class sizes. See Charts A-3 in Appendix A.

5. MOTIVATION FOR ENHANCING TEACHER QUALITY

5.1 To build an Excellent Education System

“The quality of an education system cannot exceed the quality of its teachers.” (Barber & Mourshed, 2007, p.43). This was a piece of anecdotal evidence originated from a South Korean policymaker who was explicit about the importance of getting good people into teaching. For the entire education landscape to improve, we need these warm bodies at the front of the classrooms to offer our students the quality learning opportunities that they deserve and need. One of the important goals practiced by top-performing education systems is that of monitoring teaching and learning (Vegas & Ganimian, 2011). Education policy makers around the world have paid attention to teacher quality as a major vehicle to improve student learning (OECD, 2004), which forms the critical foundation of a sound education system.

5.2 Long-Term Benefits of Quality Teachers

Using the Tennessee STAR data, researchers Rockoff, Rivkin and Kane (as cited in Chetty et al., 2010) found that one standard deviation increase in teacher quality would raise students’ kindergarten test scores by 3 to 5 percentiles; these scores had a positive effect on students’ lifetime outcomes such as future earnings, college attendance, home ownership, and retirement savings.

An effective teacher can help students generate more income. For instance, a teacher at the 60th percentile in terms of quality was estimated to raise future earnings by $105,830 for a class size of 20 (Chetty et al., 2011; Hanushek & Rivkin, 2012). See Chart A-4 in Appendix A for plot of impact on student lifetime earnings against class size at varying percentiles of the teacher quality distribution.
5.3 Cumulative Effects of Teachers

Owing to the cumulative nature of educational process, inputs applied some time in the past would affect students’ current levels of achievement (Hanushek, 1999). Hassel (2011) found that on average, children with teachers from the upper quartile (top 25%) progressed approximately three times as much as those with teachers from the lower quartile. Conversely, the negative effect of having consecutive poor quality teachers is cumulative, as demonstrated through teachers for fifth grade Math students in Tennessee (Sanders & Rivers, 1996).

Although ineffective teachers are likely to impede students’ academic growth (Ballou & Podgursky, 1997, Guarino et al., 2004; Hanushek et al., 2004), having more high quality teachers in the system is a good strategy. After all, findings suggested that children who start out one year behind their peers were likely to catch up, if they had an excellent teacher two years in a row (Hassel, 2011).

6. Urgency of Teacher Quality Issue

6.1 Stronger Demand for Quality Teachers

The educational fraternity is cognizant of the problems that exist with the quality of teachers in U.S. (Ingersoll, 2007; Levine, 2006). On average, U.S. ranked lower than in the top 15 or so higher performing OECD countries in terms of teacher quality (Fullan, 2009). In recent years, as enrollments have risen, class sizes have fallen and a large proportion of the teaching workforce has begun to retire, the demand for effective teachers has soared, making the attraction and retention of teachers an urgent concern. Murnane et al. (1997) argued that if the U.S. were to equip its young people with the skills essential in the new economy, the demand for high-quality teachers is greater than ever.

6.2 Poor International Test Performance

Recognising that student achievement, while a crude estimate, is a reflection of teacher quality, the limelight on the 2009 Program for International Student Assessment (PISA) results has been frequently shown to draw comparisons between U.S. and other high performing nations. For instance,
U.S.’ average of 487, 500 and 502 (for Math, Reading and Science respectively) vis-à-vis first-timer Shanghai’s average of 600, 556 and 575 (Paine & Schleicher, 2002) illustrated somewhat undistinguished student performance, by national standards. This could be associated with the low teacher quality ranking of U.S., relative to other nations. Given that U.S. leads the world in investing in schooling (Hanushek, 1999), it is not unreasonable to question whether the spending on education has been well justified, or if the investment could be more targeted, so that teacher quality improves, driving student learning and excellent performance.

7. IMPEDIMENTS TO ENHANCEMENT OF TEACHER QUALITY

7.1 The Attracted, Recruited and Retained Pool - weakest candidates

“He who can, does. He who cannot, teaches.” George Bernard Shaw included this quote in his documentary Man and Superman in 1903. This calamitous insult to the teaching profession (Shulman, 1986) could be explained through the following findings (Kennedy, 1991; Murnane et al., 1999): (1) those who enter the teacher education generally score lower on tests of academic achievement than those who enter non-teaching careers; (2) employed teachers with higher achievement scores were less likely to stay; and (3) former teachers with high test scores are less likely to return.

Ballou, cited in Goldhaber (2002), concurred, saying that the higher the quality of an individual’s undergraduate institution, the less likely a student was to choose a teaching career. The College Board reported in 2008 that high school graduates who had decided on an education major in college had scored in the bottom third on their Student Achievement Tests (Tucker, 2011). In short, one of the root problems of teacher quality is that the system routinely attracts lower-scoring individuals throughout the pipeline (Kennedy, 1989; Skyes, 1983).

7.2 Apprenticeship-of-observation potentially leads to a Fixed Mindset of Teaching

Coined “apprenticeship-of-observation” by Lortie (1975), the process of teachers learning through imitation of their previous teacher(s) tended not to promote changes (p. 64) or advancement in
teaching skills. Ball & Cohen (1999) contended that one of the limitations in the system were that:

1. those with a fixed mindset to hone their skills within the frame of reference of how their teachers taught them enjoyed fewer opportunities for professional discourse; and

2. one of the findings that compounded all others and made it harder to change practice was that teachers were highly likely to teach in the way they were themselves taught (Kennedy, 1989).

In this manner, teachers tended to be resistant to changes or in capacity building, which impinges on the improvement efforts in teacher quality, at a systemic level.

7.3 On the Egg-Crate Model

Lortie (1975) referred to “individualism of teacher socialization” as characteristic of the teaching profession (p. 81). The craft of teaching somewhat compelled educators to work individually due to conception of performance as individualistic. Although changes have been consciously made to inspire collaborative team work in some schools, new teachers were typically given the most challenging classes and are left, by and large, to enter their classroom, shut the classroom door, and fend for themselves (Townsend et al., 2004). Such largely compartmentalization increased work isolation and might not be conducive for making effective teachers.

8. FINDINGS ON PRE-SERVICE ASPECTS OF TEACHING

This section discusses the various issues and approaches to attract high quality individuals into the profession and to provide them with rigorous preparation prior to their teaching career.

8.1 On Magnets: Enhance Perception of Teaching to Recruit the Best Candidates.

8.1.1 Issue: Why the Best Candidates are not attracted to Teaching. Para 7.2 illustrated that teaching attracted individuals of lower qualities, relative to other professions. A possible surmise is that teaching in U.S. is mostly viewed as a flat career, as “from one day to the next the beginning teacher has the same responsibility as a teacher within 40 years of service” (Veenman, 1984; Townsend et al., 2007). Moreover, the cost of teacher education, in terms of money and time, makes teaching less
attractive for highly-qualified individuals, hence leaving the weakest graduates to join teaching (Loeb, S. & Reininger, M., 2004; Boyd et al., 2007; Murnane et al., 1991). Hanushek (2012) highlighted that recent effort to raise quality through more stringent requirements for entry to teaching could have exacerbated the problem.

8.1.2 Approach: Enhance Attractiveness of the Teaching Profession. Teach for America (TFA) was set up to allow high-ability candidates of elite colleges in the U.S. to enter the teaching profession without the arduous preparation programs (Goldhaber, 2002). However, TFA offers vanishingly small number of openings and does not itself provide a path to staffing all schools with highly capable teachers for the time and in the numbers needed (Tucker, 2011). Similar efforts resulted in programs such as Boston Teacher Residency and the New York Teaching Fellows targeting the graduates of top universities (Barber & Mourshed, 2007). Nonetheless, there remains a need for U.S. to professionalize the teaching career and to make it an attractive option.

8.1.3 International Examples of Magnet: Make Teaching Attractive and Recruit from the Top Tier. While U.S. is not drawing from the top tier of their talents (Fullan, 2009; Goldhaber, 2009), the world’s best-performing systems actively recruit their teachers from the top tier of graduates (Auguste et al., 2010; OECD, 2010). For instance, in Finland, which enjoys a high-quality teaching workforce, teaching is a well sought-after career. Finnish teachers enjoy great public respect and a high degree of professional autonomy (Asia Society, 2011; Simola, 2005). Alberta and Singapore attract relatively strong candidates to the profession due to better pay (Stewart, 2012).

8.2 On Screens: raising the bar for entrance to teacher preparation

8.2.1 Issue: non-selective process and poor hiring. Apart from recruitment, the process of hiring is critical as it acts as the quality control barrier. Previously, relative to other occupations in the U.S., teaching had a relatively low entry “bar” and wide entry “gate”, as measured by college-entrance examination scores of admitted graduates (Lortie, 1975; Henke et al., 2000). Today, none of the
individual states in U.S. had policies designed to create a high-quality pool from which candidates were selected for teacher training and rather, the pool was self-selected as the system took whoever showed up (Tucker, 2011).

Furthermore, one of the most pervasive commercial teacher selection instruments used in hiring, the Gallup Organization’s Teacher Perceiver Interview (TPI), largely ignores subject matter knowledge (Young & Delli, 2002; Metzger & Wu, 2008) and hence fails to give an accurate measure of teacher quality at the point of entry.

8.2.2: Approach: Raise the Bar for Entry into Teaching. Failing to control entry into teacher training has a significant negative effect on teacher quality (Barber & Mourshed, 2007). Many have since suggested a raise in the entrance standards for teacher education programs and to focus on encouraging high-ability individuals into the teaching profession (e.g. American Federation of Teachers, 2000). Darling-Hammond et al. (1998) commented that the system should not hire unqualified teachers.

8.2.3 International Examples of Screens: Hire well prior to Training. In Finland, the teaching profession is highly selective, with an annual acceptance rate of 10% among aspiring elementary teachers to Faculties of Education within Finnish universities (Sahlberg, 2009). Singapore carefully nurtures its talent pool, reserving the most expensive training for those best prepared to use it well; the system selects individuals with the best qualifications, get the best ratings, and have done the best in the training for the next position (Tucker, 2011, p. 190). See Chart A-5 in Appendix A for two-stage filter process that is performed by most nations.

8.3 Improve Quality of Pre-Service Education across Institutions

8.3.1 Issue: Teacher education programs overly diverse and generally ineffective. One of the main goals of pre-service training is to equip novice teachers with a better sense of what school is all about (Lortie 1975; Staton & Hunt, 1992). However, 62% of young US teachers reported that their teacher education programs had not prepared them adequately for working in the classrooms (Asia Society,
Opponents of pre-service teacher education strongly criticized the heterogeneous nature of the teacher training programs across the U.S. (Cochran-Smith, 2005; Goldhaber, 2009). For instance, a 2010 National Research Council report documented 130 distinct paths or portals through which individuals have entered the profession (Henry et al, 2012). Some viewed teacher education programs as having no or negative impact on teaching (Peck & Tucker, 1973) or as lacking breadth of advanced subject matter, as these programs placed invariably high emphasis on inputs such as courses taken, requirements met, rather than actual evidence of a teacher’s subject mastery (Schmidt, 2008; Thomas, 1999). With the findings above, it might not be surprising when Thomas (1999) remarked that taking up pre-service teacher education as the exclusive path into classrooms was placing “the next generation of Americans at educational risk” (p. 6).

**8.3.2 Approach: Enhance the Quality of Teacher Preparation Programs.** On the other hand, supporters of strong pre-service training had suggested improving teachers’ content knowledge and cognitive skills (Ingersoll, 1999; Goldhaber & Brewer, 1996; Greenwald et al., 1996; Schmidt, 2008). For instance, Taylor & Tyler (2012) advocated greater emphasis on making the quality of teacher training programs consistently high, especially in terms of developing teachers’ and cognition in their teaching subject, while Villegas-Reimers (2003) highlighted that pre-service teacher education should be pedagogically and practically oriented.

In a large-scale study based on public school teachers, Darling-Hammond (1999) found teacher quality characteristics such as status and degree in the field to be taught are significantly and positively correlated with student outcomes (see Chart A-6 in Appendix A). Similarly, compared with students whose teachers were uncertified, those with teachers who held a standard certification in mathematics achieved at higher levels in Mathematics (Goldhaber & Brewer, 1996; Clotfelter et al., 2007). The U.S. appears to be globally one of the countries instituting higher standards and certifications for teachers (Goldhaber, 2009; Steiner-Khamsi, 2004), but this did not seem to translate into an overall
enhancement of teacher quality in the system [unless, of course, if teacher quality were narrowly defined as having some form of certification].

8.3.3 International Examples of Training: Rigorous Processes. In contrast, teacher preparation programs in high performing countries such as Finland and China are distinguished by their depth and scope; the Finns take five years or more to educate a teacher on content and pedagogical training, while the Chinese devote 90 percent of the time on deep mastery of the intended teaching subject (Simola, 2005; Tucker, 2011). The Finnish teacher training is rigorous in nature and it empowers its teachers through expertise in research skills, as well as a master’s degree (Stewart, 2012).

9. Findings Pertaining to In-Service Aspects of Teaching

This section focuses on the retention of quality teachers, as well as enhancing teacher quality through mentorship, professional development (PD) and comprehensive evaluation systems.

9.1 Offer Intensive and Sustained Mentoring and Induction

9.1.1 Issue: Attrition of the Qualified Teachers. One of the biggest issues in maintaining teacher quality within the system is that the more academically able teachers were more likely to leave teaching within the first few years (Guarino et al., 2004; Rinke, 2007; Skyes, 1983).

Ingersoll’s (2001) analysis of the national schools and staffing survey and teacher follow-up survey found that more than a third of the beginning teachers leave the profession during the first three years, and almost half leave after five years. A possible reason for the high attrition rate, which Rinke (2007) refers to as a “silent crisis” (p. 3) is that new entrants into the teaching profession faced the “lost at sea” (Ingersoll, 2004; Johnson & Birkeland, 2003) experience, with “a frightening number of teachers striving on their own to give shape to the ideals they had when they chose to take up a teaching career” (Townsend et al., p. 91).

Darling-Hammond (1984) documented that poor working conditions (e.g. overly restrictive bureaucratic controls, inadequate administrative supports for teaching and lack of input into
professional decision making) contribute to teacher dissatisfaction and attrition, particularly among the most highly qualified members of the teaching force. Furthermore, Johnson et al. (2004) reported that the current cohort of teachers typically enter profession with “tentative commitment to teaching” (p. 4), which makes the retention of quality teachers a greater challenge.

9.1.3 Coping Mechanism #1: Strong Induction Programs. Induction programs have surfaced to assist new teachers in coping with the practicalities of teaching (Ingersoll, 2004), serving as a “bridge from student of teaching to teachers of students” (Ingersoll & Strong, 2011). In a review of studies from various countries, Veenman (1984) found beginning teachers found formal induction programs “helpful, good, or valuable” (p. 165). However, the quality of induction program in the system requires review. For example, on average, 54% of new teachers who worked in schools with induction programs only received appraisal and feedback once per year or less (Jensen et al., 2012), showing that the group receiving induction were not significantly more likely to receive more frequent feedback than those excluded from induction programs.

9.1.4 Coping Mechanism #2: Experienced Mentors. Mentoring serves to (a) help new teachers make improvements in their pedagogy and (b) retain qualified teachers (Johnson, et al., 2004; Johnson & Birkeland, 2008; Odell & Ferraro, 1992; Tucker, 2011). In the U.S., the proportion of beginning teachers working closely with a mentor teacher varies widely, from 45% in South Dakota to 91% in Iowa (Wei et al., 2011). Findings indicated that mentoring programs were more successful in lifting teacher effectiveness when educators were engaged in regular interaction over longer time periods (Glazerman et al., 2010; Smith & Ingersoll, 2004). Since it would take time for teachers to develop visible improvements in the quality of their teaching practices, it is recommended that induction and mentoring be long-term in nature (e.g. not limited to the first year of teaching), although this could be subjected to resource constraints.
9.1.5 International Examples of Support: Strong Mentorship. Working closely with a skilled mentor in the same subject and being highly engaged in induction, such as spending the first year under the intense supervision of a master teacher, as in Shanghai’s case, improved quality of instruction and the overall effectiveness of teachers (Tucker, 2011). School environments that support ongoing teacher development by instituting mentoring programs for inexperienced teachers is equally important, as evident through Finland’s example (Beese, 2010).

9.2 Provide Targeted Professional Development (PD)

9.2.1 Issue: Lack of Excellent Framework for effective PD. Despite pockets of good practices (Darling-Hammond, 2010), U.S. has yet to develop a robust, national infrastructure for PD (Stewart, 2010). In particular, PD for teachers in the U.S. is largely perceived as a patchwork of opportunities, with the prevalence of one-day workshops that are isolated, fragmented updates of information delivered in a didactic manner, separated from engagement with authentic work experiences (Ball & Cohen, 1999; Garett, 2001; Lewis, 1999). In addition, one of the greatest implementation challenges is that of providing teachers with the time solely used for collaborative PD and for the development of new teaching approaches (Corcoran, as cited in Choy et al., 1998).

9.2.2 Issue: Weak Link between PD and its effects on Teacher Quality. Many education researchers have suggested that promoting teachers’ PD improves teaching quality and supports professional growth (e.g. Villegas-Reimers, 2003). However, there has been an increasing concern about the link between PD and improvements to teacher practice (Borko, 2004; Penuel et al., 2007). Findings indicated that student achievement would improve by 21 percentile points if their teacher had received substantial professional development (Cohen & Hill, 2000; National Commission on Teaching and America’s Future, 1996; Yoon, 2007). However, Lawless & Pellegrino (2007) had pointed out that as student learning was influenced by many different sources, it was difficult to isolate the direct impact of teachers’ PD.
As Dewey (1929) describes aptly, there exists a challenge of establishing in the real classroom settings the pristine conditions of the laboratories, thus making it difficult to isolate a single factor or to draw, with great confidence, causation between examined factors and observed outcomes. Moreover, the relationship between teachers’ beliefs and their practice is dialectic (Villegas-Reimers, 2003, p. 20), further complicating the effect of PD on teaching practice. Nonetheless, PD has been widely recognised as a key mechanism for improving classroom instruction, teacher quality and student learning.

9.2.3 Approach: Constituents of an excellent PD infrastructure. In general, effective PD programs share the following common characteristics: (a) based on teachers’ content knowledge or subject mastery (Darling-Hammond, 2010; Supovitz, 2001; Wei, 2009); (b) highly relevant and coherent in providing continuity with local school contexts (Fishman, et al., 2003; Penuel et al., 2007); and (c) involve collective participation of teachers (Garet et al., 2001; Desimone, 2009). At the same time, PD should respond to teachers’ respective professional needs, interests and stages of professional development (Villegas-Reimers, 2003) by paying attention to specific instructional practices and professional dialogues that increase educators’ application of effective practices in the classrooms (Choy et al., 1998; Desimone et al., 2002).

9.2.4 International Examples on Models of Excellence for Professional Development. Villegas-Reimers (2003), through her research on international models of PD, suggested that effective PD requires systematic planning, support, funds and research. Darling-Hammond (2010) highlighted that most high-performing nations have good professional structures to lend support to in-service teachers. For instance, teachers in Hong Kong identified PD on content knowledge and increasing self-confidence as as crucial to their sense of success at work (Townsend et al., 2007). Canada enjoys high quality teachers owing to its shift in focus from teacher testing to teacher development since the 1990s; growing repository of projects in Ontario helped to improve teachers’ skills (Stewart, 2012).
Meanwhile, teachers in Singapore are entitled 100 hours of professional development annually (Asia Society, 2012) and this helps them in their professional growth.

9.3 Comprehensive Teacher Evaluation

9.3.1 Issue: Infrequent Teacher Evaluations that do not provide Useful Feedback. The persistent problem with teacher evaluation in the U.S. has been its low frequency and lack of positive impact on improving teacher quality. It was common to have “drive-by” teacher evaluations, based on 5- to 10-minute class visits by Principals (Papay & Johnson, 2012; Toch & Rothman, 2008). As Gates (2011) puts it, the system has been “expecting teachers to be effective without giving them feedback and training”. Another issue is that teachers had been rated by the same criteria, regardless of years of experience and such evaluations were not particularly helpful in improving teaching (Koppich, 2005). Teacher evaluations seldom distinguished well between effective and ineffective teachers, as reflected through Education Secretary Duncan’s remark that “99% of our teachers are above average” (Glazerman et. al, 2010; Weisberg et al., 2009).

9.3.2 Approach #1: Value-Added Scores. On the other extreme, as the nation moved toward evaluating their teachers in a more transparent and systematic manner, Hanushek & Rivkin (2012) highlighted that measuring teacher quality in terms of value-added (VA) scores is gaining popularity. While VA scores, which are based on the learning gains of students, offered a sensible accountability system that gives an estimated measure of teachers’ contribution to students’ growth, they have important limitations (Koretz, 2008). This includes (a) huge year-on-year fluctuations in VA scores that could lead to misclassification of teacher; and (b) test measurement errors due to families’ choices of schools and schools’ decisions about classroom assignments (Glazerman et al., 2010; Hanushek, 2012). However, Tucker (2011) cautioned that the U.S. approach of getting rid of teachers whose students have scored poorly (i.e. poor VA scores) does nothing to improve the supply of good ones, which is where the top-performing nations have invested heavily in.
9.3.3 Approach #2: Building a Holistic Evaluation System. To improve the teacher evaluation process, Toch & Rochman (2008) pushed for the approach of adopting multiple measures, such as classroom observations, VA scores, providing regular feedback, as well as infusing coaching (Donaldson & Peske, 2009), so that when results are triangulated, a more comprehensive picture of teacher quality could be painted for individual educator. School administrators could take on an active role of identifying effective teachers and making them exemplary models for other teachers, so that more students could reap the benefits of having quality teachers (Gates, 2011; Weisberg et al., 2009).

Providing teachers with support through a formal scoring and feedback routine can enhance the overall quality of the teaching pool as it (a) has lasting positive effect on individual teacher performance; (b) helps retain effective teachers; and (c) informs the firing of ineffective teachers (Taylor & Tyler, 2011; Papay & Susan, 2010). The Peer Assistance and Review (PAR) program, through its increased frequency and effectiveness of classroom evaluations, has potential for enhancing teacher quality (Koppich, 2005). The U.S. Department of Education had made teacher appraisal a large part of its current reform agenda (Asia Society, 2011). One of its priority goals is for a majority of States to have statewide requirements for comprehensive teacher evaluation and support systems by September 30, 2013 (U.S. DOE, n.d.).

9.3.3 International Examples on Evaluation and Career Ladders. School evaluation is practiced in Norway and Japan, with emphasis on collaboration between teachers (Asia Society, 2011). Singapore adopts a rigorous holistic Enhanced Performance Management System, a competency-based system that aims to help teachers improve their performance through clearly identified Key Result Areas (Stewart, 2012). In contrast to teacher rating against the same criteria for the 1st and the 31st year teachers in the U.S., educators in Singapore are being ranked against counterparts of similar years of experience and competencies (OECD, 2009). Both China and Singapore focus on tying evaluation with career ladders that offer salary incentives based on performance and responsibilities (Asia
Society, 2011, Sclafani, 2008; Stewart, 2012). Such intrinsic motivators allow quality teachers to experience a greater sense of achievement through greater influence(s) in their work.

10. Recent Teacher Quality Policies Implemented in the U.S.

10.1 Overview

The recognition of teacher quality in the U.S. as a problem has driven reformers at the federal, state, and local levels to push a host of initiatives in the recent years (Ingersoll, 2004). Sections 8 and 9 offered the audience a glimpse of how different elements of the education system could contribute to the overall goal of pursuing higher teacher quality in the U.S. education system (see Table 1 for summary). For more details, see Tables A-3, A-4 and A-5 in Annex A. It is worthwhile to highlight that offering quality teachers incentives through compensation has been omitted from the set of recommendations, owing to the mixed reaction toward merit pay and pay-for-performance in U.S. Findings pointed out that introducing performance pay runs a high risk of “rewarding A while hoping for B.” (Adams et al., 2009, p. 57). Unleashing the potential of improving teacher quality through sound compensation scheme requires careful and extensive, system-wide research, planning, execution and most of all, mindset shifts of teachers.

Table 1: Various Issues and Approaches to Improving Teacher Quality

<table>
<thead>
<tr>
<th>Strategies to Enhance Teacher Quality</th>
<th>Illustrative Studies</th>
<th>Findings and Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Magnet: Perception of Teaching / Recruit from Top Tier</strong></td>
<td>Murnane et al. (1991)</td>
<td>Teaching is not perceived as an attractive career, leaving the least qualified to teach</td>
</tr>
<tr>
<td></td>
<td>Goldhaber (2002)</td>
<td>Allow high-ability candidates to enter the teaching without arduous preparation programs</td>
</tr>
<tr>
<td><strong>Screen: Raise bar for teacher education</strong></td>
<td>Metzger &amp; Wu (2008)</td>
<td>Poor hiring practice, ineffective hiring tool</td>
</tr>
<tr>
<td></td>
<td>Darling-Hammond (1998)</td>
<td>Do not hire unqualified teachers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Certification process – effective?</td>
</tr>
<tr>
<td><strong>Improve Pre-service Teacher Training</strong></td>
<td>Cochran-Smith (2005)</td>
<td>Teacher training programs are too heterogenous</td>
</tr>
<tr>
<td></td>
<td>Schmidt (2008)</td>
<td>Improve teachers’ content knowledge and cognitive skills</td>
</tr>
</tbody>
</table>
### Strategies to Enhance Teacher Quality

<table>
<thead>
<tr>
<th>In-service</th>
<th>Illustrative Studies</th>
<th>Findings and Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance Mentorship, Induction</td>
<td>Ingersoll (2001) Smith &amp; Ingersoll (2004)</td>
<td>Attrition of teachers (e.g. 3rd &amp; 5th year) Mentors in the same subject and teacher participation in collaborative activities decrease attrition</td>
</tr>
<tr>
<td>Provide Effective Professional Development (PD)</td>
<td>Ball &amp; Cohen (1999) Villegas-Reimers, (2003)</td>
<td>Patchwork of opportunities for PD PD that is effective focuses on subject mastery Good PD structure requires systematic planning, support, funds and research</td>
</tr>
</tbody>
</table>

### 10.2 NCLB Mandates

The Federal Law, known as the No Child Left Behind (NCLB), set an unprecedented goal in 2002, to ensure that elementary and secondary students in the U.S. are all taught by highly qualified teachers (Ingersoll & Consortium for Policy Research in Education, 2007). Under the terms of NCLB, to be highly qualified, teachers must: (1) hold at least a bachelor’s degree from a four-year institution; (2) hold full state certification; and (3) demonstrate competence in their subject area (U.S. DOE, 2003). On (3), individual states were tasked to define “subject competence” on their own and had responded by simply inserting variants of existing requirements for teacher certification (Birman, 2007; Hanushek & Rivkin, 2012).

Despite perceived optimism, with about 75% of teachers in 2004-2005 reporting that they were considered highly qualified under NCLB (see Charts A-7 and A-8 in Appendix A) and 88% of school districts predicting that all their core subject teachers would have met the NCLB definition of “highly qualified” by mid-2006, most expressed skepticism that this would improve the quality of teaching (Jennings & Renter, 2006). NCLB’s version of “highly qualified” teachers hold the job of preparing
students for centralized testing, which is standing as a marker of the bureaucratic inroads made by NCLB (Townsend et al., 2007).

**10.3 Investments to improve Teacher Quality**

Recent grants such as Race to the Top Title II Grant on improving teacher quality represents the commitment in U.S. on this issue. In 2010, $99.8 million was awarded for 12 new five-year Teacher Quality Partnership grants that will be used to reform traditional university teacher preparation programs as well as create teacher residency programs for professionals from other fields (ed.gov. press release, 2010). In 2011, a further $2.3 billion was invested on the U.S. system through Improving Teacher Quality State Grants (NCES, 2012, see Table Appendix A).

**11. CRITERIA FOR EVALUATING ALTERNATIVES**

**11.1 IMPETUS FOR CRITERIA-BASED EVALUATIONS**

As state and federal policy makers attempt new ways to attract and retain quality teachers (Adams et al., 2009), the most important evaluative criterion is whether the projected outcome will solve the policy problem to an acceptable degree (Bardach, 2008). In the context of this paper, the outcomes refer to a general improvement in student achievement both qualitatively and quantitatively. See Chart A-9 in Appendix for a sample of Logframe Analysis for this topic.

**11.2 CRITERIA #1: RESOURCES**

Since U.S. economic conditions brought about cuts in budgets for public education, those who dispense federal, state, and local funds to education were hard-pressed to determine which programs raise the quality of teaching in the most cost-effective manner (Guarino et al., 2006). There is scope for research on the cost-benefits of each of the interventions at the state level.

Among the pre-service interventions, improving the perception of teaching and hiring practices might incur less manpower and time, relative to building new teacher education programs or schools. For in-service interventions, both building a strong PD infrastructure and meaningful teacher
evaluation are costly and investments should be made and evaluated wisely. School districts spend an average of 3% of their education budgets (i.e. billions of dollars) on educators’ PD, most of it paying for substitute teachers or for experts to go to schools to offer training (Wilson, 2009); program costs per district for PAR approached US$800,000 for 140 teachers, with the greatest expense coming from hiring teachers for the classes of Consulting Teachers (CTs).

11.3 Criteria #2: Effectiveness of Research Findings

Education is cumulative, with the effects of a quality teacher being long-term (see Para 6.3). However, frequently only current inputs are available, while longitudinal analyses may not be overly common due to the huge investments required. Some studies reported a lack of confidence that the approach taken accurately assesses the causal relationship between resources and outcomes (Hanushek, 1999). One of the perils of quantitative accountability is that untrustworthy statistics could undermine its credibility (Adams et al., 2009). Another concern of NCLB is that it tolerates large confidence intervals in score reporting and that may lead to misidentification of low performers. Both the amount of trust in and the magnitude of error to be tolerated in policies on teacher quality are significant.

11.4 Criteria #3: Political Feasibility

Studies done should be in the context of the country, state, district, or school concerned. For example, studying performance of schools in the same state ameliorates the unintended consequence of outcomes being strongly affected by unmeasured policies, due to large state-to-state variation in policies implemented (Hanushek, 1999). The complexities of the politics in the background of these policies (e.g. different stakeholders having divergent intentions for improving teacher quality) should be given due consideration (F. Reimers, personal communication, November 30, 2012). For policy frameworks to be effect changes in the education systems, understanding of vested interests, administrative routines, and bureaucratic inertia are as important as a sound knowledge of the policy options themselves (Reimers et al., 1997).
12. Recommendations

12.1 Theory of Change

One big assumption is that when teaching is professionalized and intrinsic motivators introduced to make teachers feel satisfied in their jobs, and offer support in their daily work, teachers are incentivized to improve. This will in turn enhance the overall teacher quality in the system. Under the spectrum of educational transfer, it is possible to introduce (a) “introduced through influence” methods to make teaching an attractive option, say through career ladders, by and (b) “purposefully borrowed” policies on research-supported collaborative PD that meets teachers’ specific content or pedagogical needs (Phillips et al., 2006, p. 17). See Table A-7 in Appendix A for evaluation matrix.

12.2 Recommendation Framework

Given the nation’s investments in improving teacher quality, a rigorous and multi-prong approach as recommended based on the extant research and overseas examples will serve the U.S. education system well. Tucker (2011) explains that alternative routes, crash courses in pedagogy, waiving licensure requirements and the like cannot solve the teacher quality problem and that there are no short cuts.

The policy framework of recommendations, illustrated in Chart 1, has been guided by research findings (Para 8, 9). Along the continuum of a typical teaching career, the funnel is a parallel. At the first stage, the pipeline should be narrowed so that highly effective candidates are selected into the teaching force and widened with enhanced content knowledge and professional development as the recruited candidate begins his or her career. The framework includes considerations at the school, state and national levels as it recognises the role of the various stakeholders in all policy reforms.
Chart 1. Recommendation Framework for U.S. Education- Teacher Quality
12.3 Recommendations on Improving Teacher Quality in K-12 classrooms

Implementing the entire framework might be a daunting task, but breaking it up into stages could help the system ease into the transitions, as well as source for sufficient funding to ensure that the policies are not abandoned due to discontinuation of resources. To collectively direct the attention of U.S. education policymakers to where the next-best investment dollar ought to be spent, recommendations should strongly focus on the following in the primary stage (see Chart 2).

**Recommendation #1: Enhance Perception and Preparation.** Invest and implement strategies most suited in the context of the states or districts to enhance the perception of teaching. Make teaching an attractive option. Actively recruit their teachers from the top tier of graduates. Be highly selective in hiring. Prepare this selected group well, especially in terms of research-based work and content based knowledge and conception.

**Recommendation #2: Establish a Collaborative Culture through Effective PD and Long-term Mentorship.** Create a culture of professional excellence that nurtures individual teachers in schools. Give special attention to provide each teacher with a skilled mentor in the same teaching subject, extending beyond the first year of teaching. Offer PD that are relevant for teachers’ use in classrooms and provide on-going support to ease teachers’ applications of techniques learned during professional growth. Provide incentives for teachers to work as a team to achieve superior performance; and

**Recommendation #3: Offer Career Progression and Frequent, Useful Feedback.** Identify, incentivize and retain highly qualified teachers by adopting a career ladder program. Learn from the Baltimore example and recognise that the upward mobility in teaching keeps the job of an educator challenging. Widen the influence of PAR so that teachers can obtain more feedback on which they could act to improve their instructional practice. Ensure that evaluation systems for teachers are perceived to be fair, transparent and effective.
The relative effectiveness of a new system depends critically on the quality of implementation (Papay, 2012). Some high performing nations such as Finland, Ontario and Singapore are small size and have a relatively homogenous population. In a nation as large and decentralized as the U.S., it might not be possible to revamp policies at the national level. A state, however, could bring together best practices to enhance teacher quality (Stewart, 2010). The challenges that remain include:

13.1 State level: Overcoming the Unions and Bureaucracies.

The teacher unions and their contracts reflect the American labor law, which is firmly grounded in the mass production model of work organization and assumes that workers and management will be locked in eternal conflict (Tucker, 2011). In general, entrenchment of school bureaucracies and teacher unions played a role in impeding the enhancement of teacher qualities. For instance, *Waiting for "Superman,“* Davis Guggenheim's edifying documentary highlighted that the coddling of bad teachers by their powerful unions virtually ensures mediocrity, at best, in the teachers (Corliss, 2010).

13.2 School level: Effective School Leadership

Excellent school leadership and teacher buy-in are necessary for policies on teacher quality to be effective. At the school level, principals are the ones who ultimately decide the quality of education at the ground level (Tharman, 2004). To achieve system-wide transformation through policies,
principals should shoulder the responsibility and challenge of charting the direction and gaining teachers’ trust amidst fast pace change (Ng, 2008). For instance, Principal McCarthy from Maine, as featured in the Edutopia video (F. Reimers, personal communication, November 16, 2012), exemplified a leader who adopted the approach of trusting his teachers; giving them autonomy to enhance their quality of teaching. Furthermore, without teachers’ engagement or acceptance of policies, the best plans could become futile. To illustrate, the Chicago teachers’ strike exemplified teachers’ fierce resistance to newly implemented performance measures.

14. Conclusion

Despite the policy recommendations made above, the best initiatives cannot work in isolation. A system-wide approach is necessary so that all stakeholders share a similar goal, which in this case is that of enhancing teacher quality. With the current population of 3.5 million full-time equivalent teachers in U.S., coupled with a mix the nuances of accountability, some states will likely vary with some erring on the side of too much command and control, others on the side of permissive autonomy and some getting the balance right (Fullan, 2009). Despite teacher quality being a challenging issue that “presents a series of knotty difficulties for public policy” (Skyes, 1983, p. 97), the system should maintain optimism and seek the best approaches to achieve the goal of every classroom an effective teacher.

Shaw’s calumny can be rejected by if one chooses to draw upon Aristotle’s wisdom: “Those who can, do. Those who understand, teach” (Shulman, 1986, p.14).
References


Glazerman (2010). Evaluating teachers – the important role of VA – article .


Goldhaber, D. (2002). The mystery of good teaching: Surveying the evidence on student achievement and teachers’ characteristics. Education Next, 2(1)


Ingersoll, R. (2004). Four Myths about America’s Teacher Quality Problem, In M. Smylie & D. Miretsky (Eds.), *Developing the teacher workforce: The 103rd yearbook of the National Society for the Study of Education* (pp. 1–33). Chicago, IL: University of Chicago Press.


Kennedy, M. M., & National Center for Research on Teacher Education. (1989). *Policy issues in teacher education*


How Teacher Professional Development Affects Student Achievement. Issues & Answers. *REL 2007. 33. Regional Educational Laboratory Southwest,*


U.S. DOE. (n.d.) Retrieved Dec 20, 2012 from

http://www2.ed.gov/about/overview/focus/goals.html


Appendix A

Chart A-1 Problem Tree Diagram

Source of graphic: Adapted from www.mainlinemedia.com
### Table A-1 Roadmap

**Motivation**
- To build an excellent education system
- To avoid cumulative harmful effects of bad teachers
- To generate good living standards for those in the education system

**Theory of Change**
When there is a systemic approach to resolving the crisis of lack of teacher quality through multiple-prong strategies so that the best are attracted and retained, teacher quality in the U.S. will be more likely to improve.

<table>
<thead>
<tr>
<th>Problem Statement</th>
<th>Root Causes</th>
<th>Effect</th>
<th>Strategies</th>
<th>Activities</th>
<th>Expected Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Quality for K-12 education in U.S. is poor</td>
<td>Teaching is not an attractive career</td>
<td>Least able ones attracted along pipeline</td>
<td>Magnet</td>
<td>Make teaching more attractive; recruit from the top tier of graduates</td>
<td>More are attracted to teaching, including the talented ones</td>
</tr>
<tr>
<td></td>
<td>Non-selective processes and poor hiring tools</td>
<td>Insufficiently qualified individuals accepted into teaching</td>
<td>Screen</td>
<td>Practice selective hiring</td>
<td>Better candidates are hired</td>
</tr>
<tr>
<td></td>
<td>Teacher Education Programs are heterogeneous</td>
<td>Those who enter teaching are not well-prepared</td>
<td>Training</td>
<td>Enhance quality of teacher preparation program</td>
<td>Higher student achievement if teachers trained in the subject</td>
</tr>
<tr>
<td></td>
<td>Poor working conditions: isolate; Lacks career progression</td>
<td>Highly qualified teachers likely to leave teaching in first few years</td>
<td>Support</td>
<td>Induction and Mentorship should be strong and regular</td>
<td>Teachers obtain more frequent and useful feedback and</td>
</tr>
<tr>
<td></td>
<td>PD fragmented and not tailored to individual teachers’ needs</td>
<td>PD does not enhance effectiveness of teaching</td>
<td>PD</td>
<td>Design effective PD with research, funding, support</td>
<td>Teachers collaborate and apply PD strategies</td>
</tr>
<tr>
<td></td>
<td>Evaluations are infrequent and ineffective</td>
<td>Few avenues to seek feedback to improve teaching practice</td>
<td>Evaluation</td>
<td>Comprehensive Approach multiple measures e.g. classroom observations, VA, PAR</td>
<td>Better distinction between effective and ineffective teachers</td>
</tr>
</tbody>
</table>
**Chart A-2. Effect on teacher quality on student performance**

![Chart A-2](chart2.png)

Source: Barber & Moursheed (2007), Exhibit 5

**Chart A-3. Influence of Teacher Qualifications on Grade 3-5 Student Achievement in Math Tests**

![Chart A-3](chart3.png)

Source: Darling-Hammond, 1998
Chart A-4. Impact of different-quality teachers according to class sizes compared to an average teacher

![Chart showing the impact of different-quality teachers on student lifetime earnings across various class sizes.](source)

Source: Hanushek (2012), Fig. 1

Chart A-5. Double Filters – careful screening of applicants, before or after teacher training programs

![Diagram of double filters for teacher recruitment and selection.](source)

Source: Barber & Moursheq (2007), Exhibit 9
Chart A-6. Variance in NAEP 1996 Student Achievement Scores explained by selected Resource Variables

Source: Darling-Hammond, 1999, p. 31, Fig. 4

Chart A-7: Proportion of Teachers Reporting that they were considered Highly Qualified or Not Highly Qualified, or that they did not know their status under NCLB, 2004-2005

**Exhibit Reads:** Seventy-four percent of general education teachers reported they were considered highly qualified under NCLB, 4 percent were not highly qualified, and 23 percent reported they did not know their status.

Note: Column totals may not sum to 100 percent due to rounding.

Source: NLS-NCLB, Teacher Survey.
Chart A-8: Proportion of Highly Qualified Public Secondary School Teachers, by Subject Area (1999-2000)

Source: DOE, 2003 p. 11

Chart A-9. Logframe

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Goal</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve Teacher Quality in U.S.</td>
<td>To build an excellent education system</td>
<td>High student achievement</td>
</tr>
<tr>
<td>To meet strong demands for high quality teachers</td>
<td>Teaching is an attractive and collaborative Profession</td>
<td>Higher % of teachers with higher test scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher teacher ranking among OECD countries</td>
</tr>
</tbody>
</table>
Table A-2: Appropriations for selected programs under the NCLB, fiscal years 2010 & 2011

<table>
<thead>
<tr>
<th>State</th>
<th>Title I, 2010</th>
<th>Title I, 2011</th>
<th>Improving Teacher Quality State Grants, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>$14,810,243</td>
<td>$14,738,332</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$14,736,332</td>
<td>$370,438</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$2,330,578</td>
</tr>
<tr>
<td>Total</td>
<td>$14,738,332</td>
<td>$370,438</td>
<td>$2,330,578</td>
</tr>
<tr>
<td>Alabama</td>
<td>232,673</td>
<td>237,082</td>
<td>6,333</td>
</tr>
<tr>
<td>Alaska</td>
<td>46,845</td>
<td>44,889</td>
<td>3,537</td>
</tr>
<tr>
<td>Arizona</td>
<td>325,711</td>
<td>334,833</td>
<td>7,726</td>
</tr>
<tr>
<td>Arkansas</td>
<td>170,160</td>
<td>168,360</td>
<td>5,070</td>
</tr>
<tr>
<td>California</td>
<td>1,941,074</td>
<td>1,826,499</td>
<td>30,245</td>
</tr>
<tr>
<td>Colorado</td>
<td>170,448</td>
<td>167,089</td>
<td>6,551</td>
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<tr>
<td>Connecticut</td>
<td>121,746</td>
<td>113,921</td>
<td>5,477</td>
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<td>Delaware</td>
<td>44,072</td>
<td>44,607</td>
<td>3,604</td>
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<td>District of Columbia</td>
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<td>Florida</td>
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<td>Georgia</td>
<td>545,230</td>
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<td>45,659</td>
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<td>268,336</td>
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<td>250,766</td>
<td>256,317</td>
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<td>48,537</td>
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<td>69,811</td>
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<tr>
<td>Ohio</td>
<td>560,380</td>
<td>595,603</td>
<td>11,096</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>170,103</td>
<td>162,269</td>
<td>5,681</td>
</tr>
<tr>
<td>Oregon</td>
<td>163,899</td>
<td>163,987</td>
<td>5,533</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>611,368</td>
<td>575,819</td>
<td>11,308</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>53,497</td>
<td>51,960</td>
<td>3,671</td>
</tr>
<tr>
<td>South Carolina</td>
<td>227,061</td>
<td>230,734</td>
<td>6,315</td>
</tr>
<tr>
<td>South Dakota</td>
<td>46,726</td>
<td>46,316</td>
<td>3,577</td>
</tr>
<tr>
<td>Tennessee</td>
<td>285,793</td>
<td>285,669</td>
<td>7,383</td>
</tr>
<tr>
<td>Texas</td>
<td>1,460,416</td>
<td>1,463,538</td>
<td>22,888</td>
</tr>
<tr>
<td>Utah</td>
<td>74,471</td>
<td>86,030</td>
<td>5,445</td>
</tr>
<tr>
<td>Vermont</td>
<td>36,247</td>
<td>35,775</td>
<td>3,392</td>
</tr>
<tr>
<td>Virginia</td>
<td>262,958</td>
<td>257,555</td>
<td>8,414</td>
</tr>
<tr>
<td>Washington</td>
<td>215,993</td>
<td>236,184</td>
<td>7,599</td>
</tr>
<tr>
<td>West Virginia</td>
<td>96,120</td>
<td>97,625</td>
<td>4,141</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>205,575</td>
<td>222,847</td>
<td>6,952</td>
</tr>
<tr>
<td>Wyoming</td>
<td>34,930</td>
<td>34,564</td>
<td>3,383</td>
</tr>
</tbody>
</table>

Source: adapted from U.S. Department of Education, prepared September 2011
<table>
<thead>
<tr>
<th>Sources</th>
<th>Aim</th>
<th>Goal, Methodology, Data Source</th>
<th>Discussion and Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanushek (2012)</td>
<td>On VA</td>
<td>Teacher value-added (VA) has entered into policy discussions, leading to considerable current research to understand how estimation approaches affect the statistical estimates. Elements of teacher VA have entered directly into a variety of policy discussions, such as which teachers should be laid off when there is a reduction in the teaching force.</td>
<td>The differences in the effectiveness of teachers are not captured by common observable characteristics such as teacher experience or teacher degrees. It is important to consider how families (in their choices of schools) and schools (in their decisions about classroom assignments) influence estimates of teacher VA.</td>
</tr>
</tbody>
</table>
| Darling-Hammond et al. (1999). Measure of TQ | **Aim:** To examine whether teacher quality indicators, as well as other school inputs, are related to student achievement at the state level | **Data Source:**  
- public school teacher qualifications  
- other school inputs available from the 1993-94 Schools and Staffing Surveys (SASS) data on student achievement, linked surveys from 65K teachers and 13K principals  
- student characteristics from the 1990, 1992, 1994, and 1996 assessments in reading and mathematics administered by the National Assessment of Educational Progress (NAEP). | **Regression analyses** of school resource variables on student achievement scores  
**Control Variables:** student characteristics such as poverty and language background.  
Measures of teacher quality  
Teacher quality variables constructed from the SASS data include the proportion of “well-qualified teachers,” defined as the proportion holding state certification and the equivalent of a major (either an undergraduate major or master’s degree) in the field taught. |
| Metzger & Wu (2009)           | Hiring               | This article synthesizes 24 studies of the most prominent teacher selection instrument, Gallup’s Teacher Perceiver Interview (TPI). Recognises challenge of hiring (on screens & magnets) teachers of high quality | To translate affective beliefs, attitudes, and values into practicable teacher selection, many schools have turned to commercial teacher hiring instruments.  
Found a modest relationship \( (r = 0.28) \) between the TPI and some measure of teaching quality  
Size of the relationship differing considerably across different indicators. |
<table>
<thead>
<tr>
<th>Citation</th>
<th>Focus</th>
<th>Sample</th>
<th>Findings relevant to Teacher Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evertson &amp; Smithey (2000)</td>
<td>Impact of mentorship on classroom</td>
<td>N = 92 teachers assigned randomly to 2 groups, trained vs untrained</td>
<td>Findings supported concept that having trained mentors increased teacher quality, as teachers then had better classroom organization and students who were more engaged.</td>
</tr>
<tr>
<td></td>
<td>effectiveness</td>
<td>mentors</td>
<td></td>
</tr>
<tr>
<td>Mathematica Policy Research</td>
<td>Effect of comprehensive induction program</td>
<td>N= 1009 Beginning teachers in urban Public Schools</td>
<td>Substantial support for teachers, including weekly meetings with mentors and monthly professional development reaped the following:</td>
</tr>
<tr>
<td>Glazerman</td>
<td>for 1-2 years</td>
<td>Longitudinal study for three years, starting 2005-2006 school year</td>
<td>‣ No impact on teacher effectiveness in the first 2 years;</td>
</tr>
<tr>
<td>Smith &amp; Ingersoll (2004)</td>
<td>Successful aspects of induction</td>
<td>N = 3235 first-year teachers</td>
<td>‣ Significant difference in student achievement (measurement of teacher quality) after third year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nationally representative sample from Schools and Staffing Survey,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1999-2000</td>
<td></td>
</tr>
<tr>
<td>Thompson, Peak, Goe, &amp; Ponte</td>
<td>Impact of intensive induction programs</td>
<td>N=1125 third-to fifth-grade public school teachers in the third year</td>
<td>Concluded that teachers with higher engagement in induction outscored those with lower engagement on all but 2 of 9 measures of teaching practice.</td>
</tr>
<tr>
<td>(2004)</td>
<td></td>
<td>of their teaching careers in California</td>
<td></td>
</tr>
<tr>
<td>Kapadia et al. (2007)</td>
<td>Induction Program</td>
<td>N = 1737 novice teachers</td>
<td>Concludes that strong induction leads to positive outcomes in retention of teachers. This includes retaining quality teachers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chicago Public Schools, 2005</td>
<td></td>
</tr>
<tr>
<td>Jensen et al. (2012)</td>
<td>Ch 3: Support and Development for New</td>
<td>Analyses the appraisal and feedback received by new teachers and looks</td>
<td>‣ New teachers are more positive than more experienced teachers about the appraisal and feedback they receive, but &gt; 1 in 6 never received appraisal/feedback</td>
</tr>
<tr>
<td></td>
<td>Teachers</td>
<td>at the impact it has on the teaching of new teachers.</td>
<td>‣ Mentoring and induction programmes are not providing additional feedback to new teachers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table A-5

Review articles, foci, Sample and Relevant Findings on Professional Development (PD)

<table>
<thead>
<tr>
<th>Citation</th>
<th>Focus</th>
<th>Sample</th>
<th>Findings relevant to Teacher Quality</th>
</tr>
</thead>
</table>
| Ball & Cohen      | Discusses what teachers need to learn, examines pedagogy for PD and offers suggestions for these proposals to work in the U.S. context | Literature Review Issue discussed - Although a good deal of money is spent on staff development in the United States, most is spent on sessions and workshops that are often intellectually superficial, disconnected from | How to make recommendations on PD work well in US
<p>| (1999)            |                                                         |                                                                        | • More people in PD would need to address systematically what it might mean to center teachers’ opportunities for learning in practice  |
|                   |                                                         |                                                                        | • Examples of practice-based PD should be recorded (e.g. written, video cases), along with companion materials designed that describe ways to organize and carry out such activities. The resources should be sufficiently vivid, compelling, concrete and well-distributed for studies  |
|                   |                                                         |                                                                        | • Alternative curricula for grounding PD in practice should be explored e.g. embed teachers’ opportunities to learn subject matter in materials of practice—in student work, curriculum materials, or classroom videotapes  |
| Garet et al.      | Examined relative value of core components of PD through self-reported changes in teacher’s knowledge and practice | Large-scale study based on data from a national probability sample of teachers who had taken part in PD activities that varied in content and duration. | Researchers found evidence supporting the value of the following structural features of PD: (a) reform orientation; (b) duration; and (c) collective participation of teachers from the same school.  |
| (2001)            |                                                         |                                                                        | PD should also focus on content knowledge, inquiry learning approaches and be highly coherent with standards in the teachers’ local school contexts  |
| Yoon et al.       | Models of exemplary PD                                  | Examined more than 1,300 studies identified as potentially addressing the effect of teacher professional development on student achievement in three key content areas. | Of the &gt;1300 studies, only 9 met What Works Clearing-house evidence standards. Findings based on the 9 studies revealed that students achievement would be improved by 21 percentile points if their teacher had received substantial PD (average of 49 hours) PD must be of high quality in its theory of action, planning, design, and implementation.  |
| (2007)            |                                                         |                                                                        |                                                                                                       |</p>
<table>
<thead>
<tr>
<th>Citation</th>
<th>Focus</th>
<th>Sample</th>
<th>Findings relevant to Teacher Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penuel et al. (2007)</td>
<td>A study that focused on Science</td>
<td>N = 454 from 2002 to 2004 were offered PD by the GLOBE initiative, that support teachers in their classrooms after their training program.</td>
<td>Curricular reforms are extremely demanding and require big changes to be implemented are often rejected altogether. Grounded within the context of implementing curricular innovation.</td>
</tr>
<tr>
<td>Supovitz &amp; Turner (2000)</td>
<td>Studied PD features that mattered most in Science</td>
<td>Analysis of PD activities</td>
<td>Performed an analysis of PD activities within the Local Systemic Change initiative based on School-level data and self-reported teacher data</td>
</tr>
<tr>
<td>Desimone (2009)</td>
<td>Critical look at application of recent research knowledge to enhance measurement of effects of PD</td>
<td>Various studies</td>
<td>Proposes a model that represents the interactive relationships between several factors, including the critical features of PD and teacher effectiveness. The features are (a) content focus; (b) active learning; (c) coherence; (d) duration; and (e) collective participation.</td>
</tr>
<tr>
<td>Desimone et al. (2002)</td>
<td>Subject Matter Training</td>
<td>N = 207 teachers (in 30 schools) in Math and Science from 1996 to 1999</td>
<td>PD that focused on specific instructional practices increases teachers’ use of those practices in the classroom. Conclusions -</td>
</tr>
<tr>
<td>Fullan &amp; Stiegelbauer (1991)</td>
<td>Effect of PD on teacher quality and student learning</td>
<td>Review of 43 research studies</td>
<td>PD provides continuity between what teachers learn and what goes on in their classrooms and schools. PD with sufficient duration and professional guidance were useful in generating instructional customizations, allowing teachers time to repeatedly test their new strategies in the classroom, hence enhancing their effectiveness.</td>
</tr>
<tr>
<td>Cohen &amp; Hill (2000)</td>
<td>Curriculum-linked PD</td>
<td>Large-scale study of PD conducted in California</td>
<td>Curriculum-linked PD is more effective than workshops that focused on general pedagogical strategies in promoting change in teachers’ practice</td>
</tr>
<tr>
<td>Lawless &amp; Pellegrino (2007)</td>
<td>Effects of technology-based PD on students</td>
<td>A series of studies, well-summarised in table forms</td>
<td>Difficulties in understanding the effects of PD on students are exacerbated by the fact that student learning is influenced by many different sources, not just by a direct link through a teacher from PD.</td>
</tr>
<tr>
<td>Citation</td>
<td>Focus</td>
<td>Sample</td>
<td>Findings relevant to Teacher Quality</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Taylor &amp; Tyler (2012)</td>
<td>Impact of teacher evaluation on improvement of teaching</td>
<td>N = 105 teachers in analysis sample</td>
<td>Findings suggest that a lack of information on how to improve could impede individual teacher improvement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mathematics mid-career teachers for grades 4 through 8, two-thirds of whom have 10-19 years of teaching experience</td>
<td>Formal scoring and feedback routines encourage conversations about effective practices. The effectiveness of teachers in raising student achievement improved incrementally during and after the school year of evaluation. This is not true for reading.</td>
</tr>
<tr>
<td>Weisberg et al (2009)</td>
<td>Recognising the national failure to acknowledge and act on differences in teacher effectiveness</td>
<td>N = 15,000 teachers and 1,300 administrators spanning 12 districts in 4 states: Arkansas, Colorado, Illinois and Ohio</td>
<td>Despite variation in methods of teacher evaluation, all 4 states had a similar outcome, with 90% of their teachers rated as good or great. The widget effect describes the phenomena of indifference to instructional effectiveness, as illustrated by binary evaluation ratings (generally “satisfactory” or “unsatisfactory”). The authors recommended training for administrators to make fairer assessment of teacher performance.</td>
</tr>
<tr>
<td>Papay &amp; Susan (2010)</td>
<td>Peer Review Assistance</td>
<td>Qualitative Study</td>
<td>Providing teachers with formal scoring and feedback routine help districts retain effective teachers, as well as dismiss teachers who are not sufficiently qualified.</td>
</tr>
<tr>
<td>Toch &amp; Rochman (2008)</td>
<td>infusing coaching</td>
<td>Drive-bys</td>
<td>Points to poor teacher evaluation practices such as (a) requiring tenured teachers to have evaluations only twice a decade; and (b) evaluations of little value, such as checklist of classroom conditions that lacks focus on the quality of teacher instruction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test scores</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mutliple meaures, teamwork advocated</td>
<td></td>
</tr>
<tr>
<td>Koretz (2008)</td>
<td>VA scores</td>
<td>Useful, but error-prone, not for high stakes decision</td>
<td>Rigorous system with clear instructions; Trained evaluations.</td>
</tr>
</tbody>
</table>
Table A-9: Sample Analysis Framework of approaches against criteria selected

<table>
<thead>
<tr>
<th>Approach</th>
<th>Resource</th>
<th>Criteria Measures in U.S.</th>
<th>Political Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnet</td>
<td>$</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Screen</td>
<td>$</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Training</td>
<td>$$</td>
<td>□□</td>
<td>□□</td>
</tr>
<tr>
<td>Support (e.g. Mentor)</td>
<td>$</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>PD</td>
<td>$</td>
<td>□□</td>
<td>□□</td>
</tr>
<tr>
<td>Teacher Evaluation</td>
<td>$$</td>
<td>□</td>
<td>□</td>
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</table>