From Challenges to Opportunities:

Professional Educator Development Systems that Work for

Students with Disabilities

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# Abstract

Teacher education effectiveness is deeply linked to fundamental structures and policies that organize activity within the U.S. education system. How the teacher workforce is conceptualized, funded, and evaluated frames teacher performance and evaluation. Expanding the scope of *all* teachers’ work to include skilled support for learners with disabilities in collaboration with special educators must be undertaken with careful attention to the patchwork of systems that comprise U. S. public education. Strategic attention to the loose links will provide more powerful change mechanisms. This paper reviews the literature on teacher education and development systems with particular emphasis on evidence of the results of systems of professional educator preparation. Literature reviewed includes papers, chapters, and policy briefs produced under federal and state funding, for national teacher education groups, and peer-reviewed empirical and theoretical papers. Where accessible, we provide summary analyses of teacher education data. We highlight effective systems levers that increase the capacity of the educator work force to produce substantive achievement and successful graduation rates for students with disabilities.

*Keywords:* teacher education, special education teacher preparation, students with disabilities, special education, educator preparation, teacher education systems

# Systems Change for Teacher Education: From Equity Challenges to Opportunities

Teacher education represents a nested system that is influenced by national standards, while responding to state departments of education and the needs of local school systems Therefore, reform intended to improve teacher education will require careful attention to how these systems influence and respond to one another and even the unintended consequences of such change. This paper examines the opportunities and constraints that face policy makers as they strive to improve the outcomes of preparing the teacher workforce, including consideration and attention to learning design and practices that account for the multiple ways of knowing and understanding that students with disabilities bring to classrooms. The analysis is grounded in complexity theory, systemic change, and cultural historical activity theory. In doing so, we seek to uncover the possibilities within systems that offer leverage for change, improvement, and transformation in what teachers know, how they practice, and how they inform and shape the institutional cultures and systems of schooling in the United States, with specific attention to the educational needs of students with disabilities.

**The Current State of Teacher Education**

Teachers and teacher education have faced severe scrutiny and criticism on a number of fronts for at least the last 40 years. The critique has centered on three issues: (a) how teachers should teach and the gap between various versions of the ideal and the reality, (b) the nature of teachers’ preparation to teach, and (c) the government’s role in assuring the quality of education afforded to children from preschool through high school graduation (abbreviated as P-12 in this paper). A number of reform efforts have sought to replace or contest existing systems of teacher education through alternative teacher education programs, alternative licensure routes, and charter schools which, because of regulatory affordances, also offer avenues into the teaching profession. The degree to which these alternative systems have influenced much less replaced the status quo can be debated. While percentages vary, depending on the research study, at least 61% of teachers continue to be produced through traditional routes funneled through universities and into local and regional networks of schools (Darling-Hammond & Wei, 2009). Most teachers continue to accept their first teaching positions within 40 miles of where they graduated from high school (Kozleski, Artiles, McCray, & Lacy, 2014). In fact, this regionalized production of teachers leads to an unequal distribution of the workforce that is exacerbated by differences in the salary scales and working conditions among local school districts (Kozleski, Artiles, & Lacy, 2014). In spite of these challenges, recent research demonstrates that teachers who graduate from education programs that focus on pedagogy, content knowledge, with an extensive, mentored, practice component produce better learning outcomes for their students than teachers without in depth content preparation or the extensive practice component (Darling-Hammond & Wei, 2009).

In this paper, we take the stance that special educators’ preparation is inextricably linked to the preparation of *All* teachers, while acknowledging the need for specialized knowledge of research-based practices that expand and support the educational progress of students with disabilities (Pugach, Blanton, & Bovada, 2014). The impact of good teaching, a combination of deep knowledge about research-based practice, knowledge of learner needs, the design of learning environments, content knowledge and the ability to synthesize these streams to ensure success for individuals, outweighs the effects of class size and composition (Wilson, 2009). In fact, at times it is as powerful as the influence of student background variables on student learning outcomes (Darling-Hammond & Wei, 2009). In recent years, a number of researchers have concluded that general education classrooms have robust effects on learning outcomes for students with disabilities (Brownell, Sindelar, Kiely & Danielson, 2010). The reasons for this are multifaceted and include the knowledge and skills of the practitioners as well as the power of learning communities to support, model, and expand how individual students access and act upon learning objects and activities (Kozleski & Artiles, 2014).

However, a continuing gap exists in teacher knowledge about the design and delivery of instruction for students with disabilities. Almost two-thirds of the six million students with disabilities in the nation’s schools are educated in general education classrooms (Office of Special Education Programs, 2014). General *and* special educators are teaching students with disabilities through consultative and/or collaborative arrangements (Pugach, Blanton, & Boveda, 2014). Yet, a current review of licensure requirements shows that in most states, general education teachers are required to complete a single course in special education with no requirement for mediated or coached practice with students with disabilities in the applied portion of their programs. This was the case in the seventies when the original federal legislation guaranteed children with disabilities access to free and appropriate education. It continues to be the case now that children with disabilities are likely to be members of general education classrooms. And, while we know that the context has changed and continues to change, not enough is done in most elementary and secondary teacher education programs to help teachers prepare for this eventuality. Further, research on learning to practice collaboratively as well as design programs with the intention to redesign the general education curriculum to account for learning differences in meaningful practice is still emerging (Pugach, Blanton, & Boveda, 2014).

In spite of a number of programs that built more extensive collaborative experiences into their general education curriculum, the special education course in most teacher education curricula is likely to focus on the disability categories that comprise the types of educational disabilities recognized in national law (Brantlinger, 2006) with brief exposure to assessment and instructional methods. Further, teacher candidates complete the single course without any sustained interaction with students with disabilities so that their ability to translate and enact what they have learned is questionable. And, even if they are in programs with extensive clinical experiences, the clinical focus is rarely on success with students with disabilities. However, a handful of studies have shown that, where teacher candidates have the opportunity to work in classrooms that include students with disabilities as part of their clinical experiences, they tend to have more positive attitudes towards teaching students with disabilities in their classrooms (Pugach, 2005). Teacher candidates are likely to have no further formal education on students with disabilities prior to taking their first job. While students with disabilities continue to improve their performance on standardized accountability measures, the 56% graduation rate for students with disabilities is far below the average graduate rate for students without disabilities of 80% (Stetser & Stillwell, 2014).

**What Can be Done**

If substantial progress is to be made on improving outcomes for students with disabilities, general education teachers must learn to design and deliver powerful learning experiences that account for the diversity of their students. While this paper focuses specifically on teacher education for students with disabilities, diversity in schools extends across a number of groups of learners who have been historically minoritized in schools. Educating teachers to teach diverse populations of learners is no small task since there are a number of policy initiatives that could derail or sidetrack such an effort. For instance, the National Council on Teacher Quality has emerged to rate existing teacher education programs, springing neither from the profession itself nor the sizable body of research about the practice of teaching and its relationship to the local and state educational systems that regulate and assess their outcomes (Mamlin, 2012).

Simultaneously, schools and states continue to reconceptualize what counts as knowledge, what high school outcomes should be, and how to measure and these shifts to a skeptical public. These professional and political efforts to reframe education exist within a public context that seems quixotic at best. While families tend to report being happy with their children’s teachers, polls of American communities find over and over again that Americans are unhappy with the education system and the skills of its graduates (Ball & Forzani, 2010). Prevailing critiques in the U.S. media point to U.S. performance on international comparisons through the Program for International Assessment (PISA), which remains static, and barely within the top 20 nations in academic achievement in reading, and 27th in math (OECD, 2013). However, policy scholars point to increasing performance outcomes for Black and Hispanic 17 year olds by as much as 20 points in Math and Reading (Center for Public Education, 2014). Nevertheless, P-12 and increasingly, P-16 education, to include undergraduate college education, is under constant and numbing critique in spite of almost thirty years of increasingly robust reform initiatives (Berliner & Glass, 2014). Much of it centers on failure to address the needs of children with disabilities as well as those who are culturally and linguistically diverse.

The inception of the new Common Core Standards currently adopted by 45 out of 50 states, four territories and the Department of Defense school system shifts the terrain substantially. Rothman (2012) notes that the Common Core reshapes what and how content will be taught. For instance, instead of covering a number of math topics, the Common Core focuses practice on deeper understanding in fewer topics. Similarly, reading nonfiction, focusing on text comprehension, and how to extract evidence in support of the central claims of the text marks a major overhaul in how reading is taught and used as a learning tool.

All of these reform voices converge in a redesign flood of how teachers should learn to teach, what they should teach, and how their performance should be assessed (Brownell, Steinbrecher, Kimerlin, Park, Bae, & Benedict, 2014). Preparing the teacher workforce is a dilemma for policy-makers, researchers, and teacher educators alike. The goal of this paper is to consider the opportunities and constraints at the national, state and local level in the process of reforming teacher education to prepare a workforce that can support students with disabilities in the classroom. Our analysis draws on complexity theory, systems change, and cultural historical activity theory in order to identify key levers for change and transformation that will improve the way we prepare All teachers to teach students with disabilities.

## Teacher Education Systems Change

Systems themselves can be conceptualized as arenas of human activity in which multiple activities converge to produce specific outcomes. Accordingly, families are systems, as are classrooms, schools, and school districts. In each of these systems, individual and collective histories, cultural practices, knowledge production, and psychological needs interact to produce outcomes like academic learning, citizenship, and knowledge of the world as well as others that are particular to contexts, cultural practices, and institutional histories. These are both individual and collective outcomes. In doing this work, culture is embedded, created, transformed and expanded (Artiles, 2014). Classrooms exist in schools which have specific rhythms and patterns that include the grade level organization, school day length, and systems of student and teacher evaluation. These features of the context, among many others, shape the daily activities of teachers, administrators, students, and families. Thus systems themselves are formed and reformed through daily interaction.

Public schools often exist within a local educational unit, which reports outcomes to a state agency which agency, which in turn, is influenced by federal policy and funding streams (Kozleski & Huber, 2010). The complex systems perspective recognizes the potential for local, unique responses to complex social, regulatory, and political influences since inputs at any systems level are responsive to specific contexts. Teacher education can be thought of in much the same way. Licensure requirements at the state level are attempts to establish the foundation for professional teaching practice. While they respond to and are informed by national standards, they are also responsive to local legislation, teacher education programs, research, and local practice.

**Framing the Analysis**

Two ideas undergird the analytical framework in this article. The first is the importance of context in terms of the degree to which systems are able to be reflexive to changes beyond their boundaries while still preserving two hallmarks of effective systems: predictability and sustainability (Cochran-Smith, Gleeson, & Mitchell, 2010). Context is more than the obvious structures, interactions, processes, and outputs of a system on any given day. In complex human systems, historicity, privilege and cultural practices play a major role in determining who has access to levers of change and how that access is granted (Bates, 2013). Systems development needs to account for context, locally, regionally, by political boundaries such as states, and nationally (Fixsen, Blase, & Van Dyke, 2012).

The second idea is that the teacher education system exists in a web of inter-related systems such as the state professional licensure system and P-12 school systems that share boundaries and borders and whose conduct impacts and influences what happens in teacher education. These systems lack coherence and often, aligned outcomes. Part of this misalignment stems from the piecemeal fashion in which teacher education systems develop over time. Some of it emerged from the disparate professional and regulatory groups that sought to influence how

*Figure 1.* Framing the analysis of teacher education systems change.

teachers are prepared and what they are able to do (Darling-Hammond, 2010). What most groups seems to agree on is that improving teacher education must also improve outcomes for students (Cochran-Smith, Gleeson, & Mitchell, 2010). The political will to improve teacher education is also complicated by emerging recognition that the path between what teachers learn and are able to do through their preparation is not solely responsible for what students produce as a result of the daily work of teachers (Darling-Hammond, 2010).

**Context Destabilizes Predictability and Sustainability.** While globalization increasingly standardizes local activities, population centers remain deeply influenced by the regional contexts in which they emerged. Cities vary greatly on socio-economic, political, linguistic, cultural, religious, and ethnic dimensions that are shaped by their geographic, economic, and natural resource histories (Soja, 1996). According to the National Center on Educational Statistics, 38 of the 100 largest school systems in the United States are in the Southeast (14 of these are in Florida). Surprisingly, only four of the largest school systems, including New York City with over a million students, are in the Northeast. Five of the largest school systems, Chicago, Detroit, Milwaukee, Omaha, and Wichita are in the Midwest. The Southwest boasts 21 of the largest school systems, including 19 in Texas. On the Pacific Rim, 14 school districts, including the State of Hawaii, make the list of the 100 largest school systems. Each of these regions of the country has been shaped by particular histories that converge in each school system’s governance, labor markets, economics, strategic planning and bureaucratic models. Moreover, the institutions of higher education who prepare teachers regionally, not only for these systems but for the 13,588 (Digest of Educational Statistics, 2012) school districts across the United States are also products of their regional contexts.

Understanding this contextual complexity helps to clarify why attempts to improve the quality of novice teachers need to account for regional variation in the constellations of culture, economics, and work force traditions such as a reliance on union/management relationships or the focus on a history of professional bureaucracies. Local politics such as the selection and composition of local boards of education, the selection of superintendents, the clout and influence of state departments of education, the involvement of governors in education agendas, the consolidation or sizing of local school districts influence the design of local education systems (Kozleski & Thorius, 2014). Shaped by the culture of a White dominant society, schools and teachers struggle to meet the burgeoning influx of English language learners, racially, ethnically, and culturally diverse learners (Paris & Alim, 2014). Increasingly, cities, suburbs, small towns, and rural areas remain sharply divided by demographics, values, and expectations for their local education systems (Henig, 2014). Disappointing outcomes and multiple demands seep into local and state policy, converging in debate about curriculum, assessment, and performance outcomes. Preparing teachers for each of these contexts is difficult. Indeed, the work of preparing teachers is to make explicit the impact of these diverse contexts on how locality impacts the ways in which schools and school systems operate *and* to continue to prepare teachers using the best information from learning sciences and education.

The relationship between local systems and the regulatory clout of the state education agency (SEA) varies between states (Henig, 2014). While federal education law flows to SEAs, the degree to which SEAs are able to influence local practice and the quality of teacher work force depends on state investments in state regulatory and continuous improvement structures and the design and quality assurance practices surrounding license to practice (Darling-Hammond, 2013). Without state-wide investments in state-wide leadership and personnel, even the most robust policy redesigns will fail widespread implementation. Further, public and private teacher education institutions have their own agendas and perspectives on the design and development of teacher education (Cochran-Smith, McQuillan, Mitchell, Terrell, Barnatt, D’Souza, Jong, Shakman, Lam & Gleeson, 2012). Their success depends on effective convergence between how teachers are developed, the roles they are expected to play, and the content they are expected to deliver. In the absence this convergence, focused on achieving high quality academic and social outcomes for all students in all schools, effective schools and systems will remain in pockets of excellence that tend to serve students who live in high-income areas with families who have attained high levels of education (Henig, 2014). Moreover, national and state policies can be destabilized and weakened by inaccurate, incomplete assumptions about and implementation strategies for local practice (Fixsen, Blase, Metz, & Van Dyke, 2013).

Complexity theory offers a language for understanding the intersections and multilayered effect of competing priorities, active resistance, and discontinuities in systems and resources (Davis & Sumara, 2006). Complexity theory helps to remind us that many complex systems, like education, have developed organically, locally, and historically through policy, practice, and research that are co-dependent and inter-linked but not necessarily *designed* to work together. Thus, teacher education, the politics of local schools and districts, their relationships to the needs of states, accountability in its many forms, and the needs of families and children are complexly interwoven and transcend the capacities of singular units to scale and sustain innovation and change. There is ambiguity in how these elements intersect and interact in spite of policy intended to describe and focus the relationships. Complexity theory accounts for nonlinearity in the relationship between output and input, underscoring the notion that inputs calibrated to prime systems for successful outcomes do not necessarily result in proportional outcomes (Gibson & Knezek, 2010). For instance, federal funding to pay teacher education loans for teachers who take jobs in high poverty schools may not produce sufficient numbers of teachers in urban schools because human capital decisions are influenced by social, material, and institutional capital ([Spillane, 2009](#_ENREF_8)). Conversely, small changes can produce substantial shifts while substantial investments may produce minimal or unnoticeable effects. This is due in part to the idealized notion that education systems are highly calibrated networks that are sensitive to specific inputs and outputs from the external environment ([Spillane, 2009](#_ENREF_8)). Nonlinearity is compounded by the reality that components of the education system, like teacher education, are nested within and buffeted by two bigger systems, the higher education and P-12 systems. Predictable and sustainable change efforts in teacher education must address the contexts in which implementation occurs.

**Interconnected Teacher Education Systems**. In this paper, we conceptualize teacher education systems as interconnected activity arenas that traverse micro, meso, and macro scales ([Kozleski, 2012](#_ENREF_6)). For example, teacher education programs for special and general educators, separate or combined, interact with each other through their students, their coursework, internal curriculum committees, the local school communities that provide practice settings, and through the processes of professional recognition within the university context such as tenure and promotion. Each teacher education program, by itself, might be considered a system. Together, they comprise complementary systems that respond to the internal needs of the organization in which they are nested and to the external pressures of state licensing agencies, professional standards groups, the national discourse, the scholarly community, and funding streams.

Like many systems, teacher education systems are associated with more than one system. An elementary school may be both a system and a member of another system called a school district or local education agency. It may also be part of a teacher education system since preservice teachers may be mentored and coached to practice teach in that setting. The systems are interconnected. A new activity introduced in one system such as particular approach to teaching reading is likely to influence the other systems as well, crossing the boundaries between the systems and, in the process, the activity is reinterpreted, assessed, and may be appropriated. This appropriation process is often not attended to when policy innovations are designed. The new Common Core, designed to increase the likelihood that students across the United States will have expanded opportunities to access the best and most current knowledge in an array of disciplines, is another example how changes intended to impact outcomes in one system will change another, such as teacher education.

A single teacher education program within a particular university or college setting is specific to that context. For instance, the roles that teacher educators play are different in research universities with very high research activity as opposed to the kinds of workloads and roles that teacher educators may play in Master’s colleges and universities where doctoral education plays a smaller role. In the first case, tenure eligible teacher educators carry high expectations for research and, their teaching loads are smaller than those of their colleagues in other kinds of institutions. Tenured faculty may only teach a single course in a preparation program. Shared intellectual commitments to teacher education are balanced by investments of time and effort in the design and development of lines of research that may have little to do with research on or about teacher education. In these contexts, it is predictable that many tenured scholars rarely teach in teacher education programs. Their research interests are often far from the reality of life in the classroom.

In university settings where teacher education is the primary focus of the faculty, faculty may teach four or five courses each semester or nine courses over the academic year in a quarter system. Intensive teaching builds a different kind of culture than an intensive research environment. Professional communities emerge around the daily practice of teacher education. While the state regulatory agency accredits all eligible programs, the programs have distinct flavors and often offer very different teacher education experiences. Policy initiatives designed to change multiple systems of teacher education may gain more traction in one system than in another. The variability in policy influence is due in part to the competing affordances of individual systems (Pugach & Blanton, 2012).

As a result, graduates of one institution are not necessarily like graduates of other institutions or alternative licensure programs (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009). Their human and social capital is linked to the resources, knowledge networks, and human capital of the institutions from which they graduated. They bring knowledge and skills into their practice environment and are transformed again by its properties, dispositions, and use of human and material resources. Envisioning these networked systems of activity helps to contextualize the localized cultures of practice that emerge from individual activity systems. Teacher quality begins with practice-based teacher preparation grounded in current, evidence-based, applied research and continues to improve over the first ten years of practice as teachers engage in ongoing professional development ([Kamman, McCray, Brownell, Ribuffo & Wang, 2014; Darling-Hammond, 2010](#_ENREF_3)). Given the long-term arc of professional growth, any systems change efforts in teacher education require that researchers, teachers and school reformers work together to understand and refine professional development initiatives so that powerful professional development serves to improve the overall performance of teachers as they advance in their careers (Pugach & Blanton, 2014). Further, understanding that multiple kinds of incentives and affordances are needed to transform what is likely an array of nested and complementary teacher education systems is critical to systems change in teacher education.

# Approach to the Literature Review

We conducted a systematic and comprehensive review of the literature on system wide reform within multi-level education systems. Our review sought to identify studies, reports, and articles that evaluated effective methods for implementing and sustaining large-scale teacher education reform. We looked at reform for what teachers learn as well as how they learn it. We also looked at literature that explored the levers for such reform within state and federal policy and implementation. Most importantly, we strove to identify research that could inform the ambitious aims of the CEEDAR Center in its delivery of technical assistance to multiple state education systems. CEEDAR, the Collaboration for Effective Education Development, Accountability, and Reform, is a national technical assistance center, funded by the federal Department of Education, to assist states, IHEs, and LEAs to create aligned, coherent professional learning systems the provided opportunities to learn for teachers and leaders. Its four goals are focused on the following:

**Reform** teaching and leadership preparation programs to embed evidence-based practices.

**Revise licensing standards** to align with reforms in teacher and leader preparation.

**Refine** personnel evaluation systemsin teacher and leader preparation programs.

**Realign** policy structures and professional learning systems**.**

We specifically targeted research that evaluated tools for systemic change such as teacher evaluation. Moreover, we looked for studies that evaluated change over multiple organizational levels that sustained their impact over time. Our initial list of sources came from four prior reviews of the literature. In total, we reviewed 697 publications and selected 127 for review.

## Inclusion Criteria

For the purposes of this paper, we wanted to include rigorous research that was both informative and apropos to CEEDAR professionals in their support of state education systems and institutions of higher education. In our final review we looked at studies as well as research and policy reviews that were (a) written in English, (b) published after 1980, (c) peer reviewed or published by reputable policy centers, and (d) took place in education systems including K-12 education as well as the university level. At first, we conducted a quick screening of the documents for the inclusion criteria by reading the titles, abstracts and keywords. From there, we further curated our reference list by reading the introductions and conclusions in an effort to identify the appropriate elements of our search.

## Study Selection

We developed our search methods in alignment with CEEDAR’s mission and goals. We aimed for our work to prove useful to CEEDAR professionals within the context of their intensive technical assistance work with different states. Therefore, we identified topical studies that demonstrated large-scale reform, proposed dynamic systemic impact and took place within an educational context. We excluded all studies dated before 1980. We omitted many sources due to the limited scope of their reform, such as narrowing their focus to evaluating principals at the school level. In addition, we excluded several sources that studied systems change within a business, social or political context. In this way, we hoped to identify the key research that would best support CEEDAR representatives as they facilitate educational reform in the intensive states. There are three sections included in this literature review: (a) what we know about teacher education systems; (b) levers of substantive change for teacher education; and (c) teacher education systems that work. Each section laces complexity theory, systemic change, and cultural historical activity theory into the analysis of the literature.

# What We Know about Teacher Education Systems

This section explores what we know about teacher education systems and the emerging literature about what constitutes effective teacher preparation programs. Part of this discussion touches on the measurement of effectiveness and its implications for emphasizing some pathways and processes over others. This, in turn, holds implications for the design of policy and its role in shaping the preparation of a teacher workforce prepared to engage the multilingual, multinational, multicultural, multi-abled students of contemporary U.S. society, whose needs, abilities (and disabilities) and capacities can be minoritized by the very services designed to support them (Artiles, 2014).

## Systems for Teacher Preparation

In a number of reports roughly spanning the years 2006 to 2014, the Stanford Center for Opportunity Policy in Education led by Linda Darling-Hammond, a distinguished professor at Stanford University and a leader in the field of teacher education, has described the features of effective teacher preparation programs for 21st century schools. These programs bridge research, evidence based practice and the direct and focused coaching of teacher performance in the classroom (Darling-Hammond, 2010). A number of types of organizations engage in teacher education such as nonprofit organizations, local education agencies (LEAs), and institutions of higher education (IHEs). However, recent figures suggest that between 61% to almost 92% of all teachers in the U.S. still go through a university sponsored preparation program (Kee, 2012; Zeichner, Payne, & Brayko, 2012). In some cases, these programs are billed as alternative tracks to licensure, such as Teach for America, but are managed and operated locally by universities who also use a number of other tracks to licensure and degrees.

Teachers need to come equipped to their first job prepared to learn on a continual basis, not to survive, but to thrive and contribute to the knowledge and evidence-based practice of the field. In this way, teachers themselves are practitioner scholars committed to understanding deeply how to scaffold and support the work of their students. This requires not only the ability to gauge how students understand and solve tasks but also the capacity to interpret their approaches to uncover information or skills that they may not have. And, once learner needs are understood, teachers must be equipped to teach the unfamiliar, forgotten, or never taught skill, content, and/or disposition. The expectation is that programs produce teachers who are “safe to practice,” a term coined by Deborah Ball to mean that teachers who are able to practice effectively across a broad range of students and learning contexts and are likely to add value to what their students know and can do over the course of an academic year ([Ball, 2013](#_ENREF_1)). There is general agreement that what safe to practice means should be consistent between teachers so that the programs that graduate teachers share a set of common standards established generally by the teaching profession, even though teachers may come from different states and have different pathways into teaching. However, teachers report different levels of confidence in their abilities to practice effectively. These differences are linked to the kinds of preparation experiences they have and, particularly, to the practice experiences they have (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009; Kee, 2012).

It is reasonable to assume that the quality of a state’s teaching force should impact the outcomes of student performance by state. Yet, our systems of teacher preparation are still honing in on what the critical components of a preparation program might be. On the 2009 National Assessment of Educational Progress (NAEP), only 33% of U. S. 8th graders scored proficient or above in mathematics (Vanneman, Hamilton, Baldwin Anderson, & Rahman, 2009). The range was from 15% (in Mississippi) to 53% (in Massachusetts). The licensure standards for both states are not dissimilar. In Massachusetts, an initial license is granted to individuals with bachelor’s degrees, who passed content knowledge and pedagogy tests called the Praxis I and II, and successfully completed at least 10 weeks of student teaching. Mississippi offers initial licensure to individuals who complete Praxis I, II, and II (content area), have 12 weeks of student teaching, and have a bachelor’s degree. Some mix of variables produces the differences in student outcomes. Universities in both states participate in the same external accreditation of their teacher education programs, ten in Mississippi and seven in Massachusetts. While a single test should not be a determinant of individual student progress or the determining factor of the success of a state’s system of P-12 education, it is instructive to look at the multiple variables that could affect teacher quality (Darling-Hammond, 2014).

## Systems of Educator Licensing

The Council for the Accreditation of Educator Preparation (CAEP) offers one vehicle for externally validating the quality of educator preparation. CAEP standards were released in August of 2013. CAEP is intended to increase the rigor of external accreditation of teacher education programs. Programs that participate offer evidence of their ability to prepare teachers, using five standards: (a) Content and Pedagogical Knowledge; (b) Clinical Partnerships and Practice; (c) Candidate Quality, Recruitment, and Selectivity; (d) Program Impact; and (e) Provider Quality Assurance and Continuous Improvement. Together these standards form the basis of what the teacher education field considers the elements of effective teacher education.

Programs that prepare educators can voluntarily participate in the CAEP process. This allows expert teacher educators and practitioners, external to the organization under review, to examine existing programs and identify potential areas for improvement, redesign, and development. Use of a standard protocol based on agreed upon standards ideally helps to determine the quality of the program and whether it is able to sustain the production of high quality teachers over time. However, this type of external program evaluation has existed for a number years. This most recent iteration places a heavier emphasis on outcomes of the program rather than processes. Whether there is a difference in teacher quality from institutions that participate in CAEP remains to be seen.

For the purposes of students with disabilities, it is notable that CAEP defines P-12 students “as children or youth attending P-12 schools including, but not limited to, students with *disabilities or exceptionalities*, students who are gifted, and students who represent diversity based on ethnicity, race, socioeconomic status, gender, language, religion, sexual identification, ad/or geographic origin (p. 3, CAEP Standards, 2013).” Ensuring that students with disabilities are part of the general population of students to be taught signals a new understanding of the diversity existing within the nation’s classrooms. It also highlights the importance of teacher preparation that incorporates knowledge building and supported practice in the assessments, designs, and instructional practices that support student learning at different paces, different points of entry, and different coaching scaffolds for mastery.

In addition to the standards that CAEP subscribes to in terms of assuring the quality of teacher preparation, the Council of Chief State School Officers (CCSSO) developed a set of standards for the licensure of teachers that have been adopted by a majority of states. The CCSSO is a non-profit member-based organization that represents public officials who lead departments of elementary and secondary education in the 50 states as well as the District of Columbia, the Department of Defense, and five U.S. extra-state territories. The Interstate New Teacher Assessment and Support Consortium (InTASC) (CCSSO, 2011), offers a set of standards that describes the work of teaching. These standards represent the consensus of a number of expert scholars, researchers, practitioners, and policy makers. They help state and district leaders focus attention on a number of key indicators of effective teaching that produces high quality learning on the part of students.

The 10 InTASC standards focus on learner development, learning differences, learning environments, content knowledge and use, assessment, instructional planning and strategies, professional learning and ethical practice and leadership and collaboration (CCSSO, 2011). Students with disabilities are mentioned eight times in the teaching standards, including within a preamble on personalized learning for diverse students as well as in standards that address learning differences, assessment, and professional learning. The ten CCSSO standards form the four elements of effective practice: knowledge of the learner and learning; content knowledge, instructional practice, and professional responsibility. These elements align with those of the Council for Exceptional Children: (a) learner and learning; (b) content knowledge and professional foundations; (c) instructional pedagogy; and (c) professionalism and collaboration.

These sets of standards are represented in Figure 2, which shows the similarity in the CEC and InTASC standards. CEC establishes standards for special educators while the InTASC standards set benchmarks for all teachers. In both cases, teacher practice is encapsulated in four major arenas: (1) knowledge about learning and learners; (2) content knowledge; (3) skilled practice in instruction; and (4) knowledge and responsibility for the teaching profession. In addition to what teachers know and are able to do, the CAEP standards also recognize the role of the organization that prepares teachers in terms of recruitment and the impact of teacher education on P-12 students. As well, CAEP focuses on the way that programs both ensure consistent quality and engage in continuous improvement of the process of teacher education.

*Figure 2.* Professional teacher education standards.

Standards by themselves are inadequate to govern the complex behaviors of organizations, like those that offer teacher education. Nor can standards of professional practice ensure that practitioners are able to perform all aspects of their practice fluently across a broad variety of P-12 students. Without systems of assessment that are focused on performance, linked to local personnel evaluation systems designed to assess professional practice and support structures that offer ongoing professional learning, turning out a reliably strong work force will remain elusive (Darling-Hammond, 2012). Further, professional organizations produced these standards, not government entities. Since state governments have responsibility for establishing and maintaining educational opportunities for their populations, they have the responsibility to license individuals to teach. While they may be influenced by the standards of the professional organizations, each state sets its standards according to the needs of its local school districts, the political and social climate within the state, and the degree to which there is effective collaboration among various stakeholder groups such as families, local school districts, local professional organizations, and policy makers.

Systems of teacher preparation are coordinated efforts. Teacher preparation programs attract prospective teachers to programs of study, select students from among a set of applicants, and provide a set of learning experiences that include knowledge building, practice, and assessment of competence or fitness to teach. The institution that educates the teacher makes the initial determination of readiness to teach as the student exits the program and receives a degree or credential that indicates successful completion of all program components. Often, in a reciprocal arrangement between the state and the institution, the graduating institution recommends graduates for licensure to the state-licensing bureau, based on successful graduation. The state recognizes graduates as successful completers and confers the license or credential to teach. Upon receipt of the license, the new teacher is now presumed to be fit to teach by employers. Grossman and Loeb (2008) call these “college recommending” programs as opposed to “early entry” programs. The latter are programs where entrants learn to teach on-the-job with varying degrees of support while teaching and knowledge building outside the classroom.

Ideally, the standards for what teachers need to know and be able to do match the context and needs of schools and local school districts. But standards are also a way of highlighting changes that need to happen in practice. Certainly, the InTASC standards, reached by consensus among many of the states and territories, represent generically the teacher competency needs of states and the approximately 100,000 local districts that comprise the nation’s public school system. Yet, licensing systems have a number of competing tensions built into them. Universities and other teacher education organizations need students to fill their programs to afford their permanent employees. States need to be able to license enough teachers to fill the vacant positions in schools throughout their political boundaries. Local districts need teachers who are equipped to their families, connect with their communities, and build on the local funds of knowledge that exist within communities but may not be represented or accessed in the dominant culture curriculum (Gonzales, Moll, & Amanti, 2005). Standards are translated, appropriated, streamlined, and recalibrated as they travel across systems and levels.

As well, political and economic realities influence implementation. Accreditation organizations like CAEP depend on their memberships to survive and perform the necessary accreditation activities. Economics certainly play a role in who chooses to teach, how the process of becoming a professional educator is funded, and how systems of monitoring and quality assurance are conducted. Investments in systems of teacher education need to account for the ways in which these interlocking mechanisms operate and the degree to which conflicts of interest are minimized and opportunities for increasing effectiveness are optimized.

# Levers of Substantive Change

Substantive change can be defined as change that sustains over time, occurs over multiple nested systems, and scales up across political boundaries such as local school districts, states, and regions of the country (Klingner, Boardman, & McMaster, 2013; Kozleski, Gibson, & Hynds, 2012). When enacted, substantive change resists efforts to restore a system to a previous state and will not revert, unless purposeful effort is undertaken. Fragile systems change, on the other hand, depends on custodial efforts like the influx of external funding and extensive technical assistance to nurture and sustain it over time. This kind of systems change is fragile because it does not sustain without extra-ordinary supports. Those supports exist as long as political will is there to sustain it. When congressional politics defund some projects and reduce educational investments, systems change that has not become embedded in local practice and policy will not survive (Fixsen, Nanoom, Blase, Friedman, & Wallace, 2005). Re-forming the teacher education systemto put 21st century learning and organizational change tools in the hands of practitioners will require focused state and local effort on substantive change. Investments in teacher education alone assume that the educational system would be fine, if only the workforce system would be improved. In this section, we argue that changing teacher education through better and more rigorous accreditation and more practice embedded preservice education will not produce the needed effects without attending to substantive change in the practice system.

In the education realm, a number of successful efforts have resulted in substantive change. The advent of public school systems funded through local tax dollars has served an important purpose in ensuring that communities across the country have had access to formal education. Indeed, by the latter part of the 20th century, graduation from high school became the normative expectation (even as we continue to work towards 100% success in graduating all students). In addition, throughout the era of expanding public schools, a cheaply funded teacher workforce was expanded by attracting young women who had an otherwise limited number of entry points into the workforce. Today, about 87% of the teacher workforce is female (Kozleski, Artiles, McCray & Lacy, 2014).

On the other hand, policy that focuses on outputs without ensuring that the fundamental building blocks are in place to respond to the policy imperatives results in resistance, local effort focused on gaming the system to produce results, and cynical front line workers (Ball & Olmedo, 2012). For instance, beginning with Brown v. Board of Education and persisting through the Elementary and Secondary Act of 1964, P.L. 94-142, the Education for All Handicapped Children Act and its subsequent reauthorizations, the Individuals with Disabilities Education Act, have had uneven impact, arguably because of unintended consequences. City schools are more segregated now than they were in the pre-Brown era (Orfield & Frankenberg, 2014), almost 40% of students with disabilities continue to be educated outside general education classrooms and schools (Kurth, Knackstedt, & Kozleski, 2014), and disproportionate numbers of culturally and linguistically diverse students continue to be over identified for special education (Artiles, Kozleski, Trent, Osher, & Ortiz, 2010). Attempts to rectify or reform such systemic ills as evidenced by a number of federally funded efforts at comprehensive school reform have met with mixed success (Aladjem et al, 2006). Even the massive investments in the No Child Left Behind Act, including technical assistance centers designed to help states implement its many provisions, have had spotty effects on improving outcomes for students (OECD, 2013). The above reform efforts have failed due to an environment that focuses on performance outcomes rather than transformative shifts in practice designed to achieve better, collective outcomes. Substantive change in the outcomes of our teacher workforce system cannot be advanced without changing the context in which practice occurs. The following levers are critical to substantive progress in outcomes.

In the education realm, a number of successful efforts have resulted in substantive change. The advent of public school systems that systematically expanded over time as population needs grew is one such example. Funded through local tax dollars, the public school system in the United States has served an important purpose in ensuring that communities across the country have had access to formal education, most often mandated through age 16. By the latter part of the 20th century, graduation from high school became the normative expectation (even as we continue to work towards 100% success in graduating all students). An ever-expanding population of young people went on to college, fueled initially by the GI bill that funded the college educations of many veterans of World War II. Throughout the era of expanding public schools, a cheaply funded teacher workforce was expanded by attracting young women who had an otherwise limited number of entry points into the workforce. Today, about 87% of the teacher workforce is female (Kozleski, Artiles, McCray & Lacy, 2014).

On the other hand, efforts to drive substantive equity changes met with uneven success. Beginning with Brown v. Board of Education and persisting through the Elementary and Secondary Act of 1964, P.L. 94-142, the Education for All Handicapped Children Act and its subsequent reauthorizations, culminating most recently in the 2004 version, the Individuals with Disabilities Education Act, these policies have had uneven impact, arguably because of unintended consequences. As Orfield and Frankenberg pointed out in 2014, our city schools are more segregated now than they were in the pre-Brown era. And, while over 6 million children with disabilities are now served in public schools, almost 40% continue to be educated outside general education classrooms and schools (Kurth, Knackstedt & Kozleski, 2014). A number of students within the special education population may be inaccurately identified. Disproportionate identification of children from linguistically and culturally diverse backgrounds with disabilities continues to occur at unacceptable levels (Artiles, Kozleski, Trent, Osher, & Ortiz, 2010). A number of federally funded efforts at comprehensive school reform have met with mixed success (Aladjem et al, 2006). Even the massive investments in the No Child Left Behind Act, including technical assistance centers designed to help states implement its many provisions, have had spotty effects on improving outcomes for students (OECD, 2013).

In comparisons with other developed nations, the U.S. remains in the middle of the pack in terms of student learning outcomes in reading and mathematics. Policy that focuses on outputs without ensuring that the fundamental building blocks are in place to respond to the policy imperatives results in resistance, local effort focused on gaming the system to produce results, and cynical front line workers (Ball & Olmedo, 2012). In such an environment, individuals and systems focus on performativity rather than transformative shifts in practice designed to achieve better, collective outcomes. Substantive change in the outcomes of our teacher workforce system cannot be advanced without changing the context in which practice occurs. The following levers are critical to substantive progress in outcomes for all students.

## Design to Improve ALL Student Learning

In this section, several levers of systems change are identified that would have direct and substantial effect on the preparation of teachers to work with a diverse range of student needs. Each of these levers address policy at the local, meso, and macro levels. It is the combination of these levers in the complex education system that offer opportunity for sustained and scaled change in student outcomes. These levers include investing in the continued professionalization of the education field, including ensuring that standards for entering, preparing, and becoming licensed to practice are rigorous, empirically measured, and continuously upgraded based on emerging research. Professionalizing the occupation requires paying teachers a professional wage, comparable to other professions, and creating a career ladder that respects continued attention to professional growth. Professional teachers must practice in professional contexts that are well equipped and offer access to materials archived in national libraries and data repositories.

Current research should inform the design of schooling practices to acknowledge and address the diverse demography of our student populations. Moreover, education policy should require schools and school districts to assess and report what is taught. Setting standards and assessments based on a generic view of what should be taught does not allow schools and school districts to do the development work needed to improve based on what they currently produce. Professionals need complete data to change practice in substantive ways. Local schools and districts do not have the capacity to design, develop and implement their own data systems. We need a data infrastructure that is flexible enough to measure outputs in a number of ways. In this section, we make a case that rewarding excellence in teacher preparation must go beyond the contemporary self-study method of accreditation. Programs differentiate based on the teachers they produce. Let us make that explicit through the way that we assess. Finally, we live in a time of constant knowledge generation and mobilization. Teacher education needs to prepare educators who are teaching for a future of increasing diversity and a demand for curating information. In this section, we explore these policy levers and the data that support their implementation.

## Invest in professional teachers. As teaching becomes an increasingly complex and multifaceted profession with an increasingly knowledge-rich curriculum, burgeoning diversity in the student population, and an emphasis on accountability for investment, it requires highly skilled professionals. Yet, teachers’ salaries remain substantially lower than many other career options. The Economic Policy Institute found that public school teachers earned about 12% less per week than comparable fields in 2010 (Allegretto, Corcoran, & Mishel, L., 2011). The average starting pay of a teacher in the United States is about $35,672 for a nine-month salary, about $47, 565 on an annual, 12-month salary (NEA Collective Bargaining, 2012). The average annual starting salary of a commissioned officer in the military, someone with a bachelor’s degree and preparation for the profession, is about $46,000 per year for a 12-month salary (Powers, 2012), including housing and basic subsistence stipends. In additional all health care is free. In 10 years, the teacher will make about $52,000 for 9 months of work, the officer about $94, 000 plus continued access to free health care. A lawyer starts, on average, at about $63,000 with three years of graduate school and passage of the state bar exam (NALP, 2013). With a bachelor’s degree in engineering, the starting salary is about $62,000 while computer science graduates can expect about $58,000 (Adams, 2013). Only Humanities and Social Science undergraduate degrees are worth less on the job market than teaching degrees.

Salaries are an important driver of increasing the quality of the teacher workforce. They help increase the number of applicants who want to enter the profession. And, they help to keep teachers even as they struggle through the notoriously difficult first years of the profession (Clotfelder, Glennie, Ladd, & Vigdor, 2006). In Singapore, one of the countries ranked in the top 3 on the PISA comparison, teachers report that three things keep them in the profession at an astonishingly low attrition rate of three percent, half of what the U.S. experiences. The first is compensation indexed against other professions to offer generous salaries, the second is a range of professional and career development opportunities, and the third is a strong sense of mission and positive culture in their workplace (Darling-Hammond, 2013).

However, funding alone, through teachers’ salaries and overall investments in public education does not correlate perfectly with the best performance on assessments like NAEP. For instance, Colorado ranks nears the bottom in terms of spending per student but produces better than average student performance on the NAEP. Salaries remain a substantive lever of systemic change but are not likely alone to sustain substantive improvements in school outcomes. Pay that is competitive with other, valued professions and career ladders that offer pathways to increasing responsibilities and leadership are essential levers for substantive improvement in educational outcomes. Investments in this area have implications for the caliber of entrants to the field and hold promise for reducing attrition rates. Yet, we have work to do to ensure that salaries reflect the differential impact that teachers have on their students’ performance and future career success (Hanuschek, 2010).

## Equip ALL practice contexts. The very best teachers cannot employ their full range of skills and knowledge in schools where inadequate, inappropriate, and outdated curricular materials and lack of technologies for learning exist (Darling-Hammond, 2014). Schools must be safe, physically and socially, to build on intellectual and professional capital (Cornell & Mayer, 2010). Students and teachers should learn and teach in schools where heat, air conditioning, water, functioning lavatories, and high speed internet access are accessible in every school. These are fundamental to effective work environments. For example, one of the great engines of economic development in the southern tier of states was the advent of air conditioning that made it possible for centers of business enterprise to flourish (Arsenault, 1984). Yet, in the Mississippi Delta in 2014, there are entire school systems without air conditioning in their classrooms, as there are in many other communities and states throughout the nation. Imagine a group of 30 children in 90 degree Fahrenheit temperatures and humidity indexes focusing on the learning the simple algorithms of multiplication and division. Think of the same lesson being taught in Fort Leavenworth Public Schools in temperature controlled buildings, insulated from the sweltering temperatures outside. The lesson becomes a heroic effort for the teacher in one setting; in the other, work that can be sustained without draining cognitive load to attend to physical comfort.

Measuring learning outputs of schools that lack fundamental resources makes little sense, yet our current system demands it. The result is a school that fails, not the infrastructure and policies that failed to ensure that sufficient materials resources were provided. Evaluation and accountability do not fix a failing system; they could draw attention and ideally, resources to improve it. However, we know too well that urban and rural schools are under resourced in a number of material ways. As well, they are often staffed with novice teachers who lack the experience that seems to predict more proficient teaching and better outcomes for students (Hanuschek, 2010).

Teachers need the same kinds of sensitive and accurately tuned evidence-base systems that are standard issue in other professions that do precision work (Ball & Forzani, 2009). Individualized teaching and learning opportunities require highly sensitive tools that provide just-in-time information, based on evidence from the classroom, to adjust the demands and feedback levels in lessons. The conditions for teaching effectively include reliable student performance data dashboards that help teachers calibrate what they teach and how they teach it based on the needs of the students in their classes. In this article we argue that holding teachers, administrators, and central office administrators accountable for learning outcomes without ensuring that the basic conditions are met, makes little or no sense. We need a national school accreditation system that assesses schools on these fundamental necessities for learning. Such a system would reward states, local school agencies, and schools that meet a “fit for use" standard. Such as providing such schools with the opportunity for partnership with local teacher education programs as professional learning schools.

## Design schools with multiple tiers of student support. The adoption of the public health model for supporting healthy communities and applying it to schools opened many opportunities in the design of schools because it changed altered their approach to towards behavior management from being reactive to proactive and, consequently, opened many opportunities in the design of schools. In the early 1990s, a team of researchers was struggling to reduce the effort that educators spent on managing behaviors and reallocate that effort to academic learning. When schools took a reactive approach to manage and suppress poor behavior, it required the concentrated effort and time of educators and administrators, pulling them away from their core work in teaching content and tools for learning such as reading. The public health model offered a way to conceptualize that problem (Stein, Hoagwood, & Cohn, 2003). This model suggested that 85% of a healthy system would focus on healthy life choices and preventative maintenance without explicit and express intervention efforts (Walker, Horner, Sugai, Bullis, Sprague, Bricker, & Kaufman, 1996). If preventative routines and resources were available and widely accessible, only about 10% of the population would need some sort of persistent and more intense support. And, only about 5% of effort would be spent on critical and life-threatening issues. When schools took a reactive approach to manage and suppress poor behavior, it If school leaders thought about classrooms and the school as a whole as trying to reach a healthy stasis, the ratio of disease and public emergency would be low and the health of the system to monitor and adjust itself was high. Every effort to manage and suppress poor behavior required the concentrated effort and time of educators and administrators, pulling them away from their core work in teaching content and tools for learning such as reading. If school leaders applied the public health model and thought about classrooms and the school as a whole as trying to reach a healthy stasis, the ratio of disease and public emergency would be low and the health of the system to monitor and adjust itself was high. In other words, when behavior issues were infrequent, teachers could spend time and effort on instructional design and delivery. The public health model suggested that 85% of a healthy system would focus on healthy life choices and preventative maintenance without explicit and express intervention efforts (Walker, Horner, Sugai, Bullis, Sprague, Bricker, & Kaufman, 1996). If preventative routines and resources were available and widely accessible, only about 10% of the population would need some sort of persistent and more intense support. And, only about 5% of effort would be spent on critical and life-threatening issues. If schools operated adopted this preventative approach to behavior management, only 5% of school effort would be spent on crisis. These measures would make behavior issues less frequent and teachers could spend time and effort on instructional design and delivery.

A preventative approach meant that effort, time, and resources currently expended to control and apprehend complex behaviors would be redirected. Applying the public health model to schools meant creating an instructional stream for students to learn to manage their own emotions as well as learn to work and play with their peers in classrooms. Making sure that students would learn and use these skills would take effort, persistence, alignment, and feedback to continue to improve. Schools began to do this work. The approach, called positive behavior supports (PBS), gained momentum through ongoing research and model demonstration funding. Success was measured by the amount of effort and time spent on the three tiers of support. The data were impressive. A review of the literature found that positive behavior supports successfully reduced the number of impeding behaviors by 80% in two-thirds of the behavioral outcomes (Carr, Horner, Turnbull, Marqui, McLaughlin, McAtee, Smith, Ryan, Ruef, Doolabh, & Braddock, 1999).

PBS was more effective when accompanied by substantial involvement of families and communities in setting the norms for behavior in schools (Dunlap, Kincaid, & Jackson, 2013). Additionally, students responded to a greater extent when a significant individual from their life, such as a teacher or parent, carries out PBS (Carr et la, 1999). Lessons learned from this research demonstrated that PBS proved most effective when all school-based stakeholders understand the tenets and practice of PBS, commit to the work of implementation, and engage in continuous improvement of the processes, directed by local data outcomes. This required a commitment to ongoing professional development, flexibility for program intensity based on school context and a willingness to engage with the greater community (Turnbull, Edmonson, Griggs, Wickham, Sailor, Freeman, Guess, Lassen, McCart, Park, Riffel, Turnbull, & Warren, 2002).

More recently, this same, tiered approach to school change with effort invested in ensuring success of 85% of a school’s student body in universally applied approaches to learning academic content (Cusamano, Algozzine, & Algozzine, 2014). Called response to intervention, the tiered approach called for the use of an array of effective, research-based learning processes to be implemented in every classroom. Predictably, any classroom at the elementary, middle, and secondary level would have a range of learners. Students might be English language learners, have a range of learning abilities, bring experiences and practices from their own families and life histories, and have a range of familiarity with the codes and expectations for learning in U.S. schools and classrooms. As mentioned earlier, across the U.S. there is also a wide range of expectations and practices within schools. Planning for student diversity at the universal access tier, general education classrooms would be geared towards the design and development of access points to the curriculum, offer a number of options for feedback and relearning, and use curriculum-based learning assessments to help teachers gauge the amount and intensity of instruction for individuals and groups of students.

When this approach at the universal tier does not meet a student’s needs for more intensive instruction, there are second and third tiers of instructional intervention as exist for students with behavioral needs. What is critical in this model is that school outcomes should measure the degree to which each tier of instruction meets the needs of the 85/10/5 split across students. Redesign and improvement of curriculum, teaching skills, and assessment is gauged against the degree to which a school is able to continue its successful implementation of the public health model. What these tiered models require is change in how all teachers conceptualize and implement their professional practices. Meeting the needs of students requires that teachers at the universal tier of behavior and academic learning are able to design learning environments for a diverse range of learners and manage the instructional load through distributed learning techniques. This requires significant change in how the general and special educator workforces are prepared and develop their individual and collective professional identities, and everyday work practices.

## Assess what is taught. Teacher education policy levers typically focus on recruiting talented teachers or developing new methods for teacher evaluation (Ball & Forzani, 2011). Policy makers typically fail to account for the non-linearity between what is being taught, what is learned, and teacher assessment. As a result, understanding the developmental trajectory that creates a high quality teacher (and for whom and under what conditions) remains poorly conceptualized and understood. Historically, the teaching profession lacks a set of uniform and measurable standards unlike other professional fields such as doctors, airline pilots, plumbers or hair stylists (Darling-Hammond, 2010). In these fields, licensure is contingent upon the successful mastery of a set of skill-specific professional standards (Ball, 2014). Conversely, teacher standards broadly focus on the process of teaching rather than on the specific skills required to teach in different content areas. Without a common core of teacher standards and evaluation aligned with those standards, extensive variance in teacher ability will persist.

Institutions of higher education, policy makers and school leaders share the responsibility of ensuring that all teachers have the capacity to be effective educators. With the adoption of the Common Core State Standards, the time is ripe to correct these missteps of the past ([Ball, 2014](#_ENREF_2)). Since state assessments and student performance will be tied to these standards, the profession can begin to identify what Ball and her colleagues call, “high leverage practices to teach high leverage content (Ball et al., 2011, p. 21).” By this they mean frequent teacher practices that are crucial to student learning combined with the content knowledge integral to grade-level standards. From here, a common core of teacher standards can be developed along with aligned accountability measures. Making sure that a tight relationship exists between what is being taught and what is measured is the only way to ensure that all teachers are of the necessary caliber to teach. Only then, can a robust system of connecting teacher development to impact on student learning be developed and used effectively.

## Invest in big data infrastructure. In 2013, the Council for the Accreditation of Teacher Preparation Commission (CAEP) presented their recommendations to the Board of Directors (CAEP Accreditation Standards, 2013). In their report, they asserted that teacher preparation programs should develop data collection systems that measure their graduates’ influence on P-12 student achievement. Multiple means of measurement are proposed such as state-supported P-12 impact measures, validated observation instruments, student surveys, and employer surveys to name a few. In turn, like any effective organization, the data will be used to continuously revise and improve program implementation. Furthermore, the outcomes of these data would serve as the basis for accreditation and be made available for public consumption. If implemented successfully, these recommendations have the potential to develop a greater tie between teacher preparation program quality, teacher quality and student learning.

The kind of sophistication required to link students’ assessment data to the teachers that taught them is beyond the kind of investment that local schools, districts, and universities can make individually (Noell, Brownell, Buzick, & Jones, 2014). It is often beyond the capacity of states. While these models should come from work within states, the protocols for these systems need to be built in a way that is both scalable and available for use on handheld mobile devices that teachers are likely to have access to. Building the specifications for these systems with teachers who understand how to use data to inform their teaching will be critical. Too much effort and financial resources are being expended on local solutions, few of which will exist in 10 years. Instead, we propose a refocus on building a few of these systems well and then, assessing them in a variety of settings to build their flexibility across multiple forms of formal education.

## Reward effective personnel preparation. Not every teacher education program produces graduates that are well-prepared to work in schools, even when their programs are accredited by their state departments or national accrediting organizations (Darling-Hammond, 2010). Practitioners report that some programs produce teachers who are able to teach effectively in their first few years of teaching; others do not (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008). Data from their first years of teaching show that some teachers from some programs produce learning trajectories for their classes that track and even exceed their students’ learning trajectories in previous years (Boyd, Lankford, Loeb, Rocoff, & Wyckoff, 2007). They produce these outcomes, even as they continue to increase the number of strategies they are able to draw on with students, manage classroom behavior with increasing fluidity, and grow their ability to plan ahead and provide feedback more efficiently and completely. Some of the studies that compare and contrast novice and expert teachers show that the cognitive load and effort made by beginning teachers shifts from immediate, emergency, and triage decision making to a focus on longer-term, more complex, decision trees focused on identifying and using learning prompts and strategies to promote effective learning outcomes for their students (Putnam & Borko, 2000). Until teacher education programs are recognized and credentialed differentially, based on what kinds of impact their teachers (as a whole) have on learning, it is likely that all of teacher education will be seen as inadequate for the job of preparing the best possible teachers for contemporary classrooms.

## Educate with diversity in mind. Teacher preparation programs must prepare teachers to work with the full range of students they will encounter in their classrooms. While on the surface, dual certification programs seem to move towards a greater capacity for culturally responsive teaching, they often take an additive approach to diversity, so that multiple and intersecting forms of diversity become an additional workload as opposed to being integral to teaching practice (Pugach & Blanton, 2012). Even when broadening the notion of diversity beyond ability, courses and instructors commonly spend greater time and focus on dis/ability rather than other identity markers such as race, language gender, sexuality, or class. Moreover, dis/ability is rarely couched in terms of its intersection with race and ethnicity and the marginalization of certain minority groups within special education. Without a greater understanding of the role that power and privilege play within the education system, the most skilled teachers will run the risk of perpetuating inequity and exclusivity in their classroom. Pugach et al. deem these dual certification programs as “transitional rather than transformational (p. 265).” Change agents must develop systems that can transform teacher preparation in order to prepare teachers for broad spectrum of students they are bound to encounter.

Engineering change around diversity represents a particular challenge in that systems change itself is an exercise in cultural activity (Kozleski & Huber, 2012). In order to support greater cultural responsiveness, substantive change must begin with a critical analysis of current practices to evaluate the extent they privilege certain groups over others and perpetuate an invisible status quo (Kozleski, Thorius & Smith, 2014). Through a process of understanding and reflection, participants can identify elements of the system that are resistant to change or too weak to sustain it (Kozleski & Smith, 2008). Transformational change for greater cultural responsiveness in teacher preparation will require this type of critical analysis at all levels including state departments, institutions of higher education and local school districts. Highly skilled teachers of the future must have the capacity to teach in increasingly diverse and complex classrooms. The system cannot be inclusive and simultaneously bifurcate the teaching profession so that only some teachers can work with particular groups of students.

## Summary

In this section on the levers of substantive change, we made eight recommendations for improving teacher quality, based on a review of the research literature (see Figure 3). To institute these kinds of large-scale teacher education reform initiatives, we need to identify the kinds of capacity building that need to occur to install and sustain these innovations.

*Figure 3.* Levers of substantive change.

# Systems that Work

Planning for scaling up from the beginning means involving people in multiple systems with a shared understanding of outcomes, methods for achieving those outcomes, measures of program monitoring that demonstrate both fidelity and sustainability across people and changes in leadership, and a process of data-based continuous improvement ([Klingner et al, 2013](#_ENREF_5)). Fixsen, Naoom, Blase, Friedman, and Wallace (2005) conducted an extensive literature review of implementation research. Their monograph distills much of what is known about the pathways to implementation that is scaleable across micro, meso, and macro levels. Here we draw on their work as well as that of a number of researchers and scholars who have attended to how systems adopt and change with and without coordinated efforts to do so.

We apply this work in particular to the design and transformation of teacher education being mindful that improved, and even transformed, teacher education alone is insufficient to change the outcomes of our national education P-12 or P-16 system. We are conscious of the number of levers for systems change that must be in play. Further, we understand that the participants in this systemic, coordinated, complex process must be deeply committed to ensuring that all four elements of systems change are fully engaged: (1) exploration; (2) installation; (3) initial implementation and (4) full implementation (Blase & Fixsen, 2013). At issue for teacher education is where does this work initiate and how does it radiate to all the contiguous, but not necessarily nested, systems.

## Adopting Implementation Science

The quality implementation framework tool ([Meyers, 2012](#_ENREF_7)) outlines three phases of implementation: (a) synthesis and translation system; (b) the support system; and (c) the delivery system. Articles, like this one, that synthesize the literature and translate it into specific elements for implementation as well as briefs, tools to guide implementation, process guidelines, and web-based dissemination efforts build the capacity of people within systems to claim and use knowledge to examine their own practice and identify needs for change. This is the work of synthesis and translation. The intent is to influence and mobilize knowledge that defines the scale, complexity, and potential consequences of making shifts in the system.

In contrast, the support system is designed to offer technical assistance, tools to benchmark progress, coaching, and feedback to systems that commit to change. The support system arena builds the capacity of systems to strengthen their interconnections, install new processes, and develop the systematic feedback loops they need to implement change consistently over time. Finally, delivery systems with the organizational structures, human capital, and clearly communicated and shared goals have the capacity to scale their work, move it across systems, and share the results and ongoing improvements being made (Aladjem, LeFloch, Zhang, Kurki, Boyle, Taylor, Herrmann, Uekawa, Thomsen, Fashola, 2006; Kozleski, Gibson & Hynds, 2011). Any innovation needs to be well defined and have specific implementation standards. Monitoring and assessing the implementation process is critical. Documentation of adjustments to implementation is essential for systems learning to occur.

All three arenas that support teacher education, the LEAs that host practice sites, the teacher education programs that design and implement the teacher preparation experience, and the SEAs that invest in support systems to ensure a high quality teaching workforce, operate at several levels: leadership for policy development and implementation, communities of practice that enact the mission of the system, and the individuals who participate in both. Everyone brings their own set of experiences, histories, cultures, expectations, and missions to the work. These perspectives add richness to the work and the challenges of moving forward. They are also one dimension of complexity. Innovation and innovation diffusion is predicated on understanding this political and cultural dimension of change (Weber & Rohracher, 2012). Within systems at the micro, meso, and macro levels, clear mapping of the power distribution within the organization; the current rate of change of organizational innovation (continuous versus occasional); the predicted mental, informational, and emotional workload on individuals; and the potential meaning of human resistance need to be discussed, planned for, and addressed as part of the change process (Kozleski & Artiles, in press). While this kind of mapping is context specific inquiry, the mapping tools can be transportable across state contexts. It is important to consider as well that the boundaries between these levels and between the systems and external constituencies and contexts are highly permeable. All three implementation phases (synthesis and translation, support, and delivery) need tools to drive the process in the three teacher education arenas: LEAs, teacher education programs, and SEAs.

## Synthesis and Translation

Implementation leaders consist of professionals and the people that they serve. Powerful systems work occurs when multiple perspectives are voiced and have the power to influence decision-making. In education systems, teachers, families and students are often left out of systems change efforts, but their voices and perspectives are key to the work since they both experience and benefit from the design and delivery of education (Lefstein & Perath, 2014). This mix of professionals and stakeholders is vital since the discourse between them disrupts prevailing practice and dialogue. When professional communities keep conversations within their boundaries, they build systems that satisfy their own vision and co-constructed identities without input from the users (Weber & Rohracher, 2012). There is value in designing systems that include multiple inputs at multiple intervals that account for the needs and aspirations of professional, community (including families), and business stakeholders. These constituencies foreground different kinds of interests.

The support system, the second of the three phases of implementation, needs to be built at three levels within states. The state education agency (SEA), teacher education programs, and local education agencies (LEAs) all have a stake in the quality of teachers as do local communities, families and individuals. Since teachers are highly likely to teach where they grew up, the focus on improving teacher education outcomes nationally must take into account the need to build capacity within states so that districts (who produce the graduates who go to teaching careers and hire them as they graduate), the teacher education institutions, and the state education agency will benefit from increasing their collective capacity to ensure quantity, quality, and retention. In the next section, we focus on building capacities at the three levels.

*Figure 4.* SEA leadership for effective teacher education.

## Build Capacity at the SEA

Understanding work that can be accomplished at the SEA level to assist improving the quality of teacher impact on students is critical. The work is three-fold: (a) work with the organizations that produce teachers to assess the impact of their teachers’ practice on student outcomes; (b) work with schools (and LEAs) to ensure that new teachers have the structures and opportunities to implement effective practice in their classrooms and with their colleagues; and (c) create a system to measure the impact of teachers in the field. Because of the number of complex, intervening variables that make value added measures of teacher outcomes suspect, state measures of education program outcomes must rely on multiple measures of success. These measures of teacher effectiveness should include (a) evidence of growth in student learning and competency in teacher education programs and (b) evidence of instructional quality (Hanuschek & Rivkin, 2010). Teacher effectiveness data should be linked to programs *and* to the school systems where teachers practice.

The State Implementation and Scaling-up of Evidence Practice (SISEP) center suggests the use of an implementation framework to help systems reach their change goals. Systems need to build human competencies throughout their system. They do this by focusing on how new members are selected, how they are educated, coached, and assessed. From a cultural historical perspective, this addresses how the community of practice within the SEA is designed, enriched, and expanded. Organizational drivers, from a technical perspective, deal with the design and use of data-based decision systems, the ways in which the administrative support structure facilitates growth and change in the organization, and how systemic analytics inform where and how change and improvement is focused. Leadership is key to this work, both technical (making sure systems are working effectively) and adaptive (the capacity to be reflexive as contexts shift). Employing all three levers, nurturing an effective, systems thinking community of practice, oiling the administrative infrastructure so that it works smoothly in the background, and leading through both technical and adaptive approaches, will enable SEAs to provide the kind of external leadership they need to enhance the quality of teachers and teaching in their states (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005).

Capacity building at the SEA level also must move the work of SEAs from compliance and monitoring to support structures that serve as bridge builders between the three legs of teacher education reform: (1) teacher education institutions focused on providing the practice-based, robust instructional practices that link how teachers design and deliver instruction to deep knowledge of the disciplines that they teach (Ball & Forzani, 2009); (2) local LEAs whose practices and experiences inspire future teachers and support the development of professional communities of practice (Darling-Hammond, 2012); and (3) the SEA that creates and supports policies that enable these partnerships to flourish.

Pugach and Blanton (2009) remind us that the Office of Special Education Programs (OSEP) invested several times in supporting general education program redesign to prepare general educators to work with students with disabilities. They also suggest that a strong, evidence based research program, focused on five dimensions, could help the field build deeper understanding of and success in program redesign. These five dimensions identify important aspects of teacher education program design: (a) curricular coherence, (b) faculty collaboration; (c) depth of knowledge; (d) performance/portfolio assessments; and (e) PK-12 partnerships (Pugach & Blanton, 2009). These kinds of frameworks might be useful as SEAs help build the capacity within states to forge more robust teacher education to prepare all educators to teach students with disabilities.

## Build Capacity in Teacher Education Institutions

For the most part, the professional standards that address teacher education (e.g., CAEP) and specific professional branches of teacher education (e.g., special education) leave the design and development of curriculum and assessment up to individual programs. Programs vary in size in terms of the number of fulltime program faculty whose professional work and scholarship engage teacher education as a primary feature of their academic lives. In large, public universities, teacher education faculty, both special and general education, can be sizable with as many as 40 or 50 tenure line faculty. The collective resources of such faculty give life to

programs that are designed in house by the faculty, instructors, graduate students, and external partners. This kind of program development effort is difficult to match in small schools and colleges where a single special education faculty member may represent the field. Yet, the state’s needs, the location of different programs, the needs and interests of people who want teaching credentials and other state-specific contexts mean that programs have different capacities and resources. Building capacity in teacher education institutions may also mean building capacity *across* teacher education programs.

Recent investments such as those by the Office of Special Education Programs have created a set of online learning modules that can be adopted by teacher education programs as part of the learning experiences that are offered students. The IRIS project has worked with respected special education researchers and practitioners to design and build modules that are widely used. These kinds of widely available resources help to ensure that the building blocks for foundational knowledge about special education and its practice are available. For programs with few faculty, such resources help to stretch the capacity of the faculty to offer what is considered to meet the standards of practice and knowledge in the field. States would do well to consider how they might reduce competition among teacher education institutions by rewarding collective improvements in the knowledge and skills of teachers, the ways in which teachers are recruited and funneled into high needs areas, particularly in rural and urban schools, and the development of effective partnerships to mentor new teachers through the first three years of their practice. The IRIS project offers an example of how to mobilize existing knowledge in pursuit of collective aims.

In low enrollment areas, such as low incidence special education teacher education, state incentives for state wide and regional programs would enhance quality and increase the likelihood of distributing teachers to areas where they are most needed. The current system operates as if content and pedagogical knowledge exists within institutions as opposed to across institutions. Focusing on creating incentives to change historically isolated teacher education programs will also require influencing change in how universities support and encourage innovation among their faculties. Further, deeper work on what *All* teachers need to know and what is specific to teachers who specialize in specific areas, such as special education, needs continued scholarship and improved licensure frameworks (Pugach, Blanton, & Boveda, 2014). Relationships between SEAs and teacher education institutions are fraught with a number of professional and political capital tensions. Supports to address these tensions include aligning research-based practices with school reports cards, the common core, and additional, state-specific initiatives. SEA support must address the human side of change and improvement for all the partners to allow for the coaching and support work embedded in the implementation of change.

## Build Capacity at the LEA Level

Teachers work in communities of practice (Aladjem, LeFloch, Zhang, Kurki, Boyle, Taylor, Herrmann, Uekawa, Thomsen, & Fashola, 2006). They are deeply affected by the norms, work conditions, and standards of practice that they encounter in the schools where they work. Together, these factors are closely linked to teacher efficacy and the likelihood that teachers remain in practice (Cochran-Smith, McQuillan, Mitchell, Terrell, Barnatt, D’Souza, Jon, Shakman, Lam, & Gleeson, 2012). Drawing on work from a number of scholars, teaching and professional teaching identities comprise an “in progress” activity in which the conditions of schooling, school cultures, and individual agency and identities interact (Cochran-Smith et al, 2012; Kozleski, Artiles, & Skrtic, 2014). Preparing excellent teachers will not substantially change the teaching force unless the early teaching years are full of daily practice that solidifies knowledge of evidence based practice, holds teachers accountable for what they have learned, and provides the tools and contexts for producing excellence in the emerging professional self and her design and implementation of content knowledge through pedagogy and carefully crafted and assessed instruction.

The work of creating professional collaborations between school districts and teacher education institutions needs to be supported and encouraged through SEA support for the time, effort, and resources that it takes to develop and maintain such partnerships. The sites where teachers learn to teach are critical to the development of grit, self-determination, and dispositions that will enable them to emerge as successful teachers who stay in the profession, honing their skills and capacities to serve a full, diverse range of students.

Special educators along with other teachers are part of the whole teaching force. They are anchored by much of the same foundational understanding of schools including the design, delivery, and assessment of effective learning opportunities in core content areas. They also have specialized knowledge that expands their ability to serve students through individualized, carefully calibrated instructional approaches to reading and numeracy and ongoing assessment that guides reoccurring adjustments to learning plans (Brownell, Sindelar, Kiely, & Danielson, 2010; Pugach, Blanton, & Boveda, 2014). LEAs need support to create shared professional learning communities that encompass special educators acknowledging the overlaps and differences in roles, professional identities, and the cultural practices of their everyday work at elementary and secondary levels.

## Develop and Use Tools for Tracking the Fidelity of Implementation at each Capacity level

Without tools that track progress towards specific kinds of implementation, such as data-driven instructional decision making, practitioners and school leaders are subject to the drift that occurs with multiple demands and the familiarity of previous ways of doing things. To streamline progress towards reform and transformation in teacher preparation, SEAs, teacher education institutions, and LEAs need to use implementation fidelity tools to gauge their progress and identify areas in which support is needed. The tools will strengthen the partnership between preparation programs and the professional learning schools where clinical practice occurs. Implementation science tells us that this work must be done with the use of tools that assess the status quo, monitor progress towards coordinated and aligned systems, measure impact and outcomes. Putnam and Borko (2001) discussed the notion of tools as transactional mechanisms that shift the cognitive load and analytic perspectives of users, influencing cognitive schemas as well as cognitive, discursive, and everyday behavior. Tools are as generic to an activity arena as email, the internet, or word processing and as task specific as the Danielson (2013) *Framework for Teaching Evaluation*, a tool for observing teacher performance in the classroom. The most effective tools for systemic change provide evidence for feedback loops, based on data from all elements of the system, which help the partners to refine, adapt, and refocus their work as needed.

## Fund Transformation Zones

Fixsen, Blase, and Van Dyke (2012) propose the development of transformation zones in which small groups, across organizational boundaries, but in geographically proximal locations, work together to design and implement system changes. With tight design, frequent progress monitoring, across-site fidelity and accountability measures, change strategies can be developed, refined, researched, and scaled. This work, in federally funded projects, like CEEDAR means that a few states can become involved in building closely coordinated systems of teacher education that involve SEA systems leadership, teacher education research and practice from institutions who produce new teachers for the profession, and the LEAs who graduate future teachers, offer practice sites for their supervised development, and employ licensed professionals.

## Summary

Weber and Rohracher (2014) remind us that multi-level systems of transformation in which planned and coordinated change at multiple levels of any system are necessary in order to shift practice, policy, and investments in research and development. Effective teacher education systems rely on the coordination of interventions at the local education agency level, the teacher education program level, and the state level gauged strategically to build the capacity of each part of the system to improve the overall health and reflexivity of the system. Arguments for a program of teacher education that invests deeply in the skills needed for teaching, bolstered by robust environments in which teacher candidates can learn to teach content to a diverse range of learners is critical for improving the outcomes of a professional teacher education agenda. The work of preparing teachers to address the needs of learners with a wide range of abilities means realigning the preparation of general and special educators so that student outcomes for all populations are improved.

# What does it mean?

The focus of this literature review has been on the analysis of the multiple, interconnected systems that affect the work of teachers and their ability to impact the learning outcomes for their students. In particular, the work has focused on the development of systems of professional practice that support the professional development of teachers entering the profession. SEAs in collaboration with teacher education programs and LEAs must work collaboratively in a grand design for teacher education as a career long continuum of opportunities to practice in mediated settings in which coaching and embedded opportunities to examine the outcomes of practice are part of the landscape. The design of teacher preparation, support, and continued professional growth systems must account for the diverse learning needs of the students who fill classrooms across the United States. To achieve this goal, clear standards for how and where teachers are prepared must be accompanied by tools that assess the quality of standards implementation. As important is how schools create a culture of collective professional activity that expects and supports ongoing professional learning among **All** its educators. Changing the landscapes of these systems is critical to the quality of teacher preparation (Darling-Hammond & Wei, 2009).

## Changing the Profession

There is much about teacher education that is shared across specific branches of teacher education and practice. The CEC and InTASC standards point out the intersections. However, special educators bring specific knowledge about the learning needs of students with disabilities, powerful interventions that support their social, behavioral, and academic development, and processes for progress monitoring that support individualizing interventions to improve learning outcomes (Brownell, Sindelar, Kiely & Danielson, 2010). As Pugach, Blanton, and Boveda (2014) emphasize, if collaborative teacher education programs capitalize on the foundational knowledge and practices that all professional educators need, along with opportunities to practice together in highly mediated and well coached conditions, professional teacher preparation can enhance the interdisciplinary practice of general and special educators. Changing the profession means blurring the boundaries between practitioners so that they share responsibilities for educating **All** students.

## Changing the Practice

Teaching as a practice is also changing. How teachers teach, how they work together in professional communities, and how they assess their own practice and their outcomes is rapidly changing. In part, these changes are responses to the learning gaps between populations of students who are identified by race, ethnicity, first languages, immigrant status and ability and who are more likely to be disciplined, identified for special education, and less likely to access advanced placement classrooms. In spite of multiple reform initiatives, disproportionality across a number of indices remain. Schools are likely to be highly segregated racially in many of our cities (Orfield & Frankenberg, 2014). Changing practice means attending to how teachers teach but it also means attending to the structural boundaries that contribute to the de facto segregation and lack of opportunity, access, and participation in high quality learning that many of our students experience. We have argued here that while we must focus our attention on the former, without changing the grand landscape, we are likely to continue to progress incrementally.

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